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

Supply, Disposition, and Prices	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Production							
Crude Oil and Lease Condensate	12.16	11.91	12.56	11.71	10.49	9.77	-0.9%
Natural Gas Plant Liquids	2.55	2.56	3.10	3.20	3.47	3.47	1.3%
Dry Natural Gas	20.23	19.56	21.05	22.20	24.43	24.64	1.0%
Coal	23.97	22.70	25.25	26.14	27.92	31.10	1.4%
Nuclear Power	8.03	8.15	8.29	8.48	8.53	8.53	0.2%
Renewable Energy[1]	5.25	5.84	7.18	7.84	8.45	9.00	1.9%
Other[2]	0.53	1.13	0.88	0.79	0.81	0.84	-1.3%
Total	**72.72**	**71.85**	**78.30**	**80.36**	**84.09**	**87.33**	**0.9%**
Imports							
Crude Oil[3]	20.26	19.84	24.51	29.37	31.55	34.21	2.4%
Petroleum Products[4]	5.04	4.75	5.76	6.00	7.83	9.63	3.1%
Natural Gas	4.06	4.10	6.54	7.29	7.56	8.29	3.1%
Other Imports[5]	0.59	0.52	0.95	1.06	1.12	1.18	3.6%
Total	**29.95**	**29.21**	**37.76**	**43.72**	**48.06**	**53.30**	**2.6%**
Exports							
Petroleum[6]	2.01	2.03	2.15	2.18	2.13	2.15	0.2%
Natural Gas	0.38	0.52	0.91	0.90	0.93	0.88	2.3%
Coal	1.26	1.03	0.89	0.80	0.69	0.56	-2.6%
Total	**3.65**	**3.58**	**3.95**	**3.88**	**3.75**	**3.59**	**0.0%**
Discrepancy[7]	**2.09**	**-0.24**	**0.34**	**0.46**	**0.48**	**0.56**	**N/A**
Consumption							
Petroleum Products[8]	38.49	38.11	44.15	48.26	51.35	54.99	1.6%
Natural Gas	23.05	23.37	26.82	28.74	31.21	32.21	1.4%
Coal	22.04	22.18	25.23	26.32	28.30	31.73	1.6%
Nuclear Power	8.03	8.15	8.29	8.48	8.53	8.53	0.2%
Renewable Energy[1]	5.25	5.84	7.18	7.84	8.46	9.00	1.9%
Other[9]	0.08	0.07	0.11	0.11	0.07	0.03	-4.6%
Total	**96.94**	**97.72**	**111.77**	**119.75**	**127.92**	**136.48**	**1.5%**
Net Imports - Petroleum	**23.29**	**22.56**	**28.13**	**33.20**	**37.25**	**41.69**	**2.7%**
Prices (2002 dollars per unit)							
World Oil Price (dollars per barrel)[10]	22.25	23.68	24.17	25.07	26.02	27.00	0.6%
Natural Gas Wellhead Price (dollars per thousand cubic feet)[11]	4.14	2.95	3.40	4.19	4.28	4.40	1.8%
Coal Minemouth Price (dollars per ton)	17.79	17.90	16.88	16.47	16.32	16.57	-0.3%
Average Electricity Price (cents per kilowatthour)	7.4	7.2	6.6	6.8	6.9	6.9	-0.2%

[1]Includes 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 A18 for selected nonmarketed residential and commercial renewable energy.
[2]Includes liquid hydrogen, methanol, supplemental natural gas, and some domestic inputs to refineries.
[3]Includes imports of crude oil for the Strategic Petroleum Reserve.
[4]Includes imports of finished petroleum products, unfinished oils, alcohols, ethers, and blending components.
[5]Includes coal, coal coke (net), and electricity (net).
[6]Includes crude oil and petroleum products.
[7]Balancing 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.
[8]Includes natural gas plant liquids, crude oil consumed as a fuel, and nonpetroleum-based liquids for blending, such as ethanol.
[9]Includes net electricity imports, methanol, and liquid hydrogen.
[10]Average refiner acquisition cost for imported crude oil.
[11]Represents 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 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 natural gas supply values: Energy Information Administration (EIA), *Natural Gas Annual 2001*, DOE/EIA-0131(2001) (Washington, DC, February 2003). 2002 natural gas supply values: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June2003). 2001 coal minemouth prices: EIA, *Annual Coal Report 2002*, DOE/EIA-0584(2002) (Washington, DC, November 2003). 2001 petroleum supply values: EIA, *Petroleum Supply Annual 2001*, DOE/EIA-0340(2001)/1 (Washington, DC, June 2002). 2002 petroleum supply values: EIA, *Petroleum Supply Annual 2002*, DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). Other 2001 and 2002 values: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002) and EIA, *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003). **Projections:** EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

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

Sector and Source	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Energy Consumption							
Residential							
Distillate Fuel	0.90	0.89	0.93	0.89	0.85	0.80	-0.5%
Kerosene	0.11	0.07	0.11	0.11	0.10	0.09	1.3%
Liquefied Petroleum Gas	0.50	0.53	0.56	0.59	0.61	0.64	0.8%
Petroleum Subtotal	1.51	1.48	1.60	1.59	1.56	1.53	0.1%
Natural Gas	4.92	5.06	5.69	5.84	6.08	6.26	0.9%
Coal	0.01	0.01	0.01	0.01	0.01	0.01	-0.3%
Renewable Energy[1]	0.36	0.39	0.40	0.41	0.41	0.41	0.1%
Electricity	4.10	4.33	4.87	5.22	5.60	5.96	1.4%
Delivered Energy	**10.91**	**11.28**	**12.58**	**13.06**	**13.66**	**14.17**	**1.0%**
Electricity Related Losses	9.28	9.60	10.48	10.92	11.43	11.95	1.0%
Total	**20.18**	**20.88**	**23.06**	**23.98**	**25.10**	**26.12**	**1.0%**
Commercial							
Distillate Fuel	0.49	0.49	0.62	0.65	0.67	0.70	1.6%
Residual Fuel	0.09	0.08	0.13	0.13	0.13	0.13	2.2%
Kerosene	0.03	0.02	0.02	0.02	0.02	0.02	1.4%
Liquefied Petroleum Gas	0.09	0.09	0.10	0.10	0.10	0.10	0.3%
Motor Gasoline[2]	0.05	0.05	0.05	0.05	0.05	0.05	0.2%
Petroleum Subtotal	0.74	0.72	0.92	0.95	0.97	1.00	1.4%
Natural Gas	3.33	3.21	3.57	3.72	3.94	4.16	1.1%
Coal	0.10	0.10	0.10	0.10	0.10	0.10	0.0%
Renewable Energy[3]	0.09	0.10	0.10	0.10	0.10	0.10	0.0%
Electricity	4.09	4.12	5.05	5.64	6.24	6.83	2.2%
Delivered Energy	**8.34**	**8.25**	**9.74**	**10.51**	**11.35**	**12.19**	**1.7%**
Electricity Related Losses	9.24	9.15	10.86	11.79	12.73	13.70	1.8%
Total	**17.58**	**17.40**	**20.60**	**22.30**	**24.07**	**25.89**	**1.7%**
Industrial[4]							
Distillate Fuel	1.21	1.16	1.17	1.27	1.34	1.43	0.9%
Liquefied Petroleum Gas	2.10	2.22	2.35	2.53	2.74	2.94	1.2%
Petrochemical Feedstock	1.16	1.22	1.35	1.43	1.54	1.62	1.2%
Residual Fuel	0.15	0.20	0.21	0.23	0.22	0.23	0.5%
Motor Gasoline[2]	0.16	0.16	0.16	0.17	0.18	0.19	0.8%
Other Petroleum[5]	4.27	4.03	4.38	4.68	4.93	5.17	1.1%
Petroleum Subtotal	9.04	9.00	9.63	10.31	10.95	11.59	1.1%
Natural Gas	7.56	7.43	8.62	9.12	9.84	10.58	1.5%
Lease and Plant Fuel[6]	1.12	1.35	1.40	1.48	1.65	1.69	1.0%
Natural Gas Subtotal	8.67	8.78	10.02	10.60	11.49	12.27	1.5%
Metallurgical Coal	0.71	0.62	0.64	0.58	0.52	0.47	-1.2%
Steam Coal	1.51	1.47	1.41	1.43	1.45	1.47	-0.0%
Net Coal Coke Imports	0.02	0.03	0.01	0.01	0.00	0.01	-4.5%
Coal Subtotal	2.25	2.12	2.06	2.01	1.97	1.95	-0.4%
Renewable Energy[7]	1.64	1.66	2.00	2.26	2.48	2.70	2.1%
Electricity	3.29	3.39	3.82	4.15	4.47	4.85	1.6%
Delivered Energy	**24.89**	**24.94**	**27.53**	**29.32**	**31.36**	**33.35**	**1.3%**
Electricity Related Losses	7.44	7.53	8.22	8.67	9.12	9.72	1.1%
Total	**32.33**	**32.47**	**35.75**	**37.99**	**40.48**	**43.07**	**1.2%**

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

Sector and Source	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Transportation							
Distillate Fuel[8]	5.32	5.12	6.42	7.25	8.02	8.94	2.5%
Jet Fuel[9]	3.43	3.34	3.93	4.36	4.69	4.91	1.7%
Motor Gasoline[2]	16.17	16.62	19.88	21.62	23.11	24.98	1.8%
Residual Fuel	0.84	0.71	0.79	0.80	0.82	0.83	0.6%
Liquefied Petroleum Gas	0.02	0.02	0.06	0.07	0.08	0.08	6.7%
Other Petroleum[10]	0.19	0.24	0.25	0.27	0.30	0.32	1.2%
Petroleum Subtotal	25.96	26.06	31.34	34.37	37.00	40.07	1.9%
Pipeline Fuel Natural Gas	0.64	0.65	0.69	0.72	0.83	0.86	1.2%
Compressed Natural Gas	0.01	0.01	0.06	0.08	0.10	0.11	9.2%
Renewable Energy (E85)[11]	0.00	0.00	0.00	0.00	0.00	0.00	7.6%
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Electricity	0.07	0.08	0.09	0.10	0.11	0.12	2.1%
Delivered Energy	**26.69**	**26.79**	**32.18**	**35.28**	**38.05**	**41.16**	**1.9%**
Electricity Related Losses	0.17	0.17	0.19	0.21	0.22	0.24	1.6%
Total	**26.85**	**26.96**	**32.37**	**35.48**	**38.27**	**41.40**	**1.9%**
Delivered Energy Consumption for All Sectors							
Distillate Fuel	7.92	7.66	9.15	10.07	10.88	11.88	1.9%
Kerosene	0.15	0.09	0.16	0.15	0.14	0.13	1.7%
Jet Fuel[9]	3.43	3.34	3.93	4.36	4.69	4.91	1.7%
Liquefied Petroleum Gas	2.70	2.86	3.07	3.28	3.53	3.76	1.2%
Motor Gasoline[2]	16.37	16.83	20.09	21.84	23.34	25.22	1.8%
Petrochemical Feedstock	1.16	1.22	1.35	1.43	1.54	1.62	1.2%
Residual Fuel	1.07	1.00	1.13	1.16	1.17	1.19	0.8%
Other Petroleum[12]	4.45	4.26	4.61	4.93	5.21	5.46	1.1%
Petroleum Subtotal	37.25	37.26	43.48	47.22	50.50	54.18	1.6%
Natural Gas	15.81	15.71	17.94	18.76	19.95	21.11	1.3%
Lease and Plant Fuel[6]	1.12	1.35	1.40	1.48	1.65	1.69	1.0%
Pipeline Natural Gas	0.64	0.65	0.69	0.72	0.83	0.86	1.2%
Natural Gas Subtotal	17.57	17.72	20.03	20.96	22.43	23.66	1.3%
Metallurgical Coal	0.71	0.62	0.64	0.58	0.52	0.47	-1.2%
Steam Coal	1.62	1.58	1.52	1.54	1.56	1.58	-0.0%
Net Coal Coke Imports	0.02	0.03	0.01	0.01	0.00	0.01	-4.5%
Coal Subtotal	2.36	2.23	2.17	2.12	2.08	2.06	-0.3%
Renewable Energy[13]	2.09	2.15	2.50	2.76	2.99	3.21	1.8%
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Electricity	11.55	11.92	13.83	15.11	16.41	17.77	1.8%
Delivered Energy	**70.83**	**71.27**	**82.03**	**88.17**	**94.42**	**100.87**	**1.5%**
Electricity Related Losses	26.12	26.45	29.75	31.57	33.50	35.61	1.3%
Total	**96.94**	**97.72**	**111.77**	**119.75**	**127.92**	**136.48**	**1.5%**
Electric Power[14]							
Distillate Fuel	0.33	0.16	0.16	0.44	0.26	0.27	2.4%
Residual Fuel	0.91	0.69	0.51	0.60	0.59	0.54	-1.1%
Petroleum Subtotal	1.25	0.85	0.66	1.04	0.85	0.81	-0.2%
Natural Gas	5.48	5.65	6.79	7.78	8.78	8.55	1.8%
Steam Coal	19.68	19.96	23.05	24.20	26.22	29.67	1.7%
Nuclear Power	8.03	8.15	8.29	8.48	8.53	8.53	0.2%
Renewable Energy[15]	3.16	3.69	4.68	5.08	5.47	5.79	2.0%
Electricity Imports	0.08	0.07	0.11	0.11	0.07	0.03	-4.6%
Total	**37.67**	**38.36**	**43.58**	**46.68**	**49.92**	**53.37**	**1.4%**

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

Sector and Source	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Total Energy Consumption							
Distillate Fuel	8.26	7.82	9.31	10.51	11.14	12.15	1.9%
Kerosene	0.15	0.09	0.16	0.15	0.14	0.13	1.7%
Jet Fuel[9]	3.43	3.34	3.93	4.36	4.69	4.91	1.7%
Liquefied Petroleum Gas	2.70	2.86	3.07	3.28	3.53	3.76	1.2%
Motor Gasoline[2]	16.37	16.83	20.09	21.84	23.34	25.22	1.8%
Petrochemical Feedstock	1.16	1.22	1.35	1.43	1.54	1.62	1.2%
Residual Fuel	1.98	1.69	1.64	1.76	1.76	1.72	0.1%
Other Petroleum[12]	4.45	4.26	4.61	4.93	5.21	5.46	1.1%
Petroleum Subtotal	38.49	38.11	44.15	48.26	51.35	54.99	1.6%
Natural Gas	21.30	21.36	24.73	26.54	28.73	29.66	1.4%
Lease and Plant Fuel[6]	1.12	1.35	1.40	1.48	1.65	1.69	1.0%
Pipeline Natural Gas	0.64	0.65	0.69	0.72	0.83	0.86	1.2%
Natural Gas Subtotal	23.05	23.37	26.82	28.74	31.21	32.21	1.4%
Metallurgical Coal	0.71	0.62	0.64	0.58	0.52	0.47	-1.2%
Steam Coal	21.30	21.54	24.57	25.74	27.78	31.25	1.6%
Net Coal Coke Imports	0.02	0.03	0.01	0.01	0.00	0.01	-4.5%
Coal Subtotal	22.04	22.18	25.23	26.32	28.30	31.73	1.6%
Nuclear Power	8.03	8.15	8.29	8.48	8.53	8.53	0.2%
Renewable Energy[16]	5.25	5.84	7.18	7.84	8.46	9.00	1.9%
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Electricity Imports	0.08	0.07	0.11	0.11	0.07	0.03	-4.6%
Total	**96.94**	**97.72**	**111.77**	**119.75**	**127.92**	**136.48**	**1.5%**
Energy Use and Related Statistics							
Delivered Energy Use	70.83	71.27	82.03	88.17	94.42	100.87	1.5%
Total Energy Use	96.94	97.72	111.77	119.75	127.92	136.48	1.5%
Population (millions)	285.92	288.93	309.28	321.95	334.61	347.53	0.8%
Gross Domestic Product (billion 1996 dollars)	9215	9440	12190	14101	16188	18520	3.0%
Carbon Dioxide Emissions (million metric tons)	5691.7	5729.3	6558.8	7028.4	7535.6	8142.0	1.5%

[1]Includes wood used for residential heating. See Table A18 for estimates of nonmarketed renewable energy consumption for geothermal heat pumps, solar thermal hot water heating, and solar photovoltaic electricity generation.
[2]Includes ethanol (blends of 10 percent or less) and ethers blended into gasoline.
[3]Includes commercial sector consumption of wood and wood waste, landfill gas, municipal solid waste, and other biomass for combined heat and power. See Table A18 for estimates of nonmarketed renewable energy consumption for solar thermal hot water heating and solar photovoltaic electricity generation.
[4]Fuel consumption includes consumption for combined heat and power, which produces electricity, both for sale to the grid and for own use, and other useful thermal energy.
[5]Includes petroleum coke, asphalt, road oil, lubricants, still gas, and miscellaneous petroleum products.
[6]Represents natural gas used in the field gathering and processing plant machinery.
[7]Includes consumption of energy from hydroelectric, wood and wood waste, municipal solid waste, and other biomass.
[8]Diesel fuel containing 500 parts per million (ppm) or 15 ppm sulfur.
[9]Includes only kerosene type.
[10]Includes aviation gasoline and lubricants.
[11]E85 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.
[12]Includes unfinished oils, natural gasoline, motor gasoline blending components, aviation gasoline, lubricants, still gas, asphalt, road oil, petroleum coke, and miscellaneous petroleum products.
[13]Includes 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.
[14]Includes 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.
[15]Includes conventional hydroelectric, geothermal, wood and wood waste, municipal solid waste, other biomass, petroleum coke, wind, photovoltaic and solar thermal sources. Excludes net electricity imports.
[16]Includes 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 2001 and 2002 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: 2001 and 2002 consumption based on: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2001 and 2002 population and gross domestic product: Global Insight macroeconomic model T250803. 2001 and 2002 carbon dioxide emissions: EIA, *Emissions of Greenhouse Gases in the United States 2002,* DOE/EIA-0573(2002) (Washington, DC, October 2003). **Projections:** EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A3. Energy Prices by Sector and Source
(2002 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Residential	**15.95**	**14.73**	**14.21**	**14.93**	**15.08**	**15.38**	**0.2%**
Primary Energy[1]	9.85	8.14	8.15	8.72	8.76	8.89	0.4%
Petroleum Products[2]	10.95	9.87	9.90	10.38	10.86	11.26	0.6%
Distillate Fuel	9.09	8.23	7.82	8.06	8.39	8.53	0.2%
Liquefied Petroleum Gas	15.05	12.92	13.89	14.46	14.79	15.19	0.7%
Natural Gas	9.53	7.65	7.67	8.29	8.24	8.32	0.4%
Electricity	25.51	24.73	23.30	23.77	23.73	23.88	-0.2%
Commercial	**15.67**	**14.68**	**13.77**	**14.62**	**14.93**	**15.28**	**0.2%**
Primary Energy[1]	8.07	6.35	6.48	7.04	7.11	7.22	0.6%
Petroleum Products[2]	7.25	6.88	6.34	6.53	6.83	6.98	0.1%
Distillate Fuel	6.38	6.07	5.45	5.66	6.01	6.15	0.1%
Residual Fuel	3.51	4.21	4.13	4.27	4.41	4.55	0.3%
Natural Gas	8.44	6.37	6.64	7.32	7.31	7.41	0.7%
Electricity	23.43	22.82	20.39	21.02	21.21	21.48	-0.3%
Industrial[3]	**7.24**	**6.31**	**6.44**	**6.96**	**7.21**	**7.42**	**0.7%**
Primary Energy	5.87	4.77	5.14	5.64	5.88	6.07	1.1%
Petroleum Products[2]	7.73	6.35	6.84	7.15	7.54	7.81	0.9%
Distillate Fuel	6.62	6.21	5.68	5.85	6.24	6.40	0.1%
Liquefied Petroleum Gas	12.48	8.28	9.72	10.29	10.66	11.11	1.3%
Residual Fuel	3.31	3.89	3.74	3.88	4.03	4.17	0.3%
Natural Gas[4]	4.91	3.75	4.05	4.81	4.89	4.99	1.3%
Metallurgical Coal	1.71	1.87	1.96	1.90	1.84	1.77	-0.2%
Steam Coal	1.51	1.52	1.58	1.55	1.53	1.53	0.0%
Electricity	15.11	14.74	13.36	13.81	13.99	14.09	-0.2%
Transportation	**10.58**	**9.91**	**10.50**	**10.53**	**10.54**	**10.69**	**0.3%**
Primary Energy	10.55	9.88	10.48	10.50	10.52	10.67	0.3%
Petroleum Products[2]	10.55	9.88	10.48	10.50	10.52	10.67	0.3%
Distillate Fuel[5]	10.16	9.41	10.12	10.16	10.00	10.03	0.3%
Jet Fuel[6]	6.27	5.97	5.76	5.85	6.06	6.21	0.2%
Motor Gasoline[7]	11.99	11.15	11.87	11.87	11.90	12.06	0.3%
Residual Fuel	3.94	3.77	3.60	3.73	3.88	4.02	0.3%
Liquefied Petroleum Gas[8]	17.12	15.00	14.96	15.39	15.51	15.83	0.2%
Natural Gas[9]	8.69	7.38	8.26	9.07	9.06	9.09	0.9%
Ethanol (E85)[10]	16.56	15.19	17.22	17.79	18.28	18.58	0.9%
Electricity	21.58	21.10	19.57	20.25	20.03	19.92	-0.2%
Average End-Use Energy	**10.95**	**10.10**	**10.23**	**10.61**	**10.76**	**10.96**	**0.4%**
Primary Energy	8.69	7.70	8.22	8.53	8.64	8.82	0.6%
Electricity	21.79	21.20	19.47	19.99	20.10	20.26	-0.2%
Electric Power[11]							
Fossil Fuel Average	2.27	1.89	1.92	2.16	2.18	2.11	0.5%
Petroleum Products	5.00	4.32	4.21	4.54	4.67	4.88	0.5%
Distillate Fuel	6.24	5.58	4.92	5.09	5.47	5.62	0.0%
Residual Fuel	4.55	4.04	3.99	4.14	4.31	4.50	0.5%
Natural Gas	5.30	3.77	4.04	4.78	4.85	4.92	1.2%
Steam Coal	1.25	1.26	1.22	1.22	1.20	1.22	-0.1%

Table A3. Energy Prices by Sector and Source (Continued)
(2002 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Average Price to All Users[12]							
Petroleum Products[2]	9.74	8.94	9.57	9.65	9.81	10.01	0.5%
Distillate Fuel	9.14	8.52	8.93	8.97	9.07	9.18	0.3%
Jet Fuel	6.27	5.97	5.76	5.85	6.06	6.21	0.2%
Liquefied Petroleum Gas	13.00	9.27	10.65	11.21	11.55	11.96	1.1%
Motor Gasoline[7]	11.99	11.15	11.87	11.87	11.90	12.06	0.3%
Residual Fuel	4.16	3.92	3.78	3.93	4.08	4.23	0.3%
Natural Gas	6.63	5.07	5.27	5.93	5.93	6.03	0.8%
Coal	1.27	1.28	1.25	1.24	1.22	1.24	-0.1%
Ethanol (E85)[10]	16.56	15.19	17.22	17.79	18.28	18.58	0.9%
Electricity	21.79	21.20	19.47	19.99	20.10	20.26	-0.2%
Non-Renewable Energy Expenditures by Sector (billion 2002 dollars)							
Residential	168.08	160.37	173.01	189.01	199.98	211.69	1.2%
Commercial	129.31	119.67	132.72	152.16	167.90	184.74	1.9%
Industrial	138.60	120.96	132.71	152.53	169.02	185.61	1.9%
Transportation	275.57	259.11	330.65	363.66	392.36	430.99	2.2%
Total Non-Renewable Expenditures	711.55	660.11	769.08	857.37	929.26	1013.03	1.9%
Transportation Renewable Expenditures	0.01	0.01	0.03	0.05	0.06	0.07	8.6%
Total Expenditures	**711.56**	**660.12**	**769.11**	**857.41**	**929.32**	**1013.10**	**1.9%**

[1]Weighted average price includes fuels below as well as coal.
[2]This quantity is the weighted average for all petroleum products, not just those listed below.
[3]Includes combined heat and power, which produces electricity and other useful thermal energy.
[4]Excludes use for lease and plant fuel.
[5]Diesel fuel containing 500 parts per million (ppm) or 15 ppm sulfur. Price includes Federal and State taxes while excluding county and local taxes.
[6]Kerosene-type jet fuel. Price includes Federal and State taxes while excluding county and local taxes.
[7]Sales weighted-average price for all grades. Includes Federal, State and local taxes.
[8]Includes Federal and State taxes while excluding county and local taxes.
[9]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[10]E85 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.
[11]Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.
[12]Weighted 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 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 and 2002 prices for motor gasoline, distillate, and jet fuel are based on: EIA, *Petroleum Marketing Annual 2002*, http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_annual/ current/pdf/pmaall.pdf (August 2003). 2001 residential, commercial, and transportation natural gas delivered prices: EIA,*Natural Gas Annual 2001*, DOE/EIA-0131(2001) (Washington, DC, February 2003). 2002 residential, commercial, and transportation natural gas delivered prices: EIA, *Natural Gas Monthly,* DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2001 and 2002 electric power sector natural gas prices: Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 2001 and 2002 industrial natural gas delivered prices are based on: EIA, *Manufacturing Energy Consumption Survey 1998*. 2001 and 2002 coal prices based on EIA, *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003) and EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E. 2001 and 2002 electricity prices: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2001 and 2002 ethanol prices derived from weekly spot prices in the Oxy Fuel News. **Projections:** EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

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

Key Indicators and Consumption	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Key Indicators							
Households (millions)							
Single-Family	73.73	74.77	82.87	87.68	92.09	96.32	1.1%
Multifamily	28.96	29.20	30.71	31.84	33.07	34.36	0.7%
Mobile Homes	6.37	6.31	6.25	6.60	6.88	7.12	0.5%
Total	**109.06**	**110.28**	**119.84**	**126.12**	**132.04**	**137.79**	**1.0%**
Average House Square Footage	**1684**	**1689**	**1731**	**1752**	**1771**	**1788**	**0.2%**
Energy Intensity							
(million Btu per household)							
Delivered Energy Consumption	100.0	102.3	105.0	103.6	103.5	102.8	0.0%
Total Energy Consumption	185.0	189.4	192.4	190.1	190.1	189.5	0.0%
(thousand Btu per square foot)							
Delivered Energy Consumption	59.4	60.6	60.6	59.1	58.4	57.5	-0.2%
Total Energy Consumption	109.9	112.1	111.1	108.5	107.3	106.0	-0.2%
Delivered Energy Consumption by Fuel							
Electricity							
Space Heating	0.38	0.40	0.43	0.44	0.45	0.46	0.6%
Space Cooling	0.63	0.71	0.69	0.72	0.76	0.80	0.5%
Water Heating	0.38	0.37	0.37	0.37	0.36	0.35	-0.3%
Refrigeration	0.43	0.42	0.37	0.36	0.36	0.37	-0.6%
Cooking	0.10	0.10	0.11	0.12	0.12	0.13	0.9%
Clothes Dryers	0.23	0.24	0.25	0.26	0.26	0.27	0.6%
Freezers	0.14	0.13	0.12	0.12	0.12	0.12	-0.4%
Lighting	0.72	0.75	0.87	0.92	0.97	1.02	1.4%
Clothes Washers[1]	0.03	0.03	0.04	0.05	0.06	0.06	3.0%
Dishwashers[1]	0.02	0.02	0.03	0.03	0.03	0.03	1.3%
Color Televisions	0.12	0.12	0.18	0.22	0.26	0.27	3.5%
Personal Computers	0.06	0.06	0.08	0.10	0.11	0.14	3.3%
Furnace Fans	0.07	0.08	0.09	0.10	0.10	0.11	1.7%
Other Uses[2]	0.79	0.88	1.25	1.44	1.63	1.83	3.2%
Delivered Energy	**4.10**	**4.33**	**4.87**	**5.22**	**5.60**	**5.96**	**1.4%**
Natural Gas							
Space Heating	3.39	3.54	4.01	4.13	4.33	4.48	1.0%
Space Cooling	0.00	0.00	0.00	0.00	0.00	0.00	16.0%
Water Heating	1.16	1.15	1.25	1.25	1.27	1.28	0.5%
Cooking	0.21	0.21	0.23	0.24	0.26	0.27	1.1%
Clothes Dryers	0.07	0.07	0.09	0.10	0.11	0.11	2.3%
Other Uses[3]	0.09	0.10	0.11	0.11	0.12	0.12	1.1%
Delivered Energy	**4.92**	**5.06**	**5.69**	**5.84**	**6.08**	**6.26**	**0.9%**
Distillate							
Space Heating	0.77	0.77	0.81	0.78	0.75	0.71	-0.4%
Water Heating	0.13	0.12	0.12	0.11	0.10	0.09	-1.1%
Other Uses[4]	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Delivered Energy	**0.90**	**0.89**	**0.93**	**0.89**	**0.85**	**0.80**	**-0.5%**
Liquefied Petroleum Gas							
Space Heating	0.29	0.30	0.30	0.31	0.31	0.31	0.1%
Water Heating	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	0.4%
Other Uses[3]	0.14	0.15	0.18	0.20	0.23	0.25	2.3%
Delivered Energy	**0.50**	**0.53**	**0.56**	**0.59**	**0.61**	**0.64**	**0.8%**
Marketed Renewables (wood)[5]	0.36	0.39	0.40	0.41	0.41	0.41	0.1%
Other Fuels[6]	0.12	0.08	0.12	0.12	0.11	0.10	1.1%

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

Key Indicators and Consumption	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Delivered Energy Consumption by End-Use							
Space Heating	5.31	5.48	6.08	6.18	6.35	6.46	0.7%
Space Cooling	0.63	0.71	0.69	0.72	0.76	0.80	0.5%
Water Heating	1.71	1.69	1.79	1.78	1.78	1.77	0.2%
Refrigeration	0.43	0.42	0.37	0.36	0.36	0.37	-0.6%
Cooking	0.34	0.34	0.37	0.39	0.41	0.42	1.0%
Clothes Dryers	0.30	0.31	0.34	0.35	0.37	0.39	1.1%
Freezers	0.14	0.13	0.12	0.12	0.12	0.12	-0.4%
Lighting	0.72	0.75	0.87	0.92	0.97	1.02	1.4%
Clothes Washers	0.03	0.03	0.04	0.05	0.06	0.06	3.0%
Dishwashers	0.02	0.02	0.03	0.03	0.03	0.03	1.3%
Color Televisions	0.12	0.12	0.18	0.22	0.26	0.27	3.5%
Personal Computers	0.06	0.06	0.08	0.10	0.11	0.14	3.3%
Furnace Fans	0.07	0.08	0.09	0.10	0.10	0.11	1.7%
Other Uses[7]	1.02	1.13	1.54	1.75	1.97	2.20	2.9%
Delivered Energy	**10.91**	**11.28**	**12.58**	**13.06**	**13.66**	**14.17**	**1.0%**
Electricity Related Losses	**9.28**	**9.60**	**10.48**	**10.92**	**11.43**	**11.95**	**1.0%**
Total Energy Consumption by End-Use							
Space Heating	6.16	6.36	6.99	7.10	7.27	7.37	0.6%
Space Cooling	2.05	2.29	2.19	2.23	2.32	2.41	0.2%
Water Heating	2.57	2.51	2.58	2.54	2.52	2.46	-0.1%
Refrigeration	1.41	1.37	1.16	1.10	1.09	1.11	-0.9%
Cooking	0.57	0.57	0.61	0.63	0.66	0.68	0.8%
Clothes Dryers	0.83	0.83	0.89	0.89	0.91	0.94	0.5%
Freezers	0.45	0.43	0.37	0.36	0.36	0.37	-0.7%
Lighting	2.34	2.41	2.73	2.84	2.95	3.07	1.1%
Clothes Washers	0.10	0.10	0.12	0.15	0.18	0.19	2.7%
Dishwashers	0.08	0.08	0.08	0.09	0.09	0.10	1.0%
Color Televisions	0.38	0.40	0.58	0.68	0.78	0.82	3.2%
Personal Computers	0.21	0.21	0.25	0.30	0.35	0.41	3.0%
Furnace Fans	0.24	0.25	0.28	0.30	0.32	0.33	1.4%
Other Uses[7]	2.79	3.09	4.22	4.76	5.29	5.87	2.8%
Total	**20.18**	**20.88**	**23.06**	**23.98**	**25.10**	**26.12**	**1.0%**
Non-Marketed Renewables							
Geothermal[8]	0.00	0.00	0.00	0.01	0.01	0.01	9.0%
Solar[9]	0.04	0.02	0.03	0.03	0.04	0.04	2.3%
Total	**0.04**	**0.02**	**0.03**	**0.04**	**0.04**	**0.05**	**3.2%**

[1]Does not include electric water heating portion of load.
[2]Includes small electric devices, heating elements, and motors.
[3]Includes such appliances as swimming pool heaters, outdoor grills, and outdoor lighting (natural gas).
[4]Includes such appliances as swimming pool and hot tub heaters.
[5]Includes wood used for primary and secondary heating in wood stoves or fireplaces as reported in the *Residential Energy Consumption Survey 2001*.
[6]Includes kerosene and coal.
[7]Includes all other uses listed above.
[8]Includes primary energy displaced by geothermal heat pumps in space heating and cooling applications.
[9]Includes primary energy displaced by solar thermal water heaters and electricity generated using photovoltaics.
N/A = Not applicable.
Btu = British thermal unit.
Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 and 2002 based on: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002).
Projections: EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

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

Key Indicators and Consumption	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Key Indicators							
Total Floorspace (billion square feet)							
Surviving	67.2	68.9	81.1	87.3	93.1	98.8	1.6%
New Additions	3.1	3.2	2.7	2.6	2.8	3.0	-0.3%
Total	**70.2**	**72.1**	**83.8**	**89.9**	**95.9**	**101.8**	**1.5%**
Energy Consumption Intensity (thousand Btu per square foot)							
Delivered Energy Consumption	118.8	114.5	116.2	116.9	118.3	119.7	0.2%
Electricity Related Losses	131.5	126.9	129.6	131.0	132.7	134.6	0.3%
Total Energy Consumption	250.3	241.4	245.8	247.9	251.0	254.3	0.2%
Delivered Energy Consumption by Fuel							
Purchased Electricity							
Space Heating[1]	0.14	0.15	0.16	0.16	0.16	0.16	0.2%
Space Cooling[1]	0.41	0.46	0.45	0.46	0.48	0.49	0.2%
Water Heating[1]	0.14	0.14	0.15	0.15	0.15	0.15	0.3%
Ventilation	0.16	0.16	0.18	0.18	0.18	0.19	0.7%
Cooking	0.03	0.03	0.03	0.03	0.03	0.03	-0.7%
Lighting	1.10	1.12	1.30	1.36	1.40	1.43	1.1%
Refrigeration	0.20	0.20	0.22	0.23	0.24	0.25	0.9%
Office Equipment (PC)	0.14	0.14	0.24	0.29	0.34	0.37	4.4%
Office Equipment (non-PC)	0.30	0.31	0.46	0.58	0.71	0.87	4.6%
Other Uses[2]	1.45	1.41	1.86	2.21	2.55	2.91	3.2%
Delivered Energy	**4.09**	**4.12**	**5.05**	**5.64**	**6.24**	**6.83**	**2.2%**
Natural Gas							
Space Heating[1]	1.33	1.42	1.56	1.58	1.64	1.69	0.8%
Space Cooling[1]	0.01	0.01	0.02	0.02	0.03	0.03	3.9%
Water Heating[1]	0.57	0.59	0.70	0.74	0.79	0.84	1.5%
Cooking	0.25	0.26	0.30	0.32	0.34	0.36	1.4%
Other Uses[3]	1.17	0.93	0.99	1.06	1.14	1.24	1.3%
Delivered Energy	**3.33**	**3.21**	**3.57**	**3.72**	**3.94**	**4.16**	**1.1%**
Distillate							
Space Heating[1]	0.17	0.17	0.24	0.27	0.29	0.31	2.6%
Water Heating[1]	0.07	0.07	0.08	0.09	0.09	0.09	1.0%
Other Uses[4]	0.25	0.24	0.30	0.30	0.29	0.29	0.9%
Delivered Energy	**0.49**	**0.49**	**0.62**	**0.65**	**0.67**	**0.70**	**1.6%**
Other Fuels[5]	**0.35**	**0.33**	**0.39**	**0.40**	**0.40**	**0.40**	**0.8%**
Marketed Renewable Fuels							
Biomass	0.09	0.10	0.10	0.10	0.10	0.10	0.0%
Delivered Energy	**0.09**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.0%**
Delivered Energy Consumption by End-Use							
Space Heating[1]	1.64	1.74	1.97	2.01	2.09	2.16	0.9%
Space Cooling[1]	0.43	0.48	0.47	0.48	0.50	0.52	0.4%
Water Heating[1]	0.78	0.80	0.93	0.97	1.03	1.08	1.3%
Ventilation	0.16	0.16	0.18	0.18	0.18	0.19	0.7%
Cooking	0.29	0.29	0.34	0.35	0.37	0.39	1.2%
Lighting	1.10	1.12	1.30	1.36	1.40	1.43	1.1%
Refrigeration	0.20	0.20	0.22	0.23	0.24	0.25	0.9%
Office Equipment (PC)	0.14	0.14	0.24	0.29	0.34	0.37	4.4%
Office Equipment (non-PC)	0.30	0.31	0.46	0.58	0.71	0.87	4.6%
Other Uses[6]	3.31	3.01	3.63	4.06	4.48	4.94	2.2%
Delivered Energy	**8.34**	**8.25**	**9.74**	**10.51**	**11.35**	**12.19**	**1.7%**

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

Key Indicators and Consumption	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Electricity Related Losses	**9.24**	**9.15**	**10.86**	**11.79**	**12.73**	**13.70**	**1.8%**
Total Energy Consumption by End-Use							
Space Heating[1]	1.97	2.07	2.31	2.34	2.41	2.47	0.8%
Space Cooling[1]	1.36	1.51	1.43	1.45	1.48	1.50	-0.0%
Water Heating[1]	1.10	1.11	1.25	1.28	1.33	1.37	0.9%
Ventilation	0.53	0.52	0.56	0.55	0.56	0.57	0.4%
Cooking	0.36	0.36	0.40	0.41	0.43	0.44	0.8%
Lighting	3.58	3.60	4.10	4.20	4.25	4.30	0.8%
Refrigeration	0.65	0.65	0.70	0.71	0.73	0.75	0.6%
Office Equipment (PC)	0.46	0.44	0.76	0.89	1.03	1.10	4.1%
Office Equipment (non-PC)	0.99	1.00	1.46	1.79	2.16	2.61	4.3%
Other Uses[6]	6.59	6.14	7.63	8.67	9.69	10.77	2.5%
Total	**17.58**	**17.40**	**20.60**	**22.30**	**24.07**	**25.89**	**1.7%**
Non-Marketed Renewable Fuels							
Solar[7]	0.02	0.02	0.03	0.03	0.03	0.03	1.5%
Total	**0.02**	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**	**1.5%**

[1]Includes fuel consumption for district services.
[2]Includes miscellaneous uses, such as service station equipment, automated teller machines, telecommunications equipment, and medical equipment.
[3]Includes miscellaneous uses, such as pumps, emergency electric generators, combined heat and power in commercial buildings, and manufacturing performed in commercial buildings.
[4]Includes miscellaneous uses, such as cooking, emergency electric generators, and combined heat and power in commercial buildings.
[5]Includes residual fuel oil, liquefied petroleum gas, coal, motor gasoline, and kerosene.
[6]Includes 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.
[7]Includes primary energy displaced by solar thermal space heating and water heating, and electricity generation by solar photovoltaic systems.
N/A = Not applicable.
Btu = British thermal unit.
PC = Personal computer.
Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 and 2002 based on: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002).
Projections: EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A6. Industrial Sector Key Indicators and Consumption
(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Key Indicators							
Value of Shipments (billion 1996 dollars)							
Manufacturing	4059	4064	5013	5760	6634	7636	2.8%
Nonmanufacturing	1309	1222	1425	1585	1710	1855	1.8%
Total	**5368**	**5285**	**6439**	**7345**	**8344**	**9491**	**2.6%**
Energy Prices (2002 dollars per million Btu)							
Distillate Oil	6.62	6.21	5.68	5.85	6.24	6.40	0.1%
Liquefied Petroleum Gas	12.48	8.28	9.72	10.29	10.66	11.11	1.3%
Residual Oil	3.31	3.89	3.74	3.88	4.03	4.17	0.3%
Motor Gasoline	11.70	11.04	11.84	11.84	11.87	12.03	0.4%
Natural Gas	4.91	3.75	4.05	4.81	4.89	4.99	1.3%
Metallurgical Coal	1.71	1.87	1.96	1.90	1.84	1.77	-0.2%
Steam Coal	1.51	1.52	1.58	1.55	1.53	1.53	0.0%
Electricity	15.11	14.74	13.36	13.81	13.99	14.09	-0.2%
Energy Consumption[1]							
Distillate	1.21	1.16	1.17	1.27	1.34	1.43	0.9%
Liquefied Petroleum Gas	2.10	2.22	2.35	2.53	2.74	2.94	1.2%
Petrochemical Feedstocks	1.16	1.22	1.35	1.43	1.54	1.62	1.2%
Residual Fuel	0.15	0.20	0.21	0.23	0.22	0.23	0.5%
Other Petroleum[2]	4.42	4.19	4.54	4.85	5.12	5.36	1.1%
Petroleum Subtotal	9.04	9.00	9.63	10.31	10.95	11.59	1.1%
Natural Gas	7.56	7.43	8.62	9.12	9.84	10.58	1.5%
Lease and Plant Fuel[3]	1.12	1.35	1.40	1.48	1.65	1.69	1.0%
Natural Gas Subtotal	8.67	8.78	10.02	10.60	11.49	12.27	1.5%
Metallurgical Coal and Coke[4]	0.74	0.65	0.66	0.59	0.52	0.48	-1.3%
Steam Coal	1.51	1.47	1.41	1.43	1.45	1.47	-0.0%
Coal Subtotal	2.25	2.12	2.06	2.01	1.97	1.95	-0.4%
Renewables[5]	1.64	1.66	2.00	2.26	2.48	2.70	2.1%
Purchased Electricity	3.29	3.39	3.82	4.15	4.47	4.85	1.6%
Delivered Energy	**24.89**	**24.94**	**27.53**	**29.32**	**31.36**	**33.35**	**1.3%**
Electricity Related Losses	7.44	7.53	8.22	8.67	9.12	9.72	1.1%
Total	**32.33**	**32.47**	**35.75**	**37.99**	**40.48**	**43.07**	**1.2%**
Energy Consumption per dollar of Shipments[1] (thousand Btu per 1996 dollars)							
Distillate	0.23	0.22	0.18	0.17	0.16	0.15	-1.6%
Liquefied Petroleum Gas	0.39	0.42	0.37	0.34	0.33	0.31	-1.3%
Petrochemical Feedstocks	0.22	0.23	0.21	0.19	0.18	0.17	-1.3%
Residual Fuel	0.03	0.04	0.03	0.03	0.03	0.02	-2.0%
Other Petroleum[2]	0.82	0.79	0.71	0.66	0.61	0.56	-1.5%
Petroleum Subtotal	1.68	1.70	1.50	1.40	1.31	1.22	-1.4%
Natural Gas	1.41	1.41	1.34	1.24	1.18	1.11	-1.0%
Lease and Plant Fuel[3]	0.21	0.26	0.22	0.20	0.20	0.18	-1.6%
Natural Gas Subtotal	1.62	1.66	1.56	1.44	1.38	1.29	-1.1%
Metallurgical Coal and Coke[4]	0.14	0.12	0.10	0.08	0.06	0.05	-3.8%
Steam Coal	0.28	0.28	0.22	0.19	0.17	0.15	-2.5%
Coal Subtotal	0.42	0.40	0.32	0.27	0.24	0.21	-2.9%
Renewables[5]	0.30	0.31	0.31	0.31	0.30	0.28	-0.4%
Purchased Electricity	0.61	0.64	0.59	0.56	0.54	0.51	-1.0%
Delivered Energy	**4.64**	**4.72**	**4.28**	**3.99**	**3.76**	**3.51**	**-1.3%**
Electricity Related Losses	1.39	1.42	1.28	1.18	1.09	1.02	-1.4%
Total	**6.02**	**6.14**	**5.55**	**5.17**	**4.85**	**4.54**	**-1.3%**

[1]Fuel 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.
[2]Includes petroleum coke, asphalt, road oil, lubricants, motor gasoline, still gas, and miscellaneous petroleum products.
[3] Represents natural gas used in the field gathering and processing plant machinery.
[4] Includes net coal coke imports.
[5]Includes 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 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 and 2002 prices for motor gasoline and distillate are based on: Energy Information Administration (EIA), *Petroleum Marketing Annual 2002*, http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_annual/ current/pdf/pmaall.pdf (August 2003). 2001 and 2002 coal prices are based on: EIA, *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003) and EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E. 2001 and 2002 electricity prices: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2001 and 2002 natural gas prices based on: EIA, *Manufacturing Energy Consumption Survey 1998*. 2001 and 2002 consumption values based on: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2001 and 2002 shipments: Global Insight macroeconomic model T250803. **Projections:** EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A7. Transportation Sector Key Indicators and Delivered Energy Consumption

Key Indicators and Consumption	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Key Indicators							
Level of Travel (billions)							
Light-Duty Vehicles <8,500 pounds (VMT)	2485	2504	3041	3409	3768	4173	2.2%
Commercial Light Trucks (VMT)[1]	64	65	79	90	101	114	2.5%
Freight Trucks >10,000 pounds (VMT)	201	196	242	276	313	354	2.6%
Air (seat miles available)	953	909	1122	1327	1455	1521	2.3%
Rail (ton miles traveled)	1417	1336	1545	1690	1852	2056	1.9%
Domestic Shipping (ton miles traveled)	774	724	805	857	918	977	1.3%
Energy Efficiency Indicators							
New Light-Duty Vehicle (miles per gallon)[2]	24.0	23.8	25.3	26.0	26.5	26.9	0.5%
New Car (miles per gallon)[2]	28.2	28.2	28.8	29.9	30.4	30.8	0.4%
New Light Truck (miles per gallon)[2]	20.5	20.5	22.8	23.5	24.1	24.7	0.8%
Light-Duty Fleet (miles per gallon)[3]	19.8	19.7	19.6	20.0	20.5	20.9	0.3%
New Commercial Light Truck (MPG)[1]	13.9	13.9	15.1	15.6	16.0	16.4	0.7%
Stock Commercial Light Truck (MPG)[1]	13.7	13.8	14.5	15.0	15.5	15.9	0.6%
Aircraft Efficiency (seat miles per gallon)	55.3	54.8	59.9	63.3	65.4	67.0	0.9%
Freight Truck Efficiency (miles per gallon)	6.0	6.0	6.0	6.1	6.4	6.5	0.4%
Rail Efficiency (ton miles per thousand Btu)	2.8	2.9	3.1	3.3	3.4	3.6	1.0%
(ton miles per thousand Btu)	2.3	2.3	2.3	2.4	2.4	2.4	0.2%
Energy Use by Mode							
(quadrillion Btu)							
Light-Duty Vehicles	15.16	15.58	18.91	20.75	22.34	24.28	1.9%
Commercial Light Trucks[1]	0.58	0.59	0.68	0.75	0.82	0.90	1.9%
Bus Transportation	0.25	0.24	0.25	0.26	0.26	0.26	0.4%
Freight Trucks	4.22	4.09	5.03	5.62	6.15	6.82	2.2%
Rail, Passenger	0.11	0.11	0.13	0.14	0.16	0.17	1.8%
Rail, Freight	0.50	0.47	0.50	0.52	0.54	0.57	0.9%
Shipping, Domestic	0.34	0.32	0.35	0.36	0.39	0.41	1.1%
Shipping, International	0.77	0.64	0.72	0.72	0.73	0.74	0.6%
Recreational Boats	0.30	0.31	0.34	0.35	0.37	0.39	0.9%
Air	2.97	2.84	3.35	3.76	4.09	4.30	1.8%
Military Use	0.62	0.66	0.77	0.79	0.81	0.82	0.9%
Lubricants	0.19	0.20	0.21	0.23	0.25	0.28	1.5%
Pipeline Fuel	0.64	0.65	0.69	0.72	0.83	0.86	1.2%
Total	**26.67**	**26.70**	**31.93**	**35.00**	**37.73**	**40.79**	**1.9%**
(million barrels per day oil equivalent)							
Light-Duty Vehicles	7.98	8.20	9.96	10.92	11.74	12.75	1.9%
Commercial Light Trucks[1]	0.31	0.31	0.36	0.40	0.43	0.47	1.9%
Bus Transportation	0.12	0.11	0.12	0.12	0.12	0.12	0.4%
Freight Trucks	2.00	1.94	2.38	2.66	2.91	3.22	2.2%
Rail, Passenger	0.05	0.05	0.06	0.07	0.07	0.08	1.8%
Rail, Freight	0.24	0.22	0.24	0.24	0.25	0.27	0.9%
Shipping, Domestic	0.16	0.15	0.16	0.17	0.18	0.19	1.1%
Shipping, International	0.34	0.28	0.32	0.32	0.32	0.32	0.6%
Recreational Boats	0.16	0.16	0.18	0.19	0.19	0.20	0.9%
Air	1.44	1.38	1.62	1.82	1.98	2.08	1.8%
Military Use	0.30	0.32	0.37	0.38	0.39	0.39	0.9%
Lubricants	0.09	0.09	0.10	0.11	0.12	0.13	1.5%
Pipeline Fuel	0.32	0.33	0.35	0.36	0.42	0.43	1.2%
Total	**13.50**	**13.54**	**16.20**	**17.75**	**19.13**	**20.68**	**1.9%**

[1]Commercial trucks 8,500 to 10,000 pounds.
[2]Environmental Protection Agency rated miles per gallon.
[3]Combined car and light truck "on-the-road" estimate.
Btu = British thermal unit.
VMT=Vehicle miles traveled.
MPG = Miles per gallon.

Note: Totals may not equal sum of components due to independent rounding. Data for 2000 and 2001 are model results and may differ slightly from official EIA data reports.

Sources: 2001 and 2002: Energy Information Administration (EIA), *Natural Gas Annual 2001*, DOE/EIA-0131(2001) (Washington, DC, February 2003); Federal Highway Administration, *Highway Statistics 2001* (Washington, DC, November 2002); Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 22 and Annual* (Oak Ridge, TN, September 2002) National Highway Traffic and Safety Administration, *Summary of Fuel Economy Performance* (Washington, DC, February 2000); EIA, *Household Vehicle Energy Consumption 1994*, DOE/EIA-0464(94) (Washington, DC, August 1997) 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 1998*, http://www.eia.doe.gov/cneaf/alt_trans98/table1.html; EIA, *State Energy Data Report 2000*, DOE/EIA-0214(2000) (Washington, DC, August 2003) U.S. Department of Transportation, Research and Special Programs Administration, *Air Carrier Statistics Monthly, December 2002/2001* (Washington, DC, 2002); EIA, *Fuel Oil and Kerosene Sales 2001*, http://www.eia.doe.gov/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/foks.html; and United States Department of Defense, Defense Fuel Supply Center. **Projections:** EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

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

Supply, Disposition, and Prices	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Generation by Fuel Type							
Electric Power Sector[1]							
Power Only[2]							
Coal	1852	1875	2201	2318	2560	2975	2.0%
Petroleum	113	77	62	103	82	77	0.0%
Natural Gas[3]	427	450	642	814	972	969	3.4%
Nuclear Power	769	780	794	812	816	816	0.2%
Pumped Storage/Other	-9	-9	-9	-9	-9	-9	0.3%
Renewable Sources[4]	259	304	400	420	442	460	1.8%
Distributed Generation (Natural Gas)	0	0	0	1	3	5	N/A
Non-Utility Generation for Own Use	-20	-34	-37	-37	-37	-37	0.4%
Total	**3391**	**3443**	**4054**	**4423**	**4829**	**5257**	**1.9%**
Combined Heat and Power[5]							
Coal	31	32	33	34	33	33	0.1%
Petroleum	6	6	1	5	2	2	-3.8%
Natural Gas	128	148	174	165	159	149	0.0%
Renewable Sources	4	5	4	4	4	4	-0.7%
Non-Utility Generation for Own Use	-9	-11	-24	-24	-24	-24	3.6%
Total	**160**	**183**	**188**	**183**	**175**	**164**	**-0.5%**
Net Available to the Grid	**3551**	**3626**	**4242**	**4606**	**5004**	**5421**	**1.8%**
End-Use Sector Generation							
Combined Heat and Power[6]							
Coal	21	21	21	21	21	21	-0.0%
Petroleum	6	5	12	15	17	18	5.6%
Natural Gas	83	84	109	129	153	181	3.4%
Other Gaseous Fuels[7]	4	5	9	11	12	13	4.3%
Renewable Sources[4]	29	30	39	45	50	54	2.6%
Other[8]	9	11	11	11	11	11	-0.0%
Total	**151**	**157**	**202**	**231**	**264**	**299**	**2.8%**
Other End-Use Generators[9]	3	4	5	5	5	7	1.9%
Generation for Own Use	-129	-134	-158	-173	-190	-210	2.0%
Total Sales to the Grid	**25**	**27**	**48**	**63**	**80**	**95**	**5.6%**
Total Electricity Generation	**3734**	**3831**	**4510**	**4904**	**5335**	**5787**	**1.8%**
Net Imports	**22**	**22**	**31**	**32**	**21**	**8**	**-4.6%**
Electricity Sales by Sector							
Residential	1203	1268	1428	1531	1641	1747	1.4%
Commercial	1197	1208	1480	1653	1828	2003	2.2%
Industrial	964	994	1120	1216	1310	1422	1.6%
Transportation	22	22	26	29	32	35	2.1%
Total	**3386**	**3492**	**4055**	**4429**	**4811**	**5207**	**1.8%**
End-Use Prices[10]							
(2002 cents per kilowatthour)							
Residential	8.7	8.4	7.9	8.1	8.1	8.1	-0.2%
Commercial	8.0	7.8	7.0	7.2	7.2	7.3	-0.3%
Industrial	5.2	5.0	4.6	4.7	4.8	4.8	-0.2%
Transportation	7.4	7.2	6.7	6.9	6.8	6.8	-0.2%
All Sectors Average	**7.4**	**7.2**	**6.6**	**6.8**	**6.9**	**6.9**	**-0.2%**
Prices by Service Category[10]							
(2002 cents per kilowatthour)							
Generation	4.8	4.6	4.1	4.4	4.5	4.5	-0.1%
Transmission	0.6	0.6	0.6	0.7	0.7	0.7	0.9%
Distribution	2.0	2.0	1.9	1.8	1.8	1.7	-0.7%

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

Supply, Disposition, and Prices	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Electric Power Sector Emissions[1]							
Sulfur Dioxide (million tons)	10.63	10.54	9.90	8.95	8.94	8.95	-0.7%
Nitrogen Oxide (million tons)	4.75	4.39	3.50	3.60	3.67	3.75	-0.7%
Mercury (tons)	49.14	50.95	52.20	52.65	53.59	54.37	0.3%

[1]Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
[2]Includes plants that only produce electricity.
[3]Includes electricity generation from fuel cells.
[4]Includes conventional hydroelectric, geothermal, wood, wood waste, municipal solid waste, landfill gas, other biomass, solar, and wind power.
[5]Includes combined heat and power plants whose primary business is to sell electricity and heat to the public (i.e., those that report NAICS code 22).
[6]Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors.
[7]Other gaseous fuels include refinery and still gas.
[8]Other includes batteries, chemicals, hydrogen, pitch, purchased steam, sulfur and miscellaneous technologies.
[9]Other end-use generators include 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.
[10]Prices represent average revenue per kilowatthour.
Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 and 2002 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 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002), and supporting databases. 2001 and 2002 commercial and transportation electricity sales: EIA estimates based on Oak Ridge National Laboratory, *Transportation Energy Data Book 21* (Oak Ridge, TN, September 2001). 2001 and 2002 prices: EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E. **Projections**: EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A9. Electricity Generating Capacity
(Gigawatts)

Net Summer Capacity[1]	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Electric Power Sector[2]							
Power Only[3]							
Coal Steam	305.5	305.7	305.1	316.4	348.4	407.2	1.3%
Other Fossil Steam[4]	133.8	132.5	105.0	101.6	100.0	95.4	-1.4%
Combined Cycle	43.0	81.0	127.1	158.8	184.4	202.3	4.1%
Combustion Turbine/Diesel	97.3	123.5	131.1	152.7	163.9	175.0	1.5%
Nuclear Power[5]	98.2	98.7	100.6	102.1	102.6	102.6	0.2%
Pumped Storage	19.9	20.2	20.3	20.3	20.3	20.3	0.0%
Fuel Cells	0.0	0.0	0.1	0.1	0.1	0.1	N/A
Renewable Sources[6]	90.4	91.4	97.1	101.0	105.7	109.9	0.8%
Distributed Generation[7]	0.0	0.0	0.5	2.4	7.6	12.4	N/A
Total	**788.0**	**853.1**	**886.8**	**955.3**	**1032.9**	**1125.1**	**1.2%**
Combined Heat and Power[8]							
Coal Steam	5.2	5.2	5.1	5.1	5.1	5.1	-0.1%
Other Fossil Steam[4]	1.1	1.1	1.1	1.1	1.1	1.1	N/A
Combined Cycle	22.5	29.4	32.9	32.9	32.9	32.9	0.5%
Combustion Turbine/Diesel	4.7	5.4	5.4	5.4	5.4	5.4	0.0%
Renewable Sources[6]	0.3	0.3	0.3	0.3	0.3	0.3	N/A
Total	33.8	41.4	44.8	44.8	44.8	44.8	0.3%
Total Electric Power Industry	**821.8**	**894.5**	**931.7**	**1000.2**	**1077.7**	**1169.9**	**1.2%**
Cumulative Planned Additions[9]							
Coal Steam	0.0	0.0	1.1	1.1	1.1	1.1	N/A
Other Fossil Steam[4]	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Combined Cycle	0.0	0.0	43.5	43.5	43.5	43.5	N/A
Combustion Turbine/Diesel	0.0	0.0	8.1	8.1	8.1	8.1	N/A
Nuclear Power	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	N/A
Fuel Cells	0.0	0.0	0.1	0.1	0.1	0.1	N/A
Renewable Sources[6]	0.0	0.0	4.3	4.6	4.7	4.8	N/A
Distributed Generation[7]	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Total	**0.0**	**0.0**	**57.1**	**57.4**	**57.5**	**57.6**	**N/A**
Cumulative Unplanned Additions[9]							
Coal Steam	0.0	0.0	5.7	17.5	50.7	110.6	N/A
Other Fossil Steam[4]	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Combined Cycle	0.0	0.0	6.6	38.3	64.0	81.9	N/A
Combustion Turbine/Diesel	0.0	0.0	10.5	32.8	46.0	59.1	N/A
Nuclear Power	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	N/A
Fuel Cells	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Renewable Sources[6]	0.0	0.0	1.1	4.6	9.3	13.3	N/A
Distributed Generation[7]	0.0	0.0	0.5	2.4	7.6	12.4	N/A
Total	**0.0**	**0.0**	**24.3**	**95.7**	**177.5**	**277.2**	**N/A**
Cumulative Total Additions	**0.0**	**0.0**	**81.4**	**153.0**	**235.0**	**334.8**	**N/A**
Cumulative Retirements[10]							
Coal Steam	0.0	0.0	7.5	8.0	9.3	10.4	N/A
Other Fossil Steam[4]	0.0	0.0	25.6	29.0	30.6	35.2	N/A
Combined Cycle	0.0	0.0	1.1	1.1	1.1	1.1	N/A
Combustion Turbine/Diesel	0.0	0.0	10.2	11.0	13.0	14.9	N/A
Nuclear Power	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	N/A
Fuel Cells	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	N/A
Total	**0.0**	**0.0**	**44.6**	**49.3**	**54.2**	**61.8**	**N/A**

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

Net Summer Capacity[1]	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
End-Use Sector							
Combined Heat and Power[11]							
Coal	4.1	4.2	4.1	4.1	4.1	4.1	-0.0%
Petroleum	1.0	1.0	1.6	1.9	2.2	2.3	3.8%
Natural Gas	13.9	14.1	17.8	20.4	23.7	27.6	3.0%
Other Gaseous Fuels	1.6	1.8	2.2	2.4	2.6	2.7	1.8%
Renewable Sources[6]	4.0	4.2	5.6	6.7	7.5	8.3	3.0%
Other	0.3	0.3	0.3	0.3	0.3	0.3	N/A
Total	**24.8**	**25.5**	**31.7**	**35.8**	**40.5**	**45.3**	**2.5%**
Other End-Use Generators[12]							
Renewable Sources[13]	1.1	1.1	1.4	1.4	1.6	2.1	3.1%
Cumulative Additions[9]							
Combined Heat and Power[11]	0.0	0.0	6.2	10.4	15.0	19.8	N/A
Other End-Use Generators[12]	0.0	0.0	0.3	0.4	0.5	1.1	N/A

[1]Net 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.
[2]Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
[3]Includes plants that only produce electricity. Includes capacity increases (uprates) at existing units.
[4]Includes oil-, gas-, and dual-fired capacity.
[5]Nuclear capacity reflects operating capacity of existing units, including 3.9 gigawatts of uprates through 2025.
[6]Includes 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.
[7]Primarily peak load capacity fueled by natural gas.
[8]Includes combined heat and power plants whose primary business is to sell electricity and heat to the public (i.e., those that report NAICS code 22).
[9]Cumulative additions after December 31, 2002.
[10]Cumulative retirements after December 31, 2002.
[11]Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors.
[12]Other end-use generators include 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.
[13]See Table A17 for more detail.
N/A = Not applicable.
Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 and 2002 electric generating capacity and projected planned additions: Energy Information Administration (EIA), Form EIA-860, "Annual Electric Generator Report" (preliminary). **Projections**: EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

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

Electricity Trade	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Interregional Electricity Trade							
Gross Domestic Firm Power Trade	142.7	138.9	107.1	70.7	41.5	41.5	-5.1%
Gross Domestic Economy Trade	182.1	209.9	229.7	221.2	218.4	183.4	-0.6%
Gross Domestic Trade	**324.8**	**348.8**	**336.8**	**291.8**	**259.9**	**224.9**	**-1.9%**
Gross Domestic Firm Power Sales (million 2002 dollars)	7126.8	6932.4	5345.8	3528.2	2074.2	2074.2	-5.1%
Gross Domestic Economy Sales (million 2002 dollars)	8870.2	6809.8	7629.6	8674.0	8663.8	7319.5	0.3%
Gross Domestic Sales (million 2002 dollars)	**15997.0**	**13742.1**	**12975.3**	**12202.2**	**10738.0**	**9393.7**	**-1.6%**
International Electricity Trade							
Firm Power Imports From Canada and Mexico	12.1	9.5	5.8	2.6	0.0	0.0	-21.9%
Economy Imports From Canada and Mexico	26.3	26.8	41.3	40.9	28.9	15.1	-2.5%
Gross Imports From Canada and Mexico	**38.4**	**36.3**	**47.2**	**43.5**	**28.9**	**15.2**	**-3.7%**
Firm Power Exports To Canada and Mexico	6.6	5.6	8.7	3.9	0.0	0.0	N/A
Economy Exports To Canada and Mexico	9.8	8.7	7.7	7.7	7.7	7.7	-0.6%
Gross Exports To Canada and Mexico	**16.4**	**14.3**	**16.4**	**11.5**	**7.7**	**7.7**	**-2.7%**

N/A = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 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: 2001 and 2002 interregional firm electricity trade data: North American Electric Reliability Council (NERC), Electricity Sales and Demand Database 1999. 2001 and 2002 Mexican electricity trade data: DOE Form FE-718R, "Annual Report of International Electrical Export/Import Data." 2001: National Energy Board, *Annual Report 2001*. 2002 Canadian electricity trade data: National Energy Board, Annual Report 2002. **Projections:** Energy Information Administration, AEO2004 National Energy Modeling System run AEO2004.D101703E.

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

Supply and Disposition	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Crude Oil							
Domestic Crude Production[1]	5.74	5.62	5.93	5.53	4.95	4.61	-0.9%
Alaska	0.96	0.98	0.92	0.93	0.72	0.51	-2.8%
Lower 48 States	4.78	4.64	5.01	4.59	4.23	4.11	-0.5%
Net Imports	9.31	9.13	11.21	13.47	14.50	15.74	2.4%
Gross Imports	9.33	9.14	11.29	13.53	14.53	15.76	2.4%
Exports	0.02	0.01	0.08	0.06	0.03	0.02	3.3%
Other Crude Supply[2]	0.02	0.07	0.00	0.00	0.00	0.00	N/A
Total Crude Supply	**15.07**	**14.83**	**17.15**	**19.00**	**19.45**	**20.35**	**1.4%**
Natural Gas Plant Liquids	**1.87**	**1.88**	**2.24**	**2.31**	**2.48**	**2.47**	**1.2%**
Other Inputs[3]	**0.30**	**0.67**	**0.47**	**0.44**	**0.46**	**0.48**	**-1.5%**
Refinery Processing Gain[4]	**0.93**	**0.98**	**0.88**	**0.97**	**1.00**	**1.04**	**0.2%**
Net Product Imports[5]	**1.59**	**1.41**	**1.95**	**2.05**	**2.99**	**3.94**	**4.6%**
Gross Refined Product Imports[6]	2.08	1.92	2.17	2.29	2.82	3.60	2.8%
Unfinished Oil Imports	0.38	0.41	0.72	0.74	1.15	1.34	5.3%
Ether Imports	0.08	0.06	0.00	0.00	0.00	0.00	N/A
Exports	0.95	0.97	0.94	0.98	0.98	1.01	0.1%
Total Primary Supply[7]	**19.75**	**19.77**	**22.69**	**24.77**	**26.38**	**28.27**	**1.6%**
Refined Petroleum Products Supplied							
Motor Gasoline[8]	8.62	8.86	10.59	11.51	12.30	13.30	1.8%
Jet Fuel[9]	1.66	1.61	1.90	2.10	2.27	2.37	1.7%
Distillate Fuel[10]	3.88	3.68	4.38	4.94	5.24	5.71	1.9%
Residual Fuel	0.86	0.74	0.71	0.77	0.77	0.75	0.1%
Other[11]	4.69	4.72	5.13	5.48	5.84	6.16	1.2%
Total	**19.71**	**19.61**	**22.71**	**24.80**	**26.41**	**28.30**	**1.6%**
Refined Petroleum Products Supplied							
Residential and Commercial	1.23	1.22	1.38	1.39	1.40	1.40	0.6%
Industrial[12]	4.79	4.80	5.14	5.50	5.86	6.21	1.1%
Transportation	13.14	13.21	15.91	17.44	18.77	20.32	1.9%
Electric Generators[13]	0.55	0.38	0.29	0.47	0.38	0.36	-0.2%
Total	**19.71**	**19.61**	**22.71**	**24.80**	**26.41**	**28.30**	**1.6%**
Discrepancy[14]	**0.04**	**0.16**	**-0.02**	**-0.03**	**-0.04**	**-0.03**	**N/A**
World Oil Price (2002 dollars per barrel)[15]	**22.25**	**23.68**	**24.17**	**25.07**	**26.02**	**27.00**	**0.6%**
Import Share of Product Supplied	**0.55**	**0.54**	**0.58**	**0.63**	**0.66**	**0.70**	**1.1%**
Net Expenditures for Imported Crude Oil and Petroleum Products (billion 2002 dollars)	**90.15**	**90.38**	**118.31**	**143.82**	**168.99**	**200.24**	**3.5%**
Domestic Refinery Distillation Capacity[16]	**16.8**	**16.8**	**18.7**	**20.4**	**20.8**	**21.8**	**1.1%**
Capacity Utilization Rate (percent)	**93.0**	**91.0**	**93.1**	**94.7**	**94.8**	**94.8**	**0.2%**

[1]Includes lease condensate.
[2]Strategic petroleum reserve stock additions plus unaccounted for crude oil and crude stock withdrawals minus crude product supplied.
[3]Includes 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.
[4]Represents volumetric gain in refinery distillation and cracking processes.
[5]Includes net imports of finished petroleum products, unfinished oils, other hydrocarbons, alcohols, ethers, and blending components.
[6]Includes other hydrocarbons, alcohols, and blending components.
[7]Total crude supply plus natural gas plant liquids, other inputs, refinery processing gain, and net product imports.
[8]Includes ethanol and ethers blended into gasoline.
[9]Includes only kerosene type.
[10]Includes distillate and kerosene.
[11]Includes 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.
[12]Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.
[13]Includes 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. Includes small power producers and exempt wholesale generators.
[14]Balancing item. Includes unaccounted for supply, losses, and gains.
[15]Average refiner acquisition cost for imported crude oil.
[16]End-of-year capacity.
N/A = Not applicable.
Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 and 2002 product supplied based on: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). Other 2001 data: EIA, *Petroleum Supply Annual 2001*, DOE/EIA-0340(2001)/1 (Washington, DC, June 2002). Other 2002 data: EIA, *Petroleum Supply Annual 2002*, DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). **Projections:** EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A12. Petroleum Product Prices
(2002 Cents per Gallon, Unless Otherwise Noted)

Sector and Fuel	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
World Oil Price (2002 dollars per barrel)	**22.25**	**23.68**	**24.17**	**25.07**	**26.02**	**27.00**	**0.6%**
Delivered Sector Product Prices							
Residential							
Distillate Fuel	126.1	114.2	108.4	111.8	116.4	118.4	0.2%
Liquefied Petroleum Gas	129.1	110.8	119.1	124.1	126.9	130.3	0.7%
Commercial							
Distillate Fuel	88.5	84.1	75.6	78.4	83.3	85.3	0.1%
Residual Fuel	52.5	63.1	61.8	64.0	66.1	68.1	0.3%
Residual Fuel (2002 dollars per barrel)	22.07	26.48	25.97	26.87	27.75	28.59	0.3%
Industrial[1]							
Distillate Fuel	91.8	86.2	78.8	81.1	86.6	88.8	0.1%
Liquefied Petroleum Gas	107.1	71.1	83.4	88.3	91.4	95.3	1.3%
Residual Fuel	49.6	58.3	56.0	58.2	60.3	62.4	0.3%
Residual Fuel (2002 dollars per barrel)	20.82	24.48	23.54	24.42	25.34	26.22	0.3%
Transportation							
Diesel Fuel (distillate)[2]	141.0	130.6	140.3	140.9	138.6	139.0	0.3%
Jet Fuel[3]	84.7	80.6	77.8	79.0	81.8	83.9	0.2%
Motor Gasoline[4]	148.6	138.1	146.9	146.8	147.3	149.2	0.3%
Liquid Petroleum Gas	146.9	128.7	128.3	132.0	133.0	135.8	0.2%
Residual Fuel	59.0	56.5	53.9	55.9	58.0	60.2	0.3%
Residual Fuel (2002 dollars per barrel)	24.80	23.71	22.62	23.48	24.37	25.28	0.3%
Ethanol (E85)[5]	148.1	135.8	153.9	159.1	163.4	166.1	0.9%
Electric Power[6]							
Distillate Fuel	86.5	77.4	68.2	70.5	75.8	77.9	0.0%
Residual Fuel	68.1	60.4	59.7	61.9	64.5	67.4	0.5%
Residual Fuel (2002 dollars per barrel)	28.61	25.38	25.07	26.01	27.07	28.30	0.5%
Refined Petroleum Product Prices[7]							
Distillate Fuel	126.8	118.1	123.8	124.4	125.9	127.3	0.3%
Jet Fuel[3]	84.7	80.6	77.8	79.0	81.8	83.9	0.2%
Liquefied Petroleum Gas	111.5	79.6	91.3	96.1	99.1	102.6	1.1%
Motor Gasoline[4]	148.5	138.1	146.9	146.8	147.3	149.2	0.3%
Residual Fuel	62.2	58.6	56.6	58.8	61.1	63.3	0.3%
Residual Fuel (2002 dollars per barrel)	26.14	24.62	23.76	24.71	25.65	26.60	0.3%
Average	**126.7**	**116.1**	**123.9**	**124.8**	**126.3**	**128.6**	**0.4%**

[1]Includes combined heat and power, which produces electricity and other useful thermal energy.
[2] Diesel fuel containing 500 part per million (ppm) or 15 ppm sulfur. Includes Federal and State taxes while excluding county and local taxes.
[3]Includes only kerosene type.
[4]Sales weighted-average price for all grades. Includes Federal, State and local taxes.
[5]E85 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.
[6]Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.
[7]Weighted averages of end-use fuel prices are derived from the prices in each sector and the corresponding sectoral consumption.
Note: Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 and 2002 prices for motor gasoline, distillate, and jet fuel are based on: Energy Information Administration (EIA), *Petroleum Marketing Annual 2002*, http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_annual/ current/pdf/pmaall.pdf (August 2003). 2001 and 2002 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." 2001 and 2002 electric power prices based on: Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 2001 and 2002 ethanol prices derived from weekly spot prices in the Oxy Fuel News. 2001 and 2002 world oil price: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections**: EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A13. Natural Gas Supply and Disposition
(Trillion Cubic Feet per Year)

Supply and Disposition	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Production							
Dry Gas Production[1]	19.70	19.05	20.50	21.62	23.79	23.99	1.0%
Supplemental Natural Gas[2]	0.09	0.08	0.10	0.10	0.10	0.10	0.8%
Net Imports	**3.60**	**3.49**	**5.50**	**6.24**	**6.47**	**7.24**	**3.2%**
Canada	3.56	3.59	3.68	3.17	2.51	2.56	-1.4%
Mexico	-0.13	-0.26	-0.34	-0.15	-0.18	-0.12	-3.2%
Liquefied Natural Gas	0.17	0.17	2.16	3.22	4.14	4.80	15.8%
Total Supply	**23.39**	**22.62**	**26.09**	**27.95**	**30.36**	**31.33**	**1.4%**
Consumption by Sector							
Residential	4.78	4.92	5.53	5.68	5.92	6.09	0.9%
Commercial	3.24	3.12	3.48	3.62	3.83	4.04	1.1%
Industrial[3]	7.35	7.23	8.39	8.87	9.57	10.29	1.5%
Electric Generators[4]	5.38	5.55	6.66	7.64	8.61	8.39	1.8%
Transportation[5]	0.01	0.01	0.06	0.08	0.10	0.11	9.5%
Pipeline Fuel	0.62	0.63	0.67	0.70	0.81	0.84	1.2%
Lease and Plant Fuel[6]	1.09	1.32	1.36	1.44	1.61	1.65	1.0%
Total	**22.48**	**22.78**	**26.15**	**28.03**	**30.44**	**31.41**	**1.4%**
Natural Gas to Liquids	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Discrepancy[7]	**0.92**	**-0.16**	**-0.06**	**-0.07**	**-0.08**	**-0.09**	**N/A**

[1]Marketed production (wet) minus extraction losses.
[2]Synthetic 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.
[3]Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.
[4]Includes 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. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as vehicle fuel.
[6]Represents natural gas used in the field gathering and processing plant machinery.
[7]Balancing 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, 2000 and 2001 values include net storage injections.
Btu = British thermal unit.
N/A = Not applicable.
Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 supply values: Energy Information Administration (EIA), *Natural Gas Annual 2001*, DOE/EIA-0131(2001) (Washington, DC, February 2003). 2002 supply values: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2001 and 2002 consumption based on: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections:** EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A14. Natural Gas Prices, Margins, and Revenues
(2002 Dollars per Thousand Cubic Feet, Unless Otherwise Noted)

Prices, Margins, and Revenue	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Source Price							
Average Lower 48 Wellhead Price[1]	4.14	2.95	3.40	4.19	4.28	4.40	1.8%
Average Import Price	4.49	3.14	3.78	4.59	4.58	4.67	1.7%
Average[2]	**4.20**	**2.98**	**3.49**	**4.29**	**4.35**	**4.47**	**1.8%**
Delivered Prices							
Residential	9.79	7.86	7.88	8.52	8.47	8.56	0.4%
Commercial	8.67	6.55	6.83	7.52	7.52	7.62	0.7%
Industrial[3]	5.04	3.85	4.16	4.94	5.02	5.13	1.3%
Electric Generators[4]	5.40	3.85	4.12	4.87	4.94	5.01	1.2%
Transportation[5]	8.94	7.58	8.49	9.32	9.32	9.34	0.9%
Average[6]	**6.81**	**5.21**	**5.41**	**6.09**	**6.09**	**6.19**	**0.8%**
Transmission and Distribution Margins[7]							
Residential	5.59	4.88	4.40	4.23	4.11	4.09	-0.8%
Commercial	4.47	3.56	3.34	3.23	3.17	3.15	-0.5%
Industrial[3]	0.84	0.87	0.68	0.65	0.67	0.66	-1.2%
Electric Generators[4]	1.20	0.86	0.63	0.58	0.59	0.54	-2.0%
Transportation[5]	4.74	4.60	5.00	5.03	4.96	4.87	0.2%
Average[6]	**2.61**	**2.23**	**1.92**	**1.80**	**1.74**	**1.72**	**-1.1%**
Transmission and Distribution Revenue (billion 2002 dollars)							
Residential	26.74	24.02	24.33	24.02	24.34	24.89	0.2%
Commercial	14.49	11.12	11.61	11.71	12.13	12.72	0.6%
Industrial[3]	6.20	6.27	5.67	5.78	6.42	6.80	0.3%
Electric Generators[4]	6.46	4.78	4.21	4.46	5.10	4.54	-0.2%
Transportation[5]	0.05	0.06	0.28	0.40	0.48	0.54	9.7%
Total	**53.93**	**46.25**	**46.11**	**46.37**	**48.46**	**49.49**	**0.3%**

[1]Represents lower 48 onshore and offshore supplies.
[2]Quantity-weighted average of the average lower 48 wellhead price and the average price of imports at the U.S. border.
[3]Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.
[4]Includes 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. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[6]Weighted average prices and margins. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.
[7]Within the table, "transmission and distribution" margins equal the difference between the delivered price and the source price (average of the wellhead price and the price of imports at the U.S. border) of natural gas and, thus, reflect the total cost of bringing natural gas to market. When the term "transmission and distribution" margins is used in today's natural gas market, it generally does not include the cost of independent natural gas marketers or costs associated with aggregation of supplies, provisions of storage, and other services. As used here, the term includes the cost of all services and the cost of pipeline fuel used in compressor stations.

Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.

Sources: 2001 residential, commercial, and transportation delivered prices; average lower 48 wellhead price; and average import price: Energy Information Administration (EIA), *Natural Gas Annual 2001*, DOE/EIA-0131(2001) (Washington, DC, February 2003). 2001 and 2002 electric generators delivered price: Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 2001 and 2002 industrial delivered prices based on EIA, *Manufacturing Energy Consumption Survey 1998*. 2002 residential, commercial, and transportation delivered prices, average lower 48 wellhead price, and average import price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). Other 2001 and 2002 values: EIA, Office of Integrated Analysis and Forecasting. **Projections:** EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A15. Oil and Gas Supply

Production and Supply	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Crude Oil							
Lower 48 Average Wellhead Price[1] (2002 dollars per barrel)	**23.16**	**24.54**	**23.61**	**24.56**	**25.82**	**26.72**	**0.4%**
Production (million barrels per day)[2]							
U.S. Total	**5.74**	**5.62**	**5.93**	**5.53**	**4.95**	**4.61**	**-0.9%**
Lower 48 Onshore	3.14	3.11	2.61	2.38	2.20	2.04	-1.8%
Lower 48 Offshore	1.64	1.53	2.40	2.21	2.03	2.06	1.3%
Alaska	0.96	0.98	0.92	0.93	0.72	0.51	-2.8%
Lower 48 End of Year Reserves (billion barrels)[2]	**19.14**	**19.05**	**18.36**	**17.13**	**16.20**	**14.98**	**-1.0%**
Natural Gas							
Lower 48 Average Wellhead Price[1] (2002 dollars per thousand cubic feet)	**4.14**	**2.95**	**3.40**	**4.19**	**4.28**	**4.40**	**1.8%**
Dry Production (trillion cubic feet)[3]							
U.S. Total	**19.70**	**19.05**	**20.50**	**21.62**	**23.79**	**23.99**	**1.0%**
Lower 48 Onshore	13.90	13.76	14.48	16.11	16.41	16.26	0.7%
Associated-Dissolved[4]	1.63	1.60	1.41	1.31	1.23	1.17	-1.4%
Non-Associated	12.27	12.16	13.08	14.81	15.18	15.09	0.9%
Conventional	6.62	6.23	5.80	6.13	6.07	5.92	-0.2%
Unconventional	5.65	5.93	7.28	8.67	9.11	9.16	1.9%
Lower 48 Offshore	5.37	4.86	5.41	4.87	5.09	5.03	0.1%
Associated-Dissolved[4]	1.15	1.05	1.61	1.33	1.34	1.43	1.4%
Non-Associated	4.21	3.81	3.80	3.54	3.75	3.60	-0.3%
Alaska	0.44	0.43	0.60	0.64	2.29	2.71	8.3%
Lower 48 End of Year Dry Reserves[3] (trillion cubic feet)	**174.66**	**180.03**	**201.20**	**203.74**	**200.97**	**193.51**	**0.3%**
Supplemental Gas Supplies (trillion cubic feet)[5]	**0.09**	**0.08**	**0.10**	**0.10**	**0.10**	**0.10**	**0.8%**
Total Lower 48 Wells (thousands)	**34.10**	**24.47**	**24.78**	**26.80**	**26.83**	**26.00**	**0.3%**

[1]Represents lower 48 onshore and offshore supplies.
[2]Includes lease condensate.
[3]Marketed production (wet) minus extraction losses.
[4]Gas which occurs in crude oil reserves either as free gas (associated) or as gas in solution with crude oil (dissolved).
[5]Synthetic 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 2001 and 2002 are model results and may differ slightly from official EIA data reports.

Sources: 2001 and 2002 lower 48 onshore, lower 48 offshore, and Alaska crude oil production: Energy Information Administration (EIA), *Petroleum Supply Annual 2002,* DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). 2000 U.S. crude oil and natural gas reserves: EIA, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*, DOE/EIA-0216(2001) (Washington, DC, November 2002). 2001 natural gas lower 48 average wellhead price, and total natural gas production: EIA, *Natural Gas Annual 2001,* DOE/EIA-0131(2001) (Washington, DC, February 2003). 2002 natural gas lower 48 average wellhead price, Alaska and total natural gas production, and supplemental gas supplies: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). Other 2001 and 2002 values: EIA, Office of Integrated Analysis and Forecasting. **Projections:** EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A16. Coal Supply, Disposition, and Prices
(Million Short Tons per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Production[1]							
Appalachia	443	408	408	395	402	419	0.1%
Interior	147	147	169	162	170	178	0.8%
West	548	550	653	728	805	946	2.4%
East of the Mississippi	539	504	524	505	522	547	0.4%
West of the Mississippi	599	601	706	780	854	996	2.2%
Total	**1138**	**1105**	**1230**	**1285**	**1377**	**1543**	**1.5%**
Net Imports							
Imports	20	17	33	38	42	46	4.4%
Exports	49	40	35	32	27	23	-2.3%
Total	**-29**	**-23**	**-2**	**6**	**14**	**23**	**N/A**
Total Supply[2]	**1109**	**1083**	**1228**	**1291**	**1391**	**1566**	**1.6%**
Consumption by Sector							
Residential and Commercial	4	4	5	5	5	5	0.4%
Industrial[3]	65	63	65	65	66	67	0.3%
of which: Coal to Liquids	0	0	0	0	0	0	N/A
Coke Plants	26	22	23	21	19	17	-1.2%
Electric Generators[4]	964	976	1136	1200	1301	1477	1.8%
Total	**1060**	**1066**	**1229**	**1291**	**1391**	**1567**	**1.7%**
Discrepancy and Stock Change[5]	**49**	**17**	**-0**	**-0**	**-0**	**-1**	**N/A**
Average Minemouth Price							
(2002 dollars per short ton)	17.79	17.90	16.88	16.47	16.32	16.57	-0.3%
(2002 dollars per million Btu)	0.87	0.87	0.82	0.81	0.80	0.82	-0.2%
Delivered Prices (2002 dollars per short ton)[6]							
Industrial	32.96	33.24	34.46	33.83	33.43	33.33	0.0%
Coke Plants	46.94	51.27	53.68	52.13	50.45	48.42	-0.2%
Electric Generators							
(2002 dollars per short ton)	25.13	25.96	24.67	24.34	24.01	24.31	-0.3%
(2002 dollars per million Btu)	1.25	1.26	1.22	1.22	1.20	1.22	-0.1%
Average	**26.15**	**26.93**	**25.74**	**25.28**	**24.83**	**24.96**	**-0.3%**
Exports[7]	37.39	40.44	36.47	35.25	34.13	32.34	-1.0%

[1]Includes anthracite, bituminous coal, lignite, and waste coal delivered to independent power producers. Waste coal deliveries totaled 10.6 million tons in 2001 and 11.1 million tons in 2002.
[2]Production plus net imports plus net storage withdrawals.
[3]Includes consumption for combined heat and power plants, except those plants whose primary business is to sell electricity, or electricity and heat, to the public.
[4]Includes all electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
[5]Balancing item: the sum of production, net imports, and net storage withdrawals minus total consumption.
[6]Sectoral prices weighted by consumption tonnage; weighted average excludes residential/ commercial prices and export free-alongside-ship (f.a.s.) prices.
[7]F.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 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001: Energy Information Administration (EIA), *Annual Coal Report 2002*, DOE/EIA-0584(2002) (Washington, DC, November 2003). 2002 data based on: EIA, *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003); EIA, *Annual Coal Report 2002*, DOE/EIA-0584(2002) (Washington, DC, November 2003); and EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E. **Projections:** EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A17. Renewable Energy Generating Capacity and Generation
(Gigawatts, Unless Otherwise Noted)

Capacity and Generation	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Electric Power Sector[1]							
Net Summer Capacity							
Conventional Hydropower	78.13	78.29	78.69	78.68	78.68	78.68	0.0%
Geothermal[2]	2.88	2.89	4.01	5.11	6.06	6.84	3.8%
Municipal Solid Waste[3]	3.38	3.49	3.92	3.92	3.95	3.95	0.5%
Wood and Other Biomass[4,5]	1.79	1.83	2.20	2.31	3.04	3.74	3.2%
Solar Thermal	0.33	0.33	0.43	0.47	0.49	0.52	1.9%
Solar Photovoltaic[6]	0.02	0.02	0.15	0.24	0.32	0.41	13.5%
Wind	4.15	4.83	8.01	10.48	13.39	15.99	5.3%
Total	**90.67**	**91.69**	**97.42**	**101.22**	**105.93**	**110.13**	**0.8%**
Generation (billion kilowatthours)							
Conventional Hydropower	213.7	255.78	304.37	304.48	304.63	304.80	0.8%
Geothermal[2]	13.74	13.36	23.25	32.31	40.14	46.66	5.6%
Municipal Solid Waste[3]	19.22	20.02	28.11	28.18	28.44	28.50	1.5%
Wood and Other Biomass[5]	8.56	8.67	23.53	25.07	27.64	29.16	5.4%
Dedicated Plants	7.22	6.32	13.26	14.03	18.47	22.90	5.8%
Cofiring	1.34	2.35	10.26	11.05	9.17	6.25	4.3%
Solar Thermal	0.54	0.54	0.84	0.97	1.04	1.11	3.2%
Solar Photovoltaic[6]	0.00	0.00	0.36	0.57	0.79	1.02	28.8%
Wind	6.74	10.51	24.07	32.95	43.54	53.16	7.3%
Total	**262.5**	**308.87**	**404.52**	**424.54**	**446.22**	**464.40**	**1.8%**
End-Use Sector							
Net Summer Capacity							
Combined Heat and Power[7]							
Municipal Solid Waste	0.21	0.25	0.25	0.25	0.25	0.25	0.0%
Biomass	3.80	3.91	5.36	6.44	7.26	8.03	3.2%
Total	**4.01**	**4.16**	**5.61**	**6.69**	**7.51**	**8.29**	**3.0%**
Other End-Use Generators[8]							
Conventional Hydropower[9]	1.02	1.02	1.02	1.02	1.02	1.02	0.0%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Solar Photovoltaic	0.03	0.04	0.39	0.42	0.58	1.13	15.4%
Total	**1.05**	**1.06**	**1.41**	**1.45**	**1.61**	**2.15**	**3.1%**
Generation (billion kilowatthours)							
Combined Heat and Power[7]							
Municipal Solid Waste	1.78	1.84	2.10	2.10	2.10	2.10	0.6%
Biomass	26.91	28.16	36.63	42.96	47.72	52.26	2.7%
Total	**28.68**	**30.00**	**38.73**	**45.06**	**49.82**	**54.36**	**2.6%**
Other End-Use Generators[8]							
Conventional Hydropower[9]	3.21	4.11	4.11	4.11	4.11	4.11	0.0%
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Solar Photovoltaic	0.06	0.09	0.82	0.91	1.26	2.42	15.4%
Total	**3.27**	**4.20**	**4.93**	**5.02**	**5.37**	**6.53**	**1.9%**

[1]Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
[2]Includes hydrothermal resources only (hot water and steam).
[3]Includes landfill gas.
[4]Facilities co-firing biomass and coal are classified as coal.
[5]Includes projections for energy crops after 2010.
[6]Does not include off-grid photovoltaics (PV). See Annual Energy Review 2002 Table 10.6 for estimates of 1989-2001 PV shipments, including exports, for both grid-connected and off-grid applications.
[7]Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors.
[8]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.
[9]Represents own-use industrial hydroelectric power.
N/A = Not applicable.
Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 and 2002 capacity: Energy Information Administration (EIA), Form EIA-860, "Annual Electric Generator Report" (preliminary). 2001 and 2002 generation: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections:** EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A18. Renewable Energy, Consumption by Sector and Source[1]
(Quadrillion Btu per Year)

Sector and Source	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Marketed Renewable Energy[2]							
Residential	**0.36**	**0.39**	**0.40**	**0.41**	**0.41**	**0.41**	**0.1%**
Wood	0.36	0.39	0.40	0.41	0.41	0.41	0.1%
Commercial	**0.09**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.0%**
Biomass	0.09	0.10	0.10	0.10	0.10	0.10	0.0%
Industrial[3]	**1.64**	**1.66**	**2.00**	**2.26**	**2.48**	**2.70**	**2.1%**
Conventional Hydroelectric	0.03	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	N/A
Biomass	1.59	1.60	1.95	2.20	2.43	2.65	2.2%
Transportation	**0.14**	**0.17**	**0.29**	**0.31**	**0.33**	**0.35**	**3.2%**
Ethanol used in E85[4]	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Ethanol used in Gasoline Blending	0.14	0.17	0.29	0.31	0.33	0.35	3.2%
Electric Generators[5]	**3.16**	**3.69**	**4.68**	**5.08**	**5.47**	**5.79**	**2.0%**
Conventional Hydroelectric	2.29	2.75	3.13	3.13	3.13	3.13	0.6%
Geothermal	0.29	0.30	0.61	0.90	1.15	1.36	6.9%
Municipal Solid Waste[6]	0.33	0.34	0.39	0.39	0.39	0.39	0.6%
Biomass	0.15	0.17	0.29	0.30	0.33	0.34	3.1%
Dedicated Plants	0.12	0.11	0.15	0.16	0.21	0.26	3.8%
Cofiring	0.03	0.06	0.14	0.15	0.12	0.08	1.4%
Solar Thermal	0.01	0.01	0.01	0.02	0.02	0.02	6.0%
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Wind	0.08	0.13	0.25	0.34	0.45	0.55	6.6%
Total Marketed Renewable Energy	**5.40**	**6.01**	**7.47**	**8.15**	**8.78**	**9.35**	**1.9%**
Sources of Ethanol							
From Corn	0.14	0.17	0.29	0.30	0.31	0.31	2.5%
From Cellulose	0.00	0.00	0.00	0.01	0.02	0.05	N/A
Total	**0.14**	**0.17**	**0.29**	**0.31**	**0.33**	**0.35**	**3.2%**
Non-Marketed Renewable Energy[7] Selected Consumption							
Residential	**0.04**	**0.02**	**0.03**	**0.04**	**0.04**	**0.05**	**3.2%**
Solar Hot Water Heating	0.04	0.02	0.03	0.03	0.03	0.04	2.2%
Geothermal Heat Pumps	0.00	0.00	0.00	0.01	0.01	0.01	9.0%
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00	0.00	15.0%
Commercial	**0.02**	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**	**1.5%**
Solar Thermal	0.02	0.02	0.03	0.03	0.03	0.03	0.6%
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00	0.01	15.5%

[1]Actual 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 kilowatthour.
[2]Includes 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.
[3]Includes all electricity production by industrial and other combined heat and power for the grid and for own use.
[4]Excludes motor gasoline component of E85.
[5]Includes 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. Includes small power producers and exempt wholesale generators.
[6]Includes landfill gas.
[7]Includes 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 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 and 2002 ethanol: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2001 and 2002 electric generators: EIA, Form EIA-860: "Annual Electric Generator Report" (preliminary). Other 2001 and 2002 values: EIA, Office of Integrated Analysis and Forecasting. **Projections:** EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A19. Carbon Dioxide Emissions by Sector and Source
(Million Metric Tons)

Sector and Source	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Residential							
Petroleum	105.6	104.0	110.4	109.1	107.1	104.5	0.0%
Natural Gas	259.5	267.2	300.4	308.1	321.2	330.7	0.9%
Coal	1.1	1.1	1.2	1.1	1.1	1.1	-0.3%
Electricity	790.8	816.7	905.3	954.0	1019.9	1106.7	1.3%
Total	**1157.**	**1189.0**	**1317.2**	**1372.3**	**1449.2**	**1543.0**	**1.1%**
Commercial							
Petroleum	52.9	52.6	66.2	68.6	70.2	72.2	1.4%
Natural Gas	165.0	169.4	188.7	196.5	207.9	219.4	1.1%
Coal	9.2	9.2	9.3	9.3	9.2	9.2	0.0%
Electricity	787.4	778.0	938.4	1030.1	1135.5	1269.2	2.2%
Total	**1014.**	**1009.1**	**1202.5**	**1304.4**	**1422.9**	**1570.1**	**1.9%**
Industrial[1]							
Petroleum	409.9	412.8	365.4	388.2	408.0	428.4	0.2%
Natural Gas[2]	441.5	432.7	522.1	552.2	598.6	639.4	1.7%
Coal	196.8	185.1	191.9	187.1	183.3	181.1	-0.1%
Electricity	634.1	640.0	710.3	757.4	813.8	900.7	1.5%
Total	**1682.**	**1670.6**	**1789.6**	**1885.0**	**2003.6**	**2149.5**	**1.1%**
Transportation							
Petroleum[3]	1789.	1811.2	2193.2	2406.2	2590.9	2805.8	1.9%
Natural Gas[4]	33.9	35.2	39.5	42.4	49.1	51.3	1.7%
Other[5]	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Electricity	14.2	14.2	16.7	18.1	19.9	22.4	2.0%
Total	**1837.**	**1860.6**	**2249.5**	**2466.7**	**2659.9**	**2879.5**	**1.9%**
Total Carbon Dioxide Emissions by Delivered Fuel							
Petroleum[3]	2358.	2380.5	2735.2	2972.0	3176.2	3410.9	1.6%
Natural Gas	899.9	904.4	1050.7	1099.2	1176.8	1240.8	1.4%
Coal	207.1	195.4	202.4	197.5	193.6	191.4	-0.1%
Other[5]	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Electricity	2226.	2249.0	2570.6	2759.6	2989.0	3299.0	1.7%
Total	**5691.**	**5729.3**	**6558.8**	**7028.4**	**7535.6**	**8142.0**	**1.5%**
Electric Power[6]							
Petroleum	99.6	72.2	51.0	78.6	65.2	61.6	-0.7%
Natural Gas	289.1	299.1	358.5	410.9	463.3	451.6	1.8%
Coal	1838.	1877.8	2161.2	2270.2	2460.5	2785.8	1.7%
Total	**2226.**	**2249.0**	**2570.6**	**2759.6**	**2989.0**	**3299.0**	**1.7%**
Total Carbon Dioxide Emissions by Primary Fuel[7]							
Petroleum[3]	2457.	2452.7	2786.1	3050.6	3241.4	3472.5	1.5%
Natural Gas	1189.	1203.4	1409.2	1510.1	1640.1	1692.4	1.5%
Coal	2045.	2073.2	2363.6	2467.7	2654.1	2977.1	1.6%
Other[5]	0.0	0.0	0.0	0.0	0.0	0.0	N/A
Total	**5691.**	**5729.3**	**6558.8**	**7028.4**	**7535.6**	**8142.0**	**1.5%**
Carbon Dioxide Emissions (ton per person)	**19.9**	**19.8**	**21.2**	**21.8**	**22.5**	**23.4**	**0.7%**

[1]Fuel consumption includes energy for combined heat and power plants, except those plants whose primary business is to sell electricity, or electricity and heat, to the public.
[2]Includes lease and plant fuel.
[3]This includes international bunker fuel, which by convention are excluded from the international accounting of carbon dioxide emissions. In the years from 1990 through 2000, international bunker fuels accounted for 24 to 30 million metric tons of carbon dioxide annually.
[4]Includes pipeline fuel natural gas and compressed natural gas used as vehicle fuel.
[5]Includes methanol and liquid hydrogen.
[6]Includes electricity-only and combined heat and power (CHP) 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.
[7]Emissions from the electric power sector are distributed to the primary fuels.
N/A = Not applicable
Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 and 2002 emissions and emission factors: Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 2002,* DOE/EIA-0573(2002) (Washington, DC, October 2003). **Projections:** EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A20. Macroeconomic Indicators
(Billion 1996 Chain-Weighted Dollars, Unless Otherwise Noted)

Indicators	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Real Gross Domestic Product	**9215**	**9440**	**12190**	**14101**	**16188**	**18520**	**3.0%**
Real Potential Gross Domestic Product	9433	9726	12313	14144	16186	18520	2.8%
Real Disposable Personal Income	**6748**	**7032**	**8894**	**10330**	**11864**	**13826**	**3.0%**
Components of Real Gross Domestic Product							
Real Consumption	6377	6576	8437	9802	11296	12946	3.0%
Real Investment	1575	1590	2387	3021	3726	4661	4.8%
Real Government Spending	1640	1713	1961	2092	2265	2423	1.5%
Real Exports	1076	1059	1838	2481	3376	4546	6.5%
Real Imports	1492	1547	2436	3265	4433	6015	6.1%
Energy Intensity							
(thousand Btu per 1996 dollar of GDP)							
Delivered Energy	7.69	7.55	6.73	6.26	5.84	5.45	-1.4%
Total Energy	10.53	10.36	9.17	8.50	7.91	7.37	-1.5%
Price Indices							
GDP Chain-Type Price Index (1996=1.000)	1.094	1.107	1.301	1.503	1.774	2.121	2.9%
Consumer Price Index (1982-4=1)	1.77	1.80	2.11	2.44	2.89	3.49	2.9%
Wholesale Price Index (1982=1.00)							
All Commodities	1.34	1.31	1.46	1.57	1.74	1.94	1.7%
Fuel and Power	1.05	0.93	1.06	1.18	1.33	1.52	2.2%
Interest Rates (percent, nominal)							
Federal Funds Rate	3.89	1.67	5.42	5.74	6.30	7.00	N/A
10-Year Treasury Note	5.02	4.61	6.60	6.52	7.07	7.95	N/A
AA Utility Bond Rate	7.57	7.19	7.99	8.19	8.59	9.27	N/A
Unemployment Rate (percent)	**4.77**	**5.78**	**4.93**	**4.53**	**4.41**	**4.44**	**N/A**
Housing Starts (millions)	**1.79**	**1.88**	**1.97**	**1.94**	**1.94**	**1.92**	**0.1%**
Commercial Floorspace, Total (billion square feet)	**70.2**	**72.1**	**83.8**	**89.9**	**95.9**	**101.8**	**1.5%**
Unit Sales of Light-Duty Vehicles (millions)	**17.11**	**16.78**	**18.01**	**18.71**	**20.25**	**21.32**	**1.0%**
Value of Shipments (billion 1996 dollars)							
Total Industrial	5368	5285	6439	7345	8344	9491	2.6%
Non-manufacturing	1309	1222	1425	1585	1710	1855	1.8%
Manufacturing	4059	4064	5013	5760	6634	7636	2.8%
Energy-Intensive	1085	1120	1273	1393	1500	1610	1.6%
Non-Energy Intensive	2974	2944	3741	4367	5135	6026	3.2%
Population and Employment (millions)							
Population, with Armed Forces Overseas	285.9	288.9	309.3	321.9	334.6	347.5	0.8%
Population, aged 16 and over	221.5	224.3	244.1	254.5	264.3	274.3	0.9%
Employment, Nonfarm	131.6	130.5	145.0	153.4	161.2	168.6	1.1%
Employment, Manufacturing	17.7	16.7	16.1	16.2	16.0	16.2	-0.1%
Labor Force	143.9	145.1	159.8	166.3	171.3	176.8	0.9%

GDP = Gross domestic product.
Btu = British thermal unit.
N/A = Not applicable.
Sources: 2001 and 2002: Global Insight macroeconomic model T250803. **Projections:** Energy Information Administration, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table A21. International Petroleum Supply and Disposition Summary
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
World Oil Price[1] (2002 dollars per barrel)	**22.25**	**23.68**	**24.17**	**25.07**	**26.02**	**27.00**	**0.6%**
Production[2] (Conventional)							
Industrialized Countries							
U.S. (50 states)	8.84	9.16	9.53	9.25	8.89	8.59	-0.3%
Canada	2.09	2.14	1.83	1.64	1.60	1.57	-1.3%
Mexico	3.62	3.61	4.20	4.53	4.60	4.82	1.3%
Western Europe[3]	6.82	6.76	6.34	5.87	5.48	4.97	-1.3%
Japan	0.08	0.08	0.08	0.07	0.06	0.06	-1.1%
Australia and New Zealand	0.79	0.75	0.96	0.91	0.88	0.86	0.6%
Total Industrialized	**22.24**	**22.51**	**22.93**	**22.28**	**21.52**	**20.87**	**-0.3%**
Eurasia							
Former Soviet Union							
Russia	7.30	7.67	9.92	10.52	10.77	10.93	1.6%
Caspian Area[4]	1.48	1.66	3.12	4.40	5.15	6.11	5.8%
Eastern Europe[5]	0.24	0.23	0.33	0.37	0.41	0.45	3.0%
Total Eurasia	**9.02**	**9.56**	**13.37**	**15.30**	**16.32**	**17.48**	**2.7%**
Developing Countries							
OPEC[6]							
Asia	1.41	1.36	1.26	1.25	1.29	1.33	-0.1%
Middle East	20.99	20.79	24.18	27.51	33.39	40.07	2.9%
North Africa	3.09	2.99	2.95	3.09	3.52	3.90	1.2%
West Africa	2.06	2.02	2.19	2.59	3.01	3.37	2.3%
South America	2.63	2.55	2.65	2.72	3.23	3.88	1.9%
Non-OPEC							
China	3.30	3.39	3.62	3.47	3.45	3.37	-0.0%
Other Asia	2.46	2.50	2.63	2.74	2.67	2.60	0.2%
Middle East[7]	2.02	1.96	2.24	2.46	2.56	2.77	1.5%
Africa	2.77	2.89	3.71	4.68	5.34	6.42	3.5%
South and Central America	3.70	3.79	4.50	5.34	5.86	6.35	2.3%
Total Developing Countries	**44.44**	**44.24**	**49.94**	**55.84**	**64.32**	**74.05**	**2.3%**
Total Production (Conventional)	**75.70**	**76.30**	**86.24**	**93.42**	**102.17**	**112.41**	**1.7%**
Production[8] (Nonconventional)							
U.S. (50 states)	0.00	0.00	0.00	0.00	0.00	0.00	N/A
Other North America	0.72	0.79	1.69	2.97	3.20	3.28	6.4%
Western Europe	0.04	0.04	0.04	0.04	0.04	0.04	0.8%
Asia	0.02	0.03	0.03	0.03	0.03	0.03	1.3%
Middle East[7]	0.01	0.01	0.01	0.02	0.02	0.03	6.8%
Africa.	0.15	0.16	0.19	0.22	0.25	0.28	2.6%
South and Central America	0.49	0.54	0.85	1.27	1.42	1.45	4.4%
Total Production (Nonconventional)	**1.42**	**1.55**	**2.81**	**4.55**	**4.97**	**5.11**	**5.3%**
Total Production	**77.12**	**77.85**	**89.05**	**97.97**	**107.13**	**117.53**	**1.8%**

Table A21. International Petroleum Supply and Disposition Summary (Continued)
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Consumption[9]							
Industrialized Countries							
U.S. (50 states)	19.71	19.61	22.71	24.80	26.41	28.30	1.6%
U.S. Territories	0.28	0.29	0.38	0.40	0.43	0.47	2.1%
Canada	1.91	1.96	2.23	2.32	2.36	2.44	1.0%
Mexico	1.94	2.01	2.65	3.19	3.62	4.09	3.1%
Western Europe[3]	13.98	14.02	14.36	14.64	14.80	15.26	0.4%
Japan	5.42	5.45	5.79	6.07	6.26	6.54	0.8%
Australia and New Zealand	1.01	1.04	1.28	1.43	1.58	1.75	2.3%
Total Industrialized	**44.25**	**44.39**	**49.41**	**52.86**	**55.47**	**58.85**	**1.2%**
Eurasia							
Former Soviet Union	3.90	4.05	5.10	5.26	5.73	6.25	1.9%
Eastern Europe[5]	1.41	1.44	1.74	1.96	2.21	2.54	2.5%
Total Eurasia	**5.30**	**5.49**	**6.84**	**7.22**	**7.94**	**8.79**	**2.1%**
Developing Countries							
China	4.97	5.11	6.48	7.68	9.39	10.88	3.3%
India	2.13	2.16	2.80	3.53	4.47	5.48	4.1%
South Korea	2.14	2.20	2.75	2.99	3.15	3.32	1.8%
Other Asia	5.53	5.63	6.65	7.81	8.93	10.17	2.6%
Middle East[7]	5.36	5.34	6.19	6.98	7.87	8.88	2.2%
Africa	2.58	2.56	2.68	2.91	3.16	3.50	1.4%
South and Central America	4.87	4.91	5.54	6.28	7.03	7.99	2.1%
Total Developing Countries	27.59	27.91	33.10	38.19	44.00	50.22	2.6%
Total Consumption	**77.14**	**77.79**	**89.35**	**98.27**	**107.40**	**117.8**	**1.8%**
OPEC Production[10]	30.55	30.11	33.89	38.12	45.51	53.67	2.5%
Non-OPEC Production[10]	46.56	47.74	55.16	59.85	61.62	63.86	1.3%
Net Eurasia Exports	3.73	4.08	6.54	8.09	8.40	8.71	3.4%
OPEC Market Share	0.40	0.39	0.38	0.39	0.42	0.46	0.7%

[1]Average refiner acquisition cost of imported crude oil.
[2]Includes 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.
[3]Western Europe = Austria, Belgium, Bosnia and Herzegovina, Croatia, Denmark, Finland, France, the unified Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Macedonia, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, United Kingdom, and Yugoslavia.
[4]Caspian area includes Other Former Soviet Union.
[5]Eastern Europe = Albania, Bulgaria, Czech Republic, Hungary, Poland, Romania, and Slovakia.
[6]OPEC = Organization of Petroleum Exporting Countries - Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.
[7]Non-OPEC Middle East includes Turkey.
[8]Includes liquids produced from energy crops, natural gas, coal, oil sands, and shale. Includes both OPEC and non-OPEC producers in the regional breakdown.
[9]Includes both OPEC and non-OPEC consumers in the regional breakdown.
[10]Includes both conventional and nonconventional liquids production.
Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.
N/A = Not applicable.
Sources: 2001 data derived from: Energy Information Administration (EIA), *International Energy Annual 2001*, DOE/EIA-0219(2001) (Washington, DC, March 2003).
2002 and projections: EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Economic Growth Case Comparisons

Table B1. Total Energy Supply and Disposition Summary

(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2002	Projections								
		2010			2020			2025		
		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	11.91	12.52	12.56	12.60	10.49	10.49	10.62	9.29	9.77	9.98
Natural Gas Plant Liquids	2.56	3.05	3.10	3.20	3.25	3.47	3.62	3.30	3.47	3.62
Dry Natural Gas	19.56	20.69	21.05	21.87	22.70	24.43	25.64	23.31	24.64	25.84
Coal	22.70	24.76	25.25	25.52	27.08	27.92	28.20	28.62	31.10	32.26
Nuclear Power	8.15	8.29	8.29	8.29	8.53	8.53	8.53	8.53	8.53	8.53
Renewable Energy[1]	5.84	6.97	7.18	7.39	7.96	8.45	9.18	8.36	9.00	10.14
Other[2]	1.13	0.85	0.88	0.91	0.79	0.81	0.82	0.82	0.84	0.86
Total	**71.85**	**77.13**	**78.30**	**79.79**	**80.81**	**84.09**	**86.62**	**82.23**	**87.33**	**91.22**
Imports										
Crude Oil[3]	19.84	23.66	24.51	25.38	30.65	31.55	33.27	32.65	34.21	35.63
Petroleum Products[4]	4.75	4.96	5.76	6.39	5.41	7.83	9.63	7.20	9.63	12.21
Natural Gas	4.10	5.87	6.54	6.79	6.90	7.56	8.40	7.45	8.29	9.35
Other Imports[5]	0.52	0.93	0.95	0.97	1.10	1.12	1.14	1.17	1.18	1.20
Total	**29.21**	**35.42**	**37.76**	**39.53**	**44.07**	**48.06**	**52.44**	**48.46**	**53.30**	**58.39**
Exports										
Petroleum[6]	2.03	2.14	2.15	2.15	2.16	2.13	2.17	2.14	2.15	2.16
Natural Gas	0.52	0.92	0.91	0.90	1.02	0.93	0.82	1.06	0.88	0.65
Coal	1.03	0.90	0.89	0.89	0.74	0.69	0.66	0.64	0.56	0.52
Total	**3.58**	**3.96**	**3.95**	**3.94**	**3.93**	**3.75**	**3.65**	**3.85**	**3.59**	**3.33**
Discrepancy[7]	**-0.24**	**0.28**	**0.34**	**0.38**	**0.45**	**0.48**	**0.51**	**0.52**	**0.56**	**0.58**
Consumption										
Petroleum Products[8]	38.11	42.46	44.15	45.79	47.82	51.35	55.09	50.41	54.99	59.41
Natural Gas	23.37	25.77	26.82	27.90	28.73	31.21	33.37	29.85	32.21	34.70
Coal	22.18	24.72	25.23	25.49	27.41	28.30	28.64	29.16	31.73	32.90
Nuclear Power	8.15	8.29	8.29	8.29	8.53	8.53	8.53	8.53	8.53	8.53
Renewable Energy[1]	5.84	6.98	7.18	7.39	7.97	8.46	9.18	8.36	9.00	10.14
Other[9]	0.07	0.09	0.11	0.12	0.06	0.07	0.08	0.03	0.03	0.03
Total	**97.72**	**108.32**	**111.77**	**114.99**	**120.51**	**127.92**	**134.89**	**126.33**	**136.48**	**145.70**
Net Imports - Petroleum	**22.56**	**26.48**	**28.13**	**29.62**	**33.90**	**37.25**	**40.72**	**37.70**	**41.69**	**45.69**
Prices (2002 dollars per unit)										
World Oil Price (dollars per barrel)[10]	23.68	23.64	24.17	24.67	24.77	26.02	27.27	25.30	27.00	28.55
Natural Gas Wellhead Price (dollars per thousand cubic feet)[11]	2.95	3.31	3.40	3.61	3.97	4.28	4.71	4.28	4.40	4.94
Coal Minemouth Price (dollars per ton)	17.90	16.53	16.88	17.47	15.78	16.32	16.92	15.67	16.57	17.95
Average Electricity Price (cents per kilowatthour)	7.2	6.5	6.6	6.9	6.5	6.9	7.3	6.6	6.9	7.3

[1]Includes 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 B18 for selected nonmarketed residential and commercial renewable energy.

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

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

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

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

[6]Includes crude oil and petroleum products.

[7]Balancing 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.

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

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

[10]Average refiner acquisition cost for imported crude oil.

[11]Represents lower 48 onshore and offshore supplies.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.

Sources: 2002 natural gas supply values: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2002 petroleum supply values: EIA, *Petroleum Supply Annual 2002,* DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). Other 2002 values: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002) and EIA, *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003). **Projections:** EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

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

Sector and Source	2002	Projections								
		2010			2020			2025		
		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	0.89	0.93	0.93	0.93	0.85	0.85	0.85	0.80	0.80	0.80
Kerosene	0.07	0.11	0.11	0.11	0.10	0.10	0.10	0.09	0.09	0.09
Liquefied Petroleum Gas	0.53	0.56	0.56	0.56	0.60	0.61	0.63	0.62	0.64	0.65
Petroleum Subtotal	1.48	1.60	1.60	1.61	1.56	1.56	1.58	1.51	1.53	1.54
Natural Gas	5.06	5.65	5.69	5.74	5.91	6.08	6.18	5.99	6.26	6.43
Coal	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Renewable Energy[1]	0.39	0.40	0.40	0.41	0.40	0.41	0.41	0.39	0.41	0.41
Electricity	4.33	4.85	4.87	4.89	5.49	5.60	5.68	5.75	5.96	6.08
Delivered Energy	**11.28**	**12.51**	**12.58**	**12.66**	**13.36**	**13.66**	**13.86**	**13.66**	**14.17**	**14.47**
Electricity Related Losses	9.60	10.48	10.48	10.47	11.41	11.43	11.37	11.77	11.95	11.91
Total	**20.88**	**23.00**	**23.06**	**23.13**	**24.77**	**25.10**	**25.23**	**25.43**	**26.12**	**26.38**
Commercial										
Distillate Fuel	0.49	0.62	0.62	0.63	0.67	0.67	0.69	0.68	0.70	0.72
Residual Fuel	0.08	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Kerosene	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Liquefied Petroleum Gas	0.09	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	0.72	0.92	0.92	0.92	0.97	0.97	1.00	0.99	1.00	1.02
Natural Gas	3.21	3.55	3.57	3.59	3.83	3.94	4.02	3.98	4.16	4.30
Coal	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Renewable Energy[3]	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Electricity	4.12	5.02	5.05	5.06	6.10	6.24	6.36	6.59	6.83	7.03
Delivered Energy	**8.25**	**9.68**	**9.74**	**9.77**	**11.09**	**11.35**	**11.57**	**11.75**	**12.19**	**12.54**
Electricity Related Losses	9.15	10.84	10.86	10.83	12.68	12.73	12.73	13.49	13.70	13.77
Total	**17.40**	**20.53**	**20.60**	**20.60**	**23.77**	**24.07**	**24.30**	**25.24**	**25.89**	**26.31**
Industrial[4]										
Distillate Fuel	1.16	1.10	1.17	1.25	1.20	1.34	1.49	1.25	1.43	1.62
Liquefied Petroleum Gas	2.22	2.12	2.35	2.52	2.22	2.74	3.20	2.28	2.94	3.53
Petrochemical Feedstock	1.22	1.21	1.35	1.44	1.24	1.54	1.79	1.25	1.62	1.95
Residual Fuel	0.20	0.20	0.21	0.22	0.21	0.22	0.24	0.21	0.23	0.25
Motor Gasoline[2]	0.16	0.15	0.16	0.17	0.16	0.18	0.20	0.16	0.19	0.22
Other Petroleum[5]	4.03	4.15	4.38	4.63	4.45	4.93	5.38	4.58	5.17	5.67
Petroleum Subtotal	9.00	8.93	9.63	10.23	9.48	10.95	12.30	9.73	11.59	13.25
Natural Gas	7.43	8.08	8.62	9.11	8.69	9.84	10.93	9.02	10.58	12.02
Lease and Plant Fuel[6]	1.35	1.38	1.40	1.44	1.54	1.65	1.72	1.61	1.69	1.75
Natural Gas Subtotal	8.78	9.46	10.02	10.55	10.23	11.49	12.65	10.64	12.27	13.77
Metallurgical Coal	0.62	0.64	0.64	0.64	0.52	0.52	0.52	0.47	0.47	0.46
Steam Coal	1.47	1.36	1.41	1.45	1.37	1.45	1.52	1.38	1.47	1.62
Net Coal Coke Imports	0.03	0.01	0.01	0.02	0.00	0.00	0.02	0.00	0.01	0.03
Coal Subtotal	2.12	2.01	2.06	2.11	1.90	1.97	2.05	1.86	1.95	2.11
Renewable Energy[7]	1.66	1.83	2.00	2.13	2.16	2.48	2.79	2.32	2.70	3.08
Electricity	3.39	3.53	3.82	4.10	3.93	4.47	5.06	4.12	4.85	5.63
Delivered Energy	**24.94**	**25.76**	**27.53**	**29.12**	**27.68**	**31.36**	**34.85**	**28.66**	**33.35**	**37.85**
Electricity Related Losses	7.53	7.62	8.22	8.76	8.17	9.12	10.13	8.43	9.72	11.03
Total	**32.47**	**33.38**	**35.75**	**37.88**	**35.85**	**40.48**	**44.98**	**37.09**	**43.07**	**48.88**

Table B2. Energy Consumption by Sector and Source (Continued)

(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Transportation										
Distillate Fuell[8]	5.12	6.00	6.42	6.84	7.16	8.02	8.92	7.83	8.94	10.12
Jet Fuel[9]	3.34	3.87	3.93	4.02	4.57	4.69	4.75	4.72	4.91	5.00
Motor Gasoline[2]	16.62	19.45	19.88	20.33	22.06	23.11	24.14	23.58	24.98	26.33
Residual Fuel	0.71	0.79	0.79	0.80	0.80	0.82	0.83	0.81	0.83	0.84
Liquefied Petroleum Gas	0.02	0.05	0.06	0.06	0.07	0.08	0.08	0.08	0.08	0.09
Other Petroleum[10]	0.24	0.24	0.25	0.27	0.27	0.30	0.32	0.28	0.32	0.36
Petroleum Subtotal	26.06	30.40	31.34	32.32	34.94	37.00	39.05	37.30	40.07	42.74
Pipeline Fuel Natural Gas	0.65	0.68	0.69	0.72	0.75	0.83	0.88	0.80	0.86	0.89
Compressed Natural Gas	0.01	0.05	0.06	0.06	0.09	0.10	0.10	0.10	0.11	0.12
Renewable Energy (E85)[11]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.11	0.11	0.11	0.12	0.12	0.12
Delivered Energy	**26.79**	**31.22**	**32.18**	**33.20**	**35.88**	**38.05**	**40.15**	**38.32**	**41.16**	**43.89**
Electricity Related Losses	0.17	0.19	0.19	0.19	0.22	0.22	0.22	0.24	0.24	0.24
Total	**26.96**	**31.41**	**32.37**	**33.39**	**36.11**	**38.27**	**40.37**	**38.56**	**41.40**	**44.13**
Delivered Energy Consumption for All Sectors										
Distillate Fuel	7.66	8.65	9.15	9.64	9.89	10.88	11.95	10.56	11.88	13.27
Kerosene	0.09	0.16	0.16	0.16	0.15	0.14	0.14	0.13	0.13	0.13
Jet Fuel[9]	3.34	3.87	3.93	4.02	4.57	4.69	4.75	4.72	4.91	5.00
Liquefied Petroleum Gas	2.86	2.82	3.07	3.24	3.00	3.53	4.00	3.08	3.76	4.37
Motor Gasoline[2]	16.83	19.65	20.09	20.55	22.26	23.34	24.39	23.79	25.22	26.60
Petrochemical Feedstock	1.22	1.21	1.35	1.44	1.24	1.54	1.79	1.25	1.62	1.95
Residual Fuel	1.00	1.12	1.13	1.15	1.14	1.17	1.20	1.15	1.19	1.23
Other Petroleum[12]	4.26	4.37	4.61	4.87	4.70	5.21	5.68	4.84	5.46	6.01
Petroleum Subtotal	37.26	41.84	43.48	45.08	46.94	50.50	53.92	49.53	54.18	58.56
Natural Gas	15.71	17.33	17.94	18.50	18.51	19.95	21.23	19.09	21.11	22.86
Lease and Plant Fuel Plant[6]	1.35	1.38	1.40	1.44	1.54	1.65	1.72	1.61	1.69	1.75
Pipeline Natural Gas	0.65	0.68	0.69	0.72	0.75	0.83	0.88	0.80	0.86	0.89
Natural Gas Subtotal	17.72	19.39	20.03	20.66	20.80	22.43	23.83	21.50	23.66	25.51
Metallurgical Coal	0.62	0.64	0.64	0.64	0.52	0.52	0.52	0.47	0.47	0.46
Steam Coal	1.58	1.47	1.52	1.56	1.48	1.56	1.63	1.49	1.58	1.73
Net Coal Coke Imports	0.03	0.01	0.01	0.02	0.00	0.00	0.02	0.00	0.01	0.03
Coal Subtotal	2.23	2.12	2.17	2.22	2.00	2.08	2.16	1.96	2.06	2.22
Renewable Energy[13]	2.15	2.34	2.50	2.64	2.66	2.99	3.30	2.82	3.21	3.60
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	11.92	13.49	13.83	14.14	15.61	16.41	17.22	16.58	17.77	18.86
Delivered Energy	**71.27**	**79.18**	**82.03**	**84.74**	**88.01**	**94.42**	**100.44**	**92.39**	**100.87**	**108.75**
Electricity Related Losses	26.45	29.14	29.75	30.25	32.49	33.50	34.46	33.93	35.61	36.95
Total	**97.72**	**108.32**	**111.77**	**114.99**	**120.50**	**127.92**	**134.89**	**126.32**	**136.48**	**145.70**
Electric Power[14]										
Distillate Fuel	0.16	0.15	0.16	0.16	0.32	0.26	0.56	0.31	0.27	0.32
Residual Fuel	0.69	0.47	0.51	0.55	0.56	0.59	0.61	0.57	0.54	0.53
Petroleum Subtotal	0.85	0.62	0.66	0.71	0.88	0.85	1.17	0.89	0.81	0.85
Natural Gas	5.65	6.38	6.79	7.24	7.93	8.78	9.54	8.34	8.55	9.19
Steam Coal	19.96	22.60	23.05	23.27	25.41	26.22	26.48	27.19	29.67	30.68
Nuclear Power	8.15	8.29	8.29	8.29	8.53	8.53	8.53	8.53	8.53	8.53
Renewable Energy[15]	3.69	4.64	4.68	4.75	5.30	5.47	5.88	5.55	5.79	6.54
Electricity Imports	0.07	0.09	0.11	0.12	0.06	0.07	0.08	0.03	0.03	0.03
Total	**38.36**	**42.63**	**43.58**	**44.39**	**48.10**	**49.92**	**51.67**	**50.52**	**53.37**	**55.81**

Table B2. Energy Consumption by Sector and Source (Continued)

(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2002	Projections								
		2010			2020			2025		
		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	7.82	8.80	9.31	9.80	10.20	11.14	12.51	10.88	12.15	13.59
Kerosene	0.09	0.16	0.16	0.16	0.15	0.14	0.14	0.13	0.13	0.13
Jet Fuel[9]	3.34	3.87	3.93	4.02	4.57	4.69	4.75	4.72	4.91	5.00
Liquefied Petroleum Gas	2.86	2.82	3.07	3.24	3.00	3.53	4.00	3.08	3.76	4.37
Motor Gasoline[2]	16.83	19.65	20.09	20.55	22.26	23.34	24.39	23.79	25.22	26.60
Petrochemical Feedstock	1.22	1.21	1.35	1.44	1.24	1.54	1.79	1.25	1.62	1.95
Residual Fuel	1.69	1.59	1.64	1.70	1.70	1.76	1.81	1.72	1.72	1.76
Other Petroleum[12]	4.26	4.37	4.61	4.87	4.70	5.21	5.68	4.84	5.46	6.01
Petroleum Subtotal	38.11	42.46	44.15	45.79	47.82	51.35	55.09	50.41	54.99	59.41
Natural Gas	21.36	23.72	24.73	25.74	26.44	28.73	30.77	27.43	29.66	32.05
Lease and Plant Fuel[6]	1.35	1.38	1.40	1.44	1.54	1.65	1.72	1.61	1.69	1.75
Pipeline Natural Gas	0.65	0.68	0.69	0.72	0.75	0.83	0.88	0.80	0.86	0.89
Natural Gas Subtotal	23.37	25.77	26.82	27.90	28.73	31.21	33.37	29.85	32.21	34.70
Metallurgical Coal	0.62	0.64	0.64	0.64	0.52	0.52	0.52	0.47	0.47	0.46
Steam Coal	21.54	24.07	24.57	24.83	26.89	27.78	28.11	28.68	31.25	32.41
Net Coal Coke Imports	0.03	0.01	0.01	0.02	0.00	0.00	0.02	0.00	0.01	0.03
Coal Subtotal	22.18	24.72	25.23	25.49	27.41	28.30	28.64	29.16	31.73	32.90
Nuclear Power	8.15	8.29	8.29	8.29	8.53	8.53	8.53	8.53	8.53	8.53
Renewable Energy[16]	5.84	6.98	7.18	7.39	7.97	8.46	9.18	8.36	9.00	10.14
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity Imports	0.07	0.09	0.11	0.12	0.06	0.07	0.08	0.03	0.03	0.03
Total	**97.72**	**108.32**	**111.77**	**114.99**	**120.51**	**127.92**	**134.89**	**126.33**	**136.48**	**145.70**
Energy Use and Related Statistics										
Delivered Energy Use	71.27	79.18	82.03	84.74	88.01	94.42	100.44	92.39	100.87	108.75
Total Energy Use	97.72	108.32	111.77	114.99	120.50	127.92	134.89	126.32	136.48	145.70
Population (millions)	288.93	304.13	309.28	314.42	322.17	334.61	347.05	331.35	347.53	363.71
Gross Domestic Product (billion 1996 dollars)	9440	11727	12190	12858	14722	16188	17603	16280	18520	20685
Carbon Dioxide Emissions (million metric tons)	5729.3	6367.8	6558.8	6729.6	7136.5	7535.6	7886.3	7537.9	8142.0	8614.9

[1]Includes wood used for residential heating. See Table B18 for estimates of nonmarketed renewable energy consumption for geothermal heat pumps, solar thermal hot water heating, and solar photovoltaic electricity generation.

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

[3]Includes commercial sector consumption of wood and wood waste, landfill gas, municipal solid waste, and other biomass for combined heat and power. See Table B18 for estimates of nonmarketed renewable energy consumption for solar thermal hot water heating and solar photovoltaic electricity generation.

[4]Fuel consumption includes consumption for combined heat and power, which produces electricity, both for sale to the grid and for own use, and other useful thermal energy.

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

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

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

[8]Diesel fuel containing 500 parts per million (ppm) or 15 ppm sulfur.

[9]Includes only kerosene type.

[10]Includes aviation gasoline and lubricants.

[11]E85 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.

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

[13]Includes 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.

[14]Includes 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.

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

[16]Includes 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 2002 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: 2002 consumption based on: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2002 population and gross domestic product: Global Insight macroeconomic model T250803. 2002 carbon dioxide emissions: EIA, *Emissions of Greenhouse Gases in the United States 2002,* DOE/EIA-0573(2002) (Washington, DC, October 2003). **Projections:** EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B3. Energy Prices by Sector and Source

(2002 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Residential	**14.73**	**13.86**	**14.21**	**14.77**	**14.26**	**15.08**	**16.06**	**14.63**	**15.38**	**16.43**
Primary Energy[1]	8.14	8.04	8.15	8.36	8.44	8.76	9.20	8.68	8.89	9.39
Petroleum Products[2]	9.87	9.75	9.90	10.08	10.30	10.86	11.18	10.72	11.26	11.93
Distillate Fuel	8.23	7.73	7.82	7.94	7.94	8.39	8.61	8.19	8.53	9.01
Liquefied Petroleum Gas	12.92	13.64	13.89	14.16	14.16	14.79	15.20	14.49	15.19	16.05
Natural Gas	7.65	7.57	7.67	7.89	7.96	8.24	8.71	8.18	8.32	8.79
Electricity	24.73	22.56	23.30	24.41	22.20	23.73	25.45	22.39	23.88	25.67
Commercial	**14.68**	**13.39**	**13.77**	**14.39**	**14.09**	**14.93**	**15.87**	**14.54**	**15.28**	**16.20**
Primary Energy[1]	6.35	6.37	6.48	6.68	6.78	7.11	7.52	7.01	7.22	7.70
Petroleum Products[2]	6.88	6.22	6.34	6.48	6.39	6.83	7.06	6.61	6.98	7.44
Distillate Fuel	6.07	5.36	5.45	5.57	5.54	6.01	6.23	5.81	6.15	6.62
Residual Fuel	4.21	4.05	4.13	4.21	4.22	4.41	4.60	4.30	4.55	4.78
Natural Gas	6.37	6.53	6.64	6.87	7.02	7.31	7.77	7.25	7.41	7.89
Electricity	22.82	19.77	20.39	21.41	19.95	21.21	22.58	20.31	21.48	22.75
Industrial[3]	**6.31**	**6.19**	**6.44**	**6.74**	**6.65**	**7.21**	**7.73**	**6.94**	**7.42**	**8.08**
Primary Energy	4.77	4.95	5.14	5.33	5.40	5.88	6.27	5.67	6.07	6.64
Petroleum Products[2]	6.35	6.60	6.84	6.99	6.95	7.54	7.86	7.25	7.81	8.41
Distillate Fuel	6.21	5.57	5.68	5.79	5.75	6.24	6.47	6.06	6.40	6.88
Liquefied Petroleum Gas	8.28	9.29	9.72	10.00	9.90	10.66	11.18	10.20	11.11	12.11
Residual Fuel	3.89	3.66	3.74	3.83	3.84	4.03	4.22	3.92	4.17	4.41
Natural Gas[4]	3.75	3.94	4.05	4.28	4.55	4.89	5.34	4.82	4.99	5.54
Metallurgical Coal	1.87	1.92	1.96	2.01	1.79	1.84	1.90	1.70	1.77	1.84
Steam Coal	1.52	1.54	1.58	1.64	1.45	1.53	1.60	1.42	1.53	1.65
Electricity	14.74	12.88	13.36	14.11	13.05	13.99	15.03	13.31	14.09	15.09
Transportation	**9.91**	**10.30**	**10.50**	**10.80**	**10.09**	**10.54**	**10.97**	**10.14**	**10.69**	**11.21**
Primary Energy	9.88	10.28	10.48	10.77	10.06	10.52	10.94	10.11	10.67	11.18
Petroleum Products[2]	9.88	10.28	10.48	10.78	10.07	10.52	10.94	10.11	10.67	11.19
Distillate Fuel[5]	9.41	9.98	10.12	10.52	9.38	10.00	10.45	9.40	10.03	10.58
Jet Fuel[6]	5.97	5.64	5.76	5.92	5.62	6.06	6.33	5.77	6.21	6.67
Motor Gasoline[7]	11.15	11.64	11.87	12.18	11.50	11.90	12.33	11.49	12.06	12.56
Residual Fuel	3.77	3.52	3.60	3.68	3.68	3.88	4.07	3.76	4.02	4.26
Liquefied Petroleum Gas[8]	15.00	14.65	14.96	15.34	14.73	15.51	16.11	14.94	15.83	16.87
Natural Gas[9]	7.38	8.12	8.26	8.56	8.66	9.06	9.63	8.86	9.09	9.68
Ethanol (E85)[10]	15.19	17.12	17.22	17.33	17.47	18.28	18.45	18.41	18.58	18.83
Electricity	21.10	19.07	19.57	20.40	18.96	20.03	21.27	19.00	19.92	21.07
Average End-Use Energy	**10.10**	**10.03**	**10.23**	**10.54**	**10.28**	**10.76**	**11.25**	**10.50**	**10.96**	**11.53**
Primary Energy	7.70	8.07	8.22	8.44	8.26	8.64	9.01	8.44	8.82	9.30
Electricity	21.20	18.97	19.47	20.33	19.00	20.10	21.30	19.28	20.26	21.40
Electric Power[11]										
Fossil Fuel Average	1.89	1.85	1.92	2.03	2.01	2.18	2.41	2.06	2.11	2.33
Petroleum Products	4.32	4.13	4.21	4.28	4.41	4.67	5.09	4.58	4.88	5.27
Distillate Fuel	5.58	4.80	4.92	5.03	4.97	5.47	5.74	5.28	5.62	6.12
Residual Fuel	4.04	3.92	3.99	4.06	4.10	4.31	4.50	4.20	4.50	4.77
Natural Gas	3.77	3.95	4.04	4.28	4.52	4.85	5.32	4.78	4.92	5.47
Steam Coal	1.26	1.19	1.22	1.26	1.15	1.20	1.24	1.14	1.22	1.30

Table B3. Energy Prices by Sector and Source (Continued)

(2002 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2002	Projections								
		2010			2020			2025		
		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 Users[12]										
Petroleum Products[2]	8.94	9.40	9.57	9.80	9.36	9.81	10.14	9.49	10.01	10.51
Distillate Fuel	8.52	8.78	8.93	9.27	8.45	9.07	9.41	8.58	9.18	9.73
Jet Fuel	5.97	5.64	5.76	5.92	5.62	6.06	6.33	5.77	6.21	6.67
Liquefied Petroleum Gas	9.27	10.33	10.65	10.89	10.95	11.55	11.96	11.25	11.96	12.84
Motor Gasoline[7]	11.15	11.64	11.87	12.18	11.50	11.90	12.33	11.49	12.06	12.56
Residual Fuel	3.92	3.70	3.78	3.86	3.88	4.08	4.27	3.96	4.23	4.48
Natural Gas	5.07	5.20	5.27	5.46	5.67	5.93	6.34	5.91	6.03	6.50
Coal	1.28	1.22	1.25	1.29	1.16	1.22	1.26	1.16	1.24	1.33
Ethanol (E85)[10]	15.19	17.12	17.22	17.33	17.47	18.28	18.45	18.41	18.58	18.83
Electricity	21.20	18.97	19.47	20.33	19.00	20.10	21.30	19.28	20.26	21.40
Non-Renewable Energy Expenditures by Sector (billion 2002 dollars)										
Residential	160.37	167.84	173.01	180.96	184.85	199.98	216.04	194.06	211.69	230.97
Commercial	119.67	128.35	132.72	139.12	154.83	167.90	182.08	169.38	184.74	201.55
Industrial	120.96	117.85	132.71	148.55	134.70	169.02	205.02	145.04	185.61	234.80
Transportation	259.11	314.69	330.65	350.71	354.55	392.36	430.65	380.37	430.99	481.97
Total Non-Renewable Expenditures	660.11	728.73	769.08	819.34	828.93	929.26	1033.79	888.85	1013.03	1149.30
Transportation Renewable Expenditures	0.01	0.03	0.03	0.04	0.05	0.06	0.06	0.06	0.07	0.08
Total Expenditures	**660.12**	**728.76**	**769.11**	**819.38**	**828.98**	**929.32**	**1033.86**	**888.91**	**1013.10**	**1149.38**

[1]Weighted average price includes fuels below as well as coal.
[2]This quantity is the weighted average for all petroleum products, not just those listed below.
[3]Includes combined heat and power, which produces electricity and other useful thermal energy.
[4]Excludes use for lease and plant fuel.
[5] Diesel fuel containing 500 parts per million (ppm) or 15 ppm sulfur. Price includes Federal and State taxes while excluding county and local taxes.
[6]Kerosene-type jet fuel. Price includes Federal and State taxes while excluding county and local taxes.
[7]Sales weighted-average price for all grades. Includes Federal, State and local taxes.
[8]Includes Federal and State taxes while excluding county and local taxes.
[9]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[10]E85 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.
[11]Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.
[12]Weighted 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 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 prices for motor gasoline, distillate, and jet fuel are based on: Energy Information Administration (EIA), *Petroleum Marketing Annual 2002*, http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_annual/current/pdf/pmaall.pdf (August 2003). 2002 residential, commercial, and transportation natural gas delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2002 electric power sector natural gas prices: Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 2002 industrial natural gas delivered prices based on: EIA, *Manufacturing Energy Consumption Survey 1998*. 2002 coal prices based on EIA, *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003) and EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E. 2002 electricity prices: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2002 ethanol prices derived from weekly spot prices in the Oxy Fuel News. **Projections:** EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B4. Residential Sector Key Indicators and End-Use Consumption

(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Key Indicators										
Households (millions)										
Single-Family	74.77	82.01	82.87	83.92	88.91	92.09	94.65	91.66	96.32	99.73
Multifamily	29.20	30.50	30.71	31.19	32.34	33.07	34.10	33.30	34.36	35.75
Mobile Homes	6.31	6.21	6.25	6.32	6.68	6.88	6.94	6.81	7.12	7.17
Total	**110.28**	**118.72**	**119.84**	**121.43**	**127.93**	**132.04**	**135.69**	**131.77**	**137.79**	**142.64**
Average House Square Footage	**1689**	**1728**	**1731**	**1733**	**1761**	**1771**	**1776**	**1774**	**1788**	**1794**
Energy Intensity										
(million Btu per household)										
Delivered Energy Consumption	102.3	105.4	105.0	104.2	104.4	103.5	102.2	103.6	102.8	101.5
Total Energy Consumption	189.4	193.7	192.4	190.4	193.6	190.1	186.0	193.0	189.5	184.9
(thousand Btu per square foot)										
Delivered Energy Consumption	60.6	61.0	60.6	60.1	59.3	58.4	57.5	58.4	57.5	56.6
Total Energy Consumption	112.1	112.1	111.1	109.9	109.9	107.3	104.7	108.8	106.0	103.1
Delivered Energy Consumption by Fuel										
Electricity										
Space Heating	0.40	0.43	0.43	0.43	0.44	0.45	0.45	0.44	0.46	0.46
Space Cooling	0.71	0.69	0.69	0.70	0.74	0.76	0.78	0.77	0.80	0.82
Water Heating	0.37	0.37	0.37	0.37	0.36	0.36	0.36	0.34	0.35	0.35
Refrigeration	0.42	0.37	0.37	0.37	0.35	0.36	0.37	0.35	0.37	0.38
Cooking	0.10	0.11	0.11	0.11	0.12	0.12	0.13	0.12	0.13	0.13
Clothes Dryers	0.24	0.25	0.25	0.25	0.26	0.26	0.27	0.27	0.27	0.28
Freezers	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13
Lighting	0.75	0.86	0.87	0.87	0.95	0.97	0.98	0.99	1.02	1.03
Clothes Washers[1]	0.03	0.04	0.04	0.04	0.06	0.06	0.06	0.06	0.06	0.07
Dishwashers[1]	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Color Televisions	0.12	0.18	0.18	0.19	0.25	0.26	0.26	0.26	0.27	0.28
Personal Computers	0.06	0.08	0.08	0.08	0.11	0.11	0.12	0.13	0.14	0.14
Furnace Fans	0.08	0.09	0.09	0.09	0.10	0.10	0.11	0.11	0.11	0.11
Other Uses[2]	0.88	1.24	1.25	1.26	1.59	1.63	1.65	1.77	1.83	1.87
Delivered Energy	**4.33**	**4.85**	**4.87**	**4.89**	**5.49**	**5.60**	**5.68**	**5.75**	**5.96**	**6.08**
Natural Gas										
Space Heating	3.54	3.98	4.01	4.04	4.20	4.33	4.40	4.28	4.48	4.60
Space Cooling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Heating	1.15	1.24	1.25	1.26	1.24	1.27	1.29	1.23	1.28	1.31
Cooking	0.21	0.23	0.23	0.23	0.25	0.26	0.26	0.26	0.27	0.27
Clothes Dryers	0.07	0.09	0.09	0.09	0.10	0.11	0.11	0.11	0.11	0.12
Other Uses[3]	0.10	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.13
Delivered Energy	**5.06**	**5.65**	**5.69**	**5.74**	**5.91**	**6.08**	**6.18**	**5.99**	**6.26**	**6.43**
Distillate										
Space Heating	0.77	0.81	0.81	0.81	0.75	0.75	0.75	0.71	0.71	0.71
Water Heating	0.12	0.12	0.12	0.12	0.10	0.10	0.10	0.09	0.09	0.10
Other Uses[4]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Delivered Energy	**0.89**	**0.93**	**0.93**	**0.93**	**0.85**	**0.85**	**0.85**	**0.80**	**0.80**	**0.80**
Liquefied Petroleum Gas										
Space Heating	0.30	0.30	0.30	0.30	0.30	0.31	0.31	0.30	0.31	0.31
Water Heating	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Cooking	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Other Uses[3]	0.15	0.18	0.18	0.18	0.22	0.23	0.23	0.24	0.25	0.26
Delivered Energy	**0.53**	**0.56**	**0.56**	**0.56**	**0.60**	**0.61**	**0.63**	**0.62**	**0.64**	**0.65**
Marketed Renewables (wood)[5]	0.39	0.40	0.40	0.41	0.40	0.41	0.41	0.39	0.41	0.41
Other Fuels[6]	0.08	0.12	0.12	0.12	0.11	0.11	0.11	0.10	0.10	0.10

Table B4. Residential Sector Key Indicators and End-Use Consumption (Continued)

(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Delivered Energy Consumption by End-Use										
Space Heating	5.48	6.05	6.08	6.12	6.21	6.35	6.44	6.23	6.46	6.60
Space Cooling	0.71	0.69	0.69	0.70	0.74	0.76	0.78	0.77	0.80	0.82
Water Heating	1.69	1.78	1.79	1.80	1.74	1.78	1.81	1.70	1.77	1.81
Refrigeration	0.42	0.37	0.37	0.37	0.35	0.36	0.37	0.35	0.37	0.38
Cooking	0.34	0.37	0.37	0.37	0.40	0.41	0.42	0.41	0.42	0.44
Clothes Dryers	0.31	0.34	0.34	0.34	0.36	0.37	0.38	0.38	0.39	0.40
Freezers	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13
Lighting	0.75	0.86	0.87	0.87	0.95	0.97	0.98	0.99	1.02	1.03
Clothes Washers	0.03	0.04	0.04	0.04	0.06	0.06	0.06	0.06	0.06	0.07
Dishwashers	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Color Televisions	0.12	0.18	0.18	0.19	0.25	0.26	0.26	0.26	0.27	0.28
Personal Computers	0.06	0.08	0.08	0.08	0.11	0.11	0.12	0.13	0.14	0.14
Furnace Fans	0.08	0.09	0.09	0.09	0.10	0.10	0.11	0.11	0.11	0.11
Other Uses[7]	1.13	1.53	1.54	1.55	1.93	1.97	2.00	2.13	2.20	2.25
Delivered Energy	**11.28**	**12.51**	**12.58**	**12.66**	**13.36**	**13.66**	**13.86**	**13.66**	**14.17**	**14.47**
Electricity Related Losses	**9.60**	**10.48**	**10.48**	**10.47**	**11.41**	**11.43**	**11.37**	**11.77**	**11.95**	**11.91**
Total Energy Consumption by End-Use										
Space Heating	6.36	6.96	6.99	7.03	7.14	7.27	7.35	7.13	7.37	7.50
Space Cooling	2.29	2.18	2.19	2.19	2.29	2.32	2.33	2.34	2.41	2.42
Water Heating	2.51	2.58	2.58	2.59	2.49	2.52	2.54	2.40	2.46	2.49
Refrigeration	1.37	1.15	1.16	1.17	1.08	1.09	1.11	1.08	1.11	1.13
Cooking	0.57	0.60	0.61	0.62	0.64	0.66	0.67	0.65	0.68	0.69
Clothes Dryers	0.83	0.89	0.89	0.89	0.90	0.91	0.91	0.92	0.94	0.94
Freezers	0.43	0.36	0.37	0.37	0.36	0.36	0.37	0.36	0.37	0.37
Lighting	2.41	2.73	2.73	2.72	2.94	2.95	2.94	3.01	3.07	3.05
Clothes Washers	0.10	0.12	0.12	0.13	0.17	0.18	0.18	0.18	0.19	0.19
Dishwashers	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10
Color Televisions	0.40	0.58	0.58	0.58	0.78	0.78	0.78	0.81	0.82	0.82
Personal Computers	0.21	0.25	0.25	0.25	0.34	0.35	0.35	0.39	0.41	0.42
Furnace Fans	0.25	0.28	0.28	0.28	0.31	0.32	0.32	0.32	0.33	0.34
Other Uses[7]	3.09	4.22	4.22	4.23	5.25	5.29	5.31	5.74	5.87	5.91
Total	**20.88**	**23.00**	**23.06**	**23.13**	**24.77**	**25.10**	**25.23**	**25.43**	**26.12**	**26.38**
Non-Marketed Renewables										
Geothermal[8]	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
Solar[9]	0.02	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04
Total	**0.02**	**0.03**	**0.03**	**0.03**	**0.04**	**0.04**	**0.05**	**0.05**	**0.05**	**0.05**

[1]Does not include electric water heating portion of load.
[2]Includes small electric devices, heating elements, and motors.
[3]Includes such appliances as swimming pool heaters, outdoor grills, and outdoor lighting (natural gas).
[4]Includes such appliances as swimming pool and hot tub heaters.
[5]Includes wood used for primary and secondary heating in wood stoves or fireplaces as reported in the *Residential Energy Consumption Survey 2001*.
[6]Includes kerosene and coal.
[7]Includes all other uses listed above.
[8]Includes primary energy displaced by geothermal heat pumps in space heating and cooling applications.
[9]Includes 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 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 based on: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections:** EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B5. Commercial Sector Key Indicators and Consumption

(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Key Indicators										
Total Floorspace (billion square feet)										
Surviving	68.9	80.3	81.1	81.8	90.0	93.1	96.2	94.3	98.8	103.1
New Additions	3.2	2.5	2.7	3.0	2.5	2.8	3.1	2.6	3.0	3.3
Total	**72.1**	**82.8**	**83.8**	**84.8**	**92.5**	**95.9**	**99.3**	**96.9**	**101.8**	**106.4**
Energy Consumption Intensity (thousand Btu per square foot)										
Delivered Energy Consumption	114.5	116.9	116.2	115.3	119.9	118.3	116.5	121.2	119.7	117.9
Electricity Related Losses	126.9	130.9	129.6	127.7	137.1	132.7	128.2	139.2	134.6	129.4
Total Energy Consumption	241.4	247.8	245.8	243.0	256.9	251.0	244.8	260.4	254.3	247.3
Delivered Energy Consumption by Fuel										
Purchased Electricity										
Space Heating[1]	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.16	0.16
Space Cooling[1]	0.46	0.45	0.45	0.45	0.47	0.48	0.48	0.48	0.49	0.50
Water Heating[1]	0.14	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Ventilation	0.16	0.18	0.18	0.18	0.18	0.18	0.19	0.18	0.19	0.19
Cooking	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Lighting	1.12	1.30	1.30	1.29	1.39	1.40	1.39	1.41	1.43	1.42
Refrigeration	0.20	0.22	0.22	0.22	0.24	0.24	0.25	0.24	0.25	0.25
Office Equipment (PC)	0.14	0.24	0.24	0.24	0.32	0.34	0.35	0.35	0.37	0.38
Office Equipment (non-PC)	0.31	0.46	0.46	0.47	0.68	0.71	0.74	0.82	0.87	0.91
Other Uses[2]	1.41	1.84	1.86	1.87	2.47	2.55	2.63	2.78	2.91	3.03
Delivered Energy	**4.12**	**5.02**	**5.05**	**5.06**	**6.10**	**6.24**	**6.36**	**6.59**	**6.83**	**7.03**
Natural Gas										
Space Heating[1]	1.42	1.56	1.56	1.57	1.61	1.64	1.66	1.64	1.69	1.72
Space Cooling[1]	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
Water Heating[1]	0.59	0.69	0.70	0.70	0.77	0.79	0.80	0.81	0.84	0.85
Cooking	0.26	0.30	0.30	0.31	0.34	0.34	0.35	0.35	0.36	0.37
Other Uses[3]	0.93	0.98	0.99	1.00	1.08	1.14	1.19	1.15	1.24	1.33
Delivered Energy	**3.21**	**3.55**	**3.57**	**3.59**	**3.83**	**3.94**	**4.02**	**3.98**	**4.16**	**4.30**
Distillate										
Space Heating[1]	0.17	0.24	0.24	0.25	0.28	0.29	0.31	0.30	0.31	0.33
Water Heating[1]	0.07	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09
Other Uses[4]	0.24	0.30	0.30	0.29	0.30	0.29	0.29	0.30	0.29	0.29
Delivered Energy	**0.49**	**0.62**	**0.62**	**0.63**	**0.67**	**0.67**	**0.69**	**0.68**	**0.70**	**0.72**
Other Fuels[5]	**0.33**	**0.39**	**0.39**	**0.40**	**0.40**	**0.40**	**0.40**	**0.40**	**0.40**	**0.40**
Marketed Renewable Fuels										
Biomass	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Delivered Energy	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**
Delivered Energy Consumption by End-Use										
Space Heating[1]	1.74	1.96	1.97	1.97	2.05	2.09	2.12	2.09	2.16	2.21
Space Cooling[1]	0.48	0.47	0.47	0.47	0.50	0.50	0.51	0.51	0.52	0.53
Water Heating[1]	0.80	0.92	0.93	0.93	1.01	1.03	1.04	1.05	1.08	1.09
Ventilation	0.16	0.18	0.18	0.18	0.18	0.18	0.19	0.18	0.19	0.19
Cooking	0.29	0.33	0.34	0.34	0.37	0.37	0.38	0.38	0.39	0.39
Lighting	1.12	1.30	1.30	1.29	1.39	1.40	1.39	1.41	1.43	1.42
Refrigeration	0.20	0.22	0.22	0.22	0.24	0.24	0.25	0.24	0.25	0.25
Office Equipment (PC)	0.14	0.24	0.24	0.24	0.32	0.34	0.35	0.35	0.37	0.38
Office Equipment (non-PC)	0.31	0.46	0.46	0.47	0.68	0.71	0.74	0.82	0.87	0.91
Other Uses[6]	3.01	3.60	3.63	3.66	4.35	4.48	4.61	4.72	4.94	5.15
Delivered Energy	**8.25**	**9.68**	**9.74**	**9.77**	**11.09**	**11.35**	**11.57**	**11.75**	**12.19**	**12.54**

Table B5. Commercial Sector Key Indicators and Consumption (Continued)

(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Electricity Related Losses	**9.15**	**10.84**	**10.86**	**10.83**	**12.68**	**12.73**	**12.73**	**13.49**	**13.70**	**13.77**
Total Energy Consumption by End-Use										
Space Heating[1]	2.07	2.30	2.31	2.31	2.38	2.41	2.44	2.41	2.47	2.52
Space Cooling[1]	1.51	1.43	1.43	1.42	1.48	1.48	1.48	1.48	1.50	1.51
Water Heating[1]	1.11	1.24	1.25	1.24	1.32	1.33	1.34	1.35	1.37	1.39
Ventilation	0.52	0.56	0.56	0.55	0.56	0.56	0.56	0.56	0.57	0.57
Cooking	0.36	0.40	0.40	0.40	0.43	0.43	0.43	0.43	0.44	0.45
Lighting	3.60	4.12	4.10	4.05	4.30	4.25	4.17	4.29	4.30	4.21
Refrigeration	0.65	0.70	0.70	0.70	0.73	0.73	0.74	0.73	0.75	0.75
Office Equipment (PC)	0.44	0.75	0.76	0.77	1.00	1.03	1.05	1.06	1.10	1.14
Office Equipment (non-PC)	1.00	1.45	1.46	1.47	2.11	2.16	2.21	2.51	2.61	2.69
Other Uses[6]	6.14	7.57	7.63	7.67	9.49	9.69	9.88	10.42	10.77	11.08
Total	**17.40**	**20.53**	**20.60**	**20.60**	**23.77**	**24.07**	**24.30**	**25.24**	**25.89**	**26.31**
Non-Marketed Renewable Fuels										
Solar[7]	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04
Total	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.04**

[1]Includes fuel consumption for district services.
[2]Includes miscellaneous uses, such as service station equipment, automated teller machines, telecommunications equipment, and medical equipment.
[3]Includes miscellaneous uses, such as pumps, emergency electric generators, combined heat and power in commercial buildings, and manufacturing performed in commercial buildings.
[4]Includes miscellaneous uses, such as cooking, emergency electric generators, and combined heat and power in commercial buildings.
[5]Includes residual fuel oil, liquefied petroleum gas, coal, motor gasoline, and kerosene.
[6]Includes 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.
[7]Includes 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 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 based on: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections:** EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B6. Industrial Sector Key Indicators and Consumption

(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Key Indicators										
Value of Shipments (billion 1996 dollars)										
Manufacturing	4064	4627	5013	5399	5830	6634	7582	6483	7636	8962
Nonmanufacturing	1222	1300	1425	1587	1462	1710	1955	1503	1855	2204
Total	**5285**	**5927**	**6439**	**6986**	**7292**	**8344**	**9537**	**7987**	**9491**	**11166**
Energy Prices (2002 dollars per million Btu)										
Distillate Oil	6.21	5.57	5.68	5.79	5.75	6.24	6.47	6.06	6.40	6.88
Liquefied Petroleum Gas	8.28	9.29	9.72	10.00	9.90	10.66	11.18	10.20	11.11	12.11
Residual Oil	3.89	3.66	3.74	3.83	3.84	4.03	4.22	3.92	4.17	4.41
Motor Gasoline	11.04	11.61	11.84	12.14	11.47	11.87	12.31	11.46	12.03	12.54
Natural Gas	3.75	3.94	4.05	4.28	4.55	4.89	5.34	4.82	4.99	5.54
Metallurgical Coal	1.87	1.92	1.96	2.01	1.79	1.84	1.90	1.70	1.77	1.84
Steam Coal	1.52	1.54	1.58	1.64	1.45	1.53	1.60	1.42	1.53	1.65
Electricity	14.74	12.88	13.36	14.11	13.05	13.99	15.03	13.31	14.09	15.09
Energy Consumption[1]										
Distillate	1.16	1.10	1.17	1.25	1.20	1.34	1.49	1.25	1.43	1.62
Liquefied Petroleum Gas	2.22	2.12	2.35	2.52	2.22	2.74	3.20	2.28	2.94	3.53
Petrochemical Feedstocks	1.22	1.21	1.35	1.44	1.24	1.54	1.79	1.25	1.62	1.95
Residual Fuel	0.20	0.20	0.21	0.22	0.21	0.22	0.24	0.21	0.23	0.25
Other Petroleum[2]	4.19	4.30	4.54	4.80	4.61	5.12	5.58	4.74	5.36	5.89
Petroleum Subtotal	9.00	8.93	9.63	10.23	9.48	10.95	12.30	9.73	11.59	13.25
Natural Gas	7.43	8.08	8.62	9.11	8.69	9.84	10.93	9.02	10.58	12.02
Lease and Plant Fuel[3]	1.35	1.38	1.40	1.44	1.54	1.65	1.72	1.61	1.69	1.75
Natural Gas Subtotal	8.78	9.46	10.02	10.55	10.23	11.49	12.65	10.64	12.27	13.77
Metallurgical Coal and Coke[4]	0.65	0.65	0.66	0.66	0.52	0.52	0.54	0.47	0.48	0.49
Steam Coal	1.47	1.36	1.41	1.45	1.37	1.45	1.52	1.38	1.47	1.62
Coal Subtotal	2.12	2.01	2.06	2.11	1.90	1.97	2.05	1.86	1.95	2.11
Renewables[5]	1.66	1.83	2.00	2.13	2.16	2.48	2.79	2.32	2.70	3.08
Purchased Electricity	3.39	3.53	3.82	4.10	3.93	4.47	5.06	4.12	4.85	5.63
Delivered Energy	**24.94**	**25.76**	**27.53**	**29.12**	**27.69**	**31.36**	**34.85**	**28.67**	**33.35**	**37.85**
Electricity Related Losses	7.53	7.62	8.22	8.76	8.17	9.12	10.13	8.43	9.72	11.03
Total	**32.47**	**33.38**	**35.75**	**37.88**	**35.86**	**40.48**	**44.98**	**37.09**	**43.07**	**48.88**
Energy Consumption per dollar of Shipments[1] **(thousand Btu per 1996 dollars)**										
Distillate	0.22	0.19	0.18	0.18	0.16	0.16	0.16	0.16	0.15	0.15
Liquefied Petroleum Gas	0.42	0.36	0.37	0.36	0.30	0.33	0.34	0.29	0.31	0.32
Petrochemical Feedstocks	0.23	0.20	0.21	0.21	0.17	0.18	0.19	0.16	0.17	0.17
Residual Fuel	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02
Other Petroleum[2]	0.79	0.73	0.71	0.69	0.63	0.61	0.59	0.59	0.56	0.53
Petroleum Subtotal	1.70	1.51	1.50	1.46	1.30	1.31	1.29	1.22	1.22	1.19
Natural Gas	1.41	1.36	1.34	1.30	1.19	1.18	1.15	1.13	1.11	1.08
Lease and Plant Fuel[3]	0.26	0.23	0.22	0.21	0.21	0.20	0.18	0.20	0.18	0.16
Natural Gas Subtotal	1.66	1.60	1.56	1.51	1.40	1.38	1.33	1.33	1.29	1.23
Metallurgical Coal and Coke[4]	0.12	0.11	0.10	0.09	0.07	0.06	0.06	0.06	0.05	0.04
Steam Coal	0.28	0.23	0.22	0.21	0.19	0.17	0.16	0.17	0.15	0.14
Coal Subtotal	0.40	0.34	0.32	0.30	0.26	0.24	0.22	0.23	0.21	0.19
Renewables[5]	0.31	0.31	0.31	0.30	0.30	0.30	0.29	0.29	0.28	0.28
Purchased Electricity	0.64	0.60	0.59	0.59	0.54	0.54	0.53	0.52	0.51	0.50
Delivered Energy	**4.72**	**4.35**	**4.28**	**4.17**	**3.80**	**3.76**	**3.65**	**3.59**	**3.51**	**3.39**
Electricity Related Losses	1.42	1.29	1.28	1.25	1.12	1.09	1.06	1.06	1.02	0.99
Total	**6.14**	**5.63**	**5.55**	**5.42**	**4.92**	**4.85**	**4.72**	**4.64**	**4.54**	**4.38**

[1]Fuel 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.
[2]Represents natural gas used in the field gathering and processing plant machinery.
[3]Includes net coal coke imports.
[4]Includes petroleum coke, asphalt, road oil, lubricants, motor gasoline, still gas, and miscellaneous petroleum products.
[5]Includes 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 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 prices for motor gasoline and distillate are based on: Energy Information Administration (EIA), *Petroleum Marketing Annual 2002*, http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_annual/current/pdf/pmaall.pdf (August 2003). 2002 coal prices are based on EIA, *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003) and EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E. 2002 electricity prices: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2002 natural gas prices based on: EIA, *Manufacturing Energy Consumption Survey 1998*. 2002 consumption values based on: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2002 shipments: Global Insight macroeconomic model T250803. **Projections:** EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B7. Transportation Sector Key Indicators and Delivered Energy Consumption

Key Indicators and Consumption	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Key Indicators										
Level of Travel (billions)										
Light-Duty Vehicles <8,500 pounds (VMT)	2504	2982	3041	3108	3597	3768	3936	3937	4173	4403
Commercial Light Trucks (VMT)[1]	65	75	79	84	91	101	112	100	114	129
Freight Trucks >10,000 pounds (VMT)	196	224	242	259	274	313	353	305	354	410
Air (seat miles available)	909	1103	1122	1148	1455	1455	1455	1521	1521	1521
Rail (ton miles traveled)	1336	1460	1545	1610	1687	1852	1998	1810	2056	2266
Domestic Shipping (ton miles traveled)	724	773	805	848	838	918	999	867	977	1082
Energy Efficiency Indicators										
New Light-Duty Vehicle (miles per gallon)[2]	23.8	25.3	25.3	25.3	26.4	26.5	26.6	26.8	26.9	27.0
New Car (miles per gallon)[2]	28.2	28.8	28.8	28.8	30.3	30.4	30.5	30.6	30.8	31.0
New Light Truck (miles per gallon)[2]	20.5	22.8	22.8	22.8	24.1	24.1	24.2	24.6	24.7	24.8
Light-Duty Fleet (miles per gallon)[3]	19.7	19.6	19.6	19.6	20.5	20.5	20.5	20.8	20.9	21.0
New Commercial Light Truck (MPG)[1]	13.9	15.1	15.1	15.1	16.0	16.0	16.1	16.3	16.4	16.5
Stock Commercial Light Truck (MPG)[1]	13.8	14.5	14.5	14.5	15.4	15.5	15.5	15.8	15.9	16.0
Aircraft Efficiency (seat miles per gallon)	54.8	59.4	59.9	60.3	64.9	65.4	66.9	66.2	67.0	69.3
Freight Truck Efficiency (miles per gallon)	6.0	6.0	6.0	6.0	6.4	6.4	6.4	6.5	6.5	6.5
Rail Efficiency (ton miles per thousand Btu)	2.9	3.1	3.1	3.1	3.4	3.4	3.4	3.6	3.6	3.6
(ton miles per thousand Btu)	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4
Energy Use by Mode										
(quadrillion Btu)										
Light-Duty Vehicles	15.58	18.53	18.91	19.32	21.35	22.34	23.28	22.97	24.28	25.51
Commercial Light Trucks[1]	0.59	0.64	0.68	0.72	0.74	0.82	0.90	0.79	0.90	1.01
Bus Transportation	0.24	0.25	0.25	0.26	0.26	0.26	0.26	0.26	0.26	0.27
Freight Trucks	4.09	4.64	5.03	5.40	5.40	6.15	6.96	5.86	6.82	7.87
Rail, Passenger	0.11	0.13	0.13	0.13	0.15	0.16	0.16	0.17	0.17	0.17
Rail, Freight	0.47	0.47	0.50	0.52	0.49	0.54	0.58	0.50	0.57	0.63
Shipping, Domestic	0.32	0.33	0.35	0.36	0.35	0.39	0.42	0.36	0.41	0.45
Shipping, International	0.64	0.72	0.72	0.72	0.73	0.73	0.73	0.73	0.74	0.74
Recreational Boats	0.31	0.33	0.34	0.34	0.36	0.37	0.38	0.38	0.39	0.40
Air	2.84	3.29	3.35	3.44	3.97	4.09	4.15	4.11	4.30	4.39
Military Use	0.66	0.77	0.77	0.77	0.81	0.81	0.81	0.83	0.82	0.82
Lubricants	0.20	0.20	0.21	0.23	0.23	0.25	0.28	0.24	0.28	0.32
Pipeline Fuel	0.65	0.68	0.69	0.72	0.75	0.83	0.88	0.80	0.86	0.89
Total	**26.70**	**31.00**	**31.93**	**32.94**	**35.59**	**37.73**	**39.81**	**37.99**	**40.79**	**43.47**
(million barrels per day oil equivalent)										
Light-Duty Vehicles	8.20	9.76	9.96	10.17	11.22	11.74	12.24	12.07	12.75	13.40
Commercial Light Trucks[1]	0.31	0.34	0.36	0.38	0.39	0.43	0.48	0.42	0.47	0.53
Bus Transportation	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13
Freight Trucks	1.94	2.20	2.38	2.55	2.55	2.91	3.29	2.77	3.22	3.72
Rail, Passenger	0.05	0.06	0.06	0.06	0.07	0.07	0.08	0.08	0.08	0.08
Rail, Freight	0.22	0.22	0.24	0.24	0.23	0.25	0.27	0.24	0.27	0.30
Shipping, Domestic	0.15	0.15	0.16	0.17	0.16	0.18	0.19	0.17	0.19	0.21
Shipping, International	0.28	0.31	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Recreational Boats	0.16	0.18	0.18	0.18	0.19	0.19	0.20	0.20	0.20	0.21
Air	1.38	1.59	1.62	1.66	1.92	1.98	2.01	1.99	2.08	2.12
Military Use	0.32	0.37	0.37	0.37	0.39	0.39	0.39	0.40	0.39	0.39
Lubricants	0.09	0.09	0.10	0.11	0.11	0.12	0.13	0.11	0.13	0.15
Pipeline Fuel	0.33	0.34	0.35	0.36	0.38	0.42	0.45	0.41	0.43	0.45
Total	**13.54**	**15.74**	**16.20**	**16.71**	**18.06**	**19.13**	**20.17**	**19.28**	**20.68**	**22.02**

[1]Commercial trucks 8,500 to 10,000 pounds.
[2]Environmental Protection Agency rated miles per gallon.
[3]Combined car and light truck "on-the-road" estimate.
Btu = British thermal unit.
VMT=Vehicle miles traveled.
MPG = Miles per gallon.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002: Energy Information Administration (EIA), *Natural Gas Annual 2001*, DOE/EIA-0131(2001) (Washington, DC, February 2003); Federal Highway Administration, *Highway Statistics 2000* (Washington, DC, November 2001); Oak Ridge National Laboratory, Transportation Energy Data Book: *Edition 22 and Annual* (Oak Ridge, TN, September 2002); National Highway Traffic and Safety Administration, *Summary of Fuel Economy Performance* (Washington, DC, February 2000); EIA, *Household Vehicle Energy Consumption 1994*, DOE/EIA-0464(94) (Washington, DC, August 1997); 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 1998*, http://www.eia.doe.gov/cneaf/alt_trans98/table1.html; EIA, *State Energy Data Report 2000*, DOE/EIA-0214(2000) (Washington, DC, August 2003); U.S. Department of Transportation, Research and Special Programs Administration, *Air Carrier Statistics Monthly, December 2002/2001* (Washington, DC, 2002); EIA, *Fuel Oil and Kerosene Sales 2001*, http://www.eia.doe.gov/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/foks.html; and United States Department of Defense, Defense Fuel Supply Center. **Projections:** EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B8. Electricity Supply, Disposition, Prices, and Emissions

(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Generation by Fuel Type										
Electric Power Sector[1]										
Power Only[2]										
Coal	1875	2159	2201	2219	2468	2560	2592	2681	2975	3111
Petroleum	77	58	62	67	85	82	121	86	77	84
Natural Gas[3]	450	594	642	699	847	972	1098	929	969	1081
Nuclear Power	780	794	794	794	816	816	816	816	816	816
Pumped Storage/Other	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
Renewable Sources[4]	304	398	400	405	429	442	478	440	460	528
Distributed Generation (Natural Gas)	0	0	0	0	2	3	5	4	5	7
Non-Utility Generation for Own Use	-34	-37	-37	-37	-37	-37	-37	-37	-37	-37
Total	**3443**	**3956**	**4054**	**4137**	**4602**	**4829**	**5063**	**4911**	**5257**	**5581**
Combined Heat and Power[5]										
Coal	32	33	33	33	33	33	33	33	33	34
Petroleum	6	1	1	1	3	2	4	3	2	2
Natural Gas	148	171	174	179	160	159	160	153	149	144
Renewable Sources	5	4	4	4	4	4	4	4	4	4
Non-Utility Generation for Own Use	-11	-24	-24	-24	-24	-24	-24	-24	-24	-24
Total	**183**	**184**	**188**	**194**	**176**	**175**	**178**	**169**	**164**	**160**
Net Available to the Grid	**3626**	**4141**	**4242**	**4331**	**4778**	**5004**	**5241**	**5079**	**5421**	**5741**
End-Use Sector Generation										
Combined Heat and Power[6]										
Coal	21	21	21	21	21	21	21	21	21	24
Petroleum	5	12	12	12	13	17	19	14	18	19
Natural Gas	84	106	109	114	134	153	172	151	181	211
Other Gaseous Fuels[7]	5	9	9	9	11	12	12	12	13	13
Renewable Sources[4]	30	35	39	42	43	50	56	46	54	62
Other[8]	11	11	11	11	11	11	11	11	11	11
Total	**157**	**194**	**202**	**209**	**233**	**264**	**291**	**256**	**299**	**342**
Other End-Use Generators[9]	4	5	5	5	5	5	6	6	7	7
Generation for Own Use	-134	-155	-158	-162	-177	-190	-202	-190	-210	-230
Total Sales to the Grid	**27**	**44**	**48**	**52**	**62**	**80**	**95**	**72**	**95**	**120**
Total Electricity Generation	3831	4401	4510	4607	5078	5335	5599	5402	5787	6152
Net Imports	**22**	**28**	**31**	**35**	**18**	**21**	**24**	**7**	**8**	**8**
Electricity Sales by Sector										
Residential	1268	1422	1428	1434	1608	1641	1665	1686	1747	1781
Commercial	1208	1472	1480	1483	1787	1828	1865	1932	2003	2059
Industrial	994	1034	1120	1200	1151	1310	1484	1207	1422	1650
Transportation	22	26	26	27	31	32	33	35	35	36
Total	**3492**	**3954**	**4055**	**4144**	**4576**	**4811**	**5046**	**4861**	**5207**	**5527**
End-Use Prices[10] **(2002 cents per kilowatthour)**										
Residential	8.4	7.7	7.9	8.3	7.6	8.1	8.7	7.6	8.1	8.8
Commercial	7.8	6.7	7.0	7.3	6.8	7.2	7.7	6.9	7.3	7.8
Industrial	5.0	4.4	4.6	4.8	4.5	4.8	5.1	4.5	4.8	5.1
Transportation	7.2	6.5	6.7	7.0	6.5	6.8	7.3	6.5	6.8	7.2
All Sectors Average	**7.2**	**6.5**	**6.6**	**6.9**	**6.5**	**6.9**	**7.3**	**6.6**	**6.9**	**7.3**
Prices by Service Category[10] **(2002 cents per kilowatthour)**										
Generation	4.6	4.0	4.1	4.4	4.1	4.5	4.8	4.2	4.5	4.9
Transmission	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7
Distribution	2.0	1.9	1.9	2.0	1.7	1.8	1.8	1.7	1.7	1.7

Table B8. Electricity Supply, Disposition, Prices, and Emissions (Continued)

(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Electric Power Sector Emissions[1]										
Sulfur Dioxide (million tons)	10.54	9.98	9.90	10.11	8.94	8.94	8.96	8.95	8.95	8.95
Nitrogen Oxide (million tons)	4.39	3.45	3.50	3.54	3.62	3.67	3.68	3.67	3.75	3.75
Mercury (tons)	50.95	52.57	52.20	53.99	53.49	53.59	54.55	53.54	54.37	55.35

[1]Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
[2]Includes plants that only produce electricity.
[3]Includes electricity generation from fuel cells.
[4]Includes conventional hydroelectric, geothermal, wood, wood waste, municipal solid waste, landfill gas, other biomass, solar, and wind power.
[5]Includes combined heat and power plants whose primary business is to sell electricity and heat to the public (i.e., those that report NAICS code 22).
[6]Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors.
[7]Other gaseous fuels include refinery and still gas.
[8]Other includes batteries, chemicals, hydrogen, pitch, purchased steam, sulfur and miscellaneous technologies.
[9]Other end-use generators include 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.
[10]Prices represent average revenue per kilowatthour.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Source: 2002 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 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002), and supporting databases. 2002 commercial and transportation electricity sales: EIA estimates based on Oak Ridge National Laboratory, *Transportation Energy Data Book 21* (Oak Ridge, TN, September 2001). 2002 prices: EIA, National Energy Modeling System run AEO2004.D101703E. **Projections**: EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B9. Electricity Generating Capacity
(Gigawatts)

Net Summer Capacity[1]	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Electric PowerSector[2]										
Power Only[3]										
Coal Steam	305.7	302.6	305.1	305.3	337.7	348.4	350.9	367.4	407.2	422.2
Other Fossil Steam[4]	132.5	100.4	105.0	104.0	93.2	100.0	100.3	90.7	95.4	97.4
Combined Cycle	81.0	124.5	127.1	131.1	169.6	184.4	211.3	191.6	202.3	227.0
Combustion Turbine/Diesel	123.5	128.7	131.1	131.6	164.0	163.9	169.9	176.4	175.0	181.4
Nuclear Power[5]	98.7	100.6	100.6	100.6	102.6	102.6	102.6	102.6	102.6	102.6
Pumped Storage	20.2	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3
Fuel Cells	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Renewable Sources[6]	91.4	96.8	97.1	97.9	102.4	105.7	114.9	104.6	109.9	125.7
Distributed Generation[7]	0.0	0.4	0.5	0.6	5.5	7.6	11.1	9.4	12.4	15.4
Total	**853.1**	**874.4**	**886.8**	**891.4**	**995.4**	**1032.9**	**1081.4**	**1063.2**	**1125.1**	**1192.1**
Combined Heat and Power[8]										
Coal Steam	5.2	5.0	5.1	5.1	5.0	5.1	5.1	5.0	5.1	5.1
Other Fossil Steam[4]	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Combined Cycle	29.4	32.9	32.9	32.9	32.9	32.9	32.9	32.9	32.9	32.9
Combustion Turbine/Diesel	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Renewable Sources[6]	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total	**41.4**	**44.7**	**44.8**	**44.8**	**44.7**	**44.8**	**44.8**	**44.7**	**44.8**	**44.8**
Total Electric Power Industry	**894.5**	**919.1**	**931.7**	**936.3**	**1040.1**	**1077.7**	**1126.3**	**1107.9**	**1169.9**	**1236.9**
Cumulative Planned Additions[9]										
Coal Steam	0.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Other Fossil Steam[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combined Cycle	0.0	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5
Combustion Turbine/Diesel	0.0	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
Nuclear Power	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Renewable Sources[6]	0.0	4.3	4.3	4.3	4.7	4.7	4.7	4.8	4.8	4.8
Distributed Generation[7]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**0.0**	**57.1**	**57.1**	**57.1**	**57.5**	**57.5**	**57.5**	**57.6**	**57.6**	**57.6**
Cumulative Unplanned Additions[9]										
Coal Steam	0.0	3.1	5.7	5.8	40.1	50.7	53.3	70.9	110.6	125.7
Other Fossil Steam[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combined Cycle	0.0	4.6	6.6	10.6	49.7	64.0	90.9	71.7	81.9	106.5
Combustion Turbine/Diesel	0.0	8.7	10.5	10.9	45.6	46.0	53.3	58.0	59.1	66.7
Nuclear Power	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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[6]	0.0	0.8	1.1	1.9	6.0	9.3	18.5	8.1	13.3	29.2
Distributed Generation[7]	0.0	0.4	0.5	0.6	5.5	7.6	11.1	9.4	12.4	15.4
Total	**0.0**	**17.6**	**24.3**	**29.9**	**146.8**	**177.5**	**227.1**	**218.1**	**277.2**	**343.3**
Cumulative Total Additions	**0.0**	**74.7**	**81.4**	**86.9**	**204.3**	**235.0**	**284.6**	**275.7**	**334.8**	**400.9**
Cumulative Retirements[10]										
Coal Steam	0.0	7.6	7.5	7.5	9.5	9.3	9.3	10.6	10.4	10.4
Other Fossil Steam[4]	0.0	30.2	25.6	26.6	37.4	30.6	30.3	39.9	35.2	33.2
Combined Cycle	0.0	1.7	1.1	1.1	1.7	1.1	1.1	1.7	1.1	1.1
Combustion Turbine/Diesel	0.0	10.8	10.2	10.2	12.4	13.0	14.3	12.4	14.9	16.1
Nuclear Power	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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[6]	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total	**0.0**	**50.5**	**44.6**	**45.5**	**61.1**	**54.2**	**55.2**	**64.7**	**61.8**	**60.9**

Table B9. Electricity Generating Capacity (Continued)
(Gigawatts)

Net Summer Capacity[1]	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
End-Use Sector										
Combined Heat and Power[11]										
Coal	4.2	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.6
Petroleum	1.0	1.6	1.6	1.6	1.8	2.2	2.4	1.9	2.3	2.5
Natural Gas	14.1	17.3	17.8	18.4	21.1	23.7	26.2	23.5	27.6	31.7
Other Gaseous Fuels	1.8	2.2	2.2	2.2	2.5	2.6	2.6	2.5	2.7	2.7
Renewable Sources[6]	4.2	5.0	5.6	6.1	6.3	7.5	8.6	6.9	8.3	9.6
Other	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total	**25.5**	**30.5**	**31.7**	**32.8**	**36.1**	**40.5**	**44.3**	**39.2**	**45.3**	**51.5**
Other End-Use Generators[12]										
Renewable Sources[13]	1.1	1.4	1.4	1.4	1.5	1.6	1.7	1.9	2.1	2.6
Cumulative Additions[9]										
Combined Heat and Power[11]	0.0	5.1	6.2	7.3	10.6	15.0	18.8	13.7	19.8	26.0
Other End-Use Generators[12]	0.0	0.3	0.3	0.3	0.4	0.5	0.7	0.8	1.1	1.5

[1]Net 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.
[2]Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
[3]Includes plants that only produce electricity. Includes capacity increases (uprates) at existing units.
[4]Includes oil-, gas-, and dual-fired capability.
[5]Nuclear capacity reflects operating capacity of existing units, including 3.9 gigawatts of uprates through 2025.
[6]Includes 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.
[7]Primarily peak-load capacity fueled by natural gas
[8]Includes combined heat and power plants whose primary business is to sell electricity and heat to the public(i.e., those that report NAICS code 22).
[9]Cumulative additions after December 31, 2002.
[10]Cumulative total retirements after December 31, 2002.
[11]Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors.
[12]Other end-use generators include 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.
[13]See Table B17 for more detail.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model estimates and may differ slightly from official EIA data reports.
Source: 2002 electric generating capacity and projected planned additions: Energy Information Administration (EIA), Form EIA-860: "Annual Electric Generator Report" (preliminary). **Projections**: EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B10. Electricity Trade
(Billion Kilowatthours, Unless Otherwise Noted)

Electricity Trade	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Interregional Electricity Trade										
Gross Domestic Firm Power Trade	138.9	107.1	107.1	107.1	41.5	41.5	41.5	41.5	41.5	41.5
Gross Domestic Economy Trade	209.9	243.1	229.7	225.1	221.7	218.4	203.5	205.1	183.4	180.0
Gross Domestic Trade	**348.8**	**350.2**	**336.8**	**332.2**	**263.2**	**259.9**	**245.1**	**246.7**	**224.9**	**221.5**
Gross Domestic Firm Power Sales (million 2002 dollars)	6932.4	5345.8	5345.8	5345.8	2074.2	2074.2	2074.2	2074.2	2074.2	2074.2
Gross Domestic Economy Sales (million 2002 dollars)	6809.8	7817.6	7629.6	7994.4	8127.5	8663.8	8812.3	7892.8	7319.5	7568.5
Gross Domestic Sales (million 2002 dollars)	**13742.1**	**13163.3**	**12975.3**	**13340.1**	**10201.7**	**10738.0**	**10886.5**	**9967.0**	**9393.7**	**9642.7**
International Electricity Trade										
Firm Power Imports From Canada and Mexico	9.5	5.8	5.8	5.8	0.0	0.0	0.0	0.0	0.0	0.0
Economy Imports From Canada and Mexico	26.8	38.3	41.3	45.0	25.7	28.9	31.3	15.0	15.1	15.2
Gross Imports From Canada and Mexico	**36.3**	**44.2**	**47.2**	**50.9**	**25.7**	**28.9**	**31.3**	**15.0**	**15.2**	**15.3**
Firm Power Exports To Canada and Mexico	5.6	8.7	8.7	8.7	0.0	0.0	0.0	0.0	0.0	0.0
Economy Exports To Canada and Mexico	8.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7
Gross Exports To Canada and Mexico	**14.3**	**16.4**	**16.4**	**16.4**	**7.7**	**7.7**	**7.7**	**7.7**	**7.7**	**7.7**

Note: Totals may not equal sum of components due to independent rounding. Data for 2002 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.

Source: Energy Information Administration, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B11. Petroleum Supply and Disposition Balance
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Crude Oil										
Domestic Crude Production[1]	5.62	5.91	5.93	5.95	4.96	4.95	5.02	4.39	4.61	4.72
Alaska	0.98	0.92	0.92	0.92	0.72	0.72	0.73	0.50	0.51	0.52
Lower 48 States	4.64	5.00	5.01	5.03	4.24	4.23	4.28	3.89	4.11	4.20
Net Imports	9.13	10.82	11.21	11.61	14.08	14.50	15.29	15.03	15.74	16.39
Gross Imports	9.14	10.90	11.29	11.69	14.12	14.53	15.32	15.04	15.76	16.41
Exports	0.01	0.08	0.08	0.08	0.03	0.03	0.04	0.01	0.02	0.02
Other Crude Supply[2]	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Crude Supply	**14.83**	**16.74**	**17.15**	**17.56**	**19.04**	**19.45**	**20.30**	**19.42**	**20.35**	**21.11**
Natural Gas Plant Liquids	**1.88**	**2.21**	**2.24**	**2.32**	**2.33**	**2.48**	**2.58**	**2.35**	**2.47**	**2.57**
Other Inputs[3]	**0.67**	**0.45**	**0.47**	**0.49**	**0.44**	**0.46**	**0.47**	**0.47**	**0.48**	**0.52**
Refinery Processing Gain[4]	**0.98**	**0.88**	**0.88**	**0.88**	**1.00**	**1.00**	**1.01**	**1.04**	**1.04**	**1.02**
Net Product Imports[5]	**1.41**	**1.53**	**1.95**	**2.28**	**1.71**	**2.99**	**3.96**	**2.58**	**3.94**	**5.37**
Gross Refined Product Imports[6]	1.92	1.85	2.17	2.49	2.01	2.82	3.67	2.69	3.60	4.98
Unfinished Oil Imports	0.41	0.61	0.72	0.74	0.69	1.15	1.30	0.90	1.34	1.40
Ether Imports	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.97	0.94	0.94	0.95	0.99	0.98	1.01	1.01	1.01	1.02
Total Primary Supply[7]	**19.77**	**21.81**	**22.69**	**23.53**	**24.52**	**26.38**	**28.32**	**25.85**	**28.27**	**30.58**
Refined Petroleum Products Supplied										
Motor Gasoline[8]	8.86	10.36	10.59	10.84	11.74	12.30	12.86	12.54	13.30	14.02
Jet Fuel[9]	1.61	1.87	1.90	1.94	2.21	2.27	2.30	2.28	2.37	2.41
Distillate Fuel[10]	3.68	4.14	4.38	4.61	4.80	5.24	5.88	5.12	5.71	6.39
Residual Fuel	0.74	0.69	0.71	0.74	0.74	0.77	0.79	0.75	0.75	0.77
Other[11]	4.72	4.77	5.13	5.43	5.06	5.84	6.53	5.19	6.16	7.02
Total	**19.61**	**21.83**	**22.71**	**23.56**	**24.54**	**26.41**	**28.36**	**25.87**	**28.30**	**30.62**
Refined Petroleum Products Supplied										
Residential and Commercial	1.22	1.37	1.38	1.38	1.39	1.40	1.42	1.38	1.40	1.42
Industrial[12]	4.80	4.74	5.14	5.46	5.02	5.86	6.61	5.16	6.21	7.15
Transportation	13.21	15.44	15.91	16.40	17.74	18.77	19.79	18.94	20.32	21.66
Electric Generators[13]	0.38	0.27	0.29	0.32	0.39	0.38	0.53	0.40	0.36	0.38
Total	**19.61**	**21.83**	**22.71**	**23.56**	**24.54**	**26.41**	**28.36**	**25.87**	**28.30**	**30.62**
Discrepancy[14]	**0.16**	**-0.02**	**-0.02**	**-0.02**	**-0.02**	**-0.04**	**-0.04**	**-0.02**	**-0.03**	**-0.04**
World Oil Price (2002 dollars per barrel)[15]	**23.68**	**23.64**	**24.17**	**24.67**	**24.77**	**26.02**	**27.27**	**25.30**	**27.00**	**28.55**
Import Share of Product Supplied	**0.54**	**0.57**	**0.58**	**0.59**	**0.64**	**0.66**	**0.68**	**0.68**	**0.70**	**0.71**
Net Expenditures for Imported Crude Oil and Petroleum Products (billion 2002 dollars)	**90.38**	**108.26**	**118.31**	**128.45**	**144.55**	**168.99**	**195.83**	**166.08**	**200.24**	**236.71**
Domestic Refinery Distillation Capacity[16]	**16.8**	**18.2**	**18.7**	**19.0**	**20.4**	**20.8**	**21.7**	**20.8**	**21.8**	**22.6**
Capacity Utilization Rate (percent)	**91.0**	**93.4**	**93.1**	**93.5**	**94.7**	**94.8**	**94.8**	**94.8**	**94.8**	**94.8**

[1]Includes lease condensate.
[2]Strategic petroleum reserve stock additions plus unaccounted for crude oil and crude stock withdrawals minus crude products supplied.
[3]Includes 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.
[4]Represents volumetric gain in refinery distillation and cracking processes.
[5]Includes net imports of finished petroleum products, unfinished oils, other hydrocarbons, alcohols, ethers, and blending components.
[6]Includes other hydrocarbons, alcohols, and blending components.
[7]Total crude supply plus natural gas plant liquids, other inputs, refinery processing gain, and net product imports.
[8]Includes ethanol and ethers blended into gasoline.
[9]Includes only kerosene type.
[10]Includes distillate and kerosene.
[11]Includes 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.
[12]Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.
[13]Includes 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. Includes small power producers and exempt wholesale generators.
[14]Balancing item. Includes unaccounted for supply, losses, and gains.
[15]Average refiner acquisition cost for imported crude oil.
[16]End-of-year capacity.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 product supplied based on: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). Other 2002 data: EIA, *Petroleum Supply Annual 2002,* DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). **Projections:** EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B12. Petroleum Product Prices
(2002 Cents per Gallon, Unless Otherwise Noted)

Sector and Fuel	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
World Oil Price (2002 dollars per barrel)	**23.68**	**23.64**	**24.17**	**24.67**	**24.77**	**26.02**	**27.27**	**25.30**	**27.00**	**28.55**
Delivered Sector Product Prices										
Residential										
Distillate Fuel	114.2	107.2	108.4	110.1	110.1	116.4	119.4	113.6	118.4	125.0
Liquefied Petroleum Gas	110.8	117.0	119.1	121.4	121.5	126.9	130.4	124.3	130.3	137.7
Commercial										
Distillate Fuel	84.1	74.3	75.6	77.3	76.8	83.3	86.4	80.6	85.3	91.8
Residual Fuel	63.1	60.6	61.8	63.0	63.2	66.1	68.9	64.3	68.1	71.6
Residual Fuel (2002 dollars per barrel)	26.48	25.43	25.97	26.48	26.54	27.75	28.93	27.02	28.59	30.06
Industrial[1]										
Distillate Fuel	86.2	77.2	78.8	80.3	79.8	86.6	89.7	84.0	88.8	95.4
Liquefied Petroleum Gas	71.1	79.7	83.4	85.8	85.0	91.4	95.9	87.5	95.3	103.8
Residual Fuel	58.3	54.8	56.0	57.3	57.4	60.3	63.2	58.6	62.4	66.0
Residual Fuel (2002 dollars per barrel)	24.48	23.01	23.54	24.06	24.12	25.34	26.55	24.62	26.22	27.72
Transportation										
Diesel Fuel (distillate)[2]	130.6	138.4	140.3	145.9	130.1	138.6	145.0	130.3	139.0	146.7
Jet Fuel[3]	80.6	76.1	77.8	80.0	75.9	81.8	85.4	77.9	83.9	90.0
Motor Gasoline[4]	138.1	144.0	146.9	150.7	142.3	147.3	152.6	142.2	149.2	155.5
Liquid Petroleum Gas	128.7	125.7	128.3	131.6	126.4	133.0	138.2	128.2	135.8	144.7
Residual Fuel	56.5	52.6	53.9	55.0	55.1	58.0	60.9	56.3	60.2	63.8
Residual Fuel (2002 dollars per barrel)	23.71	22.11	22.62	23.12	23.15	24.37	25.58	23.63	25.28	26.79
Ethanol (E85)[5]	135.8	153.0	153.9	154.9	156.2	163.4	164.9	164.5	166.1	168.3
Electric Power[6]										
Distillate Fuel	77.4	66.5	68.2	69.8	68.9	75.8	79.6	73.3	77.9	84.8
Residual Fuel	60.4	58.7	59.7	60.8	61.4	64.5	67.3	62.8	67.4	71.3
Residual Fuel (2002 dollars per barrel)	25.38	24.63	25.07	25.54	25.81	27.07	28.27	26.37	28.30	29.96
Refined Petroleum Product Prices[7]										
Distillate Fuel	118.1	121.7	123.8	128.5	117.1	125.9	130.5	119.0	127.3	135.0
Jet Fuel[3]	80.6	76.1	77.8	80.0	75.9	81.8	85.4	77.9	83.9	90.0
Liquefied Petroleum Gas	79.6	88.6	91.3	93.4	94.0	99.1	102.6	96.5	102.6	110.1
Motor Gasoline[4]	138.1	144.0	146.9	150.7	142.3	147.3	152.6	142.2	149.2	155.5
Residual Fuel	58.6	55.3	56.6	57.8	58.1	61.1	64.0	59.3	63.3	67.0
Residual Fuel (2002 dollars per barrel)	24.62	23.24	23.76	24.29	24.40	25.65	26.86	24.92	26.60	28.14
Average	**116.1**	**121.7**	**123.9**	**127.1**	**120.8**	**126.3**	**130.6**	**122.2**	**128.6**	**135.0**

[1]Includes combined heat and power, which produces electricity and other useful thermal energy.
[2] Diesel fuel containing 500 part per million (ppm) or 15 ppm sulfur. Includes Federal and State taxes while excluding county and local taxes.
[3]Kerosene-type jet fuel.
[4]Sales weighted-average price for all grades. Includes Federal, State and local taxes.
[5]E85 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.
[6]Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.
[7]Weighted averages of end-use fuel prices are derived from the prices in each sector and the corresponding sectoral consumption.
Note: Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources:. 2002 prices for motor gasoline, distillate, and jet fuel are based on: EIA, *Petroleum Marketing Annual 2002*, http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_annual/current/pdf/pmaall.pdf (August 2003). 2002 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." 2002 electric power prices based on: Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 2002 ethanol prices derived from weekly spot prices in the Oxy Fuel News. 2002 world oil price: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections**: EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B13. Natural Gas Supply and Disposition
(Trillion Cubic Feet per Year)

Supply and Disposition	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Production										
Dry Gas Production[1]	19.05	20.15	20.50	21.30	22.10	23.79	24.96	22.70	23.99	25.16
Supplemental Natural Gas[2]	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Net Imports	**3.49**	**4.83**	**5.50**	**5.75**	**5.74**	**6.47**	**7.40**	**6.23**	**7.24**	**8.50**
Canada	3.59	3.53	3.68	3.89	2.44	2.51	2.64	2.37	2.56	2.81
Mexico	-0.26	-0.35	-0.34	-0.33	-0.27	-0.18	-0.07	-0.31	-0.12	0.22
Liquefied Natural Gas	0.17	1.64	2.16	2.19	3.56	4.14	4.83	4.17	4.80	5.46
Total Supply	**22.62**	**25.07**	**26.09**	**27.15**	**27.94**	**30.36**	**32.46**	**29.03**	**31.33**	**33.75**
Consumption by Sector										
Residential	4.92	5.50	5.53	5.58	5.75	5.92	6.01	5.83	6.09	6.26
Commercial	3.12	3.45	3.48	3.49	3.72	3.83	3.91	3.87	4.04	4.18
Industrial[3]	7.23	7.86	8.39	8.86	8.45	9.57	10.63	8.78	10.29	11.69
Electric Generators[4]	5.55	6.26	6.66	7.11	7.78	8.61	9.36	8.18	8.39	9.01
Transportation[5]	0.01	0.05	0.06	0.06	0.09	0.10	0.10	0.10	0.11	0.12
Pipeline Fuel	0.63	0.66	0.67	0.70	0.73	0.81	0.86	0.78	0.84	0.87
Lease and Plant Fuel[6]	1.32	1.35	1.36	1.40	1.50	1.61	1.67	1.57	1.65	1.71
Total	**22.78**	**25.13**	**26.15**	**27.21**	**28.01**	**30.44**	**32.55**	**29.11**	**31.41**	**33.84**
Natural Gas to Liquids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discrepancy[7]	**-0.16**	**-0.06**	**-0.06**	**-0.06**	**-0.08**	**-0.08**	**-0.09**	**-0.08**	**-0.09**	**-0.09**

[1]Marketed production (wet) minus extraction losses.
[2]Synthetic 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.
[3]Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.
[4]Includes 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. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as vehicle fuel.
[6]Represents natural gas used in the field gathering and processing plant machinery.
[7]Balancing 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, 2002 values include net storage injections.
Btu = British thermal unit.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 supply values: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2002 consumption based on: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections:** EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B14. Natural Gas Prices, Margins, and Revenue

(2002 Dollars per Thousand Cubic Feet, Unless Otherwise Noted)

Prices, Margins, and Revenue	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Source Price										
Average Lower 48 Wellhead Price[1]	2.95	3.31	3.40	3.61	3.97	4.28	4.71	4.28	4.40	4.94
Average Import Price	3.14	3.63	3.78	4.00	4.28	4.58	4.98	4.48	4.67	5.13
Average[2]	**2.98**	**3.38**	**3.49**	**3.70**	**4.04**	**4.35**	**4.78**	**4.33**	**4.47**	**4.99**
Delivered Prices										
Residential	7.86	7.78	7.88	8.11	8.18	8.47	8.95	8.41	8.56	9.04
Commercial	6.55	6.72	6.83	7.06	7.21	7.52	7.99	7.45	7.62	8.12
Industrial[3]	3.85	4.05	4.16	4.40	4.68	5.02	5.49	4.95	5.13	5.69
Electric Generators[4]	3.85	4.02	4.12	4.36	4.61	4.94	5.42	4.87	5.01	5.57
Transportation[5]	7.58	8.35	8.49	8.80	8.90	9.32	9.90	9.11	9.34	9.95
Average[6]	**5.21**	**5.34**	**5.41**	**5.60**	**5.83**	**6.09**	**6.51**	**6.07**	**6.19**	**6.68**
Transmission & Distribution Margins[7]										
Residential	4.88	4.40	4.40	4.41	4.14	4.11	4.17	4.08	4.09	4.05
Commercial	3.56	3.33	3.34	3.36	3.17	3.17	3.21	3.12	3.15	3.12
Industrial[3]	0.87	0.67	0.68	0.70	0.63	0.67	0.71	0.63	0.66	0.70
Electric Generators[4]	0.86	0.64	0.63	0.66	0.56	0.59	0.64	0.54	0.54	0.58
Transportation[5]	4.60	4.97	5.00	5.10	4.85	4.96	5.12	4.78	4.87	4.96
Average[6]	**2.23**	**1.96**	**1.92**	**1.90**	**1.78**	**1.74**	**1.73**	**1.74**	**1.72**	**1.69**
Transmission & Distribution Revenue (billion 2002 dollars)										
Residential	24.02	24.18	24.33	24.62	23.78	24.34	25.08	23.80	24.89	25.32
Commercial	11.12	11.51	11.61	11.73	11.81	12.13	12.55	12.08	12.72	13.05
Industrial[3]	6.27	5.23	5.67	6.22	5.35	6.42	7.52	5.51	6.80	8.18
Electric Generators[4]	4.78	4.01	4.21	4.66	4.36	5.10	6.02	4.43	4.54	5.25
Transportation[5]	0.06	0.27	0.28	0.31	0.43	0.48	0.54	0.47	0.54	0.60
Total	**46.25**	**45.19**	**46.11**	**47.54**	**45.73**	**48.46**	**51.70**	**46.30**	**49.49**	**52.41**

[1]Represents lower 48 onshore and offshore supplies.
[2]Quantity-weighted average of the average lower 48 wellhead price and the average price of imports at the U.S. border.
[3]Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.
[4]Includes 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. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[6]Weighted average prices and margins. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.
[7]Within the table, "transmission and distribution" margins equal the difference between the delivered price and the source price (average of the wellhead price and the price of imports at the U.S. border) of natural gas and, thus, reflect the total cost of bringing natural gas to market. When the term "transmission and distribution" margins is used in today's natural gas market, it generally does not include the cost of independent natural gas marketers or costs associated with aggregation of supplies, provisions of storage, and other services. As used here, the term includes the cost of all services and the cost of pipeline fuel used in compressor stations.

Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.

Sources: 2002 electric generators delivered price: Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 2002 industrial delivered prices based on Energy Information Administration (EIA), *Manufacturing Energy Consumption Survey 1998.* 2002 residential, commercial, and transportation delivered prices, average lower 48 wellhead price, and average import price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). Other 2002 values**:** EIA, Office of Integrated Analysis and Forecasting. **Projections**: EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B15. Oil and Gas Supply

Production and Supply	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Crude Oil										
Lower 48 Average Wellhead Price[1] (2002 dollars per barrel)	**24.54**	**23.02**	**23.61**	**24.20**	**24.27**	**25.82**	**26.96**	**24.83**	**26.72**	**28.45**
Production (million barrels per day)[2]										
U.S. Total	**5.62**	**5.91**	**5.93**	**5.95**	**4.96**	**4.95**	**5.02**	**4.39**	**4.61**	**4.72**
Lower 48 Onshore	3.11	2.60	2.61	2.62	2.17	2.20	2.23	2.01	2.04	2.07
Lower 48 Offshore	1.53	2.40	2.40	2.41	2.07	2.03	2.06	1.88	2.06	2.13
Alaska	0.98	0.92	0.92	0.92	0.72	0.72	0.73	0.50	0.51	0.52
Lower 48 End of Year Reserves (billion barrels)[2]	**19.05**	**18.29**	**18.36**	**18.42**	**16.05**	**16.20**	**16.21**	**14.42**	**14.98**	**15.29**
Natural Gas										
Lower 48 Average Wellhead Price[1] (2002 dollars per thousand cubic feet)	**2.95**	**3.31**	**3.40**	**3.61**	**3.97**	**4.28**	**4.71**	**4.28**	**4.40**	**4.94**
Dry Production (trillion cubic feet)[3]										
U.S. Total	**19.05**	**20.15**	**20.50**	**21.30**	**22.10**	**23.79**	**24.97**	**22.70**	**23.99**	**25.16**
Lower 48 Onshore	13.76	14.18	14.48	15.13	15.48	16.41	17.21	15.86	16.26	17.28
Associated-Dissolved[4]	1.60	1.40	1.41	1.41	1.22	1.23	1.24	1.16	1.17	1.18
Non-Associated	12.16	12.78	13.08	13.72	14.26	15.18	15.97	14.71	15.09	16.10
Conventional	6.23	5.72	5.80	6.07	5.70	6.07	6.41	5.70	5.92	6.30
Unconventional	5.93	7.06	7.28	7.65	8.55	9.11	9.55	9.00	9.16	9.80
Lower 48 Offshore	4.86	5.37	5.41	5.57	5.15	5.09	5.09	4.51	5.03	5.17
Associated-Dissolved[4]	1.05	1.61	1.61	1.61	1.34	1.34	1.33	1.23	1.43	1.48
Non-Associated	3.81	3.76	3.80	3.96	3.80	3.75	3.76	3.29	3.60	3.69
Alaska	0.43	0.60	0.60	0.60	1.48	2.29	2.67	2.32	2.71	2.71
Lower 48 End of Year Dry Reserves[3] (trillion cubic feet)	**180.03**	**198.58**	**201.20**	**202.86**	**198.82**	**200.97**	**201.88**	**188.97**	**193.51**	**192.74**
Supplemental Gas Supplies (trillion cubic feet)[5]	**0.08**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**
Total Lower 48 Wells (thousands)	**24.47**	**23.94**	**24.78**	**25.99**	**25.79**	**26.83**	**27.68**	**25.40**	**26.00**	**27.45**

[1]Represents lower 48 onshore and offshore supplies.
[2]Includes lease condensate.
[3]Marketed production (wet) minus extraction losses.
[4]Gas which occurs in crude oil reserves either as free gas (associated) or as gas in solution with crude oil (dissolved).
[5]Synthetic 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 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 lower 48 onshore, lower 48 offshore, and Alaska crude oil production: Energy Information Administration (EIA), *Petroleum Supply Annual 2002,* DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). 2002 natural gas lower 48 average wellhead price, Alaska and total natural gas production, and supplemental gas supplies: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). Other 2002 values: EIA, Office of Integrated Analysis and Forecasting. **Projections:** EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B16. Coal Supply, Disposition, and Prices
(Million Short Tons per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Production[1]										
Appalachia	408	401	408	421	385	402	426	378	419	462
Interior	147	165	169	181	161	170	177	144	178	192
West	550	642	653	640	791	805	779	898	946	931
East of the Mississippi	504	513	524	541	497	522	553	492	547	605
West of the Mississippi	601	694	706	702	840	854	829	929	996	981
Total	**1105**	**1208**	**1230**	**1242**	**1337**	**1377**	**1382**	**1420**	**1543**	**1586**
Net Imports										
Imports	17	33	33	33	42	42	42	46	46	46
Exports	40	36	35	35	29	27	26	26	23	21
Total	**-23**	**-2**	**-2**	**-2**	**12**	**14**	**16**	**20**	**23**	**25**
Total Supply[2]	**1083**	**1205**	**1228**	**1240**	**1349**	**1391**	**1398**	**1440**	**1566**	**1611**
Consumption by Sector										
Residential and Commercial	4	5	5	5	5	5	5	5	5	5
Industrial[3]	63	62	65	67	63	66	70	63	67	79
of which: Coal to Liquids	0	0	0	0	0	0	0	0	0	8
Coke Plants	22	23	23	23	19	19	19	17	17	17
Electric Generators[4]	976	1115	1136	1145	1263	1301	1305	1355	1477	1510
Total	**1066**	**1205**	**1229**	**1240**	**1349**	**1391**	**1399**	**1441**	**1567**	**1612**
Discrepancy and Stock Change[5]	**17**	**-0**	**-0**	**0**	**-0**	**-0**	**-1**	**-1**	**-1**	**-1**
Average Minemouth Price										
(2002 dollars per short ton)	17.90	16.53	16.88	17.47	15.78	16.32	16.92	15.67	16.57	17.95
(2002 dollars per million Btu)	0.87	0.81	0.82	0.85	0.78	0.80	0.83	0.78	0.82	0.88
Delivered Prices (2002 dollars per short ton)[6]										
Industrial	33.24	33.54	34.46	35.76	31.62	33.43	34.96	31.01	33.33	33.61
Coke Plants	51.27	52.75	53.68	55.04	48.98	50.45	52.22	46.67	48.42	50.50
Electric Generators										
(2002 dollars per short ton)	25.96	24.03	24.67	25.52	22.87	24.01	25.03	22.75	24.31	26.29
(2002 dollars per million Btu)	1.26	1.19	1.22	1.26	1.15	1.20	1.24	1.14	1.22	1.30
Average	**26.93**	**25.09**	**25.74**	**26.63**	**23.65**	**24.83**	**25.90**	**23.40**	**24.96**	**26.91**
Exports[7]	40.44	35.68	36.47	37.22	33.43	34.13	35.20	31.67	32.34	33.74

[1]Includes anthracite, bituminous coal, lignite, and waste coal delivered to independent power producers. Waste coal deliveries totaled 11.1 million tons in 2002.
[2]Production plus net imports plus net storage withdrawals.
[3]Includes consumption for combined heat and power plants, except those plants whose primary business is to sell electricity, or electricity and heat, to the public.
[4]Includes all electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
[5]Balancing item: the sum of production, net imports, and net storage withdrawals minus total consumption.
[6]Sectoral prices weighted by consumption tonnage; weighted average excludes residential/ commercial prices and export free-alongside-ship (f.a.s.) prices.
[7]F.a.s. price at U.S. port of exit.
Btu = British thermal unit.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 data based on Energy Information Administration (EIA), *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003); EIA, *Annual Coal Report 2002*, DOE/EIA-0584(2002) (Washington, DC, November 2003); and EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.
Projections: EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B17. Renewable Energy Generating Capacity and Generation
(Gigawatts, Unless Otherwise Noted)

Capacity and Generation	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Electric Power Sector[1]										
Net Summer Capacity										
Conventional Hydropower	78.29	78.69	78.69	78.69	78.68	78.68	78.68	78.68	78.68	78.68
Geothermal[2]	2.89	3.94	4.01	4.11	5.91	6.06	6.36	6.63	6.84	7.30
Municipal Solid Waste[3]	3.49	3.89	3.92	3.89	3.92	3.95	4.06	3.92	3.95	4.07
Wood and Other Biomass[4,5]	1.83	2.17	2.20	2.14	2.55	3.04	4.62	2.65	3.74	8.13
Solar Thermal	0.33	0.43	0.43	0.43	0.49	0.49	0.49	0.52	0.52	0.52
Solar Photovoltaic[5]	0.02	0.15	0.15	0.15	0.32	0.32	0.32	0.41	0.41	0.41
Wind	4.83	7.82	8.01	8.74	10.77	13.39	20.65	12.09	15.99	26.84
Total	**91.69**	**97.09**	**97.42**	**98.15**	**102.65**	**105.93**	**115.18**	**104.90**	**110.13**	**125.95**
Generation (billion kilowatthours)										
Conventional Hydropower	255.78	304.35	304.37	304.40	304.57	304.63	304.69	304.72	304.80	304.88
Geothermal[2]	13.36	22.67	23.25	24.03	38.92	40.14	42.51	45.01	46.66	50.32
Municipal Solid Waste[3]	20.02	27.89	28.11	27.94	28.18	28.44	29.32	28.22	28.50	29.49
Wood and Other Biomass[5]	8.67	22.68	23.53	25.40	25.16	27.64	33.30	25.21	29.16	51.55
Dedicated Plants	6.32	13.09	13.26	13.11	15.66	18.47	27.29	16.52	22.90	49.87
Cofiring	2.35	9.59	10.26	12.29	9.50	9.17	6.01	8.68	6.25	1.68
Solar Thermal	0.54	0.84	0.84	0.84	1.04	1.04	1.04	1.11	1.11	1.11
Solar Photovoltaic[6]	0.00	0.36	0.36	0.36	0.79	0.79	0.79	1.02	1.02	1.02
Wind	10.51	23.41	24.07	26.63	34.10	43.54	70.33	38.91	53.16	93.54
Total	**308.87**	**402.20**	**404.52**	**409.59**	**432.77**	**446.22**	**481.98**	**444.18**	**464.40**	**531.90**
End- Use Sector										
Net Summer Capacity										
Combined Heat and Power[7]										
Municipal Solid Waste	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Biomass	3.91	4.71	5.36	5.83	6.02	7.26	8.37	6.60	8.03	9.38
Total	**4.16**	**4.96**	**5.61**	**6.09**	**6.27**	**7.51**	**8.62**	**6.86**	**8.29**	**9.64**
Other End-Use Generators[8]										
Conventional Hydropower[9]	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solar Photovoltaic	0.04	0.39	0.39	0.39	0.49	0.58	0.70	0.89	1.13	1.55
Total	**1.06**	**1.41**	**1.41**	**1.41**	**1.51**	**1.61**	**1.72**	**1.91**	**2.15**	**2.57**
Generation (billion kilowatthours)										
Combined Heat and Power[7]										
Municipal Solid Waste	1.84	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
Biomass	28.16	32.85	36.63	39.42	40.51	47.72	54.23	43.92	52.26	60.14
Total	**30.00**	**34.95**	**38.73**	**41.52**	**42.61**	**49.82**	**56.33**	**46.02**	**54.36**	**62.24**
Other End-Use Generators[8]										
Conventional Hydropower[9]	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solar Photovoltaic	0.09	0.82	0.82	0.82	1.05	1.26	1.50	1.92	2.42	3.31
Total	**4.20**	**4.93**	**4.93**	**4.93**	**5.16**	**5.37**	**5.61**	**6.02**	**6.53**	**7.42**

[1]Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
[2]Includes hydrothermal resources only (hot water and steam).
[3]Includes landfill gas.
[4]Facilities co-firing biomass and coal are classified as coal.
[5]Includes projections for energy crops after 2010.
[6]Does not include off-grid photovoltaics (PV). See Annual Energy Review 2002 Table 10.6 for estimates of 1989-2001 PV shipments, including exports, for both grid-connected and off-grid applications.
[7]Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors.
[8]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.
[9]Represents own-use industrial hydroelectric power.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports. Net summer capacity has been estimated for nonutility generators for AEO2004. Net summer capacity is used to be consistent with electric utility capacity estimates. Additional retirements are determined on the basis of the size and age of the units.
Sources: 2002 capacity: Energy Information Administration (EIA), Form EIA-860: "Annual Electric Generator Report" (preliminary). 2002 generation: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections:** EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B18. Renewable Energy Consumption by Sector and Source[1]
(Quadrillion Btu per Year)

Sector and Source	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Marketed Renewable Energy[2]										
Residential	**0.39**	**0.40**	**0.40**	**0.41**	**0.40**	**0.41**	**0.41**	**0.39**	**0.41**	**0.41**
Wood	0.39	0.40	0.40	0.41	0.40	0.41	0.41	0.39	0.41	0.41
Commercial	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**
Biomass	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Industrial[3]	**1.66**	**1.83**	**2.00**	**2.13**	**2.16**	**2.48**	**2.79**	**2.32**	**2.70**	**3.08**
Conventional Hydroelectric	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Municipal Solid Waste	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Biomass	1.60	1.78	1.95	2.07	2.11	2.43	2.73	2.27	2.65	3.03
Transportation	**0.17**	**0.28**	**0.29**	**0.30**	**0.32**	**0.33**	**0.35**	**0.34**	**0.35**	**0.38**
Ethanol used in E85[4]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethanol used in Gasoline Blending	0.17	0.28	0.29	0.30	0.31	0.33	0.34	0.33	0.35	0.37
Electric Generators[5]	**3.69**	**4.64**	**4.68**	**4.75**	**5.30**	**5.47**	**5.88**	**5.55**	**5.79**	**6.54**
Conventional Hydroelectric	2.75	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13
Geothermal	0.30	0.59	0.61	0.64	1.11	1.15	1.23	1.30	1.36	1.49
Municipal Solid Waste[6]	0.34	0.38	0.39	0.38	0.39	0.39	0.40	0.39	0.39	0.40
Biomass	0.17	0.28	0.29	0.31	0.30	0.33	0.37	0.30	0.34	0.53
Dedicated Plants	0.11	0.15	0.15	0.15	0.18	0.21	0.30	0.19	0.26	0.51
Cofiring	0.06	0.13	0.14	0.17	0.13	0.12	0.07	0.12	0.08	0.02
Solar Thermal	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wind	0.13	0.24	0.25	0.27	0.35	0.45	0.72	0.40	0.55	0.96
Total Marketed Renewable Energy	**6.01**	**7.26**	**7.47**	**7.68**	**8.28**	**8.78**	**9.53**	**8.70**	**9.35**	**10.51**
Sources of Ethanol										
From Corn	0.17	0.28	0.29	0.30	0.29	0.31	0.32	0.29	0.31	0.32
From Cellulose	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.05	0.05	0.05
Total	**0.17**	**0.28**	**0.29**	**0.30**	**0.32**	**0.33**	**0.35**	**0.34**	**0.35**	**0.38**
Non-Marketed Renewable Energy[7] Selected Consumption										
Residential	**0.02**	**0.03**	**0.03**	**0.03**	**0.04**	**0.04**	**0.05**	**0.05**	**0.05**	**0.05**
Solar Hot Water Heating	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04
Geothermal Heat Pumps	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.04**
Solar Thermal	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01

[1]Actual 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 kilowatthour.
[2]Includes 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 B8.
[3]Includes all electricity production by industrial and other combined heat and power for the grid and for own use.
[4]Excludes motor gasoline component of E85.
[5]Includes 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. Includes small power producers and exempt wholesale generators.
[6]Includes landfill gas.
[7]Includes 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.
Btu = British thermal unit.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 ethanol: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2002 electric generators: EIA, Form EIA-860: "Annual Electric Generator Report" (preliminary). Other 2002 values: EIA, Office of Integrated Analysis and Forecasting. **Projections:** EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B19. Carbon Dioxide Emissions by Sector and Source
(Million Metric Tons)

Sector and Source	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth
Residential										
Petroleum	104.0	110.2	110.4	110.7	106.7	107.1	108.0	103.2	104.5	105.1
Natural Gas	267.2	298.3	300.4	302.9	311.9	321.2	326.3	316.3	330.7	339.5
Coal	1.1	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1
Electricity	816.7	900.4	905.3	906.1	1008.2	1019.9	1014.6	1062.2	1106.7	1104.4
Total	**1189.0**	**1310.1**	**1317.2**	**1320.9**	**1427.8**	**1449.2**	**1449.9**	**1482.8**	**1543.0**	**1550.1**
Commercial										
Petroleum	52.6	66.0	66.2	66.5	69.8	70.2	71.7	71.0	72.2	73.9
Natural Gas	169.4	187.5	188.7	189.5	202.2	207.9	212.1	210.0	219.4	226.8
Coal	9.2	9.2	9.3	9.3	9.2	9.2	9.3	9.2	9.2	9.3
Electricity	778.0	931.6	938.4	937.0	1120.3	1135.5	1136.1	1217.1	1269.2	1276.7
Total	**1009.1**	**1194.3**	**1202.5**	**1202.3**	**1401.4**	**1422.9**	**1429.2**	**1507.2**	**1570.1**	**1586.6**
Industrial[1]										
Petroleum	412.8	346.2	365.4	381.2	366.9	408.0	446.5	380.0	428.4	471.2
Natural Gas[2]	432.7	493.3	522.1	549.7	533.7	598.6	658.8	554.9	639.4	717.4
Coal	185.1	186.9	191.9	196.6	175.6	183.3	191.1	171.9	181.1	196.4
Electricity	640.0	654.5	710.3	758.2	721.5	813.8	904.1	760.4	900.7	1023.3
Total	**1670.6**	**1680.9**	**1789.6**	**1885.8**	**1797.7**	**2003.6**	**2200.4**	**1867.2**	**2149.5**	**2408.3**
Transportation										
Petroleum[3]	1811.2	2127.3	2193.2	2262.6	2445.6	2590.9	2734.7	2611.2	2805.8	2993.7
Natural Gas[4]	35.2	38.6	39.5	41.3	44.1	49.1	52.2	47.7	51.3	53.8
Other[5]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity	14.2	16.6	16.7	16.8	19.8	19.9	19.9	21.8	22.4	22.4
Total	**1860.6**	**2182.5**	**2249.5**	**2320.6**	**2509.5**	**2659.9**	**2806.8**	**2680.7**	**2879.5**	**3069.9**
Total Carbon Dioxide Emissions by Delivered Fuel										
Petroleum[3]	2380.5	2649.7	2735.2	2820.9	2989.0	3176.2	3360.9	3165.4	3410.9	3643.9
Natural Gas	904.4	1017.7	1050.7	1083.5	1091.9	1176.8	1249.3	1128.9	1240.8	1337.6
Coal	195.4	197.3	202.4	207.0	185.9	193.6	201.4	182.1	191.4	206.7
Other[5]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity	2249.0	2503.1	2570.6	2618.1	2869.7	2989.0	3074.6	3061.5	3299.0	3426.7
Total	**5729.3**	**6367.8**	**6558.8**	**6729.6**	**7136.5**	**7535.6**	**7886.3**	**7537.9**	**8142.0**	**8614.9**
Electric Power[6]										
Petroleum	72.2	47.4	51.0	54.8	66.8	65.2	87.9	67.4	61.6	64.8
Natural Gas	299.1	336.9	358.5	382.4	418.5	463.3	503.6	440.3	451.6	485.0
Coal	1877.8	2118.8	2161.2	2181.0	2384.4	2460.5	2483.0	2553.8	2785.8	2877.0
Total	**2249.0**	**2503.1**	**2570.6**	**2618.1**	**2869.7**	**2989.0**	**3074.6**	**3061.5**	**3299.0**	**3426.7**
Total Carbon Dioxide Emissions by Primary Fuel[7]										
Petroleum[3]	2452.7	2697.1	2786.1	2875.7	3055.8	3241.4	3448.9	3232.8	3472.5	3708.7
Natural Gas	1203.4	1354.6	1409.2	1465.9	1510.4	1640.1	1753.0	1569.2	1692.4	1822.6
Coal	2073.2	2316.1	2363.6	2388.0	2570.3	2654.1	2684.5	2735.9	2977.1	3083.7
Other[5]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**5729.3**	**6367.8**	**6558.8**	**6729.6**	**7136.5**	**7535.6**	**7886.3**	**7537.9**	**8142.0**	**8614.9**
Carbon Dioxide Emissions (tons per person)	**19.8**	**20.9**	**21.2**	**21.4**	**22.2**	**22.5**	**22.7**	**22.7**	**23.4**	**23.7**

[1]Fuel consumption includes energy for combined heat and power plants, except those plants whose primary business is to sell electricity, or electricity and heat, to the public.
[2]Includes lease and plant fuel.
[3]This includes international bunker fuel, which by convention are excluded from the international accounting of carbon dioxide emissions. In the years from 1990 through 2000, international bunker fuels accounted for 24 to 30 million metric tons of carbon dioxide annually.
[4]Includes pipeline fuel natural gas and compressed natural gas used as vehicle fuel.
[5]Includes methanol and liquid hydrogen.
[6]Includes electricity-only and combined heat and power (CHP) 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.
[7]Emissions from electric power generators are distributed to the primary fuels.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 emissions and emission factors: Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 2002,* DOE/EIA-0573(2002) (Washington, DC, October 2003). **Projections:** EIA, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B20. Macroeconomic Indicators

(Billion 1996 Chain-Weighted Dollars, Unless Otherwise Noted)

Indicators	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High Economic Growth	Low Economic Growth	Reference	High.5 Economic Growth
Real Gross Domestic Product	**9440**	**11727**	**12190**	**12858**	**14722**	**16188**	**17603**	**16280**	**18520**	**20685**
Real Potential Gross Domestic Product	**9726**	**12001**	**12313**	**12745**	**15028**	**16186**	**17586**	**16645**	**18520**	**20598**
Real Disposable Personal Income	**7032**	**8619**	**8894**	**9264**	**11030**	**11864**	**12658**	**12643**	**13826**	**14969**
Components of Real Gross Domestic Product										
Real Consumption	6576	8162	8437	8801	10329	11296	12010	11483	12946	14089
Real Investment	1590	2209	2387	2638	3125	3726	4210	3627	4661	5483
Real Government Spending	1713	1879	1961	2009	2072	2265	2387	2172	2423	2599
Real Exports	1059	1751	1838	1974	2969	3376	3857	3773	4546	5347
Real Imports	1547	2278	2436	2529	3713	4433	4676	5058	6015	6492
Energy Intensity										
(thousand Btu per 1996 dollar of GDP										
Delivered Energy	7.55	6.76	6.73	6.60	5.98	5.84	5.71	5.68	5.45	5.26
Total Energy	10.36	9.24	9.17	8.95	8.19	7.91	7.67	7.76	7.37	7.05
Price Indices										
GDP Chain-Type Price Index (1996=1.000)	1.107	1.356	1.301	1.210	2.012	1.774	1.564	2.493	2.121	1.790
Consumer Price Index (1982-4=1)	1.80	2.21	2.11	1.96	3.33	2.89	2.54	4.23	3.49	2.93
Wholesale Price Index (1982=1.00)										
All Commodities	1.31	1.53	1.46	1.36	2.03	1.74	1.52	2.38	1.94	1.62
Fuel and Power	0.93	1.08	1.06	1.04	1.51	1.33	1.19	1.85	1.52	1.27
Interest Rates (percent, nominal)										
Federal Funds Rate	1.67	5.86	5.42	5.04	7.08	6.30	5.59	8.06	7.00	6.04
10-Year Treasury Note	4.61	6.95	6.60	6.27	7.79	7.07	6.42	9.02	7.95	6.95
AA Utility Bond Rate	7.19	8.41	7.99	7.61	9.53	8.59	7.75	10.69	9.27	7.99
Unemployment Rate (percent)	**5.78**	**5.45**	**4.93**	**4.38**	**5.01**	**4.41**	**3.84**	**5.08**	**4.44**	**3.80**
Housing Starts (millions)	**1.88**	**1.74**	**1.97**	**2.24**	**1.57**	**1.94**	**2.16**	**1.49**	**1.92**	**2.20**
Commercial Floorspace, Total (billion square feet)	**72.1**	**82.8**	**83.8**	**84.8**	**92.5**	**95.9**	**99.3**	**96.9**	**101.8**	**106.4**
Unit Sales of Light-Duty Vehicles (millions)	**16.78**	**17.01**	**18.01**	**19.08**	**18.41**	**20.25**	**22.16**	**18.08**	**21.32**	**24.91**
Value of Shipments (billion 1996 dollars)										
Total Industrial	5285	5927	6439	6986	7292	8344	9537	7987	9491	11166
Non-manufacturing	1222	1300	1425	1587	1462	1710	1955	1503	1855	2204
Manufacturing	4064	4627	5013	5399	5830	6634	7582	6483	7636	8962
Energy-Intensive	1120	1181	1273	1348	1321	1500	1679	1393	1610	1830
Non-Energy Intensive	2944	3446	3741	4051	4508	5135	5903	5090	6026	7132
Population and Employment (millions)										
Population with Armed Forces Overseas	288.9	304.1	309.3	314.4	322.2	334.6	347.1	331.4	347.5	363.7
Population (aged 16 and over)	224.3	240.3	244.1	247.9	255.2	264.3	273.3	262.3	274.3	286.3
Employment,Non-Agriculture	130.5	136.7	145.0	150.9	148.5	161.2	169.2	160.5	168.6	181.1
Employment,Manufacturing	16.7	15.3	16.1	16.9	15.3	16.0	17.0	15.3	16.2	17.3
Labor Force	145.1	156.8	159.8	163.6	164.2	171.3	178.8	167.1	176.8	186.8

GDP = Gross domestic product.
Btu = British thermal unit.
Sources: 2002: Global Insight macroeconomic model T250803. **Projections:** Energy Information Administration, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Table B21. International Petroleum Supply and Disposition Summary
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	2002	Projections								
		2010			2020			2025		
		Low Economic Growth	Reference Case	High Economic Growth	Low Economic Growth	Reference Case	High Economic Growth	Low Economic Growth	Reference Case	High Economic Growth
World Oil Price[1] (2002 dollars per barrel)	**23.68**	**23.64**	**24.17**	**24.67**	**24.77**	**26.02**	**27.27**	**25.30**	**27.00**	**28.55**
Production[2] (Conventional)										
Industrialized Countries										
U.S. (50 states)	9.16	9.46	9.53	9.64	8.73	8.89	9.07	8.24	8.59	8.79
Canada	2.14	1.83	1.83	1.83	1.59	1.60	1.61	1.55	1.57	1.58
Mexico	3.61	4.20	4.20	4.20	4.58	4.60	4.62	4.79	4.82	4.84
Western Europe[3]	6.76	6.33	6.34	6.34	5.47	5.48	5.49	4.96	4.97	4.99
Japan	0.08	0.08	0.08	0.08	0.06	0.06	0.07	0.06	0.06	0.06
Australia and New Zealand	0.75	0.95	0.96	0.96	0.88	0.88	0.89	0.85	0.86	0.86
Total Industrialized	**22.51**	**22.85**	**22.93**	**23.05**	**21.32**	**21.52**	**21.75**	**20.46**	**20.87**	**21.13**
Eurasia										
Former Soviet Union										
Russia	7.67	9.90	9.92	9.93	10.72	10.77	10.80	10.87	10.93	10.98
Caspian Area[4]	1.66	3.11	3.12	3.12	5.13	5.15	5.17	6.08	6.11	6.14
Eastern Europe[5]	0.23	0.33	0.33	0.33	0.41	0.41	0.41	0.45	0.45	0.45
Total Eurasia	**9.56**	**13.35**	**13.37**	**13.38**	**16.26**	**16.32**	**16.38**	**17.39**	**17.48**	**17.57**
Developing Countries	**44.24**	**49.32**	**49.94**	**50.51**	**63.37**	**64.32**	**65.32**	**73.18**	**74.05**	**75.20**
Total Production (Conventional)	**76.30**	**85.52**	**86.24**	**86.95**	**100.94**	**102.17**	**103.45**	**111.03**	**112.41**	**113.89**
Production[6] (Nonconventional)										
U.S. (50 states)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Other North America	0.79	1.69	1.69	1.69	3.20	3.20	3.20	3.28	3.28	3.28
Western Europe	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Asia	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Middle East[7]	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03
Africa	0.16	0.19	0.19	0.19	0.25	0.25	0.25	0.28	0.28	0.28
South and Central America	0.54	0.85	0.85	0.85	1.42	1.42	1.42	1.45	1.45	1.45
Total Production (Nonconventional)	**1.55**	**2.81**	**2.81**	**2.81**	**4.97**	**4.97**	**4.97**	**5.11**	**5.11**	**5.11**
Total Production	**77.85**	**88.33**	**89.05**	**89.76**	**105.91**	**107.13**	**108.41**	**116.14**	**117.53**	**119.03**
Consumption[8]										
Industrialized Countries										
U.S. (50 states)	19.61	21.83	22.71	23.56	24.54	26.41	28.36	25.87	28.30	30.62
U.S. Territories	0.29	0.38	0.38	0.38	0.43	0.43	0.42	0.48	0.47	0.46
Canada	1.96	2.25	2.23	2.23	2.40	2.36	2.33	2.50	2.44	2.40
Mexico	2.01	2.66	2.65	2.65	3.69	3.62	3.57	4.20	4.09	3.99
Western Europe[3]	14.02	14.39	14.36	14.33	14.90	14.80	14.70	15.41	15.26	15.14
Japan	5.45	5.82	5.79	5.77	6.38	6.26	6.15	6.73	6.54	6.38
Australia and New Zealand	1.04	1.28	1.28	1.28	1.59	1.58	1.57	1.76	1.75	1.74
Total Industrialized	**44.39**	**48.61**	**49.41**	**50.18**	**53.94**	**55.47**	**57.11**	**56.95**	**58.85**	**60.73**
Eurasia										
Former Soviet Union	4.05	5.11	5.10	5.09	5.76	5.73	5.70	6.29	6.25	6.21
Eastern Europe[5]	1.44	1.74	1.74	1.74	2.22	2.21	2.21	2.55	2.54	2.53
Total Eurasia	**5.49**	**6.85**	**6.84**	**6.83**	**7.98**	**7.94**	**7.90**	**8.85**	**8.79**	**8.74**
Developing Countries										
China	5.11	6.50	6.48	6.46	9.48	9.39	9.30	11.03	10.88	10.76
India	2.16	2.81	2.80	2.80	4.52	4.47	4.43	5.55	5.48	5.41
South Korea	2.20	2.76	2.75	2.74	3.18	3.15	3.12	3.37	3.32	3.27
Other Asia	5.63	6.66	6.65	6.64	8.97	8.93	8.89	10.24	10.17	10.12
Middle East[7]	5.34	6.20	6.19	6.18	7.89	7.87	7.85	8.92	8.88	8.86
Africa	2.56	2.69	2.68	2.68	3.18	3.16	3.15	3.52	3.50	3.47
South and Central America	4.91	5.54	5.54	5.53	7.06	7.03	7.00	8.03	7.99	7.95
Total Developing Countries	**27.91**	**33.17**	**33.10**	**33.04**	**44.27**	**44.00**	**43.74**	**50.66**	**50.22**	**49.84**
Total Consumption	**77.79**	**88.63**	**89.35**	**90.05**	**106.20**	**107.40**	**108.75**	**116.45**	**117.86**	**119.31**

[1]Average refiner acquisition cost of imported crude oil.
[2]Includes production of crude oil (including lease condensates, natural gas plant liquids, other hydrogen and hydrocarbons for refinery feedstocks, alcohol and other sources.
[3]Western Europe = Austria, Belgium, Bosnia and Herzegovina, Croatia, Denmark, Finland, France, the unified Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Macedonia, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, United Kingdom, and Yugoslavia.
[4]Caspian area includes Other Former Soviet Union.
[5]Eastern Europe = Albania, Bulgaria, Czech Republic, Hungary, Poland, Romania, and Slovakia.
[6]Includes liquids produced from energy crops, natural gas, coal, oil sands, and shale. Includes both OPEC and non-OPEC producers in the regional breakdown.
[7]Includes Turkey.
[8]Includes both OPEC and non-OPEC consumers in the regional breakdown.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: Energy Information Administration, AEO2004 National Energy Modeling System runs LM2004.D101703A, AEO2004.D101703E, and HM2004.D101703A.

Oil Price Case Comparisons

Table C1. Total Energy Supply and Disposition Summary

(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Production										
Crude Oil and Lease Condensate	11.91	12.05	12.56	13.06	9.54	10.49	11.59	8.50	9.77	10.27
Natural Gas Plant Liquids	2.56	2.99	3.10	3.20	3.17	3.47	3.62	3.17	3.47	3.60
Dry Natural Gas	19.56	20.80	21.05	21.87	22.75	24.43	25.62	23.09	24.64	25.69
Coal	22.70	25.38	25.25	25.30	27.44	27.92	29.21	30.10	31.10	31.86
Nuclear Power	8.15	8.29	8.29	8.29	8.53	8.53	8.53	8.53	8.53	8.53
Renewable Energy[1]	5.84	7.34	7.18	7.21	8.51	8.45	8.41	8.95	9.00	8.92
Other[2]	1.13	0.86	0.88	0.84	0.75	0.81	0.77	0.82	0.84	0.79
Total	**71.85**	**77.72**	**78.30**	**79.77**	**80.67**	**84.09**	**87.75**	**83.15**	**87.33**	**89.67**
Imports										
Crude Oil[3]	19.84	26.36	24.51	22.16	35.63	31.55	27.85	39.56	34.21	31.19
Petroleum Products[4]	4.75	6.57	5.76	4.59	9.98	7.83	5.47	12.22	9.63	6.16
Natural Gas	4.10	5.93	6.54	6.34	7.36	7.56	6.92	7.82	8.29	8.05
Other Imports[5]	0.52	0.94	0.95	0.96	1.10	1.12	1.12	1.18	1.18	1.18
Total	**29.21**	**39.80**	**37.76**	**34.04**	**54.08**	**48.06**	**41.36**	**60.78**	**53.30**	**46.58**
Exports										
Petroleum[6]	2.03	2.18	2.15	2.09	2.42	2.13	2.09	2.54	2.15	2.05
Natural Gas	0.52	0.90	0.91	0.92	0.91	0.93	1.01	0.89	0.88	1.00
Coal	1.03	0.90	0.89	0.89	0.73	0.69	0.75	0.60	0.56	0.55
Total	**3.58**	**3.98**	**3.95**	**3.90**	**4.06**	**3.75**	**3.84**	**4.03**	**3.59**	**3.61**
Discrepancy[7]	**-0.24**	**0.38**	**0.34**	**0.30**	**0.54**	**0.48**	**0.62**	**0.64**	**0.56**	**0.72**
Consumption										
Petroleum Products[8]	38.11	46.10	44.15	41.56	55.93	51.35	47.14	60.88	54.99	49.83
Natural Gas	23.37	25.98	26.82	27.22	29.34	31.21	31.17	30.19	32.21	32.39
Coal	22.18	25.34	25.23	25.22	27.78	28.30	29.33	30.68	31.73	32.23
Nuclear Power	8.15	8.29	8.29	8.29	8.53	8.53	8.53	8.53	8.53	8.53
Renewable Energy[1]	5.84	7.34	7.18	7.21	8.51	8.46	8.41	8.95	9.00	8.92
Other[9]	0.07	0.10	0.11	0.11	0.06	0.07	0.07	0.02	0.03	0.03
Total	**97.72**	**113.16**	**111.77**	**109.61**	**130.14**	**127.92**	**124.65**	**139.26**	**136.48**	**131.93**
Net Imports - Petroleum	**22.56**	**30.75**	**28.13**	**24.66**	**43.19**	**37.25**	**31.23**	**49.23**	**41.69**	**35.30**
Prices (2002 dollars per unit)										
World Oil Price (dollars per barrel)[10]	23.68	16.98	24.17	33.27	16.98	26.02	34.63	16.98	27.00	35.03
Natural Gas Wellhead Price (dollars per thousand cubic feet)[11]	2.95	3.34	3.40	3.50	3.91	4.28	4.18	4.30	4.40	4.66
Coal Minemouth Price (dollars per ton)	17.90	17.01	16.88	17.14	16.08	16.32	16.96	16.35	16.57	16.80
Average Electricity Price (cents per kilowatthour)	7.2	6.5	6.6	6.7	6.6	6.9	6.8	6.7	6.9	6.9

[1]Includes 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 C18 for selected nonmarketed residential and commercial renewable energy.

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

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

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

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

[6]Includes crude oil and petroleum products.

[7]Balancing 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.

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

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

[10]Average refiner acquisition cost for imported crude oil.

[11]Represents lower 48 onshore and offshore supplies.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.

Sources: 2002 natural gas supply values :EIA, Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2002 petroleum supply values EIA: *Petroleum Supply Annual 2002*, DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). Other 2002 values: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002) and EIA, *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003). **Projections:** EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

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

Sector and Source	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Energy Consumption										
Residential										
Distillate Fuel	0.89	0.97	0.93	0.88	0.90	0.85	0.80	0.86	0.80	0.75
Kerosene	0.07	0.12	0.11	0.10	0.11	0.10	0.09	0.10	0.09	0.08
Liquefied Petroleum Gas	0.53	0.58	0.56	0.53	0.65	0.61	0.58	0.69	0.64	0.60
Petroleum Subtotal	1.48	1.67	1.60	1.52	1.66	1.56	1.47	1.64	1.53	1.43
Natural Gas	5.06	5.71	5.69	5.68	6.13	6.08	6.10	6.31	6.26	6.26
Coal	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Renewable Energy[1]	0.39	0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.40
Electricity	4.33	4.89	4.87	4.86	5.63	5.60	5.61	5.99	5.96	5.95
Delivered Energy	**11.28**	**12.68**	**12.58**	**12.47**	**13.84**	**13.66**	**13.59**	**14.37**	**14.17**	**14.06**
Electricity Related Losses	9.60	10.56	10.48	10.44	11.55	11.43	11.45	12.01	11.95	11.92
Total	**20.88**	**23.24**	**23.06**	**22.91**	**25.39**	**25.10**	**25.04**	**26.37**	**26.12**	**25.98**
Commercial										
Distillate Fuel	0.49	0.68	0.62	0.56	0.78	0.67	0.57	0.83	0.70	0.57
Residual Fuel	0.08	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Kerosene	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Liquefied Petroleum Gas	0.09	0.10	0.10	0.09	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	0.72	0.98	0.92	0.85	1.09	0.97	0.86	1.14	1.00	0.87
Natural Gas	3.21	3.58	3.57	3.58	3.93	3.94	4.01	4.14	4.16	4.23
Coal	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Renewable Energy[3]	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Electricity	4.12	5.08	5.05	5.02	6.30	6.24	6.22	6.90	6.83	6.82
Delivered Energy	**8.25**	**9.84**	**9.74**	**9.65**	**11.52**	**11.35**	**11.29**	**12.37**	**12.19**	**12.12**
Electricity Related Losses	9.15	10.98	10.86	10.79	12.91	12.73	12.71	13.82	13.70	13.67
Total	**17.40**	**20.82**	**20.60**	**20.44**	**24.42**	**24.07**	**23.99**	**26.19**	**25.89**	**25.78**
Industrial[4]										
Distillate Fuel	1.16	1.21	1.17	1.15	1.38	1.34	1.31	1.48	1.43	1.40
Liquefied Petroleum Gas	2.22	2.40	2.35	2.31	2.84	2.74	2.66	3.09	2.94	2.80
Petrochemical Feedstock	1.22	1.36	1.35	1.33	1.57	1.54	1.51	1.66	1.62	1.58
Residual Fuel	0.20	0.23	0.21	0.18	0.27	0.22	0.20	0.27	0.23	0.21
Motor Gasoline[2]	0.16	0.16	0.16	0.16	0.18	0.18	0.18	0.19	0.19	0.19
Other Petroleum[5]	4.03	4.60	4.38	4.00	5.31	4.93	4.42	5.61	5.17	4.72
Petroleum Subtotal	9.00	9.97	9.63	9.13	11.54	10.95	10.27	12.31	11.59	10.89
Natural Gas	7.43	8.48	8.62	8.87	9.58	9.84	10.06	10.28	10.58	10.65
Lease and Plant Fuel[6]	1.35	1.39	1.40	1.44	1.57	1.65	1.72	1.61	1.69	1.75
Natural Gas Subtotal	8.78	9.86	10.02	10.31	11.14	11.49	11.78	11.89	12.27	12.40
Metallurgical Coal	0.62	0.65	0.64	0.64	0.53	0.52	0.52	0.48	0.47	0.46
Steam Coal	1.47	1.41	1.41	1.46	1.45	1.45	1.66	1.48	1.47	1.74
Net Coal Coke Imports	0.03	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01
Coal Subtotal	2.12	2.07	2.06	2.12	1.99	1.97	2.18	1.97	1.95	2.21
Renewable Energy[7]	1.66	2.01	2.00	1.99	2.50	2.48	2.46	2.73	2.70	2.68
Electricity	3.39	3.84	3.82	3.81	4.51	4.47	4.45	4.93	4.85	4.81
Delivered Energy	**24.94**	**27.75**	**27.53**	**27.35**	**31.67**	**31.36**	**31.15**	**33.82**	**33.35**	**32.99**
Electricity Related Losses	7.53	8.30	8.22	8.18	9.24	9.12	9.09	9.87	9.72	9.64
Total	**32.47**	**36.05**	**35.75**	**35.53**	**40.92**	**40.48**	**40.24**	**43.69**	**43.07**	**42.63**

Table C2. Energy Consumption by Sector and Source (Continued)

(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Transportation										
Distillate Fuel[8]	5.12	6.45	6.42	6.36	8.04	8.02	7.84	8.98	8.94	8.65
Jet Fuel[9]	3.34	3.95	3.93	3.90	4.70	4.69	4.53	4.97	4.91	4.70
Motor Gasoline[2]	16.62	20.51	19.88	18.33	24.27	23.11	20.56	26.54	24.98	21.63
Residual Fuel	0.71	0.79	0.79	0.79	0.81	0.82	0.82	0.82	0.83	0.83
Liquefied Petroleum Gas	0.02	0.06	0.06	0.05	0.08	0.08	0.07	0.09	0.08	0.08
Other Petroleum[10]	0.24	0.26	0.25	0.25	0.30	0.30	0.30	0.32	0.32	0.32
Petroleum Subtotal	26.06	32.02	31.34	29.69	38.20	37.00	34.11	41.72	40.07	36.20
Pipeline Fuel Natural Gas	0.65	0.68	0.69	0.71	0.77	0.83	0.84	0.79	0.86	0.87
Compressed Natural Gas	0.01	0.06	0.06	0.06	0.10	0.10	0.10	0.11	0.11	0.11
Renewable Energy (E85)[11]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.11	0.11	0.11	0.12	0.12	0.12
Delivered Energy	**26.79**	**32.85**	**32.18**	**30.54**	**39.19**	**38.05**	**35.15**	**42.75**	**41.16**	**37.30**
Electricity Related Losses	0.17	0.20	0.19	0.19	0.23	0.22	0.21	0.25	0.24	0.23
Total	**26.96**	**33.04**	**32.37**	**30.73**	**39.41**	**38.27**	**35.37**	**43.00**	**41.40**	**37.53**
Delivered Energy Consumption for All Sectors										
Distillate Fuel	7.66	9.31	9.15	8.95	11.09	10.88	10.51	12.16	11.88	11.36
Kerosene	0.09	0.16	0.16	0.15	0.15	0.14	0.14	0.14	0.13	0.13
Jet Fuel[9]	3.34	3.95	3.93	3.90	4.70	4.69	4.53	4.97	4.91	4.70
Liquefied Petroleum Gas	2.86	3.14	3.07	2.99	3.68	3.53	3.40	3.97	3.76	3.57
Motor Gasoline[2]	16.83	20.72	20.09	18.54	24.50	23.34	20.79	26.78	25.22	21.87
Petrochemical Feedstock	1.22	1.36	1.35	1.33	1.57	1.54	1.51	1.66	1.62	1.58
Residual Fuel	1.00	1.16	1.13	1.11	1.21	1.17	1.14	1.22	1.19	1.16
Other Petroleum[12]	4.26	4.84	4.61	4.23	5.58	5.21	4.69	5.91	5.46	5.02
Petroleum Subtotal	37.26	44.63	43.48	41.18	52.49	50.50	46.71	56.82	54.18	49.39
Natural Gas	15.71	17.82	17.94	18.19	19.74	19.95	20.27	20.84	21.11	21.25
Lease and Plant Fuel[6]	1.35	1.39	1.40	1.44	1.57	1.65	1.72	1.61	1.69	1.75
Pipeline Natural Gas	0.65	0.68	0.69	0.71	0.77	0.83	0.84	0.79	0.86	0.87
Natural Gas Subtotal	17.72	19.88	20.03	20.34	22.07	22.43	22.83	23.24	23.66	23.87
Metallurgical Coal	0.62	0.65	0.64	0.64	0.53	0.52	0.52	0.48	0.47	0.46
Steam Coal	1.58	1.52	1.52	1.57	1.56	1.56	1.76	1.59	1.58	1.85
Net Coal Coke Imports	0.03	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01
Coal Subtotal	2.23	2.18	2.17	2.23	2.09	2.08	2.29	2.08	2.06	2.32
Renewable Energy[13]	2.15	2.51	2.50	2.49	3.01	2.99	2.97	3.24	3.21	3.18
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	11.92	13.91	13.83	13.78	16.55	16.41	16.39	17.94	17.77	17.71
Delivered Energy	**71.27**	**83.12**	**82.03**	**80.02**	**96.22**	**94.42**	**91.19**	**103.31**	**100.87**	**96.47**
Electricity Related Losses	26.45	30.04	29.75	29.59	33.92	33.50	33.46	35.94	35.61	35.46
Total	**97.72**	**113.16**	**111.77**	**109.61**	**130.14**	**127.92**	**124.65**	**139.26**	**136.48**	**131.93**
Electric Power[14]										
Distillate Fuel	0.16	0.61	0.16	0.12	2.37	0.26	0.13	2.96	0.27	0.14
Residual Fuel	0.69	0.86	0.51	0.25	1.08	0.59	0.30	1.11	0.54	0.31
Petroleum Subtotal	0.85	1.47	0.66	0.37	3.44	0.85	0.43	4.07	0.81	0.45
Natural Gas	5.65	6.09	6.79	6.88	7.26	8.78	8.34	6.94	8.55	8.52
Steam Coal	19.96	23.16	23.05	22.99	25.69	26.22	27.05	28.61	29.67	29.91
Nuclear Power	8.15	8.29	8.29	8.29	8.53	8.53	8.53	8.53	8.53	8.53
Renewable Energy[15]	3.69	4.83	4.68	4.72	5.50	5.47	5.43	5.71	5.79	5.74
Electricity Imports	0.07	0.10	0.11	0.11	0.06	0.07	0.07	0.02	0.03	0.03
Total	**38.36**	**43.95**	**43.58**	**43.37**	**50.48**	**49.92**	**49.85**	**53.88**	**53.37**	**53.17**

Table C2. Energy Consumption by Sector and Source (Continued)

(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Total Energy Consumption										
Distillate Fuel	7.82	9.92	9.31	9.07	13.46	11.14	10.64	15.12	12.15	11.50
Kerosene	0.09	0.16	0.16	0.15	0.15	0.14	0.14	0.14	0.13	0.13
Jet Fuel[9]	3.34	3.95	3.93	3.90	4.70	4.69	4.53	4.97	4.91	4.70
Liquefied Petroleum Gas	2.86	3.14	3.07	2.99	3.68	3.53	3.40	3.97	3.76	3.57
Motor Gasoline[2]	16.83	20.72	20.09	18.54	24.50	23.34	20.79	26.78	25.22	21.87
Petrochemical Feedstock	1.22	1.36	1.35	1.33	1.57	1.54	1.51	1.66	1.62	1.58
Residual Fuel	1.69	2.01	1.64	1.36	2.29	1.76	1.44	2.33	1.72	1.48
Other Petroleum[12]	4.26	4.84	4.61	4.23	5.58	5.21	4.69	5.91	5.46	5.02
Petroleum Subtotal	38.11	46.10	44.15	41.56	55.93	51.35	47.14	60.88	54.99	49.83
Natural Gas	21.36	23.91	24.73	25.06	27.00	28.73	28.61	27.79	29.66	29.77
Lease and Plant Fuel[6]	1.35	1.39	1.40	1.44	1.57	1.65	1.72	1.61	1.69	1.75
Pipeline Natural Gas	0.65	0.68	0.69	0.71	0.77	0.83	0.84	0.79	0.86	0.87
Natural Gas Subtotal	23.37	25.98	26.82	27.22	29.34	31.21	31.17	30.19	32.21	32.39
Metallurgical Coal	0.62	0.65	0.64	0.64	0.53	0.52	0.52	0.48	0.47	0.46
Steam Coal	21.54	24.69	24.57	24.57	27.25	27.78	28.81	30.20	31.25	31.76
Net Coal Coke Imports	0.03	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01
Coal Subtotal	22.18	25.34	25.23	25.22	27.78	28.30	29.33	30.68	31.73	32.23
Nuclear Power	8.15	8.29	8.29	8.29	8.53	8.53	8.53	8.53	8.53	8.53
Renewable Energy[16]	5.84	7.34	7.18	7.21	8.51	8.46	8.41	8.95	9.00	8.92
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity Imports	0.07	0.10	0.11	0.11	0.06	0.07	0.07	0.02	0.03	0.03
Total	**97.72**	**113.16**	**111.77**	**109.61**	**130.14**	**127.92**	**124.65**	**139.26**	**136.48**	**131.93**
Energy Use and Related Statistics										
Delivered Energy Use	71.27	83.12	82.03	80.02	96.22	94.42	91.19	103.31	100.87	96.47
Total Energy Use	97.72	113.16	111.77	109.61	130.14	127.92	124.65	139.26	136.48	131.93
Population (millions)	288.93	309.28	309.28	309.28	334.61	334.61	334.61	347.53	347.53	347.53
Gross Domestic Product (billion 1996 dollars)	9440	12234	12190	12147	16226	16188	16155	18588	18520	18456
Carbon Dioxide Emissions (million metric tons)	5729.3	6661.3	6558.8	6400.5	7711.7	7535.6	7340.5	8350.9	8142.0	7849.1

[1]Includes wood used for residential heating. See Table C18 for estimates of nonmarketed renewable energy consumption for geothermal heat pumps, solar thermal hot water heating, and solar photovoltaic electricity generation.

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

[3]Includes commercial sector consumption of wood and wood waste, landfill gas, municipal solid waste, and other biomass for combined heat and power. See Table C18 for estimates of nonmarketed renewable energy consumption for solar thermal hot water heating and solar photovoltaic electricity generation.

[4]Fuel consumption includes consumption for combined heat and power, which produces electricity, both for sale to the grid and for own use, and other useful thermal energy.

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

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

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

[8]Diesel fuel containing 500 parts per million (ppm) or 15 ppm sulfur.

[9]Includes only kerosene type.

[10]Includes aviation gasoline and lubricants.

[11]E85 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.

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

[13]Includes 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.

[14]Includes 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.

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

[16]Includes 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 2002 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: 2002 consumption based on: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2002 population and gross domestic product: Global Insight macroeconomic model T250803. 2002 carbon dioxide emissions: EIA, *Emissions of Greenhouse Gases in the United States 2002,* DOE/EIA-0573(2002) (Washington, DC, October 2003). **Projections:** EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C3. Energy Prices by Sector and Source

(2002 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Residential	**14.73**	**13.89**	**14.21**	**14.61**	**14.43**	**15.08**	**15.20**	**14.84**	**15.38**	**15.68**
Primary Energy[1]	8.14	7.80	8.15	8.60	8.10	8.76	9.03	8.40	8.89	9.33
Petroleum Products[2]	9.87	8.63	9.90	11.68	9.13	10.86	12.47	9.31	11.26	12.89
Distillate Fuel	8.23	6.75	7.82	9.33	7.08	8.39	9.66	7.13	8.53	9.86
Liquefied Petroleum Gas	12.92	12.27	13.89	16.14	12.42	14.79	16.90	12.44	15.19	17.20
Natural Gas	7.65	7.57	7.67	7.79	7.84	8.24	8.22	8.17	8.32	8.53
Electricity	24.73	23.10	23.30	23.53	23.20	23.73	23.55	23.40	23.88	23.91
Commercial	**14.68**	**13.35**	**13.77**	**14.19**	**14.17**	**14.93**	**15.02**	**14.57**	**15.28**	**15.56**
Primary Energy[1]	6.35	6.14	6.48	6.87	6.48	7.11	7.34	6.74	7.22	7.65
Petroleum Products[2]	6.88	5.13	6.34	7.97	5.30	6.83	8.30	5.28	6.98	8.48
Distillate Fuel	6.07	4.36	5.45	6.96	4.68	6.01	7.25	4.70	6.15	7.45
Residual Fuel	4.21	3.04	4.13	5.52	3.04	4.41	5.72	3.03	4.55	5.78
Natural Gas	6.37	6.54	6.64	6.76	6.92	7.31	7.27	7.27	7.41	7.62
Electricity	22.82	19.96	20.39	20.78	20.43	21.21	21.15	20.68	21.48	21.59
Industrial[3]	**6.31**	**5.80**	**6.44**	**7.19**	**6.22**	**7.21**	**7.70**	**6.39**	**7.42**	**8.05**
Primary Energy	4.77	4.43	5.14	5.97	4.80	5.88	6.49	4.95	6.07	6.80
Petroleum Products[2]	6.35	5.39	6.84	8.72	5.60	7.54	9.19	5.58	7.81	9.37
Distillate Fuel	6.21	4.55	5.68	7.16	4.91	6.24	7.44	4.91	6.40	7.63
Liquefied Petroleum Gas	8.28	7.82	9.72	12.24	8.02	10.66	13.14	8.03	11.11	13.39
Residual Fuel	3.89	2.66	3.74	5.13	2.65	4.03	5.34	2.65	4.17	5.40
Natural Gas[4]	3.75	3.97	4.05	4.15	4.51	4.89	4.78	4.86	4.99	5.24
Metallurgical Coal	1.87	1.94	1.96	1.97	1.83	1.84	1.84	1.76	1.77	1.77
Steam Coal	1.52	1.56	1.58	1.60	1.51	1.53	1.57	1.50	1.53	1.54
Electricity	14.74	13.13	13.36	13.59	13.46	13.99	13.86	13.57	14.09	14.20
Transportation	**9.91**	**9.21**	**10.50**	**11.80**	**8.98**	**10.54**	**11.79**	**8.85**	**10.69**	**11.91**
Primary Energy	9.88	9.18	10.48	11.77	8.95	10.52	11.76	8.82	10.67	11.88
Petroleum Products[2]	9.88	9.18	10.48	11.78	8.95	10.52	11.77	8.82	10.67	11.89
Distillate Fuel[5]	9.41	8.99	10.12	11.51	8.70	10.00	11.19	8.46	10.03	11.19
Jet Fuel[6]	5.97	4.59	5.76	7.30	4.69	6.06	7.35	4.65	6.21	7.48
Motor Gasoline[7]	11.15	10.45	11.87	13.19	10.13	11.90	13.29	9.98	12.06	13.45
Residual Fuel	3.77	2.46	3.60	5.05	2.45	3.88	5.25	2.44	4.02	5.30
Liquefied Petroleum Gas[8]	15.00	13.39	14.96	17.21	13.17	15.51	17.50	13.08	15.83	17.71
Natural Gas[9]	7.38	8.10	8.26	8.33	8.54	9.06	8.92	8.76	9.09	9.19
Ethanol (E85)[10]	15.19	15.48	17.22	18.65	16.35	18.28	19.78	16.57	18.58	20.15
Electricity	21.10	19.33	19.57	19.84	19.48	20.03	19.94	19.39	19.92	20.06
Average End-Use Energy	**10.10**	**9.40**	**10.23**	**11.09**	**9.60**	**10.76**	**11.45**	**9.68**	**10.96**	**11.75**
Primary Energy	7.70	7.29	8.22	9.15	7.40	8.64	9.43	7.45	8.82	9.66
Electricity	21.20	19.17	19.47	19.75	19.47	20.10	19.98	19.63	20.26	20.35
Electric Power[11]										
Fossil Fuel Average	1.89	1.85	1.92	1.96	2.07	2.18	2.11	2.09	2.11	2.16
Petroleum Products	4.32	3.25	4.21	5.90	3.77	4.67	6.14	3.87	4.88	6.26
Distillate Fuel	5.58	3.79	4.92	6.39	4.19	5.47	6.68	4.25	5.62	6.88
Residual Fuel	4.04	2.86	3.99	5.67	2.86	4.31	5.90	2.86	4.50	5.99
Natural Gas	3.77	3.91	4.04	4.17	4.42	4.85	4.72	4.74	4.92	5.16
Steam Coal	1.26	1.21	1.22	1.24	1.17	1.20	1.23	1.19	1.22	1.24

Table C3. Energy Prices by Sector and Source (Continued)

(2002 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Average Price to All Users[12]										
Petroleum Products[2]	8.94	8.15	9.57	11.05	7.95	9.81	11.19	7.86	10.01	11.33
Distillate Fuel	8.52	7.59	8.93	10.40	7.18	9.07	10.35	7.00	9.18	10.43
Jet Fuel	5.97	4.59	5.76	7.30	4.69	6.06	7.35	4.65	6.21	7.48
Liquefied Petroleum Gas	9.27	8.82	10.65	13.09	8.98	11.55	13.93	8.97	11.96	14.18
Motor Gasoline[7]	11.15	10.45	11.87	13.19	10.13	11.90	13.29	9.98	12.06	13.45
Residual Fuel	3.92	2.69	3.78	5.22	2.70	4.08	5.44	2.70	4.23	5.51
Natural Gas	5.07	5.21	5.27	5.36	5.61	5.93	5.86	5.96	6.03	6.26
Coal	1.28	1.23	1.25	1.27	1.19	1.22	1.27	1.20	1.24	1.27
Ethanol (E85)[13]	15.19	15.48	17.22	18.65	16.35	18.28	19.78	16.57	18.58	20.15
Electricity	21.20	19.17	19.47	19.75	19.47	20.10	19.98	19.63	20.26	20.35
Non-Renewable Energy Expenditures by Sector (billion 2002 dollars)										
Residential	160.37	170.53	173.01	176.32	193.91	199.98	200.47	207.13	211.69	214.19
Commercial	119.67	130.07	132.72	135.53	161.82	167.90	168.10	178.82	184.74	187.06
Industrial	120.96	121.63	132.71	146.74	148.67	169.02	179.28	164.53	185.61	198.70
Transportation	259.11	296.17	330.65	351.89	344.91	392.36	404.44	371.41	430.99	433.72
Total Non-Renewable Expenditures	660.11	718.40	769.08	810.48	849.31	929.26	952.29	921.89	1013.03	1033.67
Transportation Renewable Expenditures	0.01	0.03	0.03	0.03	0.05	0.06	0.06	0.06	0.07	0.07
Total Expenditures	**660.12**	**718.43**	**769.11**	**810.51**	**849.36**	**929.32**	**952.34**	**921.95**	**1013.10**	**1033.73**

[1]Weighted average price includes fuels below as well as coal.
[2]This quantity is the weighted average for all petroleum products, not just those listed below.
[3]Includes combined heat and power, which produces electricity and other useful thermal energy.
[4]Excludes use for lease and plant fuel.
[5] Diesel fuel containing 500 parts per million (ppm) or 15 pm sulfur. Price includes Federal and State taxes while excluding county and local taxes.
[6]Kerosene-type jet fuel. Price includes Federal and State taxes while excluding county and local taxes.
[7]Sales weighted-average price for all grades. Includes Federal, State and local taxes.
[8]Includes Federal and State taxes while excluding county and local taxes.
[9]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[10]E85 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.
[11]Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.
[12]Weighted 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 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 prices for motor gasoline, distillate, and jet fuel are based on: Energy Information Administration (EIA), *Petroleum Marketing Annual 2002*, http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_annual/current/pdf/pmaall.pdf (August 2003). 2002 residential, commercial, and transportation natural gas delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2002 electric power sector natural gas prices: Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 2002 industrial natural gas delivered prices based on: EIA, *Manufacturing Energy Consumption Survey 1998*. 2002 coal prices based on EIA, *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003) and EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E. 2002 electricity prices: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2002 ethanol prices derived from weekly spot prices in the Oxy Fuel News. **Projections:** EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C4. Residential Sector Key Indicators and End-Use Consumption
(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Key Indicators										
Households (millions)										
Single-Family	74.77	82.94	82.87	82.80	92.23	92.09	91.96	96.50	96.32	96.16
Multifamily	29.20	30.73	30.71	30.70	33.06	33.07	33.09	34.34	34.36	34.38
Mobile Homes	6.31	6.26	6.25	6.25	6.87	6.88	6.90	7.10	7.12	7.14
Total	**110.28**	**119.93**	**119.84**	**119.75**	**132.15**	**132.04**	**131.96**	**137.94**	**137.79**	**137.68**
Average House Square Footage	**1689**	**1731**	**1731**	**1731**	**1772**	**1771**	**1770**	**1789**	**1788**	**1787**
Energy Intensity										
(million Btu per household)										
Delivered Energy Consumption	102.3	105.7	105.0	104.2	104.7	103.5	103.0	104.1	102.8	102.1
Total Energy Consumption	189.4	193.8	192.4	191.3	192.1	190.1	189.7	191.2	189.5	188.7
(thousand Btu per square foot)										
Delivered Energy Consumption	60.6	61.1	60.6	60.2	59.1	58.4	58.2	58.2	57.5	57.1
Total Energy Consumption	112.1	111.9	111.1	110.5	108.4	107.3	107.2	106.9	106.0	105.6
Delivered Energy Consumption by Fuel										
Electricity										
Space Heating	0.40	0.43	0.43	0.42	0.45	0.45	0.45	0.46	0.46	0.46
Space Cooling	0.71	0.70	0.69	0.69	0.77	0.76	0.76	0.81	0.80	0.80
Water Heating	0.37	0.37	0.37	0.37	0.36	0.36	0.36	0.35	0.35	0.35
Refrigeration	0.42	0.37	0.37	0.37	0.36	0.36	0.36	0.37	0.37	0.37
Cooking	0.10	0.11	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.13
Clothes Dryers	0.24	0.25	0.25	0.25	0.27	0.26	0.26	0.28	0.27	0.27
Freezers	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Lighting	0.75	0.87	0.87	0.86	0.98	0.97	0.97	1.03	1.02	1.02
Clothes Washers[1]	0.03	0.04	0.04	0.04	0.06	0.06	0.06	0.06	0.06	0.06
Dishwashers[1]	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Color Televisions	0.12	0.19	0.18	0.18	0.26	0.26	0.26	0.27	0.27	0.27
Personal Computers	0.06	0.08	0.08	0.08	0.11	0.11	0.11	0.14	0.14	0.14
Furnace Fans	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11
Other Uses[2]	0.88	1.25	1.25	1.24	1.64	1.63	1.63	1.84	1.83	1.83
Delivered Energy	**4.33**	**4.89**	**4.87**	**4.86**	**5.63**	**5.60**	**5.61**	**5.99**	**5.96**	**5.95**
Natural Gas										
Space Heating	3.54	4.02	4.01	4.00	4.36	4.33	4.34	4.52	4.48	4.48
Space Cooling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Heating	1.15	1.25	1.25	1.25	1.28	1.27	1.27	1.29	1.28	1.28
Cooking	0.21	0.23	0.23	0.23	0.26	0.26	0.26	0.27	0.27	0.27
Clothes Dryers	0.07	0.09	0.09	0.09	0.11	0.11	0.11	0.12	0.11	0.11
Other Uses[3]	0.10	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12
Delivered Energy	**5.06**	**5.71**	**5.69**	**5.68**	**6.13**	**6.08**	**6.10**	**6.31**	**6.26**	**6.26**
Distillate										
Space Heating	0.77	0.85	0.81	0.77	0.79	0.75	0.70	0.76	0.71	0.66
Water Heating	0.12	0.12	0.12	0.11	0.11	0.10	0.10	0.10	0.09	0.09
Other Uses[4]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Delivered Energy	**0.89**	**0.97**	**0.93**	**0.88**	**0.90**	**0.85**	**0.80**	**0.86**	**0.80**	**0.75**
Liquefied Petroleum Gas										
Space Heating	0.30	0.32	0.30	0.28	0.33	0.31	0.28	0.34	0.31	0.28
Water Heating	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04
Cooking	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Other Uses[3]	0.15	0.19	0.18	0.17	0.24	0.23	0.22	0.26	0.25	0.24
Delivered Energy	**0.53**	**0.58**	**0.56**	**0.53**	**0.65**	**0.61**	**0.58**	**0.69**	**0.64**	**0.60**
Marketed Renewables (wood)[5]	0.39	0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.40
Other Fuels[6]	0.08	0.13	0.12	0.12	0.12	0.11	0.10	0.11	0.10	0.09

Table C4. Residential Sector Key Indicators and End-Use Consumption (Continued)
(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Delivered Energy Consumption by End-Use										
Space Heating	5.48	6.15	6.08	6.00	6.47	6.35	6.29	6.59	6.46	6.38
Space Cooling	0.71	0.70	0.69	0.69	0.77	0.76	0.76	0.81	0.80	0.80
Water Heating	1.69	1.80	1.79	1.78	1.81	1.78	1.78	1.79	1.77	1.75
Refrigeration	0.42	0.37	0.37	0.37	0.36	0.36	0.36	0.37	0.37	0.37
Cooking	0.34	0.37	0.37	0.37	0.41	0.41	0.41	0.42	0.42	0.42
Clothes Dryers	0.31	0.34	0.34	0.34	0.37	0.37	0.37	0.39	0.39	0.39
Freezers	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Lighting	0.75	0.87	0.87	0.86	0.98	0.97	0.97	1.03	1.02	1.02
Clothes Washers	0.03	0.04	0.04	0.04	0.06	0.06	0.06	0.06	0.06	0.06
Dishwashers	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Color Televisions	0.12	0.19	0.18	0.18	0.26	0.26	0.26	0.27	0.27	0.27
Personal Computers	0.06	0.08	0.08	0.08	0.11	0.11	0.11	0.14	0.14	0.14
Furnace Fans	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11
Other Uses[7]	1.13	1.55	1.54	1.53	1.99	1.97	1.97	2.23	2.20	2.19
Delivered Energy	**11.28**	**12.68**	**12.58**	**12.47**	**13.84**	**13.66**	**13.59**	**14.37**	**14.17**	**14.06**
Electricity Related Losses	**9.60**	**10.56**	**10.48**	**10.44**	**11.55**	**11.43**	**11.45**	**12.01**	**11.95**	**11.92**
Total Energy Consumption by End-Use										
Space Heating	6.36	7.07	6.99	6.91	7.39	7.27	7.22	7.50	7.37	7.29
Space Cooling	2.29	2.20	2.19	2.18	2.34	2.32	2.32	2.42	2.41	2.40
Water Heating	2.51	2.60	2.58	2.57	2.55	2.52	2.52	2.49	2.46	2.45
Refrigeration	1.37	1.16	1.16	1.16	1.10	1.09	1.09	1.11	1.11	1.11
Cooking	0.57	0.61	0.61	0.61	0.66	0.66	0.66	0.68	0.68	0.68
Clothes Dryers	0.83	0.89	0.89	0.88	0.92	0.91	0.91	0.95	0.94	0.94
Freezers	0.43	0.37	0.37	0.37	0.36	0.36	0.36	0.37	0.37	0.37
Lighting	2.41	2.75	2.73	2.72	2.99	2.95	2.96	3.09	3.07	3.06
Clothes Washers	0.10	0.12	0.12	0.12	0.18	0.18	0.18	0.19	0.19	0.19
Dishwashers	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.10	0.10	0.10
Color Televisions	0.40	0.59	0.58	0.58	0.79	0.78	0.78	0.82	0.82	0.82
Personal Computers	0.21	0.25	0.25	0.25	0.35	0.35	0.35	0.41	0.41	0.41
Furnace Fans	0.25	0.28	0.28	0.28	0.32	0.32	0.32	0.34	0.33	0.33
Other Uses[7]	3.09	4.26	4.22	4.20	5.35	5.29	5.29	5.91	5.87	5.85
Total	**20.88**	**23.24**	**23.06**	**22.91**	**25.39**	**25.10**	**25.04**	**26.37**	**26.12**	**25.98**
Non-Marketed Renewables										
Geothermal[8]	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
Solar[9]	0.02	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04
Total	**0.02**	**0.03**	**0.03**	**0.03**	**0.04**	**0.04**	**0.04**	**0.05**	**0.05**	**0.05**

[1]Does not include electric water heating portion of load.
[2]Includes small electric devices, heating elements, and motors.
[3]Includes such appliances as swimming pool heaters, outdoor grills, and outdoor lighting (natural gas).
[4]Includes such appliances as swimming pool and hot tub heaters.
[5]Includes wood used for primary and secondary heating in wood stoves or fireplaces as reported in the *Residential Energy Consumption Survey 2001*.
[6]Includes kerosene and coal.
[7]Includes all other uses listed above.
[8]Includes primary energy displaced by geothermal heat pumps in space heating and cooling applications.
[9]Includes 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 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 based on: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections:** EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C5. Commercial Sector Key Indicators and Consumption

(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Key Indicators										
Total Floorspace (billion square feet)										
Surviving	68.9	81.3	81.1	80.9	93.4	93.1	92.8	99.1	98.8	98.6
New Additions	3.2	2.7	2.7	2.6	2.8	2.8	2.8	3.0	3.0	3.0
Total	**72.1**	**84.0**	**83.8**	**83.6**	**96.2**	**95.9**	**95.6**	**102.1**	**101.8**	**101.6**
Energy Consumption Intensity (thousand Btu per square foot)										
Delivered Energy Consumption	114.5	117.1	116.2	115.5	119.7	118.3	118.1	121.2	119.7	119.2
Electricity Related Losses	126.9	130.7	129.6	129.1	134.2	132.7	132.9	135.3	134.6	134.5
Total Energy Consumption	241.4	247.8	245.8	244.6	253.9	251.0	250.9	256.5	254.3	253.7
Delivered Energy Consumption by Fuel										
Purchased Electricity										
Space Heating[1]	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Space Cooling[1]	0.46	0.45	0.45	0.45	0.48	0.48	0.48	0.50	0.49	0.49
Water Heating[1]	0.14	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Ventilation	0.16	0.18	0.18	0.18	0.19	0.18	0.18	0.19	0.19	0.19
Cooking	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Lighting	1.12	1.32	1.30	1.29	1.43	1.40	1.40	1.46	1.43	1.43
Refrigeration	0.20	0.22	0.22	0.22	0.24	0.24	0.24	0.25	0.25	0.25
Office Equipment (PC)	0.14	0.24	0.24	0.24	0.34	0.34	0.34	0.37	0.37	0.37
Office Equipment (non-PC)	0.31	0.47	0.46	0.46	0.71	0.71	0.71	0.87	0.87	0.87
Other Uses[2]	1.41	1.86	1.86	1.85	2.56	2.55	2.55	2.92	2.91	2.90
Delivered Energy	**4.12**	**5.08**	**5.05**	**5.02**	**6.30**	**6.24**	**6.22**	**6.90**	**6.83**	**6.82**
Natural Gas										
Space Heating[1]	1.42	1.56	1.56	1.58	1.62	1.64	1.71	1.66	1.69	1.77
Space Cooling[1]	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03
Water Heating[1]	0.59	0.69	0.70	0.69	0.78	0.79	0.80	0.82	0.84	0.84
Cooking	0.26	0.31	0.30	0.30	0.35	0.34	0.34	0.36	0.36	0.36
Other Uses[3]	0.93	1.00	0.99	0.98	1.15	1.14	1.13	1.25	1.24	1.23
Delivered Energy	**3.21**	**3.58**	**3.57**	**3.58**	**3.93**	**3.94**	**4.01**	**4.14**	**4.16**	**4.23**
Distillate										
Space Heating[1]	0.17	0.27	0.24	0.20	0.35	0.29	0.21	0.39	0.31	0.21
Water Heating[1]	0.07	0.10	0.08	0.07	0.12	0.09	0.08	0.13	0.09	0.08
Other Uses[4]	0.24	0.31	0.30	0.28	0.31	0.29	0.28	0.31	0.29	0.28
Delivered Energy	**0.49**	**0.68**	**0.62**	**0.56**	**0.78**	**0.67**	**0.57**	**0.83**	**0.70**	**0.57**
Other Fuels[5]	**0.33**	**0.40**	**0.39**	**0.39**	**0.40**	**0.40**	**0.40**	**0.41**	**0.40**	**0.40**
Marketed Renewable Fuels										
Biomass	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Delivered Energy	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**
Delivered Energy Consumption by End-Use										
Space Heating[1]	1.74	2.00	1.97	1.94	2.14	2.09	2.07	2.22	2.16	2.14
Space Cooling[1]	0.48	0.47	0.47	0.46	0.51	0.50	0.50	0.53	0.52	0.52
Water Heating[1]	0.80	0.94	0.93	0.92	1.05	1.03	1.02	1.10	1.08	1.07
Ventilation	0.16	0.18	0.18	0.18	0.19	0.18	0.18	0.19	0.19	0.19
Cooking	0.29	0.34	0.34	0.33	0.38	0.37	0.37	0.39	0.39	0.38
Lighting	1.12	1.32	1.30	1.29	1.43	1.40	1.40	1.46	1.43	1.43
Refrigeration	0.20	0.22	0.22	0.22	0.24	0.24	0.24	0.25	0.25	0.25
Office Equipment (PC)	0.14	0.24	0.24	0.24	0.34	0.34	0.34	0.37	0.37	0.37
Office Equipment (non-PC)	0.31	0.47	0.46	0.46	0.71	0.71	0.71	0.87	0.87	0.87
Other Uses[6]	3.01	3.67	3.63	3.60	4.53	4.48	4.46	4.99	4.94	4.91
Delivered Energy	**8.25**	**9.84**	**9.74**	**9.65**	**11.52**	**11.35**	**11.29**	**12.37**	**12.19**	**12.12**

Table C5. Commercial Sector Key Indicators and Consumption (Continued)
(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Electricity Related Losses	**9.15**	**10.98**	**10.86**	**10.79**	**12.91**	**12.73**	**12.71**	**13.82**	**13.70**	**13.67**
Total Energy Consumption by End-Use										
Space Heating[1]	2.07	2.34	2.31	2.28	2.47	2.41	2.39	2.53	2.47	2.45
Space Cooling[1]	1.51	1.45	1.43	1.42	1.50	1.48	1.48	1.52	1.50	1.50
Water Heating[1]	1.11	1.26	1.25	1.23	1.36	1.33	1.33	1.40	1.37	1.36
Ventilation	0.52	0.56	0.56	0.55	0.57	0.56	0.56	0.57	0.57	0.57
Cooking	0.36	0.41	0.40	0.40	0.44	0.43	0.43	0.45	0.44	0.44
Lighting	3.60	4.17	4.10	4.07	4.35	4.25	4.25	4.38	4.30	4.30
Refrigeration	0.65	0.71	0.70	0.70	0.74	0.73	0.73	0.75	0.75	0.74
Office Equipment (PC)	0.44	0.77	0.76	0.76	1.03	1.03	1.02	1.11	1.10	1.10
Office Equipment (non-PC)	1.00	1.47	1.46	1.45	2.17	2.16	2.15	2.62	2.61	2.60
Other Uses[6]	6.14	7.69	7.63	7.58	9.78	9.69	9.65	10.85	10.77	10.73
Total	**17.40**	**20.82**	**20.60**	**20.44**	**24.42**	**24.07**	**23.99**	**26.19**	**25.89**	**25.78**
Non-Marketed Renewable Fuels										
Solar[7]	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Total	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**

[1]Includes fuel consumption for district services.
[2]Includes miscellaneous uses, such as service station equipment, automated teller machines, telecommunications equipment, and medical equipment.
[3]Includes miscellaneous uses, such as pumps, emergency electric generators, combined heat and power in commercial buildings, and manufacturing performed in commercial buildings.
[4]Includes miscellaneous uses, such as cooking, emergency electric generators, and combined heat and power in commercial buildings.
[5]Includes residual fuel oil, liquefied petroleum gas, coal, motor gasoline, and kerosene.
[6]Includes 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.
[7]Includes 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 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 based on: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections:** EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C6. Industrial Sector Key Indicators and Consumption

(Quadrillion Btu per Year, Unless Otherwise Noted)

Key Indicators and Consumption	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Key Indicators										
Value of Shipments (billion 1996 dollars)										
Manufacturing	4,064	5023	5013	5,005	6679	6634	6595	7730	7636	7554
Nonmanufacturing	1222	1433	1425	1422	1704	1710	1714	1854	1855	1853
Total	**5285**	**6456**	**6439**	**6427**	**8383**	**8344**	**8309**	**9584**	**9491**	**9407**
Energy Prices (2002 dollars per million Btu)										
Distillate Oil	6.21	4.55	5.68	7.16	4.91	6.24	7.44	4.91	6.40	7.63
Liquefied Petroleum Gas	8.28	7.82	9.72	12.24	8.02	10.66	13.14	8.03	11.11	13.39
Residual Oil	3.89	2.66	3.74	5.13	2.65	4.03	5.34	2.65	4.17	5.40
Motor Gasoline	11.04	10.42	11.84	13.16	10.11	11.87	13.27	9.96	12.03	13.43
Natural Gas	3.75	3.97	4.05	4.15	4.51	4.89	4.78	4.86	4.99	5.24
Metallurgical Coal	1.87	1.94	1.96	1.97	1.83	1.84	1.84	1.76	1.77	1.77
Steam Coal	1.52	1.56	1.58	1.60	1.51	1.53	1.57	1.50	1.53	1.54
Electricity	14.74	13.13	13.36	13.59	13.46	13.99	13.86	13.57	14.09	14.20
Energy Consumption[1]										
Distillate	1.16	1.21	1.17	1.15	1.38	1.34	1.31	1.48	1.43	1.40
Liquefied Petroleum Gas	2.22	2.40	2.35	2.31	2.84	2.74	2.66	3.09	2.94	2.80
Petrochemical Feedstocks	1.22	1.36	1.35	1.33	1.57	1.54	1.51	1.66	1.62	1.58
Residual Fuel	0.20	0.23	0.21	0.18	0.27	0.22	0.20	0.27	0.23	0.21
Other Petroleum[2]	4.19	4.77	4.54	4.16	5.49	5.12	4.60	5.81	5.36	4.91
Petroleum Subtotal	9.00	9.97	9.63	9.13	11.54	10.95	10.27	12.31	11.59	10.89
Natural Gas	7.43	8.48	8.62	8.87	9.58	9.84	10.06	10.28	10.58	10.65
Lease and Plant Fuel[3]	1.35	1.39	1.40	1.44	1.57	1.65	1.72	1.61	1.69	1.75
Natural Gas Subtotal	8.78	9.86	10.02	10.31	11.14	11.49	11.78	11.89	12.27	12.40
Metallurgical Coal and Coke[4]	0.65	0.66	0.66	0.65	0.53	0.52	0.52	0.49	0.48	0.47
Steam Coal	1.47	1.41	1.41	1.46	1.45	1.45	1.66	1.48	1.47	1.74
Coal Subtotal	2.12	2.07	2.06	2.12	1.99	1.97	2.18	1.97	1.95	2.21
Renewables[5]	1.66	2.01	2.00	1.99	2.50	2.48	2.46	2.73	2.70	2.68
Purchased Electricity	3.39	3.84	3.82	3.81	4.51	4.47	4.45	4.93	4.85	4.81
Delivered Energy	**24.94**	**27.75**	**27.53**	**27.35**	**31.67**	**31.36**	**31.15**	**33.82**	**33.35**	**32.99**
Electricity Related Losses	7.53	8.30	8.22	8.18	9.24	9.12	9.09	9.87	9.72	9.64
Total	**32.47**	**36.05**	**35.75**	**35.53**	**40.92**	**40.48**	**40.24**	**43.69**	**43.07**	**42.63**
Energy Consumption per dollar of Shipment[1] **(thousand Btu per 1996 dollars)**										
Distillate	0.22	0.19	0.18	0.18	0.16	0.16	0.16	0.15	0.15	0.15
Liquefied Petroleum Gas	0.42	0.37	0.37	0.36	0.34	0.33	0.32	0.32	0.31	0.30
Petrochemical Feedstocks	0.23	0.21	0.21	0.21	0.19	0.18	0.18	0.17	0.17	0.17
Residual Fuel	0.04	0.04	0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.02
Other Petroleum[2]	0.79	0.74	0.71	0.65	0.65	0.61	0.55	0.61	0.56	0.52
Petroleum Subtotal	1.70	1.54	1.50	1.42	1.38	1.31	1.24	1.28	1.22	1.16
Natural Gas	1.41	1.31	1.34	1.38	1.14	1.18	1.21	1.07	1.11	1.13
Lease and Plant Fuel[3]	0.26	0.21	0.22	0.22	0.19	0.20	0.21	0.17	0.18	0.19
Natural Gas Subtotal	1.66	1.53	1.56	1.60	1.33	1.38	1.42	1.24	1.29	1.32
Metallurgical Coal and Coke[4]	0.12	0.10	0.10	0.10	0.06	0.06	0.06	0.05	0.05	0.05
Steam Coal	0.28	0.22	0.22	0.23	0.17	0.17	0.20	0.15	0.15	0.18
Coal Subtotal	0.40	0.32	0.32	0.33	0.24	0.24	0.26	0.21	0.21	0.24
Renewables[5]	0.31	0.31	0.31	0.31	0.30	0.30	0.30	0.28	0.28	0.28
Purchased Electricity	0.64	0.60	0.59	0.59	0.54	0.54	0.54	0.51	0.51	0.51
Delivered Energy	**4.72**	**4.30**	**4.28**	**4.26**	**3.78**	**3.76**	**3.75**	**3.53**	**3.51**	**3.51**
Electricity Related Losses	1.42	1.29	1.28	1.27	1.10	1.09	1.09	1.03	1.02	1.02
Total	**6.14**	**5.58**	**5.55**	**5.53**	**4.88**	**4.85**	**4.84**	**4.56**	**4.54**	**4.53**

[1]Fuel 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.
[2]Represents natural gas used in the field gathering and processing plant machinery.
[3]Includes net coke coal imports.
[4]Includes petroleum coke, asphalt, road oil, lubricants, motor gasoline, still gas, and miscellaneous petroleum products.
[5]Includes 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 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 prices for motor gasoline and distillate are based on: Energy Information Administration (EIA), *Petroleum Marketing Annual 2002*, http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_annual/current/pdf/pmaall.pdf (August 2003). 2002 coal prices are based on EIA, *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003) and EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E. 2002 electricity prices: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2002 natural gas prices based on: EIA, *Manufacturing Energy Consumption Survey 1998*. 2002 consumption values based on: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2002 shipments: Global Insight macroeconomic model T250803. **Projections:** EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C7. Transportation Sector Key Indicators and Delivered Energy Consumption

Key Indicators and Consumption	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Key Indicators										
Level of Travel (billions)										
Light-Duty Vehicles <8,500 pounds (VMT)	2504	3129	3041	2802	3891	3768	3396	4330	4173	3675
Commercial Light Trucks (VMT)[1]	65	80	79	77	103	101	97	116	114	108
Freight Trucks >10,000 pounds (VMT)	196	243	242	241	314	313	311	358	354	352
Air (seat miles available)	909	1131	1122	1112	1455	1455	1455	1521	1521	1521
Rail (ton miles traveled)	1336	1547	1545	1542	1843	1852	1878	2037	2056	2069
Domestic Shipping (ton miles traveled)	724	803	805	810	899	918	934	959	977	982
Energy Efficiency Indicators										
New Light-Duty Vehicle (miles per gallon)[2]	23.8	25.0	25.3	25.7	25.9	26.5	27.1	26.1	26.9	27.6
New Car (miles per gallon)[2]	28.2	28.5	28.8	29.3	29.7	30.4	31.2	30.0	30.8	31.7
New Light Truck (miles per gallon)[2]	20.5	22.6	22.8	23.1	23.6	24.1	24.6	24.1	24.7	25.3
Light-Duty Fleet (miles per gallon)[3]	19.7	19.5	19.6	19.7	20.2	20.5	20.9	20.4	20.9	21.3
New Commercial Light Truck (MPG)[1]	13.9	15.1	15.1	15.3	15.7	16.0	16.3	16.0	16.4	16.8
Stock Commercial Light Truck (MPG)[1]	13.8	14.4	14.5	14.5	15.3	15.5	15.7	15.6	15.9	16.2
Aircraft Efficiency (seat miles per gallon)	54.8	60.0	59.9	59.8	65.4	65.4	68.0	66.5	67.0	70.3
Freight Truck Efficiency (miles per gallon)	6.0	6.0	6.0	6.0	6.3	6.4	6.4	6.5	6.5	6.6
Rail Efficiency (ton miles per thousand Btu)	2.9	3.1	3.1	3.1	3.4	3.4	3.4	3.6	3.6	3.6
(ton miles per thousand Btu)	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4
Energy Use by Mode										
(quadrillion Btu)										
Light-Duty Vehicles	15.58	19.52	18.91	17.36	23.43	22.34	19.77	25.73	24.28	20.89
Commercial Light Trucks[1]	0.59	0.69	0.68	0.66	0.84	0.82	0.77	0.93	0.90	0.84
Bus Transportation	0.24	0.26	0.25	0.25	0.26	0.26	0.25	0.27	0.26	0.25
Freight Trucks	4.09	5.05	5.03	5.00	6.20	6.15	6.04	6.91	6.82	6.65
Rail, Passenger	0.11	0.13	0.13	0.13	0.16	0.16	0.15	0.17	0.17	0.16
Rail, Freight	0.47	0.50	0.50	0.50	0.54	0.54	0.55	0.57	0.57	0.58
Shipping, Domestic	0.32	0.34	0.35	0.35	0.38	0.39	0.39	0.40	0.41	0.41
Shipping, International	0.64	0.72	0.72	0.72	0.73	0.73	0.73	0.74	0.74	0.74
Recreational Boats	0.31	0.34	0.34	0.33	0.37	0.37	0.37	0.39	0.39	0.39
Air	2.84	3.37	3.35	3.32	4.10	4.09	3.92	4.36	4.30	4.09
Military Use	0.66	0.77	0.77	0.77	0.81	0.81	0.81	0.82	0.82	0.82
Lubricants	0.20	0.21	0.21	0.21	0.25	0.25	0.25	0.28	0.28	0.28
Pipeline Fuel	0.65	0.68	0.69	0.71	0.77	0.83	0.84	0.79	0.86	0.87
Total	**26.70**	**32.60**	**31.93**	**30.31**	**38.85**	**37.73**	**34.86**	**42.36**	**40.79**	**36.96**
(million barrels per day oil equivalent)										
Light-Duty Vehicles	8.20	10.28	9.96	9.14	12.32	11.74	10.39	13.53	12.75	10.97
Commercial Light Trucks[1]	0.31	0.37	0.36	0.35	0.44	0.43	0.41	0.49	0.47	0.44
Bus Transportation	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.12	0.12
Freight Trucks	1.94	2.39	2.38	2.37	2.93	2.91	2.86	3.26	3.22	3.14
Rail, Passenger	0.05	0.06	0.06	0.06	0.07	0.07	0.07	0.08	0.08	0.08
Rail, Freight	0.22	0.24	0.24	0.23	0.25	0.25	0.26	0.27	0.27	0.27
Shipping, Domestic	0.15	0.16	0.16	0.16	0.17	0.18	0.18	0.18	0.19	0.19
Shipping, International	0.28	0.32	0.32	0.31	0.32	0.32	0.32	0.32	0.32	0.32
Recreational Boats	0.16	0.18	0.18	0.18	0.19	0.19	0.19	0.20	0.20	0.20
Air	1.38	1.63	1.62	1.61	1.98	1.98	1.90	2.11	2.08	1.98
Military Use	0.32	0.37	0.37	0.37	0.39	0.39	0.39	0.39	0.39	0.39
Lubricants	0.09	0.10	0.10	0.10	0.12	0.12	0.12	0.13	0.13	0.13
Pipeline Fuel	0.33	0.34	0.35	0.36	0.39	0.42	0.43	0.40	0.43	0.44
Total	**13.54**	**16.55**	**16.20**	**15.35**	**19.72**	**19.13**	**17.63**	**21.50**	**20.68**	**18.68**

[1]Commercial trucks 8,500 to 10,000 pounds.
[2]Environmental Protection Agency rated miles per gallon.
[3]Combined car and light truck "on-the-road" estimate.
Btu = British thermal unit.
VMT=Vehicle miles traveled.
MPG = Miles per gallon.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.

Sources: 2002: Energy Information Administration (EIA), *Natural Gas Annual 2001*, DOE/EIA-0131(2001) (Washington, DC, February 2003); Federal Highway Administration, *Highway Statistics 2000* (Washington, DC, November 2001); Oak Ridge National Laboratory, Transportation Energy Data Book: *Edition 22 and Annual* (Oak Ridge, TN, September 2002); National Highway Traffic and Safety Administration, *Summary of Fuel Economy Performance* (Washington, DC, February 2000); EIA, *Household Vehicle Energy Consumption 1994*, DOE/EIA-0464(94) (Washington, DC, August 1997); 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 1998*, http://www.eia.doe.gov/cneaf/alt_trans98/table1.html; EIA,*State Energy Data Report 2000*, DOE/EIA-0214(2000) (Washington, DC, August 2003); U.S. Department of Transportation, Research and Special Programs Administration, *Air Carrier Statistics Monthly, December 2002/2001* (Washington, DC, 2002); EIA, *Fuel Oil and Kerosene Sales 2001*, http://www.eia.doe.gov/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/foks.html; and United States Department of Defense, Defense Fuel Supply Center. **Projections:** EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C8. Electricity Supply, Disposition, Prices, and Emissions
(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Generation by Fuel Type										
Electric Power Sector[1]										
Power Only[2]										
Coal	1875	2214	2201	2196	2495	2560	2661	2848	2975	3002
Petroleum	77	143	62	34	421	82	39	478	77	40
Natural Gas[3]	450	560	642	647	740	972	902	750	969	955
Nuclear Power	780	794	794	794	816	816	816	816	816	816
Pumped Storage/Other	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
Renewable Sources[4]	304	412	400	405	444	442	440	456	460	456
Distributed Generation (Natural Gas)	0	0	0	0	4	3	3	7	5	5
Non-Utility Generation for Own Use	-34	-37	-37	-37	-37	-37	-37	-37	-37	-37
Total	**3443**	**4078**	**4054**	**4030**	**4874**	**4829**	**4814**	**5308**	**5257**	**5228**
Combined Heat and Power[5]										
Coal	32	33	33	33	33	33	33	34	33	33
Petroleum	6	8	1	0	16	2	0	15	2	1
Natural Gas	148	167	174	178	147	159	160	137	149	151
Renewable Sources	5	4	4	4	4	4	4	4	4	4
Non-Utility Generation for Own Use	-11	-24	-24	-24	-24	-24	-24	-24	-24	-24
Total	**183**	**187**	**188**	**191**	**176**	**175**	**173**	**165**	**164**	**165**
Net Available to the Grid	**3626**	**4265**	**4242**	**4221**	**5050**	**5004**	**4988**	**5473**	**5421**	**5394**
End-Use Sector Generation										
Combined Heat and Power[6]										
Coal	21	21	21	24	21	21	33	21	21	37
Petroleum	5	11	12	11	17	17	14	17	18	14
Natural Gas	84	109	109	109	154	153	149	183	181	174
Other Gaseous Fuels[7]	5	9	9	9	12	12	11	13	13	12
Renewable Sources[4]	30	39	39	38	50	50	49	55	54	54
Other[8]	11	11	11	11	11	11	11	11	11	11
Total	157	201	202	203	265	264	268	301	299	302
Other End-Use Generators[9]	4	5	5	5	5	5	5	6	7	6
Generation for Own Use	-134	-158	-158	-157	-190	-190	-186	-210	-210	-204
Total Sales to the Grid	**27**	**48**	**48**	**51**	**80**	**80**	**87**	**97**	**95**	**105**
Total Electricity Generation	**3831**	**4533**	**4510**	**4491**	**5382**	**5335**	**5323**	**5842**	**5787**	**5763**
Net Imports	**22**	**30**	**31**	**33**	**17**	**21**	**22**	**7**	**8**	**8**
Electricity Sales by Sector										
Residential	1268	1433	1428	1424	1651	1641	1643	1756	1747	1745
Commercial	1208	1490	1480	1472	1846	1828	1824	2021	2003	2000
Industrial	994	1126	1120	1116	1322	1310	1306	1444	1422	1411
Transportation	22	27	26	26	32	32	31	36	35	34
Total	**3492**	**4075**	**4055**	**4039**	**4852**	**4811**	**4803**	**5257**	**5207**	**5190**
End-Use Prices[10] **(2002 cents per kilowatthour)**										
Residential	8.4	7.9	7.9	8.0	7.9	8.1	8.0	8.0	8.1	8.2
Commercial	7.8	6.8	7.0	7.1	7.0	7.2	7.2	7.1	7.3	7.4
Industrial	5.0	4.5	4.6	4.6	4.6	4.8	4.7	4.6	4.8	4.8
Transportation	7.2	6.6	6.7	6.8	6.6	6.8	6.8	6.6	6.8	6.8
All Sectors Average	**7.2**	**6.5**	**6.6**	**6.7**	**6.6**	**6.9**	**6.8**	**6.7**	**6.9**	**6.9**
Prices by Service Category[10] **(2002 cents per kilowatthour)**										
Generation	4.6	4.0	4.1	4.2	4.2	4.5	4.4	4.3	4.5	4.6
Transmission	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7
Distribution	2.0	1.9	1.9	1.9	1.8	1.8	1.7	1.7	1.7	1.7

Table C8. Electricity Supply, Disposition, Prices, and Emissions (Continued)
(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Electric Power Sector Emissions[1]										
Sulfur Dioxide (million tons)	10.54	9.56	9.90	9.93	8.94	8.94	8.95	8.94	8.95	8.95
Nitrogen Oxide (million tons)	4.39	3.52	3.50	3.48	3.72	3.67	3.65	3.80	3.75	3.73
Mercury (tons)	50.95	51.09	52.20	52.19	53.41	53.59	53.76	54.69	54.37	54.05

[1]Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
[2]Includes plants that only produce electricity.
[3]Includes electricity generation from fuel cells.
[4]Includes conventional hydroelectric, geothermal, wood, wood waste, municipal solid waste, landfill gas, other biomass, solar, and wind power.
[5]Includes combined heat and power plants whose primary business is to sell electricity and heat to the public (i.e., those that report NAICS code 22).
[6]Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors.
[7]Other gaseous fuels include refinery and still gas.
[8]Other includes batteries, chemicals, hydrogen, pitch, purchased steam, sulfur and miscellaneous technologies.
[9]Other end-use generators include 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.
[10]Prices represent average revenue per kilowatthour.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Source: 2002 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 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002), and supporting databases. 2002 commercial and transportation electricity sales: EIA estimates based on Oak Ridge National Laboratory, *Transportation Energy Data Book 21* (Oak Ridge, TN, September 2001). 2002 prices: EIA, National Energy Modeling System run AEO2004.D101703E. **Projections:** AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C9. Electricity Generating Capacity
(Gigawatts)

Net Summer Capacity[1]	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Electric Power Sector[2]										
Power Only[3]										
Coal Steam	305.7	306.8	305.1	304.4	338.2	348.4	364.3	386.3	407.2	412.9
Other Fossil Steam[4]	132.5	108.8	105.0	103.7	102.4	100.0	96.7	99.8	95.4	94.8
Combined Cycle	81.0	126.4	127.1	126.0	190.4	184.4	173.1	218.8	202.3	195.2
Combustion Turbine/Diesel	123.5	131.6	131.1	129.6	174.4	163.9	161.8	186.0	175.0	176.6
Nuclear Power[5]	98.7	100.6	100.6	100.6	102.6	102.6	102.6	102.6	102.6	102.6
Pumped Storage	20.2	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3
Fuel Cells	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Renewable Sources[6]	91.4	100.5	97.1	98.6	106.5	105.7	105.5	109.3	109.9	108.5
Distributed Generation[7]	0.0	0.6	0.5	0.5	9.8	7.6	6.6	15.5	12.4	11.8
Total	**853.1**	**895.7**	**886.8**	**883.7**	**1044.7**	**1032.9**	**1031.0**	**1138.7**	**1125.1**	**1122.7**
Combined Heat and Power[8]										
Coal Steam	5.2	5.2	5.1	5.2	5.2	5.1	5.2	5.2	5.1	5.2
Other Fossil Steam[4]	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Combined Cycle	29.4	32.9	32.9	32.9	32.9	32.9	32.9	32.9	32.9	32.9
Combustion Turbine/Diesel	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Renewable Sources[6]	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total	**41.4**	**44.9**	**44.8**	**44.9**	**44.9**	**44.8**	**44.9**	**44.9**	**44.8**	**44.9**
Total Electric Power Industry	**894.5**	**940.5**	**931.7**	**928.6**	**1089.5**	**1077.7**	**1075.9**	**1183.5**	**1169.9**	**1167.6**
Cumulative Planned Additions[9]										
Coal Steam	0.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Other Fossil Steam[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combined Cycle	0.0	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5
Combustion Turbine/Diesel	0.0	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
Nuclear Power	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Renewable Sources[6]	0.0	4.3	4.3	4.3	4.7	4.7	4.7	4.8	4.8	4.8
Distributed Generation[7]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**0.0**	**57.1**	**57.1**	**57.1**	**57.5**	**57.5**	**57.5**	**57.6**	**57.6**	**57.6**
Cumulative Unplanned Additions[9]										
Coal Steam	0.0	8.1	5.7	5.6	41.3	50.7	67.3	90.5	110.6	117.0
Other Fossil Steam[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combined Cycle	0.0	6.4	6.6	5.5	70.4	64.0	52.7	98.9	81.9	74.7
Combustion Turbine/Diesel	0.0	10.4	10.5	9.9	56.7	46.0	42.8	69.5	59.1	58.8
Nuclear Power	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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[6]	0.0	4.5	1.1	2.6	10.1	9.3	9.1	12.8	13.3	12.0
Distributed Generation[7]	0.0	0.6	0.5	0.5	9.8	7.6	6.6	15.5	12.4	11.8
Total	**0.0**	**30.0**	**24.3**	**24.1**	**188.4**	**177.5**	**178.5**	**287.2**	**277.2**	**274.3**
Cumulative Total Additions	**0.0**	**87.0**	**81.4**	**81.1**	**245.8**	**235.0**	**236.0**	**344.8**	**334.8**	**331.9**
Cumulative Retirements[10]										
Coal Steam	0.0	8.2	7.5	8.1	10.0	9.3	10.0	11.1	10.4	11.1
Other Fossil Steam[4]	0.0	21.8	25.6	26.9	28.2	30.6	33.9	30.8	35.2	35.8
Combined Cycle	0.0	1.7	1.1	1.1	1.7	1.1	1.1	1.7	1.1	1.1
Combustion Turbine/Diesel	0.0	9.6	10.2	11.1	13.1	13.0	11.9	14.3	14.9	13.1
Nuclear Power	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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[6]	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total	**0.0**	**41.4**	**44.6**	**47.4**	**53.2**	**54.2**	**57.0**	**58.1**	**61.8**	**61.2**

Table C9. Electricity Generating Capcity (Continued)
(Gigawatts)

Net Summer Capacity[1]	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
End-Use Sector										
Combined Heat and Power[11]										
Coal	4.2	4.1	4.1	4.6	4.1	4.1	5.7	4.1	4.1	6.2
Petroleum	1.0	1.5	1.6	1.5	2.2	2.2	1.8	2.2	2.3	1.8
Natural Gas	14.1	17.8	17.8	17.7	23.8	23.7	23.2	27.8	27.6	26.6
Other Gaseous Fuels	1.8	2.2	2.2	2.2	2.6	2.6	2.4	2.7	2.7	2.5
Renewable Sources[6]	4.2	5.7	5.6	5.5	7.6	7.5	7.4	8.4	8.3	8.2
Other	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total	**25.5**	**31.6**	**31.7**	**31.8**	**40.6**	**40.5**	**40.9**	**45.6**	**45.3**	**45.6**
Other End-Use Generators[12]										
Renewable Sources[13]	1.1	1.4	1.4	1.4	1.6	1.6	1.6	2.1	2.1	2.1
Cumulative Additions[9]										
Combined Heat and Power[11]	0.0	6.2	6.2	6.3	15.1	15.0	15.4	20.1	19.8	20.1
Other End-Use Generators[12]	0.0	0.3	0.3	0.3	0.5	0.5	0.5	1.0	1.1	1.1

[1]Net 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.
[2]Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
[3]Includes plants that only produce electricity. Includes capacity increases (uprates) at existing units.
[4]Includes oil-, gas-, and dual-fired capability.
[5]Nuclear capacity reflects operating capacity of existing units, including 3.9 gigawatts of uprates through 2025.
[6]Includes 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.
[7]Primarily peak-load capacity fueled by natural gas.
[8]Includes combined heat and power plants whose primary business is to sell electricity and heat to the public (i.e., those that report NAICS code 22).
[9]Cumulative additions after December 31, 2002.
[10]Cumulative total retirements after December 31, 2002.
[11]Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors.
[12]Other end-use generators include 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.
[13]See Table C17 for more detail.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model estimates and may differ slightly from official EIA data reports.
Source: 2002 electric generating capacity and projected planned additions: Energy Information Administration (EIA), Form EIA-860: "Annual Electric Generator Report" (preliminary). **Projections**: AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C10. Electricity Trade
(Billion Kilowatthours, Unless Otherwise Noted)

Electricity Trade	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Interregional Electricity Trade										
Gross Domestic Firm Power Trade	138.9	107.1	107.1	107.1	41.5	41.5	41.5	41.5	41.5	41.5
Gross Domestic Economy Trade	209.9	207.9	229.7	239.6	188.2	218.4	210.6	169.0	183.4	198.2
Gross Domestic Trade	**348.8**	**315.0**	**336.8**	**346.7**	**229.7**	**259.9**	**252.1**	**210.6**	**224.9**	**239.8**
Gross Domestic Firm Power Sales (million 2002 dollars)	6932.4	5345.8	5345.8	5345.8	2074.2	2074.2	2074.2	2074.2	2074.2	2074.2
Gross Domestic Economy Sales (million 2002 dollars)	6809.8	6551.0	7629.6	8387.5	6892.5	8663.8	8340.6	6251.4	7319.5	8162.0
Gross Domestic Sales (million 2002 dollars)	**13742.1**	**11896.8**	**12975.3**	**13733.2**	**8966.7**	**10738.0**	**10414.8**	**8325.6**	**9393.7**	**10236.2**
International Electricity Trade										
Firm Power Imports From Canada & Mexico	9.5	5.8	5.8	5.8	0.0	0.0	0.0	0.0	0.0	0.0
Economy Imports From Canada and Mexico	26.8	40.0	41.3	43.0	25.0	28.9	29.5	14.8	15.1	15.7
Gross Imports From Canada and Mexico	**36.3**	**45.9**	**47.2**	**48.9**	**25.0**	**28.9**	**29.5**	**14.8**	**15.2**	**15.7**
Firm Power Exports To Canada and Mexico	5.6	8.7	8.7	8.7	0.0	0.0	0.0	0.0	0.0	0.0
Economy Exports To Canada and Mexico	8.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7
Gross Exports To Canada and Mexico	**14.3**	**16.4**	**16.4**	**16.4**	**7.7**	**7.7**	**7.7**	**7.7**	**7.7**	**7.7**

Note: Totals may not equal sum of components due to independent rounding. Data for 2002 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.

Source: Energy Information Administration, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C11. Petroleum Supply and Disposition Balance
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Crude Oil										
Domestic Crude Production[1]	5.62	5.69	5.93	6.17	4.51	4.95	5.48	4.02	4.61	4.85
Alaska	0.98	0.89	0.92	0.97	0.66	0.72	0.78	0.46	0.51	0.55
Lower 48 States	4.64	4.81	5.01	5.20	3.84	4.23	4.69	3.55	4.11	4.31
Net Imports	9.13	12.08	11.21	10.12	16.40	14.50	12.77	18.21	15.74	14.34
Gross Imports	9.14	12.14	11.29	10.21	16.41	14.53	12.83	18.22	15.76	14.37
Exports	0.01	0.07	0.08	0.09	0.01	0.03	0.06	0.01	0.02	0.03
Other Crude Supply[2]	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Crude Supply	**14.83**	**17.77**	**17.15**	**16.29**	**20.90**	**19.45**	**18.25**	**22.23**	**20.35**	**19.19**
Natural Gas Plant Liquids	**1.88**	**2.15**	**2.24**	**2.31**	**2.25**	**2.48**	**2.58**	**2.24**	**2.47**	**2.55**
Other Inputs[3]	**0.67**	**0.46**	**0.47**	**0.53**	**0.44**	**0.46**	**0.67**	**0.48**	**0.48**	**0.71**
Refinery Processing Gain[4]	**0.98**	**0.91**	**0.88**	**0.84**	**1.09**	**1.00**	**0.90**	**1.13**	**1.04**	**0.94**
Net Product Imports[5]	**1.41**	**2.35**	**1.95**	**1.42**	**3.93**	**2.99**	**1.85**	**5.07**	**3.94**	**2.22**
Gross Refined Product Imports[6]	1.92	2.57	2.17	1.89	3.60	2.82	2.17	4.60	3.60	2.47
Unfinished Oil Imports	0.41	0.75	0.72	0.43	1.47	1.15	0.61	1.68	1.34	0.70
Ether Imports	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exports	0.97	0.97	0.94	0.90	1.14	0.98	0.94	1.21	1.01	0.95
Total Primary Supply[7]	**19.77**	**23.65**	**22.69**	**21.39**	**28.61**	**26.38**	**24.25**	**31.14**	**28.27**	**25.62**
Refined Petroleum Products Supplied										
Motor Gasoline[8]	8.86	10.92	10.59	9.77	12.92	12.30	10.96	14.12	13.30	11.53
Jet Fuel[9]	1.61	1.91	1.90	1.88	2.27	2.27	2.19	2.40	2.37	2.27
Distillate Fuel[10]	3.68	4.67	4.38	4.27	6.33	5.24	5.00	7.11	5.71	5.41
Residual Fuel	0.74	0.88	0.71	0.59	1.00	0.77	0.63	1.02	0.75	0.64
Other[11]	4.72	5.30	5.13	4.88	6.14	5.84	5.48	6.55	6.16	5.79
Total	**19.61**	**23.68**	**22.71**	**21.39**	**28.66**	**26.41**	**24.26**	**31.20**	**28.30**	**25.63**
Refined Petroleum Products Supplied										
Residential and Commercial	1.22	1.44	1.38	1.30	1.51	1.40	1.29	1.54	1.40	1.28
Industrial[12]	4.80	5.31	5.14	4.89	6.16	5.86	5.52	6.59	6.21	5.85
Transportation	13.21	16.27	15.91	15.04	19.40	18.77	17.26	21.19	20.32	18.31
Electric Generators[13]	0.38	0.66	0.29	0.17	1.58	0.38	0.19	1.88	0.36	0.20
Total	**19.61**	**23.68**	**22.71**	**21.39**	**28.66**	**26.41**	**24.26**	**31.20**	**28.30**	**25.63**
Discrepancy[14]	**0.16**	**-0.03**	**-0.02**	**-0.00**	**-0.05**	**-0.04**	**-0.01**	**-0.06**	**-0.03**	**-0.01**
World Oil Price (2002 dollars per barrel)[15]	**23.68**	**16.98**	**24.17**	**33.27**	**16.98**	**26.02**	**34.63**	**16.98**	**27.00**	**35.03**
Import Share of Product Supplied	**0.54**	**0.61**	**0.58**	**0.54**	**0.71**	**0.66**	**0.60**	**0.75**	**0.70**	**0.65**
Net Expenditures for Imported Crude Oil and Petroleum Products (billion 2002 dollars)	**90.38**	**92.51**	**118.31**	**140.96**	**130.58**	**168.99**	**186.21**	**152.32**	**200.24**	**213.44**
Domestic Refinery Distillation Capacity[16]	**16.8**	**19.0**	**18.7**	**18.0**	**22.4**	**20.8**	**19.8**	**23.8**	**21.8**	**20.6**
Capacity Utilization Rate (percent)	**91.0**	**94.6**	**93.1**	**91.7**	**94.7**	**94.8**	**93.3**	**94.8**	**94.8**	**94.3**

[1]Includes lease condensate.
[2]Strategic petroleum reserve stock additions plus unaccounted for crude oil and crude stock withdrawals minus crude products supplied.
[3]Includes 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.
[4]Represents volumetric gain in refinery distillation and cracking processes.
[5]Includes net imports of finished petroleum products, unfinished oils, other hydrocarbons, alcohols, ethers, and blending components.
[6]Includes other hydrocarbons, alcohols, and blending components.
[7]Total crude supply plus natural gas plant liquids, other inputs, refinery processing gain, and net product imports.
[8]Includes ethanol and ethers blended into gasoline.
[9]Includes only kerosene type.
[10]Includes distillate and kerosene.
[11]Includes 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.
[12]Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.
[13]Includes 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. Includes small power producers and exempt wholesale generators.
[14]Balancing item. Includes unaccounted for supply, losses and gains.
[15]Average refiner acquisition cost for imported crude oil.
[16]End-of-year capacity.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 product supplied based on: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). Other 2002 data: EIA, *Petroleum Supply Annual 2002,* DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). **Projections:** EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C12. Petroleum Product Prices
(2002 Cents per Gallon, Unless Otherwise Noted)

Sector and Fuel	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
World Oil Price (2002 dollars per barrel)	**23.68**	**16.98**	**24.17**	**33.27**	**16.98**	**26.02**	**34.63**	**16.98**	**27.00**	**35.03**
Delivered Sector Product Prices										
Residential										
Distillate Fuel	114.2	93.6	108.4	129.4	98.2	116.4	133.9	98.9	118.4	136.7
Liquefied Petroleum Gas	110.8	105.2	119.1	138.5	106.5	126.9	144.9	106.7	130.3	147.6
Commercial										
Distillate Fuel	84.1	60.4	75.6	96.5	64.9	83.3	100.6	65.1	85.3	103.3
Residual Fuel	63.1	45.5	61.8	82.6	45.4	66.1	85.7	45.3	68.1	86.5
Residual Fuel (2002 dollars per barrel)	26.48	19.12	25.97	34.70	19.09	27.75	35.97	19.03	28.59	36.34
Industrial[1]										
Distillate Fuel	86.2	63.1	78.8	99.3	68.0	86.6	103.1	68.1	88.8	105.8
Liquefied Petroleum Gas	71.1	67.1	83.4	105.0	68.8	91.4	112.7	68.8	95.3	114.9
Residual Fuel	58.3	39.9	56.0	76.8	39.7	60.3	80.0	39.7	62.4	80.9
Residual Fuel (2002 dollars per barrel)	24.48	16.75	23.54	32.27	16.68	25.34	33.58	16.68	26.22	33.97
Transportation										
Diesel Fuel (distillate)[2]	130.6	124.7	140.3	159.7	120.6	138.6	155.2	117.3	139.0	155.2
Jet Fuel[3]	80.6	62.0	77.8	98.5	63.3	81.8	99.2	62.8	83.9	101.0
Motor Gasoline[4]	138.1	129.3	146.9	163.2	125.4	147.3	164.5	123.5	149.2	166.4
Liquid Petroleum Gas	128.7	114.9	128.3	147.6	113.0	133.0	150.1	112.2	135.8	152.0
Residual Fuel	56.5	36.9	53.9	75.5	36.6	58.0	78.5	36.5	60.2	79.4
Residual Fuel (2002 dollars per barrel)	23.71	15.49	22.62	31.72	15.38	24.37	32.99	15.31	25.28	33.35
Ethanol (E85)[5]	135.8	138.4	153.9	166.7	146.1	163.4	176.8	148.1	166.1	180.1
Electric Power[6]										
Distillate Fuel	77.4	52.6	68.2	88.6	58.1	75.8	92.6	58.9	77.9	95.4
Residual Fuel	60.4	42.8	59.7	84.9	42.8	64.5	88.4	42.8	67.4	89.7
Residual Fuel (2002 dollars per barrel)	25.38	17.96	25.07	35.66	17.97	27.07	37.12	17.99	28.30	37.66
Refined Petroleum Product Prices[7]										
Distillate Fuel	118.1	105.3	123.8	144.3	99.5	125.9	143.6	97.1	127.3	144.7
Jet Fuel[3]	80.6	62.0	77.8	98.5	63.3	81.8	99.2	62.8	83.9	101.0
Liquefied Petroleum Gas	79.6	75.7	91.3	112.3	77.0	99.1	119.5	76.9	102.6	121.7
Motor Gasoline[4]	138.1	129.3	146.9	163.2	125.4	147.3	164.5	123.5	149.2	166.4
Residual Fuel	58.6	40.3	56.6	78.1	40.4	61.1	81.4	40.4	63.3	82.4
Residual Fuel (2002 dollars per barrel)	24.62	16.92	23.76	32.81	16.96	25.65	34.19	16.95	26.60	34.62
Average	**116.1**	**106.3**	**123.9**	**142.0**	**103.4**	**126.3**	**143.5**	**102.1**	**128.6**	**145.4**

[1]Includes combined heat and power, which produces electricity and other useful thermal energy.
[2] Diesel fuel containing 500 parts per million (ppm) or 15 ppm sulfur. Includes Federal and State taxes while excluding county and local taxes.
[3]Includes only Kerosene type.
[4]Sales weighted-average price for all grades. Includes Federal, State and local taxes.
[5]E85 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.
[6]Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes small power producers and exempt wholesale generators.
[7]Weighted averages of end-use fuel prices are derived from the prices in each sector and the corresponding sectoral consumption.
Note: Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 prices for motor gasoline, distillate, and jet fuel are based on: EIA, *Petroleum Marketing Annual 2002*, http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_marketing_annual/current/pdf/pmaall.pdf (August 2003). 2002 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." 2002 electric power prices based on: Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 2002 ethanol prices derived from weekly spot prices in the Oxy Fuel News. 2002 world oil price: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections**: EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C13. Natural Gas Supply and Disposition
(Trillion Cubic Feet per Year)

Supply and Disposition	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Production										
Dry Gas Production[1]	19.05	20.26	20.50	21.30	22.15	23.79	24.95	22.48	23.99	25.02
Supplemental Natural Gas[2]	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Net Imports	**3.49**	**4.91**	**5.50**	**5.29**	**6.29**	**6.47**	**5.77**	**6.77**	**7.24**	**6.88**
Canada	3.59	3.70	3.68	3.53	2.88	2.51	2.02	2.87	2.56	2.22
Mexico	-0.26	-0.45	-0.34	-0.35	-0.16	-0.18	-0.25	-0.13	-0.12	-0.25
Liquefied Natural Gas	0.17	1.66	2.16	2.12	3.58	4.14	4.00	4.03	4.80	4.91
Total Supply	**22.62**	**25.26**	**26.09**	**26.68**	**28.54**	**30.36**	**30.82**	**29.35**	**31.33**	**32.00**
Consumption by Sector										
Residential	4.92	5.55	5.53	5.52	5.96	5.92	5.93	6.14	6.09	6.09
Commercial	3.12	3.48	3.48	3.48	3.83	3.83	3.90	4.02	4.04	4.11
Industrial[3]	7.23	8.24	8.39	8.63	9.32	9.57	9.79	10.00	10.29	10.36
Electric Generators[4]	5.55	5.98	6.66	6.75	7.12	8.61	8.19	6.81	8.39	8.36
Transportation[5]	0.01	0.06	0.06	0.06	0.10	0.10	0.10	0.11	0.11	0.11
Pipeline Fuel	0.63	0.66	0.67	0.69	0.75	0.81	0.82	0.77	0.84	0.85
Lease and Plant Fuel[6]	1.32	1.35	1.36	1.41	1.52	1.61	1.67	1.56	1.65	1.71
Total	**22.78**	**25.32**	**26.15**	**26.54**	**28.60**	**30.44**	**30.40**	**29.43**	**31.41**	**31.59**
Natural Gas to Liquids	**0.00**	**0.00**	**0.00**	**0.21**	**0.00**	**0.00**	**0.50**	**0.00**	**0.00**	**0.50**
Discrepancy[7]	**-0.16**	**-0.06**	**-0.06**	**-0.06**	**-0.06**	**-0.08**	**-0.08**	**-0.08**	**-0.09**	**-0.09**

[1]Marketed production (wet) minus extraction losses.
[2]Synthetic 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.
[3]Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.
[4]Includes 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. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as vehicle fuel.
[6]Represents natural gas used in the field gathering and processing plant machinery.
[7]Balancing 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, 2002 values include net storage injections.
Btu = British thermal unit.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 supply values: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2002 consumption based on: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections:** EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C14. Natural Gas Prices, Margins, and Revenue
(2002 Dollars per Thousand Cubic Feet, Unless Otherwise Noted)

Prices, Margins, and Revenue	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Source Price										
Average Lower 48 Wellhead Price[1]	2.95	3.34	3.40	3.50	3.91	4.28	4.18	4.30	4.40	4.66
Average Import Price	3.14	3.57	3.78	3.94	4.15	4.58	4.50	4.47	4.67	4.92
Average[2]	**2.98**	**3.39**	**3.49**	**3.60**	**3.97**	**4.35**	**4.25**	**4.34**	**4.47**	**4.73**
Delivered Prices										
Residential	7.86	7.79	7.88	8.00	8.06	8.47	8.45	8.40	8.56	8.77
Commercial	6.55	6.72	6.83	6.95	7.12	7.52	7.48	7.47	7.62	7.83
Industrial[3]	3.85	4.08	4.16	4.27	4.64	5.02	4.91	4.99	5.13	5.39
Electric Generators[4]	3.85	3.99	4.12	4.25	4.50	4.94	4.81	4.83	5.01	5.26
Transportation[5]	7.58	8.33	8.49	8.57	8.78	9.32	9.17	9.01	9.34	9.45
Average[6]	**5.21**	**5.35**	**5.41**	**5.51**	**5.76**	**6.09**	**6.02**	**6.12**	**6.19**	**6.43**
Transmission and Distribution Margins[7]										
Residential	4.88	4.39	4.40	4.41	4.09	4.11	4.20	4.06	4.09	4.04
Commercial	3.56	3.33	3.34	3.35	3.15	3.17	3.23	3.13	3.15	3.11
Industrial[3]	0.87	0.69	0.68	0.67	0.67	0.67	0.66	0.65	0.66	0.66
Electric Generators[4]	0.86	0.60	0.63	0.65	0.54	0.59	0.56	0.49	0.54	0.54
Transportation[5]	4.60	4.94	5.00	4.97	4.82	4.96	4.92	4.66	4.87	4.72
Average[6]	**2.23**	**1.96**	**1.92**	**1.91**	**1.79**	**1.74**	**1.77**	**1.77**	**1.72**	**1.71**
Transmission and Distribution Revenue (billion 2002 dollars)										
Residential	24.02	24.40	24.33	24.33	24.38	24.34	24.90	24.91	24.89	24.64
Commercial	11.12	11.60	11.61	11.66	12.07	12.13	12.58	12.57	12.72	12.78
Industrial[3]	6.27	5.66	5.67	5.79	6.23	6.42	6.47	6.47	6.80	6.85
Electric Generators[4]	4.78	3.57	4.21	4.40	3.82	5.10	4.61	3.32	4.54	4.47
Transportation[5]	0.06	0.28	0.28	0.28	0.46	0.48	0.47	0.52	0.54	0.51
Total	**46.25**	**45.51**	**46.11**	**46.47**	**46.96**	**48.46**	**49.03**	**47.79**	**49.49**	**49.25**

[1]Represents lower 48 onshore and offshore supplies.
[2]Quantity-weighted average of the average lower 48 wellhead price and the average price of imports at the U.S. border.
[3]Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.
[4]Includes 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. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.
[6]Weighted average prices and margins. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.
[7]Within the table, "transmission and distribution" margins equal the difference between the delivered price and the source price (average of the wellhead price and the price of imports at the U.S. border) of natural gas and, thus, reflect the total cost of bringing natural gas to market. When the term "transmission and distribution" margins is used in today's natural gas market, it generally does not include the cost of independent natural gas marketers or costs associated with aggregation of supplies, provisions of storage, and other services. As used here, the term includes the cost of all services and the cost of pipeline fuel used in compressor stations.

Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.

Sources: 2002 electric generators delivered price: Federal Energy Regulatory Commission, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." 2002 industrial delivered prices based on Energy Information Administration (EIA), *Manufacturing Energy Consumption Survey 1998.* 2002 residential, commercial, and transportation delivered prices, average lower 48 wellhead price, and average import price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). Other 2002 values: EIA, Office of Integrated Analysis and Forecasting. **Projections:** EIA, Office of Integrated Analysis and Forecasting AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C15. Oil and Gas Supply

Production and Supply	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Crude Oil										
Lower 48 Average Wellhead Price[1] (2002 dollars per barrel)	**24.54**	**16.36**	**23.61**	**32.80**	**16.82**	**25.82**	**34.33**	**16.49**	**26.72**	**34.90**
Production (million barrels per day)[2]										
U.S. Total	**5.62**	**5.69**	**5.93**	**6.17**	**4.51**	**4.95**	**5.48**	**4.02**	**4.61**	**4.85**
Lower 48 Onshore	3.11	2.45	2.61	2.76	2.03	2.20	2.32	1.87	2.04	2.13
Lower 48 Offshore	1.53	2.35	2.40	2.44	1.82	2.03	2.37	1.68	2.06	2.17
Alaska	0.98	0.89	0.92	0.97	0.66	0.72	0.78	0.46	0.51	0.55
Lower 48 End of Year Reserves (billion barrels)[2]	**19.05**	**17.43**	**18.36**	**19.21**	**14.98**	**16.20**	**17.43**	**13.64**	**14.98**	**15.63**
Natural Gas										
Lower 48 Average Wellhead Price[1] (2002 dollars per thousand cubic feet)	**2.95**	**3.34**	**3.40**	**3.50**	**3.91**	**4.28**	**4.18**	**4.30**	**4.40**	**4.66**
Dry Production (trillion cubic feet)[3]										
U.S. Total	**19.05**	**20.26**	**20.50**	**21.30**	**22.15**	**23.79**	**24.95**	**22.48**	**23.99**	**25.02**
Lower 48 Onshore	13.76	14.21	14.48	14.98	15.18	16.41	16.62	15.56	16.26	16.89
Associated-Dissolved[4]	1.60	1.35	1.41	1.45	1.18	1.23	1.27	1.11	1.17	1.20
Non-Associated	12.16	12.86	13.08	13.52	14.00	15.18	15.35	14.45	15.09	15.69
Conventional	6.23	5.70	5.80	6.09	5.57	6.07	6.17	5.60	5.92	6.12
Unconventional	5.93	7.16	7.28	7.43	8.43	9.11	9.19	8.85	9.16	9.58
Lower 48 Offshore	4.86	5.44	5.41	5.50	4.68	5.09	5.50	4.59	5.03	4.89
Associated-Dissolved[4]	1.05	1.61	1.61	1.62	1.28	1.34	1.59	1.16	1.43	1.43
Non-Associated	3.81	3.84	3.80	3.89	3.40	3.75	3.91	3.43	3.60	3.46
Alaska	0.43	0.60	0.60	0.82	2.29	2.29	2.83	2.33	2.71	3.24
Lower 48 End of Year Dry Reserves[3] (trillion cubic feet)	**180.03**	**196.17**	**201.20**	**204.63**	**194.25**	**200.97**	**206.11**	**186.21**	**193.51**	**194.51**
Supplemental Gas Supplies (trillion cubic feet)[5]	**0.08**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**
Total Lower 48 Wells (thousands)	**24.47**	**22.80**	**24.78**	**27.26**	**24.56**	**26.83**	**27.77**	**24.60**	**26.00**	**27.16**

[1]Represents lower 48 onshore and offshore supplies.
[2]Includes lease condensate.
[3]Marketed production (wet) minus extraction losses.
[4]Gas which occurs in crude oil reserves either as free gas (associated) or as gas in solution with crude oil (dissolved).
[5]Synthetic 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 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 lower 48 onshore, lower 48 offshore, and Alaska crude oil production: Energy Information Administration (EIA), *Petroleum Supply Annual 2002*, DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). 2002 natural gas lower 48 average wellhead price, Alaska and total natural gas production, and supplemental gas supplies: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). Other 2002 values: EIA, Office of Integrated Analysis and Forecasting. **Projections:** EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C16. Coal Supply, Disposition, and Prices
(Million Short Tons per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Production[1]										
Appalachia	408	421	408	412	403	402	427	420	419	422
Interior	147	169	169	170	165	170	177	171	178	181
West	550	641	653	651	780	805	837	894	946	985
East of the Mississippi	504	541	524	529	523	522	554	547	547	554
West of the Mississippi	601	690	706	703	826	854	887	939	996	1034
Total	**1105**	**1231**	**1230**	**1233**	**1349**	**1377**	**1441**	**1486**	**1543**	**1588**
Net Imports										
Imports	17	33	33	33	42	42	42	46	46	46
Exports	40	36	35	35	29	27	30	24	23	22
Total	**-23**	**-2**	**-2**	**-2**	**13**	**14**	**12**	**21**	**23**	**23**
Total Supply[2]	**1083**	**1228**	**1228**	**1231**	**1362**	**1391**	**1453**	**1507**	**1566**	**1612**
Consumption by Sector										
Residential and Commercial	4	5	5	5	5	5	5	5	5	5
Industrial[3]	63	65	65	72	67	66	94	68	67	103
of which: Coal to Liquids	0	0	0	8	0	0	28	0	0	36
Coke Plants	22	24	23	23	19	19	19	18	17	17
Electric Generators[4]	976	1135	1136	1131	1272	1301	1336	1418	1477	1487
Total	**1066**	**1229**	**1229**	**1231**	**1363**	**1391**	**1454**	**1508**	**1567**	**1612**
Discrepancy and Stock Change[5]	**17**	**-0**	**-0**	**-0**	**-1**	**-0**	**-0**	**-1**	**-1**	**-0**
Average Minemouth Price										
(2002 dollars per short ton)	17.90	17.01	16.88	17.14	16.08	16.32	16.96	16.35	16.57	16.80
(2002 dollars per million Btu)	0.87	0.82	0.82	0.84	0.79	0.80	0.84	0.81	0.82	0.84
Delivered Prices (2002 dollars per short ton)[6]										
Industrial	33.24	34.12	34.46	32.35	32.93	33.43	27.66	32.64	33.33	26.17
Coke Plants	51.27	53.28	53.68	53.96	50.18	50.45	50.51	48.22	48.42	48.53
Electric Generators										
(2002 dollars per short ton)	25.96	24.57	24.67	25.04	23.49	24.01	24.81	23.79	24.31	24.74
(2002 dollars per million Btu)	1.26	1.21	1.22	1.24	1.17	1.20	1.23	1.19	1.22	1.24
Average	**26.93**	**25.63**	**25.74**	**26.02**	**24.34**	**24.83**	**25.33**	**24.47**	**24.96**	**25.08**
Exports[7]	40.44	35.95	36.47	36.63	34.15	34.13	34.44	32.07	32.34	32.47

[1]Includes anthracite, bituminous coal, lignite, and waste coal delivered to independent power producers. Waste coal deliveries totaled 11.1 million tons in 2002.
[2]Production plus net imports and net storage withdrawals.
[3]Includes consumption for combined heat and power plants, except those plants whose primary business is to sell electricity, or electricity and heat, to the public.
[4]Includes all electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
[5]Balancing item: the sum of production, net imports, and net storage withdrawals minus total consumption.
[6]Sectoral prices weighted by consumption tonnage; weighted average excludes residential/ commercial prices and export free-alongside-ship (f.a.s.) prices.
[7]F.a.s. price at U.S. port of exit.
Btu = British thermal unit.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 data based on Energy Information Administration (EIA), *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003); EIA, *Annual Coal Report 2002*, DOE/EIA-0584(2002) (Washington, DC, November 2003); and EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.
Projections: EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C17. Renewable Energy Generating Capacity and Generation
(Gigawatts, Unless Otherwise Noted)

Capacity and Generation	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Electric Power Sector[1]										
Net Summer Capacity										
Conventional Hydropower	78.29	78.69	78.69	78.69	78.68	78.68	78.68	78.68	78.68	78.68
Geothermal[2]	2.89	4.13	4.01	3.95	6.11	6.06	5.98	6.69	6.84	6.81
Municipal Solid Waste[3]	3.49	3.99	3.92	3.89	3.99	3.95	3.92	3.99	3.95	3.92
Wood and Other Biomass[4,5]	1.83	2.26	2.20	2.19	3.04	3.04	2.76	4.20	3.74	3.34
Solar Thermal	0.33	0.43	0.43	0.43	0.49	0.49	0.49	0.52	0.52	0.52
Solar Photovoltaic[6]	0.02	0.15	0.15	0.15	0.32	0.32	0.32	0.41	0.41	0.41
Wind	4.83	11.14	8.01	9.55	14.11	13.39	13.58	15.12	15.99	15.10
Total	**91.69**	**100.80**	**97.42**	**98.86**	**106.75**	**105.93**	**105.73**	**109.61**	**110.13**	**108.78**
Generation (billion kilowatthours)										
Conventional Hydropower	255.78	304.38	304.37	304.37	304.64	304.63	304.63	304.81	304.80	304.80
Geothermal[2]	13.36	24.18	23.25	22.77	40.55	40.14	39.46	45.35	46.66	46.46
Municipal Solid Waste[3]	20.02	28.68	28.11	27.90	28.78	28.44	28.22	28.84	28.50	28.28
Wood and Other Biomass[5]	8.67	22.71	23.53	23.75	26.12	27.64	26.14	28.94	29.16	28.33
Dedicated Plants	6.32	12.89	13.26	13.18	18.19	18.47	17.03	24.78	22.90	21.02
Cofiring	2.35	9.82	10.26	10.56	7.93	9.17	9.11	4.16	6.25	7.32
Solar Thermal	0.54	0.84	0.84	0.84	1.04	1.04	1.04	1.11	1.11	1.11
Solar Photovoltaic[5]	0.00	0.36	0.36	0.36	0.79	0.79	0.79	1.02	1.02	1.02
Wind	10.51	35.11	24.07	29.53	46.02	43.54	44.16	49.76	53.16	49.82
Total	**308.87**	**416.26**	**404.52**	**409.52**	**447.94**	**446.22**	**444.44**	**459.83**	**464.40**	**459.82**
End-Use Sector										
Net Summer Capacity										
Combined Heat and Power[7]										
Municipal Solid Waste	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Biomass	3.91	5.41	5.36	5.29	7.35	7.26	7.17	8.17	8.03	7.93
Total	**4.16**	**5.66**	**5.61**	**5.54**	**7.60**	**7.51**	**7.42**	**8.42**	**8.29**	**8.18**
Other End-Use Generators[8]										
Contentional Hydropower[9]	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solar Photovoltaic	0.04	0.39	0.39	0.39	0.55	0.58	0.57	1.04	1.13	1.11
Total	**1.06**	**1.41**	**1.41**	**1.41**	**1.57**	**1.61**	**1.59**	**2.06**	**2.15**	**2.14**
Generation (billion kilowatthours)										
Combined Heat and Power[7]										
Municipal Solid Waste	1.84	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
Biomass	28.16	36.95	36.63	36.26	48.24	47.72	47.23	53.05	52.26	51.67
Total	**30.00**	**39.05**	**38.73**	**38.36**	**50.34**	**49.82**	**49.33**	**55.16**	**54.36**	**53.77**
Other End-Use Generators[8]										
Conventional Hydropower[9]	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solar Photovoltaic	0.09	0.82	0.82	0.82	1.18	1.26	1.22	2.23	2.42	2.38
Total	**4.20**	**4.93**	**4.93**	**4.93**	**5.29**	**5.37**	**5.33**	**6.34**	**6.53**	**6.49**

[1]Includes electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public.
[2]Includes hydrothermal resources only (hot water and steam).
[3]Includes landfill gas.
[4]Facilities co-firing biomass and coal are classified as coal.
[5]Includes projections for energy crops after 2010.
[6]Does not include off-grid photovoltaics (PV). See Annual Energy Review 2002 Table 10.6 for estimates of 1989-2001 PV shipments, including exports, for both grid-connected and off-grid applications.
[7]Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors.
[8]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.
[9]Represents own-use industrial hydroelectric power.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 capacity: Energy Information Administration (EIA), Form EIA-860: "Annual Electric Generator Report" (preliminary). 2002 generation: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections:** EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C18. Renewable Energy Consumption by Sector and Source[1]
(Quadrillion Btu per Year)

Sector and Source	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Marketed Renewable Energy[2]										
Residential	**0.39**	**0.40**	**0.40**	**0.40**	**0.41**	**0.41**	**0.41**	**0.41**	**0.41**	**0.40**
Wood	0.39	0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.40
Commercial	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**
Biomass	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Industrial[3]	**1.66**	**2.01**	**2.00**	**1.99**	**2.50**	**2.48**	**2.46**	**2.73**	**2.70**	**2.68**
Conventional Hydroelectric	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Municipal Solid Waste	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Biomass	1.60	1.96	1.95	1.93	2.45	2.43	2.41	2.68	2.65	2.62
Transportation	**0.17**	**0.30**	**0.29**	**0.27**	**0.35**	**0.33**	**0.30**	**0.38**	**0.35**	**0.31**
Ethanol used in E85[4]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethanol used in Gasoline Blending	0.17	0.30	0.29	0.27	0.34	0.33	0.30	0.37	0.35	0.31
Electric Generators[5]	**3.69**	**4.83**	**4.68**	**4.72**	**5.50**	**5.47**	**5.43**	**5.71**	**5.79**	**5.74**
Conventional Hydroelectric	2.75	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13
Geothermal	0.30	0.64	0.61	0.59	1.16	1.15	1.13	1.32	1.36	1.36
Municipal Solid Waste[6]	0.34	0.39	0.39	0.38	0.40	0.39	0.39	0.40	0.39	0.39
Biomass	0.17	0.29	0.29	0.29	0.32	0.33	0.31	0.33	0.34	0.33
Dedicated Plants	0.11	0.15	0.15	0.15	0.21	0.21	0.19	0.28	0.26	0.24
Cofiring	0.06	0.14	0.14	0.14	0.10	0.12	0.12	0.05	0.08	0.09
Solar Thermal	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wind	0.13	0.36	0.25	0.30	0.47	0.45	0.45	0.51	0.55	0.51
Total Marketed Renewable Energy	**6.01**	**7.64**	**7.47**	**7.48**	**8.85**	**8.78**	**8.70**	**9.32**	**9.35**	**9.23**
Sources of Ethanol										
From Corn	0.17	0.30	0.29	0.27	0.32	0.31	0.27	0.33	0.31	0.26
From Cellulose	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.05	0.05	0.05
Total	**0.17**	**0.30**	**0.29**	**0.27**	**0.35**	**0.33**	**0.30**	**0.38**	**0.35**	**0.31**
Non-Marketed Renewable Energy[7] Selected Consumption										
Residential	**0.02**	**0.03**	**0.03**	**0.03**	**0.04**	**0.04**	**0.04**	**0.05**	**0.05**	**0.05**
Solar Hot Water Heating	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04
Geothermal Heat Pumps	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**
Solar Thermal	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01

[1]Actual 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 kilowatthour.
[2]Includes 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 C8.
[3]Includes all electricity production by industrial and other combined heat and power for the grid and for own use.
[4]Excludes motor gasoline component of E85.
[5]Includes 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. Includes small power producers and exempt wholesale generators.
[6]Includes landfill gas.
[7]Includes 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.
Btu = British thermal unit.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 ethanol: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). 2002 electric generators: EIA, Form EIA-860: "Annual Electric Generator Report" (preliminary). Other 2002 values: EIA, Office of Integrated Analysis and Forecasting. **Projections:** EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C19. Carbon Dioxide Emissions by Sector and Source
(Million Metric Tons)

Sector and Source	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Residential										
Petroleum	104.0	115.0	110.4	104.8	113.8	107.1	100.6	112.1	104.5	97.5
Natural Gas	267.2	301.4	300.4	299.8	323.6	321.2	322.1	333.4	330.7	330.7
Coal	1.1	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1
Electricity	816.7	915.1	905.3	898.3	1037.9	1019.9	1029.6	1119.7	1106.7	1106.8
Total	**1189.0**	**1332.7**	**1317.2**	**1304.0**	**1476.4**	**1449.2**	**1453.3**	**1566.3**	**1543.0**	**1536.0**
Commercial										
Petroleum	52.6	70.7	66.2	61.3	78.3	70.2	62.2	82.4	72.2	62.5
Natural Gas	169.4	188.9	188.7	189.1	207.8	207.9	211.5	218.3	219.4	223.3
Coal	9.2	9.2	9.3	9.3	9.2	9.2	9.3	9.2	9.2	9.2
Electricity	778.0	951.8	938.4	928.5	1160.2	1135.5	1142.9	1288.7	1269.2	1268.7
Total	**1009.1**	**1220.7**	**1202.5**	**1188.2**	**1455.5**	**1422.9**	**1425.8**	**1598.7**	**1570.1**	**1563.7**
Industrial[1]										
Petroleum	412.8	385.9	365.4	334.2	443.7	408.0	367.9	472.0	428.4	392.5
Natural Gas[2]	432.7	513.7	522.1	537.7	580.1	598.6	614.5	619.2	639.4	646.5
Coal	185.1	192.5	191.9	197.0	184.6	183.3	202.3	183.0	181.1	205.6
Electricity	640.0	719.5	710.3	704.0	830.9	813.8	818.1	920.5	900.7	894.9
Total	**1670.6**	**1811.6**	**1789.6**	**1772.8**	**2039.3**	**2003.6**	**2002.8**	**2194.7**	**2149.5**	**2139.5**
Transportation										
Petroleum[3]	1811.2	2240.6	2193.2	2078.9	2673.9	2590.9	2389.5	2920.4	2805.8	2536.5
Natural Gas[4]	35.2	38.8	39.5	40.5	46.1	49.1	49.6	47.9	51.3	52.0
Other[5]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity	14.2	17.0	16.7	16.1	20.4	19.9	19.3	22.9	22.4	21.4
Total	**1860.6**	**2296.4**	**2249.5**	**2135.5**	**2740.5**	**2659.9**	**2458.5**	**2991.2**	**2879.5**	**2609.8**
Total Carbon Dioxide Emissions by Delivered Fuel										
Petroleum[3]	2380.5	2812.3	2735.2	2579.3	3309.7	3176.2	2920.1	3586.9	3410.9	3088.9
Natural Gas	904.4	1042.8	1050.7	1067.0	1157.5	1176.8	1197.8	1218.9	1240.8	1252.5
Coal	195.4	202.9	202.4	207.4	194.9	193.6	212.7	193.2	191.4	215.9
Other[5]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity	2249.0	2603.4	2570.6	2546.9	3049.5	2989.0	3009.9	3351.8	3299.0	3291.9
Total	**5729.3**	**6661.3**	**6558.8**	**6400.5**	**7711.7**	**7535.6**	**7340.5**	**8350.9**	**8142.0**	**7849.1**
Electric Power[6]										
Petroleum	72.2	111.1	51.0	28.4	255.5	65.2	32.5	300.9	61.6	34.2
Natural Gas	299.1	321.7	358.5	363.2	384.3	463.3	440.5	366.4	451.6	449.7
Coal	1877.8	2170.5	2161.2	2155.3	2409.7	2460.5	2536.9	2684.6	2785.8	2807.9
Total	**2249.0**	**2603.4**	**2570.6**	**2546.9**	**3049.5**	**2989.0**	**3009.9**	**3351.8**	**3299.0**	**3291.9**
Total Carbon Dioxide Emissions by Primary Fuel[7]										
Petroleum[3]	2452.7	2923.4	2786.1	2607.7	3565.2	3241.4	2952.7	3887.7	3472.5	3123.2
Natural Gas	1203.4	1364.5	1409.2	1430.2	1541.8	1640.1	1638.3	1585.3	1692.4	1702.2
Coal	2073.2	2373.4	2363.6	2362.7	2604.6	2654.1	2749.6	2877.8	2977.1	3023.8
Other[5]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**5729.3**	**6661.3**	**6558.8**	**6400.5**	**7711.7**	**7535.6**	**7340.5**	**8350.9**	**8142.0**	**7849.1**
Carbon Dioxide Emissions (tons per person)	**19.8**	**21.5**	**21.2**	**20.7**	**23.0**	**22.5**	**21.9**	**24.0**	**23.4**	**22.6**

[1]Fuel consumption includes energy for combined heat and power plants, except those plants whose primary business is to sell electricity, or electricity and heat, to the public.
[2]Includes lease and plant fuel.
[3]This includes international bunker fuel, which by convention are excluded from the international accounting of carbon dioxide emissions. In the years from 1990 through 2000, international bunker fuels accounted for 24 to 30 million metric tons of carbon dioxide annually.
[4]Includes pipeline fuel natural gas and compressed natural gas used as vehicle fuel.
[5]Includes methanol and liquid hydrogen.
[6]Includes electricity-only and combined heat and power (CHP) 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.
[7]Emissions from electric power generators are distributed to the primary fuels.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 emissions and emission factors: Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 2002,* DOE/EIA-0573(2002) (Washington, DC, October 2003). **Projections:** EIA, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C20. Macroeconomic Indicators
(Billion 1996 Chain-Weighted Dollars, Unless Otherwise Noted)

Indicators	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
Real Gross Domestic Product	**9440**	**12234**	**12190**	**12147**	**16226**	**16188**	**16155**	**18588**	**18520**	**18456**
Real Potential Gross Domestic Product	**9726**	**12352**	**12313**	**12275**	**16238**	**16186**	**16140**	**18594**	**18520**	**18456**
Real Disposable Personal Income	**7032**	**8964**	**8894**	**8813**	**11897**	**11864**	**11844**	**13859**	**13826**	**13815**
Components of Real Gross Domestic										
Real Consumption	6576	8488	8437	8374	11333	11296	11252	12989	12946	12899
Real Investment	1590	2413	2387	2363	3753	3726	3698	4698	4661	4627
Real Government Spending	1713	1961	1961	1962	2260	2265	2271	2418	2423	2429
Real Exports	1059	1840	1838	1837	3395	3376	3360	4588	4546	4511
Real Imports	1547	2483	2436	2378	4511	4433	4343	6120	6015	5920
Energy Intensity										
(thousand Btu per 1996 dollar of GDP										
Delivered Energy	7.55	6.80	6.73	6.59	5.93	5.84	5.65	5.56	5.45	5.23
Total Energy	10.36	9.25	9.17	9.03	8.03	7.91	7.72	7.50	7.37	7.15
Price Indices										
GDP Chain-Type Price Index (1996=1.000)	1.107	1.293	1.301	1.308	1.741	1.774	1.805	2.067	2.121	2.168
Consumer Price Index (1982-4=1)	1.80	2.09	2.11	2.14	2.82	2.89	2.96	3.37	3.49	3.59
Wholesale Price Index (1982=1.00)										
All Commodities	1.31	1.42	1.46	1.50	1.66	1.74	1.81	1.84	1.94	2.02
Fuel and Power	0.93	0.98	1.06	1.17	1.17	1.33	1.45	1.31	1.52	1.68
Interest Rates (percent, nominal)										
Federal Funds Rate	1.67	5.28	5.42	5.58	6.02	6.30	6.56	6.68	7.00	7.24
10-Year Treasury Note	4.61	6.46	6.60	6.74	6.86	7.07	7.28	7.70	7.95	8.14
AA Utility Bond Rate	7.19	7.88	7.99	8.07	8.36	8.59	8.75	8.96	9.27	9.49
Unemployment Rate (percent)	**5.78**	**4.91**	**4.93**	**4.95**	**4.46**	**4.41**	**4.36**	**4.45**	**4.44**	**4.43**
Housing Starts (millions)	**1.88**	**1.98**	**1.97**	**1.96**	**1.95**	**1.94**	**1.94**	**1.92**	**1.92**	**1.91**
Commercial Floorspace, Total (billion square feet)	**72.1**	**84.0**	**83.8**	**83.6**	**96.2**	**95.9**	**95.6**	**102.1**	**101.8**	**101.6**
Unit Sales of Light-Duty Vehicles (millions)	**16.78**	**18.10**	**18.01**	**17.95**	**20.27**	**20.25**	**20.27**	**21.37**	**21.32**	**21.33**
Value of Shipments (billion 1996 dollars)										
Total Industrial	5285	6456	6439	6427	8383	8344	8309	9584	9491	9407
Nonmanufacturing	1222	1433	1425	1422	1704	1710	1714	1854	1855	1853
Manufacturing	4064	5023	5013	5005	6679	6634	6595	7730	7636	7554
Energy-Intensive	1120	1284	1273	1256	1524	1500	1476	1646	1610	1583
Non-Energy-Intensive	2944	3739	3741	3749	5155	5135	5119	6084	6026	5971
Population (millions)										
Population with Armed Forces Overseas)	288.9	309.3	309.3	309.3	334.6	334.6	334.6	347.5	347.5	347.5
Population (aged 16 and over)	224.3	244.1	244.1	244.1	264.3	264.3	264.3	274.3	274.3	274.3
Employment, Non-Agriculture	130.5	145.0	145.0	145.1	160.9	161.2	161.7	168.5	168.6	168.9
Employment, Manufacturing	16.7	16.1	16.1	16.2	16.0	16.0	16.1	16.3	16.2	16.2
Labor Force	145.1	159.8	159.8	159.8	171.3	171.3	171.4	176.8	176.8	176.8

GDP = Gross domestic product.
Btu = British thermal unit.
Sources: 2002: Global Insight macroeconomic model T250803. **Projections:** Energy Information Administration, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Table C21. International Petroleum Supply and Disposition Summary
(Million Barrels per Day, Unless Otherwise Noted)

Supply and Disposition	2002	Projections								
		2010			2020			2025		
		Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price	Low World Oil Price	Reference	High World Oil Price
World Oil Price[1] (2002 dollars per barrel)	**23.68**	**16.98**	**24.17**	**33.27**	**16.98**	**26.02**	**34.63**	**16.98**	**27.00**	**35.03**
Production[2] (Conventional)										
Industrialized Countries										
U.S. (50 states)	9.16	9.22	9.53	9.76	8.28	8.89	9.39	7.86	8.59	8.79
Canada	2.14	1.80	1.83	1.92	1.54	1.60	1.77	1.45	1.57	1.79
Mexico	3.61	4.09	4.20	4.46	4.42	4.60	4.96	4.62	4.82	5.20
Western Europe[3]	6.76	6.25	6.34	6.64	5.39	5.48	5.82	4.88	4.97	5.28
Japan	0.08	0.07	0.08	0.10	0.05	0.06	0.09	0.05	0.06	0.09
Australia and New Zealand	0.75	0.93	0.96	1.01	0.85	0.88	0.95	0.82	0.86	0.92
Total Industrialized	**22.51**	**22.37**	**22.93**	**23.89**	**20.53**	**21.52**	**22.99**	**19.67**	**20.87**	**22.07**
Eurasia										
Former Soviet Union										
Russia	7.67	9.65	9.92	10.62	10.36	10.77	11.75	10.47	10.93	11.94
Caspian Area[4]	1.66	3.03	3.12	3.34	4.95	5.15	5.62	5.85	6.11	6.68
Eastern Europe[5]	0.23	0.33	0.33	0.35	0.40	0.41	0.44	0.43	0.45	0.48
Total Eurasia	**9.56**	**13.01**	**13.37**	**14.30**	**15.70**	**16.32**	**17.82**	**16.75**	**17.48**	**19.09**
Developing Countries	**44.24**	**55.83**	**49.94**	**43.20**	**76.04**	**64.32**	**53.23**	**89.14**	**74.05**	**61.99**
Total Production (Conventional)	**76.30**	**91.21**	**86.24**	**81.39**	**112.27**	**102.17**	**94.03**	**125.56**	**112.41**	**103.16**
Production[6] (Nonconventional)										
U.S. (50 states)	0.00	0.00	0.00	0.09	0.00	0.00	0.24	0.00	0.00	0.27
Other North America	0.79	1.61	1.69	1.77	2.86	3.20	3.55	2.83	3.28	3.73
Western Europe	0.04	0.04	0.04	0.05	0.03	0.04	0.06	0.03	0.04	0.06
Asia	0.03	0.02	0.03	0.04	0.02	0.03	0.05	0.02	0.03	0.05
Middle East[7]	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.01	0.03	0.04
Africa	0.16	0.16	0.19	0.23	0.16	0.25	0.34	0.15	0.28	0.41
South and Central America	0.54	0.78	0.85	1.02	1.16	1.42	1.94	1.11	1.45	2.13
Total Production[3] (Nonconventional)	**1.55**	**2.62**	**2.81**	**3.21**	**4.25**	**4.97**	**6.20**	**4.16**	**5.11**	**6.70**
Total Production	**77.8**	**93.84**	**89.05**	**84.59**	**116.52**	**107.13**	**100.24**	**129.72**	**117.53**	**109.86**
Consumption[8]										
Industrialized Countries										
U.S. (50 states)	19.61	23.68	22.71	21.39	28.66	26.41	24.26	31.20	28.30	25.63
U.S. Territories	0.29	0.43	0.38	0.34	0.50	0.43	0.38	0.56	0.47	0.42
Canada	1.96	2.48	2.23	2.03	2.74	2.36	2.12	2.88	2.44	2.20
Mexico	2.01	2.93	2.65	2.43	4.53	3.62	3.02	5.44	4.09	3.31
Western Europe[3]	14.02	15.09	14.36	13.72	15.82	14.80	14.09	16.42	15.26	14.59
Japan	5.45	6.52	5.79	5.21	7.81	6.26	5.26	8.48	6.54	5.45
Australia and New Zealand	1.04	1.33	1.28	1.23	1.68	1.58	1.52	1.86	1.75	1.68
Total Industrialized	**44.39**	**52.46**	**49.41**	**46.36**	**61.74**	**55.47**	**50.65**	**66.84**	**58.85**	**53.28**
Eurasia										
Former Soviet Union	4.05	5.31	5.10	4.92	6.04	5.73	5.51	6.62	6.25	6.03
Eastern Europe[5]	1.44	1.79	1.74	1.70	2.29	2.21	2.16	2.63	2.54	2.49
Total Eurasia	**5.49**	**7.10**	**6.84**	**6.62**	**8.32**	**7.94**	**7.67**	**9.25**	**8.79**	**8.52**
Developing Countries										
China	5.11	6.95	6.48	6.09	10.28	9.39	8.79	12.02	10.88	10.24
India	2.16	2.98	2.80	2.65	4.97	4.47	4.12	6.18	5.48	5.05
South Korea	2.20	2.97	2.75	2.57	3.53	3.15	2.89	3.77	3.32	3.05
Other Asia	5.63	6.88	6.65	6.45	9.35	8.93	8.63	10.70	10.17	9.86
Middle East[7]	5.34	6.32	6.19	6.08	8.08	7.87	7.73	9.14	8.88	8.74
Africa	2.56	2.77	2.68	2.61	3.33	3.16	3.04	3.71	3.50	3.36
South and Central America	4.91	5.71	5.54	5.39	7.30	7.03	6.84	8.33	7.99	7.79
Total Developing Countries	**27.91**	**34.57**	**33.10**	**31.83**	**46.84**	**44.00**	**42.03**	**53.85**	**50.22**	**48.08**
Total Consumption	**77.79**	**94.13**	**89.35**	**84.81**	**116.91**	**107.40**	**100.35**	**129.94**	**117.86**	**109.89**

[1]Average refiner acquisition cost of imported crude oil.
[2]Includes 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.
[3]Western Europe = Austria, Belgium, Bosnia and Herzegovina, Croatia, Denmark, Finland, France, the unified Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Macedonia, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, United Kingdom, and Yugoslavia.
[4]Caspian area includes Other Former Soviet Union.
[5]Eastern Europe = Albania, Bulgaria, Czech Republic, Hungary, Poland, Romania, and Slovakia.
[6]Includes liquids produced from energy crops, natural gas, coal, oil sands, and shale. Includes both OPEC and non-OPEC producers in the regional breakdown.
[7]Includes Turkey.
[8]Includes both OPEC and non-OPEC consumers in the regional breakdown.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: Energy Information Administration, AEO2004 National Energy Modeling System runs LW2004.D101703B, AEO2004.D101703E, and HW2004.D101703B.

Crude Oil Equivalency Summary

Table D1. Total Energy Supply and Disposition Summary
(Million Barrels per Day Oil Equivalent, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Production							
Crude Oil and Lease Condensate	5.74	5.62	5.93	5.53	4.95	4.61	-0.9%
Natural Gas Plant Liquids	1.20	1.21	1.46	1.51	1.64	1.64	1.3%
Dry Natural Gas	9.56	9.24	9.94	10.49	11.51	11.64	1.0%
Coal	11.32	10.72	11.93	12.35	13.15	14.69	1.4%
Nuclear Power	3.79	3.85	3.92	4.01	4.02	4.03	0.2%
Renewable Energy[1]	2.48	2.76	3.39	3.70	3.98	4.25	1.9%
Other[2]	0.25	0.54	0.41	0.37	0.38	0.39	-1.3%
Total	**34.35**	**33.94**	**36.99**	**37.96**	**39.63**	**41.25**	**0.9%**
Imports							
Crude Oil[3]	9.33	9.14	11.29	13.53	14.53	15.76	2.4%
Petroleum Products[4]	2.38	2.24	2.72	2.84	3.70	4.55	3.1%
Natural Gas	1.92	1.93	3.09	3.44	3.56	3.92	3.1%
Other Imports[5]	0.28	0.25	0.45	0.50	0.53	0.56	3.6%
Total	**13.91**	**13.57**	**17.55**	**20.31**	**22.32**	**24.78**	**2.7%**
Exports							
Petroleum[6]	0.95	0.96	1.01	1.03	1.00	1.01	0.2%
Natural Gas	0.18	0.25	0.43	0.43	0.44	0.41	2.3%
Coal	0.60	0.49	0.42	0.38	0.33	0.27	-2.6%
Total	**1.72**	**1.69**	**1.86**	**1.83**	**1.77**	**1.69**	**0.0%**
Discrepancy[7]	**-0.76**	**0.33**	**0.12**	**0.13**	**0.07**	**0.13**	**N/A**
Consumption							
Petroleum Products[8]	18.18	18.00	20.85	22.80	24.19	25.98	1.6%
Natural Gas	10.89	11.04	12.67	13.58	14.70	15.22	1.4%
Coal	10.40	10.47	11.91	12.43	13.33	14.98	1.6%
Nuclear Power	3.79	3.85	3.92	4.01	4.02	4.03	0.2%
Renewable Energy[1]	2.48	2.76	3.39	3.70	3.98	4.25	1.9%
Other[9]	0.04	0.04	0.05	0.05	0.03	0.01	-4.6%
Total	**45.78**	**46.15**	**52.79**	**56.56**	**60.26**	**64.47**	**1.5%**
Net Imports - Petroleum	**11.00**	**10.66**	**13.29**	**15.68**	**17.55**	**19.69**	**2.7%**
Prices (2002 dollars per unit)							
World Oil Price (dollars per barrel)[10]	22.25	23.68	24.17	25.07	26.02	27.00	0.6%
Natural Gas Wellhead Price (dollars per thousand cubic feet)[11]	4.14	2.95	3.40	4.19	4.28	4.40	1.8%
Coal Minemouth Price (dollars per ton)	17.79	17.90	16.88	16.47	16.32	16.57	-0.3%
Average Electricity Price (cents per kilowatthour)	7.4	7.2	6.6	6.8	6.9	6.9	-0.2%

[1]Includes 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.
[2]Includes liquid hydrogen, methanol, supplemental natural gas, and some domestic inputs to refineries.
[3]Includes imports of crude oil for the Strategic Petroleum Reserve.
[4]Includes imports of finished petroleum products, imports of unfinished oils, alcohols, ethers, and blending components.
[5]Includes coal, coal coke (net), and electricity (net).
[6]Includes crude oil and petroleum products.
[7]Balancing 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.
[8]Includes natural gas plant liquids, crude oil consumed as a fuel, and nonpetroleum based liquids for blending, such as ethanol.
[9]Includes net electricity imports, methanol, and liquid hydrogen.
[10]Average refiner acquisition cost for imported crude oil.
[11]Represents lower 48 onshore and offshore supplies.
N/A = Not applicable.
Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 natural gas supply values: Energy Information Administration (EIA), *Natural Gas Annual 2001*, DOE/EIA-0131(2001) (Washington, DC, February 2003). 2002 natural gas supply values: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2001 coal minemouth prices: EIA, *Annual Coal Report 2002*, DOE/EIA-0584(2002) (Washington, DC, November 2003). 2001 petroleum supply values: EIA *Petroleum Supply Annual 2001,* DOE/EIA-0340(2001)/1 (Washington, DC, June 2002). 2002 petroleum supply values: EIA, *Petroleum Supply Annual 2002,* DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). Other 2001 and 2002 values: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002) and EIA, *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003).
Projections: EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Crude Oil Equivalency Summary

Table D1. Total Energy Supply and Disposition Summary
(Million Barrels per Day Oil Equivalent, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Production							
Crude Oil and Lease Condensate	5.74	5.62	5.93	5.53	4.95	4.61	-0.9%
Natural Gas Plant Liquids	1.20	1.21	1.46	1.51	1.64	1.64	1.3%
Dry Natural Gas	9.56	9.24	9.94	10.49	11.51	11.64	1.0%
Coal	11.32	10.72	11.93	12.35	13.15	14.69	1.4%
Nuclear Power	3.79	3.85	3.92	4.01	4.02	4.03	0.2%
Renewable Energy[1]	2.48	2.76	3.39	3.70	3.98	4.25	1.9%
Other[2]	0.25	0.54	0.41	0.37	0.38	0.39	-1.3%
Total	**34.35**	**33.94**	**36.99**	**37.96**	**39.63**	**41.25**	**0.9%**
Imports							
Crude Oil[3]	9.33	9.14	11.29	13.53	14.53	15.76	2.4%
Petroleum Products[4]	2.38	2.24	2.72	2.84	3.70	4.55	3.1%
Natural Gas	1.92	1.93	3.09	3.44	3.56	3.92	3.1%
Other Imports[5]	0.28	0.25	0.45	0.50	0.53	0.56	3.6%
Total	**13.91**	**13.57**	**17.55**	**20.31**	**22.32**	**24.78**	**2.7%**
Exports							
Petroleum[6]	0.95	0.96	1.01	1.03	1.00	1.01	0.2%
Natural Gas	0.18	0.25	0.43	0.43	0.44	0.41	2.3%
Coal	0.60	0.49	0.42	0.38	0.33	0.27	-2.6%
Total	**1.72**	**1.69**	**1.86**	**1.83**	**1.77**	**1.69**	**0.0%**
Discrepancy[7]	**-0.76**	**0.33**	**0.12**	**0.13**	**0.07**	**0.13**	**N/A**
Consumption							
Petroleum Products[8]	18.18	18.00	20.85	22.80	24.19	25.98	1.6%
Natural Gas	10.89	11.04	12.67	13.58	14.70	15.22	1.4%
Coal	10.40	10.47	11.91	12.43	13.33	14.98	1.6%
Nuclear Power	3.79	3.85	3.92	4.01	4.02	4.03	0.2%
Renewable Energy[1]	2.48	2.76	3.39	3.70	3.98	4.25	1.9%
Other[9]	0.04	0.04	0.05	0.05	0.03	0.01	-4.6%
Total	**45.78**	**46.15**	**52.79**	**56.56**	**60.26**	**64.47**	**1.5%**
Net Imports - Petroleum	**11.00**	**10.66**	**13.29**	**15.68**	**17.55**	**19.69**	**2.7%**
Prices (2002 dollars per unit)							
World Oil Price (dollars per barrel)[10]	22.25	23.68	24.17	25.07	26.02	27.00	0.6%
Natural Gas Wellhead Price (dollars per thousand cubic feet)[11]	4.14	2.95	3.40	4.19	4.28	4.40	1.8%
Coal Minemouth Price (dollars per ton)	17.79	17.90	16.88	16.47	16.32	16.57	-0.3%
Average Electricity Price (cents per kilowatthour)	7.4	7.2	6.6	6.8	6.9	6.9	-0.2%

[1]Includes 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.
[2]Includes liquid hydrogen, methanol, supplemental natural gas, and some domestic inputs to refineries.
[3]Includes imports of crude oil for the Strategic Petroleum Reserve.
[4]Includes imports of finished petroleum products, imports of unfinished oils, alcohols, ethers, and blending components.
[5]Includes coal, coal coke (net), and electricity (net).
[6]Includes crude oil and petroleum products.
[7]Balancing 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.
[8]Includes natural gas plant liquids, crude oil consumed as a fuel, and nonpetroleum based liquids for blending, such as ethanol.
[9]Includes net electricity imports, methanol, and liquid hydrogen.
[10]Average refiner acquisition cost for imported crude oil.
[11]Represents lower 48 onshore and offshore supplies.
N/A = Not applicable.
Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 natural gas supply values: Energy Information Administration (EIA), *Natural Gas Annual 2001*, DOE/EIA-0131(2001) (Washington, DC, February 2003). 2002 natural gas supply values: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2001 coal minemouth prices: EIA, *Annual Coal Report 2002*, DOE/EIA-0584(2002) (Washington, DC, November 2003). 2001 petroleum supply values: EIA *Petroleum Supply Annual 2001,* DOE/EIA-0340(2001)/1 (Washington, DC, June 2002). 2002 petroleum supply values: EIA, *Petroleum Supply Annual 2002,* DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). Other 2001 and 2002 values: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002) and EIA, *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003).
Projections: EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Crude Oil Equivalency Summary

Table D2. Total Energy Supply and Disposition Summary
(Million Tons of Oil Equivalent, Unless Otherwise Noted)

Supply, Disposition, and Prices	Reference Case						Annual Growth 2002-2025 (percent)
	2001	2002	2010	2015	2020	2025	
Production							
Crude Oil and Lease Condensate	306.38	300.06	316.51	295.00	264.29	246.16	-0.9%
Natural Gas Plant Liquids	64.17	64.55	78.01	80.71	87.35	87.45	1.3%
Dry Natural Gas	509.91	492.97	530.43	559.54	615.72	620.86	1.0%
Coal	604.04	572.04	636.20	658.80	703.48	783.64	1.4%
Nuclear Power	202.31	205.26	209.02	213.66	214.85	214.85	0.2%
Renewable Energy[1]	132.33	147.07	180.90	197.50	213.05	226.72	1.9%
Other[2]	13.46	28.59	22.11	19.89	20.33	21.05	-1.3%
Total	**1832.60**	**1810.54**	**1973.19**	**2025.11**	**2119.08**	**2200.73**	**0.9%**
Imports							
Crude Oil[3]	510.44	500.05	617.72	740.12	795.03	861.97	2.4%
Petroleum Products[4]	127.02	119.73	145.14	151.30	197.31	242.60	3.1%
Natural Gas	102.42	103.21	164.87	183.71	190.52	208.93	3.1%
Other Imports[5]	14.97	13.20	23.91	26.66	28.21	29.69	3.6%
Total	**754.85**	**736.19**	**951.63**	**1101.79**	**1211.07**	**1343.19**	**2.6%**
Exports							
Petroleum[6]	50.55	51.16	54.06	54.85	53.58	54.08	0.2%
Natural Gas	9.46	13.09	22.91	22.76	23.44	22.11	2.3%
Coal	31.88	26.01	22.52	20.16	17.40	14.23	-2.6%
Total	**91.89**	**90.25**	**99.49**	**97.77**	**94.42**	**90.42**	**0.0%**
Discrepancy[7]	**52.60**	**-5.99**	**8.65**	**11.51**	**12.16**	**14.11**	**N/A**
Consumption							
Petroleum Products[8]	970.06	960.37	1112.48	1216.12	1294.03	1385.85	1.6%
Natural Gas	580.98	588.84	675.90	724.23	786.55	811.77	1.4%
Coal	555.38	559.03	635.72	663.34	713.24	799.53	1.6%
Nuclear Power	202.31	205.26	209.02	213.66	214.85	214.85	0.2%
Renewable Energy[1]	132.34	147.08	180.92	197.52	213.08	226.75	1.9%
Other[9]	1.89	1.89	2.65	2.75	1.83	0.65	-4.6%
Total	**2442.96**	**2462.47**	**2816.69**	**3017.61**	**3223.57**	**3439.39**	**1.5%**
Net Imports - Petroleum	**586.91**	**568.62**	**708.80**	**836.56**	**938.76**	**1050.49**	**2.7%**
Prices (2002 dollars per unit)							
World Oil Price (dollars per barrel)[10]	22.25	23.68	24.17	25.07	26.02	27.00	0.6%
Natural Gas Wellhead Price (dollars per thousand cubic feet)[11]	4.14	2.95	3.40	4.19	4.28	4.40	1.8%
Coal Minemouth Price (dollars per ton)	17.79	17.90	16.88	16.47	16.32	16.57	-0.3%
Average Electricity Price (cents per kilowatthour)	7.4	7.2	6.6	6.8	6.9	6.9	-0.2%

[1]Includes 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.
[2]Includes liquid hydrogen, methanol, supplemental natural gas, and some domestic inputs to refineries.
[3]Includes imports of crude oil for the Strategic Petroleum Reserve.
[4]Includes imports of finished petroleum products, imports of unfinished oils, alcohols, ethers, and blending components.
[5]Includes coal, coal coke (net), and electricity (net).
[6]Includes crude oil and petroleum products.
[7]Balancing 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.
[8]Includes natural gas plant liquids, crude oil consumed as a fuel, and nonpetroleum based liquids for blending, such as ethanol.
[9]Includes net electricity imports, methanol, and liquid hydrogen.
[10]Average refiner acquisition cost for imported crude oil.
[11]Represents lower 48 onshore and offshore supplies.
N/A = Not applicable.
Note: Totals may not equal sum of components due to independent rounding. Data for 2001 and 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2001 natural gas supply values: Energy Information Administration (EIA), *Natural Gas Annual 2001*, DOE/EIA-0131(2001) (Washington, DC, February 2003). 2002 natural gas supply values: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2001 coal minemouth prices: EIA, *Annual Coal Report 2002*, DOE/EIA-0584(2002) (Washington, DC, November 2003). 2001 petroleum supply values: EIA *Petroleum Supply Annual 2001,* DOE/EIA-0340(2001)/1 (Washington, DC, June 2002). 2002 petroleum supply values: EIA, *Petroleum Supply Annual 2002,* DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). Other 2001 and 2002 values: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002) and EIA, *Quarterly Coal Report, October-December 2002*, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003).
Projections: EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Household Expenditures

Table E1. 2001 Average Household Expenditures for Energy by Household Characteristic
(2002 Dollars)

Household Characteristics	Fuels					
	Total Energy	Total Home	Electricity	Natural Gas	Fuel Oil and Kerosene	Motor Gasoline
Average U.S. Household	**2983.60**	**1446.69**	**943.05**	**444.01**	**59.63**	**1536.91**
Households by Income Quintile						
1st	1707.27	1032.59	664.12	333.93	34.54	674.68
2nd	2531.28	1245.82	799.73	395.54	50.54	1285.46
3rd	3033.91	1404.40	930.92	409.01	64.47	1629.51
4th	3523.42	1639.12	1079.75	482.43	76.93	1884.30
5th	4257.70	2007.68	1296.00	641.71	69.96	2250.02
Households by Census Division						
New England	3304.63	1756.35	868.36	438.90	449.09	1548.28
Middle Atlantic	2878.05	1681.53	913.87	577.43	190.23	1196.52
South Atlantic	3159.31	1474.98	767.34	691.20	16.44	1684.34
East North Central	3284.35	1436.65	842.55	564.40	29.71	1847.70
East South Central	2934.45	1438.30	1136.18	277.61	24.51	1496.16
West North Central	2832.80	1324.87	1042.11	280.06	2.71	1507.92
West South Central	3035.74	1612.84	1244.90	367.72	0.22	1422.90
Mountain	2774.65	1210.87	794.26	414.83	1.79	1563.78
Pacific	2827.90	1148.61	787.98	354.91	5.73	1679.30

Source: Energy Information Administration, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table E2. 2010 Average Household Expenditures for Energy by Household Characteristic
(2002 Dollars)

Household Characteristics	Fuels					
	Total Energy	Total Home	Electricity	Natural Gas	Fuel Oil and Kerosene	Motor Gasoline
Average U.S. Household	**3051.77**	**1351.91**	**926.70**	**377.52**	**47.69**	**1699.86**
Households by Income Quintile						
1st	1732.66	972.69	666.07	278.88	27.74	759.97
2nd	2605.59	1161.48	784.50	336.25	40.72	1444.12
3rd	3115.23	1313.34	914.92	347.01	51.41	1801.89
4th	3587.59	1528.51	1057.04	410.43	61.05	2059.07
5th	4305.44	1858.69	1254.84	548.18	55.67	2446.75
Households by Census Division						
New England	3310.18	1578.25	808.05	391.75	378.44	1731.93
Middle Atlantic	2847.41	1477.55	805.67	508.20	163.67	1369.86
South Atlantic	3070.96	1359.94	750.78	596.70	12.46	1711.02
East North Central	3343.35	1353.74	868.43	462.03	23.28	1989.61
East South Central	3097.20	1449.60	1188.49	243.20	17.92	1647.60
West North Central	3011.58	1337.08	1104.67	230.12	2.29	1674.51
West South Central	3099.37	1468.09	1180.03	287.95	0.11	1631.28
Mountain	3044.89	1210.07	810.18	398.49	1.40	1834.81
Pacific	2921.85	1024.64	728.63	291.45	4.56	1897.21

Source: Energy Information Administration, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table E3. 2015 Average Household Expenditures for Energy by Household Characteristic
(2002 Dollars)

Household Characteristics	Fuels					
	Total Energy	Total Home	Electricity	Natural Gas	Fuel Oil and Kerosene	Motor Gasoline
Average U.S. Household	**3159.07**	**1404.66**	**961.86**	**398.01**	**44.79**	**1754.41**
Households by Income Quintile						
1st	1799.40	1010.64	692.57	291.92	26.15	788.75
2nd	2705.19	1208.35	816.16	353.89	38.30	1496.83
3rd	3223.04	1362.45	948.45	365.74	48.26	1860.59
4th	3707.51	1587.62	1097.24	433.13	57.25	2119.89
5th	4442.85	1930.71	1298.60	579.92	52.19	2512.14
Households by Census Division						
New England	3436.82	1643.05	865.88	411.09	366.08	1793.77
Middle Atlantic	2981.44	1560.11	874.84	526.04	159.22	1421.34
South Atlantic	3179.85	1438.63	794.82	632.13	11.68	1741.22
East North Central	3423.80	1384.43	883.67	479.04	21.72	2039.36
East South Central	3211.53	1501.06	1223.58	261.57	15.91	1710.47
West North Central	3077.58	1366.84	1116.57	248.12	2.15	1710.75
West South Central	3261.57	1568.16	1266.32	301.72	0.12	1693.41
Mountain	3216.87	1283.36	843.33	438.81	1.22	1933.51
Pacific	2946.14	1004.04	689.25	310.46	4.33	1942.11

Source: Energy Information Administration, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table E4. 2020 Average Household Expenditures for Energy by Household Characteristic
(2002 Dollars)

Household Characteristics	Fuels					
	Total Energy	Total Home	Electricity	Natural Gas	Fuel Oil and Kerosene	Motor Gasoline
Average U.S. Household	**3214.81**	**1418.52**	**982.39**	**393.80**	**42.33**	**1796.29**
Households by Income Quintile						
1st	1831.14	1019.96	708.24	286.92	24.79	811.18
2nd	2759.03	1220.16	834.32	349.60	36.24	1538.88
3rd	3280.44	1374.39	967.38	361.41	45.60	1906.06
4th	3769.17	1603.66	1120.57	429.05	54.05	2165.52
5th	4513.41	1951.40	1325.77	576.43	49.20	2562.01
Households by Census Division						
New England	3489.08	1653.63	887.82	409.68	356.13	1835.45
Middle Atlantic	3017.77	1565.64	896.36	513.91	155.37	1452.13
South Atlantic	3197.58	1446.27	815.47	619.83	10.97	1751.31
East North Central	3464.53	1391.57	908.05	463.12	20.39	2072.96
East South Central	3281.69	1519.67	1241.51	264.20	13.96	1762.01
West North Central	3108.92	1374.35	1123.30	248.99	2.06	1734.57
West South Central	3341.49	1605.99	1311.56	294.29	0.14	1735.50
Mountain	3338.70	1304.34	851.73	451.53	1.08	2034.36
Pacific	3001.53	1014.18	693.55	316.51	4.12	1987.35

Source: Energy Information Administration, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table E5. 2025 Average Household Expenditures for Energy by Household Characteristic
(2002 Dollars)

Household Characteristics	Fuels					
	Total Energy	Total Home	Electricity	Natural Gas	Fuel Oil and Kerosene	Motor Gasoline
Average U.S. Household	**3323.87**	**1438.67**	**1007.04**	**392.62**	**39.01**	**1885.21**
Households by Income Quintile						
1st	1888.77	1033.23	726.19	284.14	22.90	855.54
2nd	2859.85	1237.51	855.78	348.33	33.40	1622.33
3rd	3394.12	1392.26	990.31	359.92	42.04	2001.85
4th	3891.76	1626.75	1148.66	428.30	49.80	2265.01
5th	4662.57	1981.95	1359.82	576.90	45.23	2680.62
Households by Census Division						
New England	3569.40	1667.51	914.70	413.85	338.97	1901.88
Middle Atlantic	3074.95	1571.60	916.50	506.78	148.32	1503.35
South Atlantic	3274.54	1461.77	839.23	612.86	9.68	1812.76
East North Central	3561.59	1411.02	936.51	456.50	18.02	2150.57
East South Central	3384.60	1539.61	1262.24	265.89	11.48	1844.99
West North Central	3166.30	1377.54	1127.50	248.12	1.92	1788.76
West South Central	3465.01	1656.66	1370.49	286.02	0.15	1808.35
Mountain	3563.66	1337.07	868.61	467.52	0.94	2226.59
Pacific	3154.51	1034.15	704.10	326.22	3.83	2120.36

Source: Energy Information Administration, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Appendix F

Results from Side Cases

Table F1. Key Results for Residential and Commercial Sector Technology Cases

Energy Consumption	2002	2010				2015			
		2004 Technology	Reference Case	High Technology	Best Available Technology	2004 Technology	Reference Case	High Technology	Best Available Technology
Residential									
Energy Consumption (quadrillion Btu)									
Distillate Fuel	0.89	0.94	0.93	0.92	0.89	0.91	0.89	0.88	0.83
Kerosene	0.07	0.11	0.11	0.11	0.10	0.11	0.11	0.11	0.10
Liquefied Petroleum Gas	0.53	0.56	0.56	0.55	0.52	0.60	0.59	0.57	0.51
Petroleum Subtotal	1.48	1.62	1.60	1.59	1.51	1.62	1.59	1.55	1.44
Natural Gas	5.06	5.72	5.69	5.67	5.07	5.90	5.84	5.74	4.78
Coal	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Renewable Energy	0.39	0.41	0.40	0.40	0.40	0.41	0.41	0.40	0.39
Electricity	4.33	4.90	4.87	4.80	4.53	5.28	5.22	5.06	4.56
Delivered Energy	**11.28**	**12.66**	**12.58**	**12.48**	**11.52**	**13.22**	**13.06**	**12.76**	**11.18**
Electricity Related Losses	9.60	10.54	10.48	10.33	9.74	11.03	10.91	10.56	9.53
Total	**20.88**	**23.21**	**23.05**	**22.80**	**21.26**	**24.25**	**23.98**	**23.32**	**20.71**
Delivered Energy Consumption per Household (million Btu per household)	**102.3**	**105.7**	**105.0**	**104.1**	**96.1**	**104.8**	**103.6**	**101.2**	**88.7**
Non-Marketed Renewables Consumption (quadrillion Btu)	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**	**0.04**	**0.04**	**0.04**	**0.03**
Commercial									
Energy Consumption (quadrillion Btu)									
Distillate Fuel	0.49	0.63	0.62	0.62	0.61	0.66	0.65	0.65	0.64
Residual Fuel	0.08	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Kerosene	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Liquefied Petroleum Gas	0.09	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	0.72	0.92	0.92	0.91	0.91	0.96	0.95	0.94	0.94
Natural Gas	3.21	3.59	3.57	3.56	3.48	3.74	3.72	3.71	3.60
Coal	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Renewable Energy	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Electricity	4.12	5.10	5.05	4.97	4.53	5.76	5.64	5.48	4.84
Delivered Energy	**8.25**	**9.81**	**9.74**	**9.64**	**9.12**	**10.66**	**10.51**	**10.32**	**9.57**
Electricity Related Losses	9.15	10.98	10.86	10.69	9.74	12.03	11.78	11.44	10.12
Total	**17.40**	**20.79**	**20.60**	**20.33**	**18.86**	**22.69**	**22.29**	**21.76**	**19.69**
Delivered Energy Consumption per Square Foot (thousand Btu per square foot)	**114.5**	**117.1**	**116.2**	**115.0**	**108.8**	**118.5**	**116.9**	**114.8**	**106.4**
Net Summer Generation Capacity (megawatts)									
Natural Gas	617	703	765	774	786	758	967	1038	1147
Solar Photovoltaic	35	258	258	285	297	284	284	452	650
Generation (billion kilowatthours)									
Natural Gas	4.45	5.06	5.51	5.58	5.66	5.46	6.98	7.50	8.29
Solar Photovoltaic	0.07	0.55	0.55	0.60	0.63	0.60	0.60	0.97	1.39
Non-Marketed Renewables (quadrillion Btu)	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2002 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, AEO2004 National Energy Modeling System, runs BLDFRZN.D102303D, BLDDEF.D102303A, BLDHIGH.D102303D, and BLDBEST.D102303D

2020				2025				Annual Growth 2002-2025			
2004 Technology	Reference Case	High Technology	Best Available Technology	2004 Technology	Reference Case	High Technology	Best Available Technology	2004 Technology	Reference Case	High Technology	Best Available Technology
0.88	0.85	0.83	0.76	0.84	0.80	0.78	0.70	-0.3%	-0.5%	-0.6%	-1.1%
0.10	0.10	0.10	0.08	0.09	0.09	0.09	0.07	1.4%	1.3%	1.2%	0.3%
0.63	0.61	0.58	0.52	0.66	0.64	0.60	0.54	1.0%	0.8%	0.6%	0.1%
1.61	1.56	1.51	1.37	1.59	1.53	1.46	1.31	0.3%	0.1%	-0.1%	-0.5%
6.17	6.08	5.92	4.81	6.37	6.27	6.04	4.87	1.0%	0.9%	0.8%	-0.2%
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-0.1%	-0.3%	-0.4%	-0.5%
0.42	0.41	0.39	0.39	0.42	0.41	0.39	0.38	0.3%	0.1%	-0.1%	-0.2%
5.66	5.60	5.34	4.66	6.06	5.96	5.64	4.85	1.5%	1.4%	1.2%	0.5%
13.87	**13.66**	**13.18**	**11.23**	**14.45**	**14.17**	**13.54**	**11.42**	**1.1%**	**1.0%**	**0.8%**	**0.1%**
11.56	11.43	10.91	9.51	12.15	11.94	11.31	9.73	1.0%	1.0%	0.7%	0.1%
25.43	**25.10**	**24.09**	**20.74**	**26.60**	**26.11**	**24.85**	**21.15**	**1.1%**	**1.0%**	**0.8%**	**0.1%**
105.0	**103.5**	**99.8**	**85.1**	**104.9**	**102.8**	**98.3**	**82.9**	**0.1%**	**0.0%**	**-0.2%**	**-0.9%**
0.04	**0.04**	**0.04**	**0.05**	**0.05**	**0.05**	**0.05**	**0.08**	**2.9%**	**3.2%**	**3.5%**	**5.2%**
0.69	0.67	0.66	0.65	0.72	0.70	0.68	0.67	1.7%	1.6%	1.5%	1.4%
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	2.2%	2.2%	2.2%	2.2%
0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	1.4%	1.4%	1.4%	1.4%
0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.3%	0.3%	0.3%	0.3%
0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.2%	0.2%	0.2%	0.2%
0.99	0.97	0.96	0.95	1.02	1.00	0.99	0.98	1.5%	1.4%	1.4%	1.3%
3.95	3.94	3.92	3.79	4.16	4.16	4.15	4.05	1.1%	1.1%	1.1%	1.0%
0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.0%	0.0%	0.0%	0.0%
0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.0%	0.0%	0.0%	0.0%
6.45	6.24	5.96	5.20	7.17	6.83	6.44	5.56	2.4%	2.2%	2.0%	1.3%
11.59	**11.34**	**11.05**	**10.15**	**12.54**	**12.19**	**11.78**	**10.79**	**1.8%**	**1.7%**	**1.6%**	**1.2%**
13.17	12.73	12.17	10.62	14.36	13.70	12.91	11.15	2.0%	1.8%	1.5%	0.9%
24.76	**24.08**	**23.22**	**20.77**	**26.90**	**25.89**	**24.69**	**21.94**	**1.9%**	**1.7%**	**1.5%**	**1.0%**
120.8	**118.3**	**115.2**	**105.8**	**123.2**	**119.7**	**115.7**	**106.0**	**0.3%**	**0.2%**	**0.0%**	**-0.3%**
806	1309	1521	1841	867	1919	2409	3822	1.5%	5.1%	6.1%	8.2%
311	434	890	1715	337	953	1800	3267	10.3%	15.4%	18.7%	21.8%
5.81	9.47	11.01	13.34	6.25	13.90	17.47	27.75	1.5%	5.1%	6.1%	8.3%
0.66	0.93	1.91	3.57	0.72	2.04	3.80	6.73	10.4%	15.5%	18.6%	21.6%
0.03	**0.03**	**0.03**	**0.04**	**0.03**	**0.03**	**0.04**	**0.05**	**1.1%**	**1.5%**	**2.1%**	**3.1%**

Table F2. Key Results for Industrial Sector Technology Cases

Consumption	2002	2010			2020			2025		
		2004 Technology	Reference Case	High Technology	2004 Technology	Reference Case	High Technology	2004 Technology	Reference Case	High Technology
Energy Consumption (quadrillion Btu)										
Distillate Fuel	1.16	1.19	1.17	1.16	1.39	1.34	1.29	1.49	1.43	1.37
Liquefied Petroleum Gas	2.22	2.40	2.35	2.32	2.85	2.74	2.64	3.07	2.94	2.83
Petrochemical Feedstocks	1.22	1.37	1.35	1.33	1.60	1.54	1.49	1.69	1.62	1.57
Residual Fuel	0.20	0.22	0.21	0.20	0.24	0.22	0.20	0.25	0.23	0.21
Motor Gasoline	0.16	0.16	0.16	0.16	0.19	0.18	0.18	0.20	0.19	0.19
Other Petroleum	4.03	4.42	4.38	4.34	5.04	4.93	4.82	5.30	5.17	5.03
Petroleum Subtotal	9.00	9.77	9.63	9.52	11.30	10.95	10.63	11.99	11.59	11.19
Natural Gas	7.43	8.94	8.62	8.47	10.57	9.84	9.20	11.42	10.58	9.74
Lease and Plant Fuel	1.35	1.40	1.40	1.40	1.65	1.65	1.65	1.69	1.69	1.69
Natural Gas Subtotal	8.78	10.34	10.02	9.88	12.22	11.49	10.85	13.11	12.27	11.43
Metallurgical Coal[1]	0.65	0.72	0.66	0.58	0.67	0.52	0.38	0.65	0.48	0.32
Steam Coal	1.47	1.43	1.41	1.39	1.50	1.45	1.39	1.53	1.47	1.40
Coal Subtotal	2.12	2.14	2.06	1.97	2.16	1.97	1.78	2.18	1.95	1.72
Renewable Energy	1.66	1.98	2.00	2.10	2.43	2.48	2.86	2.63	2.70	3.25
Electricity	3.39	3.89	3.82	3.64	4.69	4.47	4.11	5.16	4.85	4.41
Delivered Energy	**24.94**	**28.12**	**27.53**	**27.11**	**32.80**	**31.36**	**30.22**	**35.08**	**33.35**	**32.00**
Electricity Related Losses	7.53	8.37	8.22	7.83	9.57	9.12	8.39	10.34	9.72	8.84
Total	**32.47**	**36.49**	**35.75**	**34.94**	**42.37**	**40.48**	**38.61**	**45.42**	**43.07**	**40.84**
Delivered Energy Use per Dollar of Shipments (thousand Btu per 1996 dollar)	**4.72**	**4.37**	**4.28**	**4.21**	**3.93**	**3.76**	**3.62**	**3.70**	**3.51**	**3.37**
Onsite Industrial Combined Heat and Power										
Capacity (gigawatts)	19.91	24.20	24.28	26.85	29.87	30.68	36.20	32.56	34.45	40.80
Generation (billion kilowatthours)	119.26	148.84	149.23	166.76	187.92	193.26	228.93	206.59	219.49	259.07

[1]Includes net coal coke imports.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 2002 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, AEO2004 National Energy Modeling System runs INDFRZN.D102303A, AEO2004.D101703E, and INDHIGH.D102303A.

Table F3. Key Results for Transportation Sector Technology Cases

Consumption and Indicators	2002	2010			2020			2025		
		2004 Technology	Reference Case	High Technology	2004 Technology	Reference Case	High Technology	2004 Technology	Reference Case	High Technology
Energy Consumption (quadrillion Btu)										
Distillate Fuel	5.12	6.48	6.42	6.36	8.49	8.02	7.73	9.63	8.94	8.49
Jet Fuel	3.34	3.97	3.93	3.90	5.06	4.69	4.38	5.44	4.91	4.45
Motor Gasoline	16.62	19.91	19.88	19.76	23.76	23.11	22.52	26.14	24.98	24.14
Residual Fuel	0.71	0.80	0.79	0.79	0.82	0.82	0.81	0.84	0.83	0.81
Liquefied Petroleum Gas	0.02	0.06	0.06	0.06	0.08	0.08	0.07	0.09	0.08	0.08
Other Petroleum	0.24	0.25	0.25	0.25	0.30	0.30	0.30	0.32	0.32	0.32
Petroleum Subtotal	26.06	31.47	31.34	31.12	38.50	37.00	35.81	42.46	40.07	38.30
Pipeline Fuel Natural Gas	0.65	0.69	0.69	0.69	0.83	0.83	0.83	0.86	0.86	0.86
Compressed Natural Gas	0.01	0.06	0.06	0.06	0.10	0.10	0.09	0.11	0.11	0.10
Renewables (E85)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.08	0.09	0.09	0.09	0.11	0.12	0.10	0.12	0.14
Delivered Energy	**26.79**	**32.30**	**32.18**	**31.97**	**39.53**	**38.05**	**36.86**	**43.53**	**41.16**	**39.40**
Electricity Related Losses	0.17	0.18	0.19	0.20	0.19	0.22	0.24	0.20	0.24	0.27
Total	**26.96**	**32.49**	**32.37**	**32.17**	**39.72**	**38.27**	**37.10**	**43.73**	**41.41**	**39.68**
Energy Efficiency Indicators										
New Light-Duty Vehicle (miles per gallon)[1]	23.8	25.0	25.3	25.9	24.9	26.5	27.9	24.8	26.9	28.5
New Car (miles per gallon)[1]	28.2	28.3	28.8	29.9	28.6	30.4	32.1	28.5	30.8	32.7
New Light Truck (miles per gallon)[1]	20.5	22.6	22.8	23.1	22.7	24.1	25.4	22.7	24.7	26.1
Light-Duty Fleet (miles per gallon)[2]	19.7	19.6	19.6	19.7	19.9	20.5	21.2	19.8	20.9	21.8
New Commercial Light Truck (MPG)[3]	13.9	15.0	15.1	15.4	14.9	16.0	17.0	14.9	16.4	17.4
Stock Commercial Light Truck (MPG)[3]	13.8	14.4	14.5	14.5	14.9	15.5	16.0	14.9	15.9	16.7
Aircraft Efficiency (seat miles per gallon)	54.8	59.1	59.9	60.4	60.0	65.4	70.8	59.6	67.0	75.2
Freight Truck Efficiency (miles per gallon)	6.0	6.0	6.0	6.1	6.0	6.4	6.6	6.0	6.5	6.8
Rail Efficiency (ton miles per thousand Btu)	2.9	2.9	3.1	3.2	2.9	3.4	3.8	2.9	3.6	4.1
Domestic Shipping Efficiency (ton miles per thousand Btu)	2.3	2.3	2.3	2.4	2.3	2.4	2.5	2.3	2.4	2.6
Light-Duty Vehicles Less Than 8500 Pounds (vehicle miles traveled)	**2504**	**3041**	**3041**	**3044**	**3748**	**3768**	**3792**	**4132**	**4173**	**4210**

[1]Environmental Protection Agency rated miles per gallon.
[2]Combined car and light truck "on-the-road" estimate.
[3]Commercial trucks 8,500 to 10,000 pounds.
Btu = British thermal unit.
MPG = Miles per gallon.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 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, AEO2004 National Energy Modeling System runs TRNFRZN.D102403A, AEO2004.D101703E, and TRNHIGH.D102403A

Table F4. Key Results for Integrated Technology Cases

Consumption and Emissions	2002	2010			2020			2025		
		2004 Technology	Reference Case	High Technology	2004 Technology	Reference Case	High Technology	2004 Technology	Reference Case	High Technology
Consumption by Sector (quadrillion Btu)										
Residential	20.9	23.1	23.1	22.8	25.4	25.1	24.1	26.6	26.1	24.7
Commercial	17.4	20.7	20.6	20.4	24.7	24.1	23.3	26.9	25.9	24.5
Industrial	32.5	36.5	35.7	34.9	42.6	40.5	38.4	45.8	43.1	40.3
Transportation	27.0	32.5	32.4	32.2	39.8	38.3	37.1	43.8	41.4	39.7
Total	**97.7**	**112.9**	**111.8**	**110.3**	**132.5**	**127.9**	**122.9**	**143.0**	**136.5**	**129.2**
Consumption by Fuel (quadrillion Btu)										
Petroleum Products	38.1	44.5	44.1	43.7	53.5	51.4	49.6	58.0	55.0	52.7
Natural Gas	23.4	27.4	26.8	26.3	32.6	31.2	30.1	33.3	32.2	31.6
Coal	22.2	25.4	25.2	24.5	29.4	28.3	25.5	34.4	31.7	26.5
Nuclear Power	8.1	8.3	8.3	8.3	8.5	8.5	8.5	8.5	8.5	8.5
Renewable Energy	5.8	7.1	7.2	7.4	8.3	8.5	9.2	8.7	9.0	9.9
Other	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0
Total	**97.7**	**112.9**	**111.8**	**110.3**	**132.5**	**127.9**	**122.9**	**143.0**	**136.5**	**129.2**
Energy Intensity (thousand Btu per 1996 dollar of GDP)	**10.4**	**9.3**	**9.2**	**9.1**	**8.2**	**7.9**	**7.6**	**7.7**	**7.4**	**7.0**
Carbon Dioxide Emissions by Sector (million metric tons)										
Residential	1189.0	1324.4	1317.2	1295.3	1478.1	1449.2	1354.5	1601.7	1543.0	1393.0
Commercial	1009.1	1212.8	1202.5	1179.2	1476.6	1422.9	1332.4	1669.5	1570.1	1412.3
Industrial	1670.6	1834.3	1789.6	1729.5	2137.1	2003.6	1836.0	2335.7	2149.5	1908.9
Transportation	1860.6	2258.5	2249.5	2234.3	2764.6	2659.9	2574.8	3046.7	2879.5	2758.3
Total	**5729.3**	**6630.0**	**6558.8**	**6438.3**	**7856.4**	**7535.6**	**7097.6**	**8653.6**	**8142.0**	**7472.5**
Carbon Dioxide Emissions by End-Use Fuel (million metric tons)										
Petroleum	2380.5	2750.7	2735.2	2714.0	3301.3	3176.2	3070.3	3603.9	3410.9	3264.3
Natural Gas	904.4	1069.5	1050.7	1041.8	1223.3	1176.8	1131.1	1293.5	1240.8	1171.6
Coal	195.4	209.7	202.4	194.2	211.4	193.6	176.4	213.6	191.4	171.1
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity	2249.0	2600.2	2570.6	2488.2	3120.4	2989.0	2719.8	3542.5	3299.0	2865.4
Total	**5729.3**	**6630.0**	**6558.8**	**6438.3**	**7856.4**	**7535.6**	**7097.6**	**8653.6**	**8142.0**	**7472.5**
Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)										
Petroleum	72.2	58.3	51.0	45.2	81.9	65.2	55.7	66.6	61.6	60.4
Natural Gas	299.1	370.6	358.5	337.6	490.1	463.3	449.5	456.4	451.6	487.4
Coal	1877.8	2171.2	2161.2	2105.4	2548.4	2460.5	2214.6	3019.6	2785.8	2317.7
Total	**2249.0**	**2600.2**	**2570.6**	**2488.2**	**3120.4**	**2989.0**	**2719.8**	**3542.5**	**3299.0**	**2865.4**
Carbon Dioxide Emissions by Primary Fuel (million metric tons)										
Petroleum	2452.7	2809.0	2786.1	2759.3	3383.2	3241.4	3126.0	3670.5	3472.5	3324.7
Natural Gas	1203.4	1440.1	1409.2	1379.4	1713.4	1640.1	1580.6	1749.9	1692.4	1659.0
Coal	2073.2	2380.9	2363.6	2299.6	2759.8	2654.1	2391.1	3233.2	2977.1	2488.8
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**5729.4**	**6630.0**	**6558.8**	**6438.3**	**7856.4**	**7535.6**	**7097.6**	**8653.6**	**8142.0**	**7472.5**

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 2002 are model results and may differ slightly from official EIA data reports.
Source: Energy Information Administration, AEO2004 National Energy Modeling System runs LTRKITEN.D102303A, AEO2004.D101703E, and HTRKITEN.D103103A.

Table F5. Key Results for Advanced Nuclear Cost Case
(Gigawatts, Unless Otherwise Noted)

Net Summer Capacity, Generation, Emissions, and Fuel Prices	2002	2010			2020			2025		
		Reference Case	Vendor Estimates	AP1000	Reference Case	Vendor Estimates	AP1000	Reference Case	Vendor Estimates	AP 1000
Capacity										
Coal Steam	310.9	310.3	310.3	310.2	353.5	354.0	354.1	412.3	402.9	393.5
Other Fossil Steam	133.6	106.1	106.0	106.0	101.1	100.2	100.3	96.5	96.5	96.0
Combined Cycle	110.5	160.0	159.9	160.0	217.3	215.6	213.7	235.2	232.6	232.0
Combustion Turbine/Diesel	128.8	136.5	136.6	136.6	169.2	166.6	167.4	180.4	182.0	181.3
Nuclear Power	98.7	100.6	100.6	100.6	102.6	106.9	106.9	102.6	115.4	128.4
Pumped Storage	20.2	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3
Fuel Cells	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Renewable Sources	91.7	97.4	97.4	97.4	105.9	103.9	104.7	110.1	106.5	106.1
Distributed Generation (Natural Gas)	0.0	0.5	0.4	0.4	7.6	7.6	7.5	12.4	13.3	13.1
Combined Heat and Power[1]	26.6	33.1	33.1	33.1	42.1	42.0	41.9	47.4	47.2	47.2
Total	**921.1**	**964.7**	**964.6**	**964.7**	**1119.7**	**1117.1**	**1116.9**	**1217.3**	**1216.8**	**1217.9**
Cumulative Additions										
Coal Steam	0.0	6.8	6.8	6.8	51.9	52.3	52.4	111.8	102.3	93.0
Other Fossil Steam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combined Cycle	0.0	50.1	50.0	50.1	107.4	105.7	103.8	125.3	122.7	122.1
Combustion Turbine/Diesel	0.0	18.5	18.6	18.6	54.1	51.3	52.1	67.1	69.5	68.8
Nuclear Power	0.0	0.0	0.0	0.0	0.0	4.3	4.3	0.0	12.8	25.8
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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Renewable Sources	0.0	5.5	5.4	5.5	14.0	11.9	12.8	18.2	14.6	14.1
Distributed Generation	0.0	0.5	0.4	0.4	7.6	7.6	7.5	12.4	13.3	13.1
Combined Heat and Power[1]	0.0	6.5	6.5	6.5	15.5	15.4	15.4	20.9	20.7	20.7
Total	**0.0**	**87.9**	**87.8**	**87.9**	**250.5**	**248.6**	**248.3**	**355.7**	**355.9**	**357.6**
Cumulative Retirements	**0.0**	**44.6**	**44.7**	**44.6**	**54.2**	**54.9**	**54.8**	**61.8**	**62.5**	**63.1**
Generation by Fuel (billion kilowatthours)										
Coal	1907	2235	2234	2234	2593	2592	2592	3008	2935	2862
Petroleum	83	63	64	63	85	84	84	80	76	76
Natural Gas	598	816	816	816	1131	1112	1110	1117	1115	1104
Nuclear Power	780	794	794	794	816	848	848	816	913	1002
Pumped Storage	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
Renewable Sources	309	405	405	405	446	439	442	464	450	448
Distributed Generation	0	0	0	0	3	3	3	5	6	6
Combined Heat and Power[1]	161	207	207	206	270	269	269	305	304	304
Total	**3829**	**4510**	**4510**	**4510**	**5335**	**5337**	**5337**	**5787**	**5789**	**5792**
Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)[2]										
Petroleum	72.2	51.0	51.4	51.0	65.2	64.7	64.6	61.6	59.5	59.1
Natural Gas	299.1	358.5	358.3	358.5	463.3	456.8	456.5	451.6	451.9	447.7
Coal	1877.8	2161.2	2160.8	2160.4	2460.5	2458.5	2458.1	2785.8	2727.5	2669.1
Total	**2249.0**	**2570.6**	**2570.5**	**2569.9**	**2989.0**	**2980.0**	**2979.3**	**3299.0**	**3238.9**	**3176.0**
Prices to the Electric Power Sector[2] (2002 dollars per million Btu)										
Petroleum	4.32	4.21	4.20	4.21	4.67	4.66	4.67	4.88	4.83	4.87
Natural Gas	3.77	4.04	4.04	4.04	4.85	4.79	4.78	4.92	4.95	4.93
Coal	1.26	1.22	1.23	1.22	1.20	1.20	1.19	1.22	1.20	1.18

[1]Includes 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.

[2]Includes 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 2002 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2004 National Energy Modeling System runs AEO2004.D101703E, ADVNUC3A.D102803A, and ADVNUC5A.D102803A.

Table F6. Key Results for High Electricity Demand Case

Net Summer Capacity, Generation, Consumption, Emissions, and Prices	2002	2010		2020		2025		Annual Growth 2002-2025	
		Reference Case	High Demand	Reference Case	High Demand	Reference Case	High Demand	Reference Case	High Demand
Electricity Sales (billion kilowatthours)	**3492**	**4055**	**4296**	**4811**	**5480**	**5207**	**6149**	**1.8%**	**2.5%**
Electricity Prices (2002 cents per kilowatthour)	**7.2**	**6.6**	**6.8**	**6.9**	**7.1**	**6.9**	**7.1**	**-0.2%**	**-0.1%**
Capacity (gigawatts)									
Coal Steam	310.9	310.3	314.9	353.5	405.7	412.3	498.1	1.2%	2.1%
Other Fossil Steam	133.6	106.1	116.0	101.1	112.0	96.5	110.5	-1.4%	-0.8%
Combined Cycle	110.5	160.0	181.0	217.3	274.1	235.2	293.5	3.3%	4.3%
Combustion Turbine/Diesel	128.8	136.5	149.0	169.2	192.3	180.4	219.5	1.5%	2.3%
Nuclear Power	98.7	100.6	100.6	102.6	102.6	102.6	102.6	0.2%	0.2%
Fuel Cells	0.0	0.1	0.1	0.1	0.1	0.1	0.1	N/A	N/A
Renewable Sources/Pumped Storage	111.9	117.7	121.4	126.3	134.7	130.5	144.1	0.7%	1.1%
Distributed Generation	0.0	0.5	1.0	7.6	14.3	12.4	23.0	N/A	N/A
Combined Heat and Power[1]	26.6	33.1	33.1	42.1	42.2	47.4	47.7	2.6%	2.6%
Total	**921.1**	**964.7**	**1017.0**	**1119.7**	**1277.8**	**1217.3**	**1438.9**	**1.2%**	**2.0%**
Cumulative Additions (gigawatts)									
Coal Steam	0.0	6.8	11.4	51.9	104.0	111.8	197.5	N/A	N/A
Other Fossil Steam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A	N/A
Combined Cycle	0.0	50.1	70.7	107.4	163.8	125.3	183.5	N/A	N/A
Combustion Turbine/Diesel	0.0	18.5	29.8	54.1	77.3	67.1	105.1	N/A	N/A
Nuclear Power	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A	N/A
Fuel Cells	0.0	0.1	0.1	0.1	0.1	0.1	0.1	N/A	N/A
Renewable Sources/Pumped Storage	0.0	5.5	9.1	14.0	22.4	18.2	31.8	N/A	N/A
Distributed Generation	0.0	0.5	1.0	7.6	14.3	12.4	23.0	N/A	N/A
Combined Heat and Power[1]	0.0	6.5	6.6	15.5	15.6	20.9	21.1	N/A	N/A
Total	**0.0**	**87.9**	**128.5**	**250.5**	**397.4**	**355.7**	**562.1**	**N/A**	**N/A**
Generation by Fuel (billion kilowatthours)									
Coal	1907	2235	2295	2593	2987	3008	3644	2.0%	2.9%
Petroleum	83	63	82	85	121	80	125	-0.2%	1.8%
Natural Gas	598	816	974	1131	1372	1117	1362	2.8%	3.6%
Nuclear Power	780	794	794	816	816	816	816	0.2%	0.2%
Renewable Sources/Pumped Storage	300	395	409	437	469	455	519	1.8%	2.4%
Distributed Generation	0	0	0	3	6	5	10	N/A	N/A
Combined Heat and Power[1]	161	207	207	270	271	305	307	2.8%	2.8%
Total	**3829**	**4510**	**4762**	**5335**	**6042**	**5787**	**6784**	**1.8%**	**2.5%**
Fossil Fuel Consumption by the Electric Power Sector (quadrillion Btu)[2]									
Petroleum	0.85	0.66	0.84	0.85	1.15	0.81	1.18	-0.2%	1.4%
Natural Gas	5.65	6.79	7.93	8.78	10.27	8.55	10.12	1.8%	2.6%
Coal	19.96	23.05	23.67	26.22	29.49	29.67	34.71	1.7%	2.4%
Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)[2]									
Petroleum	72.2	51.0	63.9	65.2	86.6	61.6	88.7	-0.7%	0.9%
Natural Gas	299.1	358.5	418.5	463.3	542.1	451.6	534.6	1.8%	2.6%
Coal	1877.8	2161.2	2218.4	2460.5	2768.0	2785.8	3260.7	1.7%	2.4%
Total	**2249.0**	**2570.6**	**2700.8**	**2989.0**	**3396.7**	**3299.0**	**3883.9**	**1.7%**	**2.4%**
Prices to the Electric Power Sector [2] (2002 dollars per million Btu)									
Petroleum	4.32	4.21	4.26	4.67	4.86	4.88	5.11	0.5%	0.7%
Natural Gas	3.77	4.04	4.26	4.85	5.08	4.92	5.30	1.2%	1.5%
Coal	1.26	1.22	1.24	1.20	1.26	1.22	1.29	-0.1%	0.1%

[1]Includes 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.

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

Btu = British thermal unit.

N/A = not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports. Other includes non-coal fossil steam, pumped storage, methane, propane and blast furnace gas. Side case was run without the fully integrated modeling system, so not all potential feedbacks were captured.

Source: Energy Information Administration, AEO2004 National Energy Modeling System runs AEO2004.D101703E and HDEM04.D101903A

Table F7. Key Results for Electric Power Sector Fossil Technology Cases
(Gigawatts, Unless Otherwise Noted)

Net Summer Capacity, Generation Consumption, and Emissions	2002	2010				2025			
		Low Fossil	Reference Case	High Fossil	DOE Fossil Goals	Low Fossil	Reference Case	High Fossil	DOE Fossil Goals
Capacity									
Pulverized Coal	310.4	309.8	309.8	307.4	307.5	425.5	405.5	328.5	304.6
Coal Gasification Combined-Cycle	0.5	0.5	0.5	0.5	2.0	0.9	6.8	26.2	90.3
Conventional Natural Gas Combined-Cycle	110.5	154.4	153.6	153.4	153.4	191.9	154.6	153.4	153.2
Advanced Natural Gas Combined-Cycle	0.0	2.6	6.4	13.4	12.6	9.0	80.6	189.6	162.7
Conventional Combustion Turbine	128.8	134.4	133.4	130.7	131.3	185.5	153.3	128.2	129.2
Advanced Combustion Turbine	0.0	3.3	3.1	2.0	2.4	10.7	27.1	18.2	15.1
Fuel Cells	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Nuclear	98.7	100.6	100.6	100.6	100.6	102.6	102.6	102.6	102.6
Oil and Gas Steam	133.6	108.0	106.1	104.2	104.3	98.9	96.5	92.4	85.2
Renewable Sources/Pumped Storage	111.9	119.4	117.7	117.8	117.9	135.7	130.5	125.6	121.0
Distributed Generation	0.0	0.5	0.5	0.4	0.4	15.6	12.4	5.6	4.4
Combined Heat and Power[1]	26.6	33.1	33.1	33.1	33.1	47.5	47.4	47.3	46.8
Total	**921.1**	**966.5**	**964.7**	**963.5**	**965.4**	**1223.7**	**1217.3**	**1217.7**	**1215.4**
Cumulative Additions									
Pulverized Coal	0.0	6.8	6.8	4.5	4.6	125.4	105.5	28.5	4.6
Coal Gasification Combined-Cycle	0.0	0.0	0.0	0.0	1.5	0.4	6.3	25.7	89.8
Conventional Natural Gas Combined-Cycle	0.0	44.5	43.7	43.5	43.5	82.0	44.7	43.5	43.5
Advanced Natural Gas Combined-Cycle	0.0	2.6	6.4	13.4	12.6	9.0	80.6	189.6	162.7
Conventional Combustion Turbine	0.0	16.4	15.5	13.1	13.6	72.6	40.0	16.7	18.3
Advanced Combustion Turbine	0.0	3.3	3.1	2.0	2.4	10.7	27.1	18.2	15.1
Fuel Cells	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oil and Gas Steam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Renewable Sources	0.0	7.1	5.5	5.5	5.6	23.4	18.2	13.4	8.8
Distributed Generation	0.0	0.5	0.5	0.4	0.4	15.6	12.4	5.6	4.4
Combined Heat and Power[1]	0.0	6.5	6.5	6.5	6.5	20.9	20.9	20.7	20.3
Total	**0.0**	**87.7**	**87.9**	**88.9**	**90.6**	**360.0**	**355.7**	**361.8**	**367.5**
Cumulative Retirements	**0.0**	**42.6**	**44.6**	**46.8**	**46.6**	**59.8**	**61.8**	**67.6**	**75.6**
Generation by Fuel (billion kilowatthours)									
Coal	1906.9	2234.8	2234.5	2217.4	2228.6	3100.2	3007.9	2614.6	2896.5
Petroleum	83.1	64.8	63.4	60.1	60.4	73.8	79.9	113.4	69.0
Natural Gas	598.1	808.7	816.4	836.8	825.2	1009.1	1117.5	1499.4	1287.6
Nuclear Power	780.1	794.3	794.3	794.3	794.3	816.5	816.5	816.5	816.5
Renewable Sources/Pumped Storage	300.1	400.7	395.1	395.6	395.5	476.7	455.0	437.0	414.1
Distributed Generation	0.0	0.2	0.2	0.2	0.2	6.8	5.4	2.4	1.9
Combined Heat and Power[1]	161.1	206.5	206.5	206.4	206.4	305.6	305.1	303.4	300.3
Total	**3829.4**	**4510.2**	**4510.5**	**4510.8**	**4510.7**	**5788.7**	**5787.3**	**5786.7**	**5785.9**
Fuel Consumption by the Electric Power Sector (quadrillion Btu)[2]									
Coal	19.96	23.06	23.05	22.90	22.98	30.51	29.67	26.02	26.99
Petroleum	0.85	0.68	0.66	0.63	0.64	0.78	0.81	0.99	0.66
Natural Gas	5.65	6.79	6.79	6.82	6.74	8.25	8.55	9.96	8.17
Nuclear Power	8.15	8.29	8.29	8.29	8.29	8.53	8.53	8.53	8.53
Renewable Sources	3.69	4.73	4.68	4.70	4.68	6.04	5.79	5.57	5.17
Total	**38.29**	**43.55**	**43.48**	**43.35**	**43.34**	**54.10**	**53.35**	**51.05**	**49.52**
Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)[2]									
Petroleum	72.2	52.1	51.0	48.4	48.8	59.5	61.6	74.2	50.0
Natural Gas	299.1	358.3	358.5	360.1	356.1	435.4	451.6	525.8	431.5
Coal	1877.8	2161.7	2161.2	2146.9	2154.3	2865.0	2785.8	2440.7	2532.7
Total	**2249.0**	**2572.1**	**2570.6**	**2555.5**	**2559.1**	**3359.9**	**3299.0**	**3040.8**	**3014.2**

[1]Includes 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.

[2]Includes 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 2002 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.

Source: Energy Information Administration, AEO2004 National Energy Modeling System runs LFOSS04.D101903A, AEO2004.D101703E, HFOSS10.D102103A, and HFOSS04.D101903A.

Table F8. Key Results for High Renewable Energy Case

Capacity, Generation, and Emissions	2002	2010				2025			
		Low Renewables	Reference Case	High Renewables	DOE Renewable Goals	Low Renewables	Reference Case	High Renewables	DOE Renewable Goals
Renewable Capacity (gigawatts) Net Summer Capacity									
Electric Power Sector[1]									
Conventional Hydropower	78.29	78.69	78.69	78.69	78.69	78.68	78.68	78.68	78.68
Geothermal[2]	2.89	3.82	4.01	3.69	3.71	5.89	6.84	8.62	12.48
Municipal Solid Waste[3]	3.49	3.92	3.92	3.89	3.89	3.95	3.95	3.95	3.95
Wood and Other Biomass[4]	1.83	2.14	2.20	2.14	2.14	2.14	3.74	5.90	2.54
Solar Thermal	0.33	0.43	0.43	0.43	0.43	0.52	0.52	0.52	0.52
Solar Photovoltaic	0.02	0.15	0.15	0.15	0.15	0.41	0.41	0.41	0.41
Wind	4.83	7.89	8.01	7.83	9.79	10.79	15.99	35.35	80.83
Total	**91.69**	**97.04**	**97.42**	**96.82**	**98.80**	**102.38**	**110.13**	**133.43**	**179.41**
Combined Heat and Power[5]									
Municipal Solid Waste	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Wood and Other Biomass	3.91	5.31	5.36	5.81	5.81	7.81	8.03	10.31	10.31
Total	**4.16**	**5.56**	**5.61**	**6.06**	**6.06**	**8.06**	**8.29**	**10.57**	**10.57**
Other End-Use Generators[6]									
Conventional Hydropower	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solar Photovoltaic	0.04	0.39	0.39	0.41	0.42	0.50	1.13	2.28	8.52
Total	**1.06**	**1.41**	**1.41**	**1.44**	**1.45**	**1.52**	**2.15**	**3.31**	**9.55**
Generation (billion kilowatthours)									
Electric Power Sector[1]									
Coal	1875	2197	2201	2153	2154	2990	2975	2907	2702
Petroleum	77	62	62	73	74	76	77	78	71
Natural Gas	450	648	642	668	659	987	969	927	941
Total Fossil	**2401**	**2908**	**2906**	**2895**	**2887**	**4053**	**4021**	**3912**	**3715**
Conventional Hydropower	255.78	304.38	304.37	304.37	304.37	304.80	304.80	304.80	304.81
Geothermal	13.36	21.69	23.25	20.79	20.93	38.84	46.66	61.10	90.33
Municipal Solid Waste[3]	20.02	28.11	28.11	27.90	27.88	28.50	28.50	28.49	28.50
Wood and Other Biomass[4]	8.67	23.40	23.53	24.21	24.30	22.19	29.16	39.33	25.52
Dedicated Plants	6.32	13.01	13.26	12.99	13.04	12.99	22.90	35.62	15.61
Cofiring	2.35	10.39	10.26	11.21	11.25	9.20	6.25	3.71	9.92
Solar Thermal	0.54	0.84	0.84	0.84	0.93	1.11	1.11	1.11	1.41
Solar Photovoltaic	0.00	0.36	0.36	0.36	0.36	1.02	1.02	1.02	1.02
Wind	10.51	23.62	24.07	23.43	30.95	33.66	53.16	130.11	330.98
Total Renewable	**308.87**	**402.39**	**404.52**	**401.90**	**409.72**	**430.12**	**464.40**	**565.95**	**782.56**
Combined Heat and Power[5]									
Total Fossil	**111**	**142**	**142**	**143**	**143**	**221**	**220**	**217**	**207**
Municipal Solid Waste	1.84	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
Wood and Other Biomass	28.16	36.34	36.63	39.28	39.27	50.93	52.26	65.57	65.57
Total Renewables	**30.00**	**38.44**	**38.73**	**41.38**	**41.37**	**53.03**	**54.36**	**67.67**	**67.67**
Other End-Use Generators[6]									
Conventional Hydropower[7]	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11	4.11
Geothermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solar Photovoltaic	0.09	0.82	0.82	0.88	0.91	1.07	2.42	4.86	17.47
Total	**4.20**	**4.93**	**4.93**	**4.99**	**5.02**	**5.18**	**6.53**	**8.97**	**21.58**
Sources of Ethanol									
From Corn	0.17	0.29	0.29	0.28	0.28	0.31	0.31	0.27	0.27
From Cellulose	0.00	0.00	0.00	0.01	0.01	0.05	0.05	0.09	0.09
Total	**0.17**	**0.29**	**0.29**	**0.29**	**0.29**	**0.35**	**0.35**	**0.36**	**0.36**
Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)[1]									
Petroleum	72.2	50.8	51.0	59.5	59.7	60.7	61.6	61.9	57.9
Natural Gas	299.1	360.5	358.5	386.6	382.7	459.5	451.6	438.3	437.7
Coal	1877.8	2157.8	2161.2	2118.0	2118.6	2798.0	2785.8	2709.5	2564.5
Total	**2249.0**	**2569.1**	**2570.6**	**2564.2**	**2560.9**	**3318.2**	**3299.0**	**3209.8**	**3060.1**

[1]Includes electricity-only and combined heat and power plants whose primary business is to sell electricity, or electricity and heat, to the public.
[2]Includes hydrothermal resources only (hot water and steam).
[3]Includes landfill gas.
[4]Includes projections for energy crops after 2010.
[5]Includes combined heat and power plants and electricity-only plants in the commercial and industrial sectors.
[6]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.
[7]Represents own-use industrial hydroelectric power.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Source: Energy Information Administration, AEO2004 National Energy Modeling System runs LORENEW04.D102703B, AEO2004.D101703E, HIREN1004.D103103A, and EERE04.D103103A.

Table F9. Total Energy Supply and Disposition Summary, Oil and Gas Technological Progress Cases

(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2002	2010			2020			2025		
		Slow Technology Progress	Reference Case	Rapid Technology Progress	Slow Technology Progress	Reference Case	Rapid Technology Progress	Slow Technology Progress	Reference Case	Rapid Technology Progress
Production										
Crude Oil and Lease Condensate	11.91	12.46	12.56	12.67	10.02	10.49	11.07	8.99	9.77	10.28
Natural Gas Plant Liquids	2.56	3.06	3.10	3.19	3.29	3.47	3.79	3.23	3.47	3.88
Dry Natural Gas	19.56	20.76	21.05	21.75	23.10	24.43	27.10	22.79	24.64	28.21
Coal	22.70	25.28	25.25	25.13	28.47	27.92	27.21	31.97	31.10	29.51
Nuclear Power	8.15	8.29	8.29	8.29	8.53	8.53	8.53	8.53	8.53	8.53
Renewable Energy[1]	5.84	7.23	7.18	7.23	8.46	8.45	8.32	9.00	9.00	8.82
Other[2]	1.13	0.87	0.88	0.89	0.81	0.81	0.81	0.84	0.84	0.84
Total	**71.85**	**77.95**	**78.30**	**79.16**	**82.68**	**84.09**	**86.82**	**85.35**	**87.33**	**90.06**
Imports										
Crude Oil[3]	19.84	24.68	24.51	24.37	32.06	31.55	30.68	35.23	34.21	33.29
Petroleum Products[4]	4.75	5.83	5.76	5.61	8.20	7.83	7.43	10.19	9.63	9.21
Natural Gas	4.10	6.47	6.54	6.22	7.69	7.56	6.94	8.01	8.29	7.90
Other Imports[5]	0.52	0.95	0.95	0.95	1.11	1.12	1.11	1.17	1.18	1.18
Total	**29.21**	**37.93**	**37.76**	**37.14**	**49.06**	**48.06**	**46.16**	**54.60**	**53.30**	**51.59**
Exports										
Petroleum[6]	2.03	2.14	2.15	2.14	2.12	2.13	2.16	2.17	2.15	2.17
Natural Gas	0.52	0.89	0.91	0.93	0.83	0.93	1.08	0.66	0.88	1.24
Coal	1.03	0.89	0.89	0.89	0.69	0.69	0.74	0.64	0.56	0.58
Total	**3.58**	**3.93**	**3.95**	**3.96**	**3.64**	**3.75**	**3.97**	**3.47**	**3.59**	**3.98**
Consumption										
Petroleum Products[7]	38.11	44.24	44.15	44.08	51.56	51.35	50.99	55.51	54.99	54.63
Natural Gas	23.37	26.47	26.82	27.18	30.11	31.21	33.10	30.26	32.21	35.01
Coal	22.18	25.26	25.23	25.11	28.86	28.30	27.56	32.52	31.73	30.13
Nuclear Power	8.15	8.29	8.29	8.29	8.53	8.53	8.53	8.53	8.53	8.53
Renewable Energy[1]	5.84	7.23	7.18	7.23	8.46	8.46	8.32	9.00	9.00	8.82
Other[8]	0.07	0.11	0.11	0.11	0.07	0.07	0.06	0.02	0.03	0.03
Total	**97.72**	**111.60**	**111.77**	**112.00**	**127.59**	**127.92**	**128.54**	**135.84**	**136.48**	**137.14**
Net Imports - Petroleum	**22.56**	**28.38**	**28.13**	**27.83**	**38.14**	**37.25**	**35.95**	**43.26**	**41.69**	**40.34**
Prices (2002 dollars per unit)										
World Oil Price (dollars per barrel)[9]	23.68	24.17	24.17	24.17	26.02	26.02	26.02	27.00	27.00	27.00
Natural Gas Wellhead Price (dollars per thousand cubic feet)[10]	2.95	3.58	3.40	3.25	4.54	4.28	3.56	5.10	4.40	3.80
Coal Minemouth Price (dollars per ton)	17.90	16.95	16.88	16.81	16.55	16.32	16.12	16.80	16.57	16.39
Average Electricity Price (cents per kilowatthour)	7.2	6.7	6.6	6.6	7.0	6.9	6.6	7.1	6.9	6.6
Carbon Dioxide Emissions (million metric tons)	**5729.4**	**6550.3**	**6558.8**	**6560.6**	**7546.5**	**7535.6**	**7536.4**	**8152.2**	**8142.0**	**8110.5**

[1]Includes 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.
[2]Includes liquid hydrogen, methanol, supplemental natural gas, and some domestic inputs to refineries.
[3]Includes imports of crude oil for the Strategic Petroleum Reserve.
[4]Includes imports of finished petroleum products, unfinished oils, alcohols, ethers, and blending components.
[5]Includes coal, coal coke (net), and electricity (net).
[6]Includes crude oil and petroleum products.
[7]Includes natural gas plant liquids, crude oil consumed as a fuel, and nonpetroleum-based liquids for blending, such as ethanol.
[8]Includes net electricity imports, methanol, and liquid hydrogen.
[9]Average refiner acquisition cost for imported crude oil.
[10]Represents lower 48 onshore and offshore supplies.
Btu = British thermal unit.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 natural gas supply values: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2002 petroleum supply values: *EIA, Petroleum Supply Annual 2002*, DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). 2002 carbon dioxide emission values: EIA, *Emissions of Greenhouse Gases in the United States 2002*, DOE/EIA-0573(2002) (Washington, DC, October 2003). Other 2002 values: *EIA,Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002) and *EIA,Quarterly Coal Report*, October-December 2002, DOE/EIA-0121(2002/4Q) (Washington, DC, March 2003). **Projections:** EIA, AEO2004 National Energy Modeling System runs OGLTEC04.D102103A, AEO2004.D101703E, and OGHTEC04.D102003B.

Table F10. Natural Gas Supply and Disposition, Oil and Gas Technological Progress Cases
(Trillion Cubic Feet per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	2002	2010			2020			2025		
		Slow Technology Progress	Reference Case	Rapid Technology Progress	Slow Technology Progress	Reference Case	Rapid Technology Progress	Slow Technology Progress	Reference Case	Rapid Technology Progress
Lower 48 Average Wellhead Price (2002 dollars per thousand cubic feet)	**2.95**	**3.58**	**3.40**	**3.25**	**4.54**	**4.28**	**3.56**	**5.10**	**4.40**	**3.80**
Dry Gas Production[1]										
U.S. Total	**19.05**	**20.21**	**20.50**	**21.18**	**22.49**	**23.79**	**26.39**	**22.19**	**23.99**	**27.46**
Lower 48 Onshore	13.76	14.34	14.48	14.89	15.62	16.41	18.68	15.20	16.26	19.98
Associated-Dissolved	1.60	1.42	1.41	1.39	1.22	1.23	1.25	1.14	1.17	1.20
Non-Associated	12.16	12.92	13.08	13.50	14.41	15.18	17.43	14.06	15.09	18.78
Conventional	6.23	5.89	5.80	5.92	5.83	6.07	5.96	5.65	5.92	5.84
Unconventional	5.93	7.03	7.28	7.58	8.58	9.11	11.47	8.41	9.16	12.94
Lower 48 Offshore	4.86	5.28	5.41	5.69	4.58	5.09	5.42	4.29	5.03	5.16
Associated-Dissolved	1.05	1.56	1.61	1.66	1.25	1.34	1.49	1.12	1.43	1.54
Non-Associated	3.81	3.72	3.80	4.03	3.33	3.75	3.93	3.16	3.60	3.62
Alaska	0.43	0.60	0.60	0.60	2.29	2.29	2.29	2.71	2.71	2.33
Supplemental Natural Gas[2]	**0.08**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**
Net Imports	**3.49**	**5.44**	**5.50**	**5.17**	**6.70**	**6.47**	**5.72**	**7.18**	**7.24**	**6.50**
Canada	3.59	3.47	3.68	3.89	2.03	2.51	2.84	1.56	2.56	3.24
Mexico	-0.26	-0.32	-0.34	-0.36	-0.08	-0.18	-0.32	0.15	-0.12	-0.48
Liquefied Natural Gas	0.17	2.29	2.16	1.63	4.74	4.14	3.20	5.46	4.80	3.75
Total Supply	**22.62**	**25.75**	**26.09**	**26.44**	**29.29**	**30.36**	**32.20**	**29.46**	**31.33**	**34.06**
Consumption by Sector										
Residential	4.92	5.50	5.53	5.57	5.86	5.92	6.03	6.00	6.09	6.27
Commercial	3.12	3.45	3.48	3.51	3.77	3.83	3.94	3.94	4.04	4.22
Industrial[3]	7.23	8.32	8.39	8.44	9.46	9.57	9.88	10.02	10.29	10.64
Electric Generators[4]	5.55	6.46	6.66	6.84	7.86	8.61	9.74	7.09	8.39	10.20
Transportation[5]	0.01	0.06	0.06	0.06	0.10	0.10	0.10	0.11	0.11	0.11
Pipeline Fuel	0.63	0.66	0.67	0.69	0.77	0.81	0.88	0.77	0.84	0.92
Lease and Plant Fuel[6]	1.32	1.35	1.36	1.39	1.54	1.61	1.71	1.56	1.65	1.78
Total	**22.78**	**25.81**	**26.15**	**26.51**	**29.36**	**30.44**	**32.28**	**29.50**	**31.41**	**34.15**
Gas to Liquids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discrepancy[7]	**-0.16**	**-0.06**	**-0.06**	**-0.06**	**-0.08**	**-0.08**	**-0.08**	**-0.04**	**-0.09**	**-0.09**
Lower 48 End of Year Reserves	**180.03**	**193.63**	**201.20**	**212.12**	**185.12**	**200.97**	**239.47**	**171.76**	**193.51**	**238.82**

[1]Marketed production (wet) minus extraction losses.
[2]Synthetic 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.
[3]Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.
[4]Includes 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. Includes small power producers and exempt wholesale generators.
[5]Compressed natural gas used as vehicle fuel.
[6]Represents natural gas used in the field gathering and processing plant machinery.
[7]Balancing 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, 2001 values include net storage injections.
Btu = British thermal unit.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 supply values: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2003/06) (Washington, DC, June 2003). 2002 consumption based on: EIA, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). **Projections:** EIA, AEO2004 National Energy Modeling System runs OGLTEC04.D102103A, AEO2004.D101703E, and OGHTEC04.D102003B.

Table F11. Crude Oil Supply and Disposition, Oil and Gas Technological Progress Cases
(Million Barrels per Day, Unless Otherwise Noted)

Supply, Disposition, and Prices	2002	2010			2020			2025		
		Slow Technology Progress	Reference Case	Rapid Technology Progress	Slow Technology Progress	Reference Case	Rapid Technology Progress	Slow Technology Progress	Reference Case	Rapid Technology Progress
World Oil Price (2002 dollars per barrel)	**23.68**	**24.17**	**24.17**	**24.17**	**26.02**	**26.02**	**26.02**	**27.00**	**27.00**	**27.00**
Production[1]										
U.S. Total	**5.62**	**5.88**	**5.93**	**5.98**	**4.73**	**4.95**	**5.23**	**4.25**	**4.61**	**4.85**
Lower 48 Onshore	3.11	2.65	2.61	2.57	2.18	2.20	2.22	2.00	2.04	2.09
Lower 48 Offshore	1.53	2.32	2.40	2.49	1.86	2.03	2.28	1.75	2.06	2.25
Alaska	0.98	0.92	0.92	0.93	0.69	0.72	0.73	0.50	0.51	0.51
Net Crude Imports	**9.13**	**11.30**	**11.21**	**11.15**	**14.74**	**14.50**	**14.08**	**16.22**	**15.74**	**15.31**
Other Crude Supply	**0.07**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total Crude Supply	**14.83**	**17.18**	**17.15**	**17.13**	**19.48**	**19.45**	**19.31**	**20.47**	**20.35**	**20.16**
Natural Gas Plant Liquids	**1.88**	**2.22**	**2.24**	**2.31**	**2.35**	**2.48**	**2.69**	**2.30**	**2.47**	**2.74**
Other Inputs[2]	**0.67**	**0.47**	**0.47**	**0.48**	**0.46**	**0.46**	**0.46**	**0.47**	**0.48**	**0.48**
Refinery Processing Gain[3]	**0.98**	**0.88**	**0.88**	**0.88**	**1.01**	**1.00**	**1.00**	**1.04**	**1.04**	**1.03**
Net Product Imports[4]	**1.41**	**1.99**	**1.95**	**1.88**	**3.19**	**2.99**	**2.76**	**4.22**	**3.94**	**3.70**
Total Primary Supply[5]	**19.77**	**22.73**	**22.69**	**22.66**	**26.47**	**26.38**	**26.22**	**28.50**	**28.27**	**28.11**
Refined Petroleum Products Supplied										
Residential and Commercial	1.22	1.38	1.38	1.37	1.41	1.40	1.39	1.41	1.40	1.38
Industrial[6]	4.80	5.14	5.14	5.13	5.86	5.86	5.79	6.23	6.21	6.15
Transportation	13.21	15.90	15.91	15.92	18.76	18.77	18.80	20.31	20.32	20.36
Electric Generators[7]	0.38	0.34	0.29	0.26	0.48	0.38	0.27	0.59	0.36	0.24
Total	**19.61**	**22.75**	**22.71**	**22.68**	**26.51**	**26.41**	**26.25**	**28.54**	**28.30**	**28.13**
Discrepancy[8]	**0.16**	**-0.02**	**-0.02**	**-0.02**	**-0.04**	**-0.04**	**-0.02**	**-0.04**	**-0.03**	**-0.03**
Lower 48 End of Year Reserves (billion barrels)[1]	**19.05**	**18.73**	**18.36**	**18.03**	**16.19**	**16.20**	**16.23**	**14.84**	**14.98**	**15.04**

[1]Includes lease condensate.
[2]Includes 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.
[3]Represents volumetric gain in refinery distillation and cracking processes.
[4]Includes net imports of finished petroleum products, unfinished oils, other hydrocarbons, alcohols, ethers, and blending components.
[5]Total crude supply plus natural gas plant liquids, other inputs, refinery processing gain, and net product imports.
[6]Includes consumption for combined heat and power, which produces electricity and other useful thermal energy.
[7]Includes 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. Includes small power producers and exempt wholesale generators.
[8]Balancing item. Includes unaccounted for supply, losses and gains.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Sources: 2002 product supplied data based on: Energy Information Administration (EIA), *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002). Other 2002 data: EIA, *Petroleum Supply Annual 2002,* DOE/EIA-0340(2002)/1 (Washington, DC, June 2003). **Projections:** EIA, AEO2004 National Energy Modeling System runs OGLTEC04.D102103A, AEO2004.D101703E, and OGHTEC04.D102003B.

Table F12. Key Results for Coal Mining Cost Cases

Prices, Productivity, Wages, and Emissions	2002	2010			2020			2025		
		Low Cost	Reference Case	High Cost	Low Cost	Reference Case	High Cost	Low Cost	Reference Case	High Cost
Minemouth Price (2002 dollars per short ton)	**17.90**	**15.68**	**16.88**	**18.28**	**13.87**	**16.32**	**19.67**	**13.27**	**16.57**	**21.45**
Delivered Price to Electric Generators (2002 dollars per million Btu)	**1.26**	**1.16**	**1.22**	**1.29**	**1.07**	**1.20**	**1.36**	**1.04**	**1.22**	**1.44**
Labor Productivity (short tons per miner per hour)	**6.80**	**8.54**	**7.59**	**6.75**	**11.30**	**8.57**	**6.27**	**13.10**	**9.19**	**5.94**
Labor Productivity (average annual growth from 2002)	**0.00**	**2.89**	**1.38**	**-0.09**	**2.86**	**1.29**	**-0.45**	**2.89**	**1.32**	**-0.59**
Average Coal Miner Wage (2002 dollars per hour)	**19.64**	**18.87**	**19.64**	**20.44**	**17.95**	**19.64**	**21.48**	**17.50**	**19.64**	**22.03**
Average Coal Miner Wage (average annual growth from 2002)	**0.00**	**-0.50**	**0.00**	**0.50**	**-0.50**	**0.00**	**0.50**	**-0.50**	**0.00**	**0.50**
Carbon Dioxide Emissions by the Electric Power Sector (million metric tons)[1]										
Petroleum	72.2	50.5	51.0	50.9	55.7	65.2	76.7	60.0	61.6	79.2
Natural Gas	299.1	359.3	358.5	365.2	425.3	463.3	503.3	419.9	451.6	509.8
Coal	1877.8	2165.1	2161.2	2134.6	2592.7	2460.5	2304.2	2901.8	2785.8	2520.1
Total	**2249.0**	**2574.8**	**2570.6**	**2550.7**	**3073.7**	**2989.0**	**2884.2**	**3381.8**	**3299.0**	**3109.1**
Electric Power Sector Capacity [1] (gigawatts)										
Coal	310.9	310.5	310.3	306.8	378.2	353.5	326.3	434.0	412.3	364.7
Other	583.6	618.6	621.4	621.9	699.8	724.2	750.4	741.5	757.6	813.8
Total	**894.5**	**929.1**	**931.7**	**928.7**	**1078.0**	**1077.7**	**1076.7**	**1175.6**	**1169.9**	**1178.5**

[1]Includes 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.
N/A = Not applicable.
Note: Totals may not equal sum of components due to independent rounding. Data for 2002 are model results and may differ slightly from official EIA data reports.
Source: Energy Information Administration, AEO2004 National Energy Modeling System runs LMCST04.D102303A, AEO2004.D101703E, and HMCST04.D102303A.

Appendix G

Major Assumptions for the Forecasts

The National Energy Modeling System

The projections in the *Annual Energy Outlook 2004* (*AEO2004*) are generated from the National Energy Modeling System (NEMS), 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 and other offices within the Department of Energy. The *AEO* forecasts 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 midterm period, approximately 20 years into the future. In order to represent the 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 aggregations of 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 prices of fuel 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 availability.

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, permitting 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 midterm horizon. Other variables are also evaluated for convergence, such as petroleum product imports, crude oil imports, and several macroeconomic indicators.

Each NEMS component also 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 September 1, 2003, such as the Clean Air Act Amendments of 1990 (CAAA90), and the costs of compliance with other regulations, such as the new Corporate Average Fuel Economy rule for light-duty trucks, which was formally announced on April 1, 2003, and published in the *Federal Register* on April 7, 2003.

In general, the historical data used for the *AEO2004* projections were based on EIA's *Annual Energy Review 2002*, published in October 2003 [*1*]; however, data were taken from multiple sources. In some cases, only partial or preliminary data were available for 2002. Carbon dioxide emissions were calculated by using carbon dioxide coefficients from the EIA report, *Emissions of Greenhouse Gases in the United States 2002*, published in October 2003 [*2*].

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 forecasts. For example, the transportation demand sector in *AEO2004* 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 all historical data.

The *AEO2004* projections for 2003 and 2004 incorporate short-term projections from EIA's September

and October 2003 *Short-Term Energy Outlook* (*STEO*). For short-term energy projections, readers are referred to the monthly updates of the *STEO* [*3*].

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 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, and employment. This module uses the following Global Insight models: Macroeconomic Model of the U.S. Economy, National Industrial Shipments Model, National Employment Model, and the Regional Disaggregation Model for macroeconomic drivers. In addition, EIA has constructed a Commercial Floorspace Model to forecast 13 floorspace types in 9 Census divisions.

International Energy Module

The International Energy Module represents the world oil markets, calculating the average world oil price and computing supply curves for five categories of imported crude oil for the Petroleum Market Module (PMM) of NEMS, in response to changes in U.S. import requirements. Fourteen international petroleum product supply curves, including curves for oxygenates, are also calculated and provided to the PMM.

Household Expenditures Module

The Household Expenditures Module provides estimates of average household direct expenditures for energy used in the home and in private motor vehicle transportation. The forecasts of expenditures reflect the projections from NEMS for the residential and transportation sectors. The projected household energy expenditures incorporate the changes in residential energy prices and motor gasoline price determined in NEMS, as well as changes in the efficiency of energy use for residential end uses and in light-duty vehicle fuel efficiency. Estimates of average expenditures for households are provided by income group and Census division.

Residential and Commercial Demand Modules

The Residential Demand Module forecasts consumption of residential sector energy 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 forecasts consumption of commercial sector energy by building types 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 module incorporates combined heat and power (CHP) technology. Both modules include a forecast of distributed generation.

Industrial Demand Module

The Industrial Demand Module forecasts 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. The industries are classified into three groups—energy-intensive, non-energy-intensive, and nonmanufacturing. Of the eight energy-intensive industries, seven are modeled in the Industrial Demand Module, with components for boiler/steam/cogeneration, buildings, and process/assembly use of energy. A representation of cogeneration and a recycling component are also included. The use of energy for petroleum refining is modeled in the Petroleum Market Module, and the projected consumption is included in the industrial totals.

Transportation Demand Module

The Transportation Demand Module forecasts consumption of transportation sector fuels, 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 CAAA90 and other legislative proposals, and the

module includes a component to explicitly assess the penetration of alternative-fuel vehicles. The air transportation module was substantially revamped for *AEO2004*. The model represents the industry practice of parking aircraft to reduce operating costs and the movement of aircraft from the passenger to cargo markets as aircraft age [*4*]. For air freight shipments, the model employs narrow-body and wide-body aircraft only. The model also uses an infrastructure constraint that limits air travel growth to levels commensurate with industry-projected infrastructure expansion and capacity growth.

Electricity Market Module

The Electricity Market Module models 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 fuel cost of uranium fuel for nuclear generation is directly incorporated into the Electricity Market Module.

All specifically identified CAAA90 compliance options that have been promulgated by the U.S. Environmental Protection Agency (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). 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 *AEO2004*.

Renewable Fuels Module

The Renewable Fuels Module (RFM) includes submodules representing natural resource supply and technology input information for central-station, grid-connected electricity generation technologies, including biomass (wood, energy crops, and biomass co-firing), geothermal, landfill gas, solar thermal, solar photovoltaics, and wind energy. The RFM contains natural resource supply estimates representing the regional opportunities for renewable energy development. Conventional hydroelectricity is represented in the Electricity Market Module (EMM). Investment tax credits for renewable fuels are incorporated, as currently legislated in the Energy Policy Act of 1992 [*5*]. They provide a 10-percent tax credit for business investment in solar energy (thermal nonpower uses as well as power uses) and geothermal power. The credits have no expiration date.

Oil and Gas Supply Module

The Oil and Gas Supply Module models domestic crude oil and natural gas supply within an integrated framework that captures the interrelationships between the various sources of supply: onshore, offshore, and Alaska by both conventional and nonconventional techniques, including 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 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 PMM 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 gas supply, liquefaction, transportation, regasification, and 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 and storage capacity expansion requirements. Peak and off-peak periods are represented for natural gas transmission, and core and noncore markets are represented at the burner tip. Key components of pipeline and distributor tariffs are included in the pricing algorithms.

Petroleum Market Module

The Petroleum Market Module (PMM) forecasts 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 fuels. The module represents refining activities for five regions—Petroleum Administration for Defense Districts (PADD) 1 through 5. The module uses the same crude oil types as the International Energy Module. It explicitly models the requirements of CAAA90 and the costs of automotive fuels, such as oxygenated and reformulated gasoline, and includes oxygenate production and blending for reformulated gasoline. *AEO2004* reflects legislation that bans or limits the use of the gasoline blending component methyl tertiary butyl ether (MTBE) in the next several years in California, Colorado, Connecticut, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, New York, Ohio, South Dakota, Washington, and Wisconsin [*6*].

The Federal oxygen requirement for reformulated gasoline in Federal nonattainment areas is assumed to remain intact. The "Tier 2" regulation that requires the nationwide phase-in of gasoline with a greatly reduced annual average sulfur content between 2004 and 2007 and the diesel regulation that significantly limits the sulfur content of all highway diesel fuel produced after June 1, 2006, are represented in *AEO2004*. Costs of the regulation include capacity expansion for refinery-processing units based on a 10-percent hurdle rate and a 10-percent after-tax return on investment [*7*]. End-use prices are based on the marginal costs of production, plus markups representing product and distribution costs, and State and Federal taxes. Refinery capacity expansion at existing sites may occur in all five refining regions modeled.

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. The coal supply curves include a response to capacity utilization of mines, mining capacity, fuel costs, labor productivity, and factor input costs (mining equipment, mining labor, and fuel requirements). Twelve coal types are represented—differentiated by coal rank, sulfur content, and mining process. Production and distribution are computed for 11 supply and 14 demand regions, using imputed coal transportation costs and trends in factor input costs. The CMM also forecasts the requirements for U.S. coal exports and imports. The international coal market component of the module computes trade in 3 types of coal for 16 export and 20 import regions. Both the domestic and international coal markets are simulated in a linear program.

Major Assumptions for the *Annual Energy Outlook 2004*

Table G1 provides a summary of the cases used to derive the *AEO2004* forecasts. 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.

Assumptions for domestic macroeconomic activity are presented in the "Market Trends" section. The resulting GDP growth rates between 2002 and 2025 in the three macroeconomic growth cases are 2.4, 3.0, and 3.5 percent per year in the low economic growth, reference and high economic growth cases, respectively. The following section describes the key regulatory, programmatic, and resource assumptions that factor into the projections. More detailed assumptions for each sector are available 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/.

World Oil Market Assumptions

World oil price. The world oil price is the annual average U.S. refiner's acquisition cost of imported crude oil. Three distinct world oil price scenarios are represented in *AEO2004*, reaching $17, $27, and $35 per barrel in 2025, respectively, in the low world oil price, reference, and high world oil price cases in 2002 dollars. The reference case represents EIA's current judgment regarding the expected behavior of the

Table G1. Summary of the *AEO2004* cases

Case name	Description	Integration mode	Reference in text	Reference in Appendix G
Reference	Baseline economic growth, world oil price, and technology assumptions.	Fully integrated	—	—
Low Economic Growth	Gross domestic product grows at an average annual rate of 2.4 percent from 2002 through 2025, compared to the reference case growth of 3.0 percent.	Fully integrated	p. 67	—
High Economic Growth	Gross domestic product grows at an average annual rate of 3.5 percent from 2002 through 2025, compared to the reference case growth of 3.0 percent.	Fully integrated	p. 67	—
Low World Oil Price	World oil prices are $19.04 per barrel in 2025, compared to $26.57 per barrel in the reference case.	Fully integrated	p. 68	—
High World Oil Price	World oil prices are $33.05 per barrel in 2025, compared to $26.57 per barrel in the reference case.	Fully integrated	p. 68	—
Residential: 2004 Technology	Future equipment purchases based on equipment available in 2004. Existing building shell efficiencies fixed at 2004 levels.	With commercial	p. 77	p. 244
Residential: High Technology	Earlier availability, lower costs, and higher efficiencies assumed for more advanced equipment. Heating shell efficiency increases by 13 percent from 2001 values by 2025.	With commercial	p. 77	p. 244
Residential: Best Available Technology	Future equipment purchases and new building shells based on most efficient technologies available. Heating shell efficiency increases by 18 percent from 2001 values by 2025.	With commercial	p. 77	p. 244
Commercial: 2004 Technology	Future equipment purchases based on equipment available in 2004. Building shell efficiencies fixed at 2004 levels.	With residential	p. 78	p. 245
Commercial: High Technology	Earlier availability, lower costs, and higher efficiencies assumed for more advanced equipment. Heating shell efficiencies for new and existing buildings increase by 8.75 and 6.25 percent, respectively, from 1999 values by 2025.	With residential	p. 78	p. 245
Commercial: Best Available Technology	Future equipment purchases based on most efficient technologies available. Heating shell efficiencies for new and existing buildings increase by 10.5 and 7.5 percent, respectively, from 1999 values by 2025.	With residential	p. 78	p. 245
Industrial: 2004 Technology	Efficiency of plant and equipment fixed at 2004 levels.	Standalone	p. 79	p. 246
Industrial: High Technology	Earlier availability, lower costs, and higher efficiencies assumed for more advanced equipment.	Standalone	p. 79	p. 246
Transportation: 2004 Technology	Efficiencies for new equipment in all modes of travel are fixed at 2004 levels.	Standalone	p. 79	p. 248
Transportation: High Technology	Reduced costs and improved efficiencies are assumed for advanced technologies.	Standalone	p. 79	p. 248
Integrated 2004 Technology	Combination of the residential, commercial, industrial, and transportation 2004 technology cases, electricity low fossil technology case, and assumption of renewable technologies fixed at 2004 levels.	Fully integrated	p. 104	—
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.	Fully integrated	p. 104	—

Table G1. Summary of the *AEO2004* cases (continued)

Case name	Description	Integration mode	Reference in text	Reference in Appendix G
Electricity: Advanced Nuclear Cost	New nuclear capacity is assumed to have 10 percent lower capital and operating costs in 2025 than in the reference case.	Fully integrated	p. 87	p. 250
Electricity: Nuclear AP1000 Case	New nuclear capacity is assumed to have lower capital costs, based on vendor goals for the AP1000 reactor.	Fully integrated	p. 87	p. 250
Electricity: Nuclear Vendor Estimate Case	New nuclear capacity is assumed to have lower capital costs, based on vendor goals for the AP1000 and CANDU reactors.	Fully integrated	p. 58	p. 250
Electricity: High Demand	Electricity demand increases at an annual rate of 2.5 percent, compared to 1.8 percent in the reference case.	Partially integrated	p. 88	p. 251
Electricity: Low Fossil Technology	New advanced fossil generating technologies are assumed not to improve over time from 2004.	Partially integrated	p. 87	p. 251
Electricity: High Fossil Technology	Costs and efficiencies for advanced fossil-fired generating technologies improve by 10 percent in 2025 from reference case values.	Partially integrated	p. 87	p. 251
Electricity: DOE Fossil Goals	Costs and/or efficiencies for advanced fossil-fired generating technologies improve from reference case values, based on Department goals.	Partially integrated	p. 87	p. 252
Renewables: Low Renewables	New renewable generating technologies are assumed not to improve over time from 2004.	Fully Integrated	p. 86	p. 254
Renewables: High Renewables	Levelized cost of energy for nonhydropower renewable generating technologies declines by 10 percent in 2025 from reference case values.	Fully Integrated	p. 86	p. 253
Renewables: DOE Goals	Lower costs and higher efficiencies for central-station renewable generating technologies and for distributed photovoltaics, approximating U.S. Department of Energy goals for 2025. Includes greater improvements in residential and commercial photovoltaic systems, more rapid improvement in recovery of industrial biomass byproducts, and more rapid improvement in cellulosic ethanol production technology.	Fully integrated	p. 86	p. 254
Oil and Gas: Slow Technology	Cost, finding rate, and success rate parameters adjusted for 50-percent slower improvement than in the reference case.	Fully integrated	p. 91	p. 254
Oil and Gas: Rapid Technology	Cost, finding rate, and success rate parameters adjusted for 50-percent more rapid improvement than in the reference case.	Fully integrated	p. 91	p. 254
Coal: Low Mining Cost	Productivity increases at an annual rate of 2.9 percent, compared to the reference case growth of 1.3 percent. Real wages and real mine equipment costs decrease by 0.5 percent annually, compared to constant real wages and equipment costs in the reference case.	Fully integrated	p. 100	p. 258
Coal: High Mining Cost	Productivity decreases at an annual rate of 0.6 percent, compared to the reference case growth of 1.3 percent. Real wages and real mine equipment costs increase by 0.5 percent annually, compared to constant real wages and equipment costs in the reference case.	Fully integrated	p. 100	p. 258

Organization of Petroleum Exporting Countries (OPEC) in the mid-term, where production is adjusted to keep world oil prices in the $22 to $28 per barrel range. Since OPEC, particularly the Persian Gulf nations, is expected to be the dominant supplier of oil in the international market over the mid-term, the organization's production choices will significantly affect world oil prices. The low world oil price case could result from a future market where all oil production becomes more competitive and plentiful. The high price case could result from a more cohesive and market-assertive OPEC with lower production goals and other nonfinancial (geopolitical) considerations.

World oil demand. Demand outside the United States is assumed to be for total petroleum with no specificity as to individual refined products or sectors of the economy. The forecast of petroleum demand within a region uses a Koyck-lag formulation and is a function of world oil price and GDP. Estimates of regional GDPs are from EIA's *International Energy Outlook 2003*.

World oil supply. Supply outside the United States is assumed to be total liquids and includes production of crude oils (including lease condensates), natural gas plant liquids, other hydrogen and hydrocarbons for refinery feedstocks, refinery gains, alcohol, and liquids produced from coal and other sources. The forecast of oil supply is a function of the world oil price, estimates of proved oil reserves, estimates of ultimately recoverable oil resources, and technological improvements that affect exploration, recovery, and cost. Estimates of proved oil reserves are provided by the *Oil & Gas Journal* [*8*] and represent country-level assessments as of January 1, 2003. Estimates of ultimately recoverable oil resources are provided by the United States Geological Survey (USGS) [*9*] and are part of its "Worldwide Petroleum Assessment 2000." Technology factors are derived from the DESTINY forecast software [*10*] and are a part of the International Energy Services of Petroconsultants, Inc.

Buildings sector assumptions

The buildings sector includes both residential and commercial structures and commercial nonbuilding applications. The National Appliance Energy Conservation Act of 1987 (NAECA) and the Energy Policy Act of 1992 (EPACT), both of which are incorporated in *AEO2004*, contain provisions that affect future buildings sector energy use. The most significant are minimum equipment efficiency standards, which require that new heating, cooling, and other specified energy-using equipment meet minimum energy efficiency levels, which change over time. The manufacture of equipment that does not meet the standards is prohibited. Federal mandates, such as Executive Order 13123, "Greening the Government Through Efficient Energy Management" (signed in June 1999) and Executive Order 13221, "Energy-Efficient Standby Power Devices" (signed in July 2001), are expected to affect future energy use in Federal buildings.

Residential sector assumptions. The NAECA minimum standards [*11*] for the major types of equipment in the residential sector are:

- Central air conditioners and heat pumps—a 10.0 minimum seasonal energy efficiency ratio for 1992, increasing to 12.0 in 2006
- Room air conditioners—an 8.7 energy efficiency ratio in 1990, raised to 9.7 in 2003
- Gas/oil furnaces—a 0.78 annual fuel utilization efficiency in 1992
- Refrigerators—a standard of 976 kilowatthours per year in 1990, 691 kilowatthours per year in 1993, and 483 kilowatthours per year in 2002
- Electric water heaters—a 0.88 energy factor in 1990, increasing to 0.90 in 2004
- Natural gas water heaters—a 0.54 energy factor in 1990, raised to 0.59 in 2004.

The *AEO2004* version of the NEMS Residential Demand Module is based on EIA's 2001 Residential Energy Consumption Survey (RECS) [*12*]. This survey provides most of the housing stock characteristics, appliance stock information (equipment type and fuel), and energy consumption estimates used to initialize the residential module. The projected effects of equipment turnover and the choice of various levels of equipment energy efficiency are based on tradeoffs between higher equipment costs for the more efficient equipment versus lower annual energy costs. Equipment characterizations range from minimum efficiency standards to the best available equipment with the highest energy efficiency. These characterizations include equipment made available through various green programs, such as the EPA's Energy Star Programs [*13*].

A combined heating, ventilation, and air conditioning (HVAC)/shell module is used to model building shells in new construction. The module combines specific

heating and cooling equipment with appropriate levels of shell efficiency to represent the least expensive ways to meet selected overall efficiency levels. The levels include:

- The current average new house, defined by the post-1990 housing stock in RECS 2001 and data obtained from results of the 2002 McGraw-Hill Dodge Survey of New Home Builders
- The International Energy Conservation Code (IECC 2000)
- Energy Star Homes using upgraded HVAC equipment and/or shell integrity (combined energy requirements for HVAC must be 30 percent lower than IECC 2000)
- The PATH home (Partnership for Advancing Technology in Housing) [*14*]
- A shell intermediate to Energy Star and PATH set to save 40 percent of HVAC energy.

Similar to the choice of end-use equipment, the choice of HVAC/shell efficiency level among the available alternatives is based on a tradeoff between estimated higher initial capital costs for the more efficient combinations and lower estimated annual energy costs.

In addition to the *AEO2004* reference case, three cases using the Residential and Commercial Demand Modules of NEMS were developed to examine the effects of equipment and building shell efficiencies. For the residential sector:

- The *2004 technology case* assumes that all future equipment purchases are based only on the range of equipment available in 2004. Existing building shell efficiencies are assumed to be fixed at 2004 levels.
- The *high technology case* assumes earlier availability, lower costs, and higher efficiencies for more advanced equipment [*15*]. Heating shell efficiency is projected to increase by 13 percent over 2001 levels by 2025.
- 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. Heating shell efficiency is projected to increase by 18 percent over 2001 levels by 2025.

Commercial sector assumptions. The definition of the commercial sector for *AEO2004* is based on building characteristics and energy consumption data from the 1999 Commercial Buildings Energy Consumption Survey (CBECS) [*16*]. Minimum equipment efficiency standards for the commercial sector are mandated in the EPACT legislation [*17*]. Minimum standards for representative equipment types are:

- Small central air conditioning heat pumps—a 9.7 seasonal energy efficiency rating (January 1994)
- Natural-gas-fired forced-air furnaces—a 0.8 thermal efficiency standard (January 1994)
- Natural-gas-fired storage water heaters—a 0.80 thermal efficiency standard (October 2003)
- Fluorescent lamps—a 75.0 lumens per watt lighting efficacy standard for 4-foot F40T12 lamps (November 1995) and an 80.0 lumens per watt efficacy standard for 8-foot F96T12 lamps (May 1994) [*18*]
- Fluorescent lamp ballasts—a standard mandating electronic ballasts with a 1.17 ballast efficacy factor for 4-foot ballasts holding two F40T12 lamps and a 0.63 ballast efficacy for 8-foot ballasts holding two F96T12 lamps (April 2005 for new lighting systems, June 2010 for replacement ballasts).

Improvements to existing building shells are based on assumed annual efficiency increases. New building shell efficiencies relative to the efficiencies of existing construction vary for each of the 11 building types. The effects of shell improvements are modeled differentially for heating and cooling. For space heating, existing and new shells improve by 5 percent and 7 percent, respectively, by 2025 relative to the 1999 averages.

Among the energy efficiency programs recognized in the *AEO2004* reference case are the expansion of the EPA Energy Star Buildings program and improvements to building shells from advanced insulation methods and technologies. The EPA green programs are designed to facilitate cost-effective retrofitting of equipment by providing participants with information and analysis as well as participation recognition. Retrofitting behavior is captured in the commercial module through discount parameters for controlling cost-based equipment retrofit decisions in various market segments. To model programs that target particular end uses, the *AEO2004* version of the commercial module includes end-use-specific segmentation of discount rates. Federal buildings are assumed to participate in energy efficiency programs and to use the 10-year Treasury Bond rate as a discount rate in

making equipment purchase decisions, pursuant to the directives in Executive Order 13123.

In addition to the *AEO2004* reference case, three cases using the Residential and Commercial Demand Modules of NEMS were developed to examine the effects of equipment and building shell efficiencies. For the commercial sector:

- The *2004 technology case* assumes that all future equipment purchases are based only on the range of equipment available in 2004. Building shell efficiencies are assumed to be fixed at 2004 levels.
- The *high technology case* assumes earlier availability, lower costs, and/or higher efficiencies for more advanced equipment than the reference case [*19*]. Heating shell efficiencies for new and existing buildings are assumed to increase by 8.75 and 6.25 percent, respectively, from 1999 values by 2025—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 in the high technology case, regardless of cost. Heating shell efficiencies for new and existing buildings are assumed to increase by 10.5 and 7.5 percent, respectively, from 1999 values by 2025—a 50-percent improvement relative to the reference case.

Buildings renewable energy. The forecast for wood consumption in the residential sector is based on the RECS. The RECS data provide a benchmark for British thermal units (Btu) of wood energy use in 2001. Wood consumption is then computed by multiplying the number of homes that use wood for main and secondary space heating by the amount of wood used. Ground source (geothermal) heat pump energy consumption is also based on the latest RECS; however, the measure of geothermal energy consumption is represented by the amount of primary energy displaced by using a geothermal heat pump in place of an electric resistance furnace. Residential and commercial solar thermal energy consumption for water heating is represented by displaced primary energy relative to an electric water heater. Residential and commercial solar photovoltaic systems are discussed in the distributed generation section that follows.

Buildings distributed generation. Distributed generation includes photovoltaics and fuel cells for both the residential and commercial sectors, as well as microturbines and conventional combined heat and power technologies for the commercial sector. The forecast of distributed generation is developed on the basis of economic returns projected for investments in distributed generation technologies. The model uses a detailed cash-flow approach for each technology to estimate the number of years required to achieve a cumulative positive cash flow (although some technologies may never achieve a cumulative positive cash flow). Penetration rates are estimated by Census division and building type and vary by building vintage (newly constructed versus existing floorspace).

For purchases not related to specific programs, penetration rates are determined by the number of years required for an investment to show a positive economic return: the more quickly costs are recovered, the higher the technology penetration rate. Solar photovoltaic technology specifications for the residential and commercial sectors are based on a study published in June 2003 [*20*]. Program-driven installations of photovoltaic systems are based on information from DOE's Photovoltaic and Million Solar Roofs programs, as well as DOE and industry news releases and the National Renewable Energy Laboratory's Renewable Electric Plant Information System [*21*]. The program-driven installations incorporate some of the non-economic considerations and local incentives that are not captured in the cash flow model.

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 2025 that are approximately 10 percent lower than reference case costs for distributed photovoltaic technologies, and these costs are used in the integrated high renewables case, which focuses on electricity generation. A second, alternative high renewables case, the *DOE goals case*, was completed using assumptions that result in capital cost estimates for 2020 that approximate DOE's Office of Energy Efficiency and Renewable Energy technology characterizations for distributed photovoltaic technologies [*22*]. Like the high renewables case, the DOE goals case focuses on electricity generation.

Industrial Sector Assumptions

The manufacturing portion of the Industrial Demand Module is calibrated to EIA's 1998 Manufacturing

Energy Consumption Survey [*23*]. The nonmanufacturing portion of the module is based on information from EIA, the U.S. Department of Agriculture, and the U.S. Census Bureau [*24*]. EPACT sets efficiency standards for coke ovens and for boilers, furnaces, and electric motors. CAAA90 sets emissions limits for criteria air pollutants. The electric motor standards in EPACT set minimum efficiency levels for all motors up to 200 horsepower purchased after 1998 [*25*]. It has been estimated that electric motors account for about 60 percent of industrial process electricity use [*26*].

The industrial model includes a motor stock model for the Food, Bulk Chemicals, Metal-Based Durables, and Balance of Manufacturing sectors. When new motors are purchased, either an EPACT minimum efficiency motor or a premium efficiency motor is installed, depending on prevailing electricity prices. For *AEO2004*, the motor stock model was modified to include an explicit economic choice on whether to replace or repair motors when they fail. The cost and performance characteristics of the motor options have been updated based on the Motor Master + 4.0 database [*27*]. Combined heat and power (CHP), the simultaneous generation of electricity and useful steam, has been a standard practice in the industrial sector for many years. A separate model within NEMS evaluates additions to natural-gas-fired CHP, based on technical potential and prevailing electricity and natural gas prices. The cost and performance characteristics for CHP systems have also been updated for *AEO2004*.

High technology, 2004 technology, and high renewables cases. The *high technology case* assumes earlier availability, lower costs, and higher efficiency for more advanced equipment [*28*]. The high technology case also assumes a more rapid rate of improvement in the recovery of biomass byproducts from industrial processes, at 1.0 percent per year as compared with 0.1 percent per year in the reference case. The same assumption is also incorporated in the integrated high renewable case, which focuses on electricity generation. While the choice of 1 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, primary energy intensity falls by 1.5 percent annually in the high technology case. In the reference case, primary energy intensity falls by 1.3 percent annually between 2002 and 2025.

The *2004 technology case* holds the energy efficiency of plant and equipment constant at the 2004 level over the forecast. In this case, primary energy intensity falls by 1.1 percent annually. Because the level and composition of industrial output are the same in the reference, high technology, and 2004 technology cases, any change in primary energy intensity in the two technology cases is attributable to efficiency changes. Both cases were run with only the Industrial Demand Module rather than as fully integrated NEMS runs. Consequently, no potential feedback effects from energy market interactions were captured.

Transportation Sector Assumptions

The transportation sector accounts for two-thirds of the Nation's oil use and has been subject to regulations for many years. The Corporate Average Fuel Economy (CAFE) standards, which mandate average miles-per-gallon standards for manufacturers, continue to be widely debated. The *AEO2004* projections assume that there will be no further increase in the CAFE standard from the current 27.5 miles per gallon standard for automobiles. The CAFE standard for light trucks was increased in *AEO2004* from 20.7 miles per gallon to 21.0 miles per gallon in 2005, 21.6 miles per gallon in 2006, and 22.2 miles per gallon in 2007, where it remains constant through the projection period. This is consistent with the new Federal CAFE standard for light trucks promulgated in April 2003 and the overall policy that only current legislation is assumed in the *AEO*.

EPACT requires that centrally fueled light-duty fleet operators—Federal and State governments and fuel providers (e.g., natural gas and electric utilities)—purchase a minimum fraction of alternative-fuel vehicles [*29*]. The legislation requires that alternative-fuel vehicles make up 75 percent of Federal and State fleet purchases in 2002. *AEO2004* assumes that they remain at that level through 2005. The municipal and private business fleet mandates, which were proposed to begin in 2003 at 20 percent and scale up to 70 percent by 2005 but were never adopted, are not included in *AEO2004*.

In addition to the EPACT requirements, the sale of zero-emission vehicles (ZEVs) required by the State of California's Low Emission Vehicle Program (LEVP) is also included in the forecast. In 1998, California modified those requirements so that 60 percent of the ZEV mandate could be met by credits earned from the sales of advanced technology vehicles, depending on their degree of similarity to electric vehicles. The remaining 40 percent of the ZEV mandate was to be achieved through the sales of "true ZEVs," which include only electric and hydrogen fuel cell vehicles [*30*]. In December 2001, further modifications were enacted that maintained progress toward the 2003 goal while recognizing technology and cost limitations on ZEV product offerings. Those modifications removed ZEV sales requirements before 2003 but maintained the 2003 required sales goal of 10 percent and required a gradual increase in ZEV sales to 16 percent by 2018.

Additional sales credits were given for the sale of true ZEVs, and partial credits were allowed for advanced technology vehicles and certain alternative-fuel vehicles. The number of vehicles included in the estimation of required ZEV sales was also increased to include light-duty and medium-duty trucks. Auto manufacturers filed a Federal suit in California in 2002 arguing that the revisions to the ZEV program are preempted by the Federal fuel economy statute of the Energy Policy and Conservation Act of 1975. In June 2002, a Federal judge granted a preliminary injunction preventing the California Air Resources Board from enforcing the ZEV regulations for model year 2003 and 2004 vehicles.

In April 2003, the California Air Resources Board proposed amendments to the LEVP in response to the Federal suit filed by auto manufacturers [*31*]. As a result of the proposed amendments, the auto manufacturers agreed to settle litigation with the California Air Resources Board and have indicated initial agreement with the proposed amendments. The amendments place a greater emphasis on emissions reductions from partial zero emission vehicles (PZEVs) and advanced technology partial emission vehicles (AT-PZEVs), and require that manufacturers produce a minimum number of electric and fuel cell vehicles. Credits earned from the sales of PZEVs can be used to meet up to 60 percent of the ZEV sales requirement and credits earned from AT-PZEVs can be used to meet up to 20 percent of the requirement. PZEVs and AT-PZEVs are allowed 0.2 credits per vehicle. The *AEO2004* projections assume that California, Massachusetts, New York, Maine, and Vermont will formally begin implementing the LEVP mandates in 2005.

Technology choice. Conventional light-duty (less than 8,500 pounds gross vehicle weight) vehicle technologies are chosen by consumers and penetrate the market based on the assumption of cost-effectiveness, which compares the capital cost to the discounted stream of fuel savings from the technology. There are approximately 63 fuel-saving technologies, which vary by capital cost, date of availability, marginal fuel efficiency improvement, and marginal horsepower effect [*32*]. The projections assume that the regulations for alternative-fuel and advanced technology vehicles represent minimum requirements for alternative-fuel vehicle sales; in the model, consumers are allowed to purchase more of the vehicles if their cost, fuel efficiency, range, and performance characteristics make them desirable. Technology choice captures the manufacturers' response to the market.

Many consumers do not place a significant value on high-efficiency vehicles. This is reflected in the model by assuming a 3-year payback period, with the real discount rate remaining steady at 15 percent. Expected future fuel prices are calculated based on extrapolation of the growth rate between a 5-year moving average of fuel prices 3 years and 4 years before the present year. This assumption is based on a lead time of 3 to 4 years for significant modification of the vehicles offered by a manufacturer.

For freight trucks, technology choice is based on several technology characteristics, including capital cost, marginal improvement in fuel efficiency, payback period, and discount rate, which are used to calculate a fuel price at which the technologies become cost-effective [*33*]. When technologies are mutually exclusive, the more cost-effective technology will gain market share relative to the less cost-effective technology. Efficiency improvements for both rail and ship are based on recent historical trends [*34*].

As in the case of freight trucks, fuel efficiency improvements for new aircraft are also determined by a trigger fuel price, the time the technology becomes commercially available, and the projected marginal fuel efficiency improvement. The advanced technologies are ultra-high bypass, propfan, thermodynamics, hybrid laminar flow, advanced aerodynamics, and weight-reducing materials [*35*].

Travel. Projections of vehicle-miles traveled for personal travel [*36*] and ton-miles traveled for freight travel [*37*] are based on the assumption that modal shares (for example, personal automobile travel versus mass transit) remain stable over the forecast and follow recent historical patterns. Important factors affecting the forecast of vehicle-miles traveled for light-duty vehicles are personal disposable income per capita and the cost of driving. Travel by freight truck, rail, and ship is based on the growth in industrial output by sector and the historical relationship between freight travel and industrial output [*38*]. Both rail and ship travel are also based on projected coal production and distribution.

Air travel is estimated for domestic travel, international travel, and dedicated air freight shipments by U.S. carriers. Depending on the market segment, the demand for air travel is based on projected disposable personal income, GDP, merchandise exports, and ticket price as a function of jet fuel prices. Load factors, which represent the percentage of seats occupied per plane and are used to convert air travel (expressed in revenue-passenger miles and revenue-ton miles) to seat-miles of demand, increase slightly over the forecast period. For passenger travel, domestic and international air travel is modeled specific to aircraft type (regional, narrow body and wide body) such that regional aircraft are used exclusively for domestic travel, while narrow body aircraft serve both domestic and international markets, and wide body aircraft primarily serve the international market. In addition, the model captures the industry practice of parking aircraft to reduce operating costs and moving aircraft from the passenger to cargo markets as aircraft age. For air freight shipments, the model employs narrow body and wide body aircraft only. The model also utilizes an infrastructure constraint that limits air travel growth to levels commensurate with industry-projected infrastructure expansion and capacity growth.

2004 technology case. The *2004 technology case* assumes that new fuel efficiency levels are held constant at 2004 levels through the forecast horizon for all modes of travel.

High technology case. For the *high technology case*, light-duty conventional and alternative-fuel vehicle characteristics reflect more optimistic assumptions for incremental fuel economy improvements and costs [*39*]. In the air travel sector, the high technology case reflects lower costs for improved thermodynamics, advanced aerodynamics, and weight reduction materials, which provides a 25-percent improvement in new aircraft efficiency compared to the reference case by 2025. In the freight truck sector, the high technology case assumes more optimistic incremental fuel efficiency improvements for engine and emission control technologies [*40*]. 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.

Electricity Assumptions

Characteristics of generating technologies. The costs (including capital costs and operating and maintenance costs) and performance (efficiency) of new generating technologies are important factors in determining the future mix of capacity. Fossil fuel, renewable, and nuclear technologies are represented and include those currently available as well as those that are expected to be commercially available within the horizon of the forecast. It is assumed that the selection of new plants to be built is based on least cost, subject to environmental constraints. The incremental costs associated with each option are evaluated and used as the basis for selecting plants to be built. Details about each of the generating plant options are described in the detailed assumptions, which are available at web site www.eia.doe.gov/oiaf/aeo/assumption/.

Regulation of electricity markets. It is assumed that electricity producers comply with CAAA90, which mandates a limit of 9.48 million short tons of sulfur dioxide (SO_2) emissions per year from 2001 through 2009 and 8.95 million tons per year by 2010. Electricity producers are assumed to comply with the limits on sulfur dioxide emissions by retrofitting units with flue gas desulfurization (FGD) equipment, transferring or purchasing sulfur emission allowances, operating high-sulfur coal units at a lower capacity utilization rate, or switching to low-sulfur fuels. Electricity producers are assumed to comply with the limits on nitrogen oxides (NO_x) by installing selective catalytic reduction (SCR) equipment. FGD units are assumed to remove 95 percent of the SO_2 and SCR units are assumed to remove 90 percent of the NO_x. The costs per kilowatt to add FGD or SCR equipment decline as the capacity of the coal plant increases. Capital costs for retrofitting with FGD equipment are

estimated to decline from $270 per kilowatt (2002 dollars) for a 300-megawatt plant to $206 per kilowatt for a 500-megawatt plant and $171 per kilowatt for a 700-megawatt plant. Capital costs for installing SCR equipment are estimated to decline from $111 per kilowatt for a 300-megawatt plant to $97 per kilowatt for a 500-megawatt plant and $88 per kilowatt for a 700-megawatt plant [*41*].

In the reference, high, and low economic growth, and high and low world oil price cases, generators are projected to meet the annual SO_2 caps based on additions of 23 gigawatts of planned retrofits and 2 to 10 gigawatts of unplanned retrofits of FGD equipment at existing coal-fired power plants, combined with the drawdown of banked SO_2 emission allowances amounting to 9.2 million tons at the end of 2001. Announced retrofits by Duke Power and Progress Energy in response to North Carolina's Clean Smokestacks Bill account for nearly one-half of the planned retrofits included. The remaining are based on other factors, including compliance strategies developed by generators in response to CAAA90, agreements that generators have reached with the U.S. Department of Justice in litigation related to New Source Review, and other State and local environmental issues.

The EPA has issued rules to limit emissions of NO_x, specifically calling for capping emissions during the summer season in 22 eastern and midwestern States. After an initial challenge, the rules have been upheld, and emissions limits have been finalized for 19 States and the District of Columbia, starting in 2004. *AEO2004* assumes that electricity generators in those 19 States and the District of Columbia comply with the limits either by reducing their own emissions or by purchasing allowances from others. *AEO2004* also assumes that generators comply with the NO_x limits through a combination of combustion and post-combustion controls. In the reference case, installed and planned post-combustion control equipment amounts to 42 gigawatts of SCR equipment and 5 gigawatts of selective noncatalytic reduction (SNCR) equipment. The facilities in which the equipment is installed are located in 12 States, and their actions are in response to the EPA rules. Additional unplanned retrofits are projected in the reference case—52 gigawatts of SCR and 25 gigawatts of SNCR—between 2002 and 2025.

The reference case assumes a transition to full competitive pricing in New York, New England, the Mid-Atlantic Area Council, and Texas. In addition, electricity prices in the East Central Area Reliability Council, the Mid-America Interconnected Network, the Southeastern Electric Reliability Council, the Southwest Power Pool, the Northwest Power Pool, and the Rocky Mountain Power Area/Arizona (Arizona, New Mexico, Colorado, and eastern Wyoming) regions are assumed to be partially competitive. Some of the States in each of these regions have not taken action to deregulate their pricing of electricity, and in those States prices are assumed to continue to be based on traditional cost-of-service pricing. In California, a return to almost total cost-of-service regulation is now assumed.

In many deregulated States the legislation has mandated price freezes or reductions over a specified transition period. *AEO2004* includes such agreements in the electricity price forecast. In general, the transition period is assumed to be a 10-year period from the beginning of restructuring in each region, during which time prices gradually shift to competitive prices. The transition period reflects the time needed for the establishment of competitive market institutions and recovery of stranded costs as permitted by regulators. *AEO2004* assumes that the competitive price in deregulated regions is the marginal cost of generation.

Competitive cost of capital. The cost of capital is calculated as a weighted average of the costs of debt and equity. The cost of equity is an implied investor's opportunity cost, or the required rate of return on any risky investment. *AEO2004* assumes a ratio of 45 percent debt and 55 percent equity. The yield on debt represents that of a BBB corporate bond, calculated by applying a 1.25-percent premium to the annual AA utility bond rate projected by the Macroeconomic Activity Module. The cost of equity is calculated to be representative of unregulated industries similar to the electricity generation sector. It is assumed that the capital invested in a new plant must be recovered over a 20-year plant life rather than the traditional 30-year life.

Representation of Climate Challenge participation agreements. As a result of the Climate Challenge Program, many electricity generators have announced efforts to reduce their greenhouse gas emissions voluntarily. These efforts cover a wide variety of programs, including increasing demand-side management investments, repowering (fuel switching) fossil plants, restarting nuclear plants that have been out of service, planting trees, and purchasing emissions offsets from international sources.

To the degree possible, each of the participation agreements was examined to determine whether the commitments made were addressed in the normal reference case assumptions or whether they should be addressed separately. Programs such as tree planting and emissions offset purchasing are not addressed, but the other programs are, for the most part, captured in *AEO2004*. For example, electricity generators annually report to EIA their plans (over the next 10 years) to bring a plant back on line, repower a plant, extend a plant's life, cancel a previously planned plant, build a new plant, or switch fuel at a plant. Data for these programs are included in the *AEO2004* input data. However, because many of the agreements do not identify the specific plants where action is planned, it is not possible to determine which of the specified actions, together with their greenhouse gas emissions savings, should be attributed to the Climate Challenge Program and which are the result of normal business operations.

Fossil steam and nuclear plant retirement assumptions. Fossil steam plants and nuclear plants are retired when it is no longer economical to run them. In each forecast year the model determines whether the market price of electricity is sufficient to support the continued operation of existing plants. If the revenue a plant receives is not sufficient to cover its forward costs (including fuel, operations and maintenance costs, and assumed annual capital additions) the plant is retired. Beyond age 30, the forward costs also include capital expenditures assumed to be needed to address aging-related issues. For fossil plants the aging-related costs are assumed to be $5 per kilowatt, in year 2002 dollars. For nuclear plants the aging-related costs are assumed to be $37 per kilowatt. Aging-related cost increases result from increased capital costs, decreases in performance, and/or increased maintenance expenditures to mitigate the effects of aging.

Nuclear power. There are no nuclear units actively under construction in the United States. In NEMS, new nuclear plants are competed against other options when new capacity is needed. The cost assumptions for new nuclear units are based on an analysis of the realized costs of nuclear plants recently constructed overseas, since no advanced reactors have been built yet in the United States.

The capital cost assumptions in the reference case are meant to represent the expense of building a new single-unit nuclear plant of approximately 1,000 megawatts. Because no new nuclear plants have been built in the United States in many years, there is a great deal of uncertainty about the true costs of a new unit. The estimate used for *AEO2004* is an average of the actual costs incurred in completed advanced reactor builds in Asia, adjusting for expected learning from other units still under construction. The average nuclear capacity factor in 2002 was 90 percent, the highest annual average ever in the United States. The average annual capacity factor reaches a national average of 91 percent by 2011. Capacity factor assumptions are developed at the unit level, and improvements or decrements are based on the age of the reactor.

The *AEO2004* nuclear power forecast assumes capacity increases at existing units. The U.S. Nuclear Regulatory Commission (NRC) approved 18 applications for power uprates in 2002, and another 9 were approved or pending in 2003. *AEO2004* assumes that all of those uprates will be implemented, as well as others expected by the NRC over the next 15 years, for a capacity increase of 3.9 gigawatts between 2003 and 2025.

For nuclear power plants, several advanced nuclear cases analyze the sensitivity of the projections to lower costs for new plants. The cost assumptions for the *advanced nuclear cost case* reflect a 10-percent reduction in the capital and operating costs for the advanced nuclear technology in 2025, relative to the reference case. Since the reference case assumes some learning occurs regardless of new orders and construction, the reference case already projects a 10-percent reduction in capital costs between 2005 and 2025. The advanced nuclear cost case therefore assumes a 19-percent reduction between 2005 and 2025. The *nuclear AP1000 case* assumptions are consistent with estimates from British Nuclear Fuel Limited (BNFL) for the manufacture of its Advanced Pressurized Water Reactor (AP1000), as provided to the Near-Term Deployment Working Group of DOE's Office of Nuclear Energy, Science, and Technology. In this case, the overnight capital cost of a new advanced nuclear unit is assumed initially to be $1,580 per kilowatt, declining to $1,081 per kilowatt for plants coming on line in 2025 (in year 2002 dollars)—18 percent lower than assumed in the reference case in 2002 and 38 percent lower in 2025. A final case, the *nuclear vendor estimate case* (discussed in "Issues in Focus"), uses cost assumptions based on the average of estimates for the AP1000 and Atomic Energy Canada Limited's CANDU reactor, now being marketed to

the United States. In this case, the overnight cost is $1,555 per kilowatt initially, falling to $1,149 per kilowatt for plants coming online in 2025. Cost and performance characteristics for all other technologies are as assumed in the reference case.

Biomass co-firing. Coal-fired power plants are allowed to co-fire with biomass fuel if it is economical. Co-firing requires a capital investment for boiler modifications and fuel handling. This expenditure ranges from about $100 to $240 per kilowatt of biomass capacity, depending on the type and size of the boiler. A coal-fired unit modified to allow co-firing can generate up to 15 percent of its total output using biomass fuel, assuming sufficient fuel supplies are available. Larger units are required to pay additional transportation costs as the level of co-firing increases, due to the concentrated use of the regional biomass supply.

Distributed generation. AEO2004 assumes the availability of two generic technologies for distributed electricity generation. To determine the levels of capacity and generation for distributed technologies projected to be used in the forecast, the model compares their costs with the "avoided costs" of electricity producers. The avoided costs are the costs electricity producers would incur if they added the least expensive conventional central-station generators rather than distributed generators, as well as the costs of additional transmission and distribution equipment that would be required if the distributed generators were not added. Because there are currently no reliable estimates of the transmission and distribution costs that can be avoided by adding distributed generators, regional estimates were developed for the transmission and distribution investments that would be needed for each kilowatt of central-station generating capacity added. It was then assumed that 75 percent of such "growth-related" transmission and distribution costs could be avoided by adding distributed generators.

International learning. Capital costs for all new electricity generating technologies are assumed to decrease in response to domestic as well as foreign experience, to the extent that the new foreign plants reflect technologies and firms competing in the United States. In its learning function, *AEO2004* includes 1,938 megawatts of advanced coal gasification combined-cycle capacity (including the 127-megawatt Fife plant that entered service in Scotland in 2001) and 5,244 megawatts of advanced combined-cycle natural gas capacity operating or under construction outside the United States from 2000 through 2003. A small amount of international biomass integrated gasification combined cycle and wind capacity is also assumed to be on line in that time period. The learning function also includes 7,200 megawatts of advanced nuclear capacity, representing two completed units and four additional units under construction in Asia. Experience indicates that the small amount of learning attributed to international renewable energy installations is already adequately incorporated in U.S. domestic learning functions, and that because installations taking place in the United States are lowering projected capital costs, no additional accounting for new international renewable energy capacity is required.

High electricity demand case. The *high electricity demand case* assumes that the demand for electricity grows by 2.5 percent annually between 2002 and 2025, compared with 1.8 percent in the reference case. No attempt was made to determine changes in the end-use sectors that would result in the stronger demand growth. The high electricity demand case is partially integrated, with no feedback from the Macroeconomic Activity, International, or end-use demand modules. Rapid growth in electricity demand also leads to higher prices. The price of electricity in 2025 is 7.1 cents per kilowatthour in the high demand case, as compared with 6.9 cents in the reference case. Higher fuel prices, especially for natural gas, and higher capital costs for alternative technologies are the key factors leading to higher electricity prices.

High and low fossil technology cases. The high and low fossil technology cases are partially integrated cases, with no feedback from the Macroeconomic Activity, International, or end-use demand modules. In the *high fossil technology case*, capital costs, heat rates and operating costs for the advanced coal and gas technologies are assumed to be 10-percent lower than reference case levels in 2025. Since learning occurs 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 high fossil case fall to roughly 20 percent below initial levels, while capital costs are reduced by 20 to 25 percent between 2003 and 2025. 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 forecast period and remain fixed at the 2004 values assumed in the reference case.

In the *DOE fossil goals case*, capital costs and heat rates for the advanced coal and gas technologies are assumed to be lower and decline faster than in the reference case, and in most instances are lower than the high fossil technology case. The values used in the DOE goals case for capital costs and heat rates were based on the DOE's Vision 21 program. The capital costs and heat rates for renewable, nuclear, and other fossil technologies are assumed to be the same as in the reference case. Details about annual capital costs, operating and maintenance costs, plant efficiencies, and other factors used in the high fossil technology, low fossil technology, and DOE goals cases are described in the detailed assumptions, which are available at web site www.eia.doe.gov/oiaf/aeo/assumption/.

Renewable Fuels Assumptions

Energy Policy Act of 1992. The EPACT 10-year renewable electricity production tax credit (PTC) of 1.5 cents per kilowatthour (now adjusted for inflation to 1.8 cents) for new wind and some biomass plants originally expired on June 30, 1999. It was first extended through December 31, 2001, and then retroactively extended from December 31, 2001 through December 31, 2003, by the Job Creation and Worker Assistance Act of 2002 (P.L. 107-147). *AEO2004* applies the credit to all wind plants built through 2003. ("Closed loop" biomass plants are assumed to be commercially available beginning in 2010 and thus are not available to take advantage of the credit until 2010.) *AEO2004* assumes that the 10-percent investment tax credit for solar and geothermal technologies that generate electric power will be continued through 2025.

Renewable capacity additions. In addition to new unplanned generation capacity using renewable resources as determined by NEMS, *AEO2004* includes 4,362 megawatts of new "planned" central-station generating capacity using renewable resources as announced by utilities and independent power producers or identified by EIA to be built from 2003 through 2015. No planned builds were assumed after 2015. Of the total planned capacity builds, 3,132 megawatts result from State mandates, State renewable portfolio standards (RPS), State goals and other objectives or requirements, and 1,229 megawatts result from commercial builds and voluntary programs, such as green power programs and utility testing and demonstration projects using renewable technologies.

Because of demand and regulatory uncertainties, *AEO2004* does not assume that all new renewable capacity implied by State RPS and other mandates will be built; the assumptions for planned renewable capacity include primarily the near-term requirements about which the States and utilities are relatively certain. States and utilities are sometimes unable to quantify the amount of new capacity that will result from the RPS. Further, actual RPS implementation for some States is proceeding more slowly than initially expected, suggesting caution in expectations for the near term. Moreover, RPS implementation itself is often uncertain, because many of the RPS programs are set to be reevaluated, often by 2007. Given the legal alternatives (such as fines and exemptions) and technology choices (including conservation), the prospect of RPS reevaluation and redirection after 2007 may slow or inhibit compliance. Finally, even if the new capacity is eventually built, the specific technologies that will be chosen, the years in which they will be built, and their sizes and locations are uncertain.

Estimating supplemental additions of new renewable capacity for *AEO2004* is further complicated by reported transmission constraints thwarting wind development, by uncertainty about post-2003 extension of the PTC, by uncertain financial positions of utilities in the West that serve California markets, by uncertain demand for renewables in light of potential overbuilding of natural gas capacity, and by uncertainty about States' adherence to RPS mandates when economic growth is slow. As a result, the State RPS estimates should be considered relatively certain estimates of new capacity likely to be built in the near term and not as measure of the full potential consequences of the RPS over the entire forecast period. Using publicly available information and working with State agencies, EIA confirms projections of mandated renewable energy capacity; however, limited resources preclude confirming the status of every new renewable energy plant.

In addition to supplemental additions based on known plans, the projection includes minimum expectations for new central-station solar energy capacity assumed to be installed for reasons other than least-cost electricity supply, based on historical rates of addition of new capacity. *AEO2004* estimates include 75.5 megawatts of central-station solar thermal-electric and 332.5 megawatts of central-station photovoltaic (PV) generating capacity to be installed from 2003 through 2025.

Renewable resources. All central-station electricity generating technologies, including those using renewable energy resources, compete in NEMS based on their relative costs. Intermittent renewables (solar and wind) compete during time periods when they are assumed to be available but decrease in value as they contribute increasing shares of a region's total electricity supply, because they can contribute less additionally to meeting a region's reliability needs. As wind power provides increasing shares of a region's total generation, new wind plants alone cannot provide significant additional reliable capacity and therefore either must be used as fuel-saving nonfirm substitutes for the operation of existing capacity or must have backup capacity to ensure firm power delivery.

The delivered cost of electricity from renewables depends both on the availability of adequate renewable resources and on the capital costs of the technologies using them. Costs of renewable energy resources tend to increase as more of them are used and the best sites are exhausted; at the same time, costs of renewable energy technologies are assumed to decline with experience and mass production. As a result, depending upon the assumed rates of resource cost increases and the assumed rate of decline in capital costs, a region's delivered electricity cost from renewable energy resources may decrease or increase as a function of the changing cost of each input.

Although conventional hydroelectricity is the largest source of renewable energy in U.S. electricity markets today, the lack of available new sites, environmental and other restrictions, and costs are assumed to halt the expansion of U.S. hydroelectric power. Solar, wind, and geothermal resources are theoretically very large, but economically accessible resources are less available.

Solar energy (direct normal insolation) for thermal applications is considered economical only in drier regions west of the Mississippi River. Photovoltaics can be economical in all regions, although conditions are also superior in the West. Wind energy resource potential, while large, is constrained by wind quality differences, distance from markets, power transmission costs, alternative land uses, and environmental objections. The geographic distribution of available wind resources is based on work by the Pacific Northwest Laboratory and the National Renewable Energy Laboratory [*42*], enumerating winds among average annual wind-power classes. Geothermal energy is limited geographically to regions in the western United States with hydrothermal resources of hot water and steam. Although the potential for biomass is large, transportation costs limit the amount of the resource that is economically productive, because biomass fuels have a low Btu content per weight of fuel.

The *AEO2004* reference case incorporates upward-sloping supply curves for geothermal and wind technologies, in recognition of the higher costs of consuming increasing proportions of a region's resources. Capital costs are assumed to increase in response to (1) declining natural resource quality, such as rough or steep terrain or turbulent winds, (2) increasing costs of upgrading the existing transmission and distribution network, and (3) market conditions that increase wind power costs in competition with other land uses, such as for crops, recreation, or environmental or cultural preferences.

AEO2004 includes a revision to the treatment of wind energy for capacity planning and dispatch. This change reflects the additional costs imposed on the power grid by increasing levels of wind penetration. For *AEO2004*, the marginal capacity credit for wind decreases toward zero with increasing penetration, which ensures the availability of adequate firm capacity within a region to satisfy reliability requirements. In addition, surplus wind generation (such as during low-load periods) is assumed to be curtailed and does not contribute to cost-recovery for wind operations during curtailed periods. Penetration of wind and other intermittent generation resources is initially limited to 20 percent of a region's total generation but is allowed to increase over time to 40 percent. These limits reflect the need for a system with large intermittent generation to adjust to new and significantly different operational requirements and recognizes the uncertainties associated with operating a system that has high intermittency.

High renewables case. For 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 technologies in 2025. 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 performance improvement (an increased capacity factor) rather than capital cost reductions. Biomass

supplies are also assumed to be 10-percent greater for each supply step.

The *DOE goals case*, like the high renewables case, assumes improved performance and lower capital costs than the reference case for central-station nonhydroelectric generating technologies using renewable resources (other than landfill gas), in order to approximate published projections of cost and performance targets from DOE's Office of Energy Efficiency and Renewable Energy [*43*]. Differences from the reference case are not uniform, but instead reflect differences existing between the two cases in 2025. The DOE goals case also incorporates reduced operations and maintenance costs, improvements in capacity factors for wind technologies, increased biomass supplies, and lower capital costs for residential and commercial photovoltaic systems.

Annual limits are placed on the development of geothermal sites for both high renewable cases, because they require incremental development to assure that the resource is viable. The annual limits on capacity additions at geothermal sites were raised from 25 megawatts per year through 2015 to 50 megawatts per year for all forecast years. All other cases are assumed to retain the 25-megawatt limit through 2015. Other generating technologies and forecast assumptions remain unchanged from those in the reference case. In both the high renewables case and the DOE goals case, the rate of improvement in the recovery of biomass byproducts from industrial processes is also increased. More rapid improvement in cellulosic ethanol production technology is also assumed in both the high renewables case and the DOE goals case, and cellulosic ethanol production is assumed to capture a higher share of the renewable transportation fuels market, resulting in increased cellulosic ethanol supply compared with the reference case.

Low renewables case. 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 2004 levels through 2025.

Oil and Gas Supply Assumptions

Domestic oil and gas technically recoverable resources. The levels of available oil and gas resources assumed for *AEO2004* are based on estimates of the technically recoverable resource base from the U.S. Geological Survey (USGS) and the Minerals Management Service (MMS) of the Department of the Interior [*44*], with supplemental adjustments to the USGS nonconventional resources by Advanced Resources International (ARI), an independent consulting firm.

Technological improvements affecting recovery and costs. Productivity improvements are simulated by assuming that drilling, success rates, and finding rates will improve and the effective cost of supply activities will be reduced. The assumed increase in recovery is due to the recent development and deployment of technologies such as three-dimensional seismology and horizontal drilling and completion techniques.

For conventional oil and gas, drilling, operating, and lease equipment costs are expected to decline due exclusively to technological progress, at econometrically estimated rates that vary somewhat by cost and fuel categories, ranging roughly from 0.3 to 1.9 percent. The technological impacts work against increases in costs associated with drilling to greater depths, higher drilling activity levels, and rig availability. As a direct result of technological progress, success rates are assumed to improve by 0.5 percent per year, and finding rates are expected to improve by 2.8 percent per year. For nonconventional gas, these costs are expected to remain at current levels.

Rapid and slow technology cases. Two alternative 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. To create these cases, conventional oil and natural gas reference case parameters for the effects of technological progress on finding rates, drilling, lease equipment and operating costs, and success rates were adjusted by plus or minus 50 percent. For unconventional gas, a number of key exploration and production technologies were also adjusted by plus or minus 50 percent in the rapid and slow technology cases. Key Canadian supply parameters were also adjusted to simulate the assumed impacts of rapid and slow oil and gas technology penetration on Canadian supply potential.

All other parameters 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 liquefied natural gas 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 2004*, which is available at web site www.eia.doe.gov/oiaf/aeo/assumption/.

Leasing and drilling restrictions. The projections of crude oil and natural gas supply assume that current restrictions on leasing and drilling will continue to be enforced throughout the forecast period. At present, drilling is prohibited along the entire East Coast, the west coast of Florida, and the West Coast except for the area off Southern California. In Alaska, drilling is prohibited in a number of areas, including the Arctic National Wildlife Refuge. The projections also assume that coastal drilling activities will be reduced in response to the restrictions of CAAA90, which require that offshore drilling sites within 25 miles of the coast, with the exception of areas off Texas, Louisiana, Mississippi, and Alabama, meet the same clean air requirements as onshore drilling sites.

Gas supply from Alaska, MacKenzie Delta, and LNG imports. Due to the relative economics, the assumption in the model is that a pipeline from the MacKenzie Delta to Alberta would be constructed first, followed by one from Alaska, with potential expansions following thereafter. The timing of both systems is based on estimates of the cost to bring the gas to market in the United States, relative to the average lower 48 wellhead price.

A natural gas pipeline from Alaska into Alberta, Canada, is assumed to carry an initial capitalization of $13.2 billion (2002 dollars) and be depreciated over 15 years. The initial capitalization includes an expected cost of $ 11.6 billion plus an additional 20 percent to account for the uncertainty in realized capital costs. The expected cost for a pipeline from the MacKenzie Delta into Alberta is $3.6 billion. It is assumed that the Alaska pipeline will require 4 years to construct (3 years for the MacKenzie pipeline), will not be completed before 2013 (2009 for MacKenzie), will deliver 3.9 billion cubic feet of dry natural gas per day once fully operational (1.5 billion for MacKenzie), and can be expanded by 23 percent, if economical. The wellhead price of natural gas from Alaska to be delivered through the pipeline is assumed to be $0.81 per thousand cubic feet in 2002 dollars ($1.00 for MacKenzie). Gas treatment and pipeline fuel costs are accounted for as well.

A market price risk premium totaling $0.34 per thousand cubic feet is assumed, above and beyond the expected cost of delivery into Alberta and on to the lower 48 States. For MacKenzie, a capital cost and market price risk premium totaling $0.39 per thousand cubic feet is assumed. Those assumptions imply that an average price in the lower 48 States of around $3.69 (2002 dollars) per thousand cubic feet ($3.41 for MacKenzie) would need to be maintained on average over a 5-year (2-year for MacKenzie) planning period for construction to commence. Falling prices during the planning period can delay the construction period, depending on the severity of the decline.

The four existing liquefied natural gas (LNG) receiving facilities in Massachusetts, Maryland, Louisiana, and Georgia are in operation and have a combined design capacity of about 1.2 trillion cubic feet per year. All four facilities are in the process of expanding, and additional capacity of approximately 650 billion cubic feet per year is expected to be in place by 2006. This will bring the total U.S. design capacity to approximately 1.8 trillion cubic feet per year. Assumed maximum load factors effectively reduce the total available LNG from existing facilities to a maximum of 1.4 trillion cubic feet per year over the forecast period. It is assumed that existing facilities will not expand beyond current plans.

The model has a provision for the construction of new facilities in all U.S. coastal regions and in Baja California, Mexico. Construction in a region is triggered when the regional price of natural gas meets or exceeds the cost (per thousand cubic feet) of producing, liquefying, transporting, and regasifying the LNG, plus a risk premium of $0.45 (in 2002 dollars) per thousand cubic feet. The risk premium is applied only in making the decision to go ahead with a project, and is not reflected in subsequent costs of LNG to the consumer. The regasification component is based on the assumed cost of constructing a generic terminal in the region with adjustments to account for region-specific parameters such as cost of land and labor costs. New facilities are assumed to range in size from 250 million cubic feet per day to 1 billion cubic feet per day, depending on location. Regional prices at the LNG tailgate (including relevant transportation charges), which trigger construction range from $3.62 (2002 dollars) per thousand cubic feet along the Gulf Coast in Texas and Louisiana to $4.57 per thousand cubic feet in California. The effect of technological progress on reducing some of the component costs is assumed to be offset by increases in other components, such as production costs.

An LNG facility in Baja California, Mexico, with a capacity of 1 billion cubic feet per day and expansion potential of an additional 1 billion cubic feet per day, is assumed to be constructed at a tailgate price of $3.10 (in 2002 dollars) per thousand cubic feet, with

half of its capacity available for export to the United States and the other half reserved for use within Mexico. A liquefaction plant in Kenai, Alaska, has been producing and exporting LNG to Japan for the past 30 years, and this is expected to continue throughout the forecast at a level of approximately 65 billion cubic feet per year. Exports to Mexico are determined based on projected production and consumption within Mexico. Consumption in Mexico is projected to grow at an average annual rate of 6.1 percent per year over the forecast period. Production is expected to grow at a slower rate, with the shortfall met by a combination of pipeline imports from the United States and LNG imports.

Natural gas transmission and distribution assumptions. Transportation rates for pipeline services are calculated with the assumption that the costs of new pipeline capacity will be rolled into the existing ratebase. The rates based on cost of service are adjusted according to pipeline utilization, to reflect a more market-based approach. In determining interstate pipeline tariffs, potential future expenditures for pipeline safety necessary to comply with the Pipeline Safety Improvement Act of 2002 are not considered.

Distribution markups to core customers (not including electricity generators) change over the forecast in response to changes in consumption levels and in the costs of capital and labor. Markups to electricity generators are a direct function of changes in consumption levels alone. The natural gas vehicle sector is divided into fleet and nonfleet vehicles. The distributor tariffs for natural gas to fleet vehicles are based on historical differences between end-use and citygate prices from EIA's *Natural Gas Annual* plus Federal and State taxes on natural gas used by vehicles. The price to nonfleet vehicles is based on the industrial sector firm price plus an assumed dispensing charge of $4.29 (2002 dollars) per thousand cubic feet plus taxes.

Petroleum Market Assumptions

Gasoline demand. Demands for conventional, reformulated, and oxygenated gasolines are disaggregated from composite gasoline consumption on the basis of their 2002 market shares in each Census division. Reformulated gasoline (RFG) is consumed in the 10 serious ozone nonattainment areas required by CAAA90 and in areas that voluntarily opted into the program [*45*]. RFG projections also reflect a Statewide requirement in California and State law in Phoenix, Arizona. In total, RFG is assumed to account for about 33 percent of annual gasoline sales throughout the *AEO2004* forecast. The estimated market shares for oxygenated gasoline assume continued wintertime participation of carbon monoxide nonattainment areas and statewide participation in Minnesota. Oxygenated gasoline represents about 4.6 percent of gasoline demand in the forecast. Conventional gasoline makes up the balance (62.4 percent) of gasoline demand.

RFG specifications. RFG must meet the EPA's "Complex Model 2" requirements beginning in 2000. Gasoline currently sold in the United States slightly exceeds the quality implied in the Complex Model 2 specifications (i.e., "over-compliance"). In addition to assuming Complex Model 2 compliance for the RFG, *AEO2004* also reflects the over-compliance nature of gasoline in general by adopting the EPA survey of RFG properties in 2002 [*46*]. The RFG specifications used for the West Coast represent the California Air Resources Board (CARB) statewide gasoline requirements, first implemented in 1996, which will be tightened in 2004 [*47*]. The U.S. 9th Circuit Court of Appeals recently ruled that the EPA must reconsider a request by California to waive the Federal oxygen requirement in Federal nonattainment areas, including Los Angeles, San Diego, Sacramento, and San Joaquin Valley. Because those areas contain about 80 percent of California's population and EPA is appealing the Court's ruling, *AEO2004* assumes that 80 percent of RFG in the State will continue to require 2.0 percent oxygen by weight after MTBE is banned.

State MTBE bans. *AEO2004* includes constraints that model legislation banning or limiting the use of the gasoline blending component MTBE in the next few years in 17 States: California, Colorado, Connecticut, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, New York, Ohio, South Dakota, Washington, and Wisconsin [*48*]. Of the 17 States, only California, New York, Connecticut, Missouri, and Kentucky still sold MTBE-blended RFG in 2003. *AEO2004* assumes that ethanol will replace MTBE as the oxygenate for RFG in those five States, blending at 5.7 percent per volume ethanol in California's RFG (due to stricter CARB gasoline specifications), and 10 percent per volume ethanol in RFG in all other States where MTBE will soon be banned.

Low-sulfur fuel requirements. *AEO2004* reflects "Tier 2" Motor Vehicle Emissions Standards and

Gasoline Sulfur Control Requirements finalized by the EPA in February 2000. The regional assumptions for phasing down the sulfur content of conventional gasoline include less stringent sulfur requirements for small refineries and refineries in the Rocky Mountain region as allowed by EPA. The 30-ppm annual average standard is not fully realized in conventional gasoline until 2008 due to allowances for small refineries.

AEO2004 also incorporates the "ultra-low-sulfur diesel" (ULSD) regulation finalized in December 2000. By definition, ULSD is highway diesel that contains no more than 15 ppm sulfur at the pump; however, there is general consensus that refiners will need to produce ULSD somewhat below 10 ppm in order to allow for contamination during the distribution process. *AEO2004* assumes that ULSD at the refinery gate will contain a maximum of 7 ppm sulfur. The new regulation contains the "80/20" rule, which requires the production of 80 percent ULSD and 20 percent 500 ppm highway diesel between June 2006 and June 2010, and a 100-percent requirement for ULSD thereafter. Because NEMS is an annual average model, the full impact of the 80/20 rule cannot be seen until 2007, and the impact of the 100-percent requirement cannot be seen until 2011. No change in the sulfur level of nonroad diesel fuel is assumed, because the EPA has not yet formally adopted nonroad diesel standards.

Gas-to-liquids. If prices for lower sulfur distillates reach a high level, it is assumed that gas-to-liquids (GTL) facilities will be built on the North Slope of Alaska to convert stranded natural gas into distillates, to be transported on the Trans-Alaskan Pipeline System (TAPS) to Valdez and shipped to markets in the lower 48 States. The facilities are assumed to be built incrementally, no earlier than 2005, with output volumes of 50,000 barrels per day, at a cost of $21,750 per barrel of daily capacity (2002 dollars). Operating costs are assumed to be $4.04 per barrel. Transportation costs to ship the GTL product from the North Slope to Valdez along the TAPS range from $2.78 to $4.50 per barrel, depending on total oil flow on the pipeline and the potential need for GTL to maintain the viability of the TAPS line if Alaskan oil production declines. Initially, the natural gas feedstock is assumed to cost $0.83 per thousand cubic feet (2002 dollars).

Coal-to-liquids. It is also assumed that coal-to-liquids (CTL) facilities will be built when low-sulfur distillate prices are high. One CTL facility is capable of processing 16,400 tons of bituminous coal per day, with a production capacity of 33,200 barrels of synthetic petroleum fuel per day and 696 megawatts of capacity for electricity cogeneration sold to the grid [*49*]. The CTL yields are assumed to be similar to those from a GTL facility, because both involve the Fischer-Tropsch process to convert syngas ($CO + H_2$) to liquid hydrocarbons. The primary yields would be distillate and kerosene, with additional yields of naphthas and liquefied petroleum gases. Petroleum products from CTL facilities are assumed to be competitive when distillate prices rise above the cost of CTL production (adjusted for credits from the sale of cogenerated electricity). CTL capacity is projected to be built only in the *AEO2004* high world oil price case.

Petroleum coke gasification. Gasification of petroleum coke (petcoke) and heavy oil (asphalt, vacuum residual, etc.) are represented in *AEO2004* [*50*]. The primary feedstock for gasification is assumed to be petcoke. Petcoke can be used for combined heat and power (CHP) electric and steam generation or for hydrogen production, based on the particular refinery economics. A typical gasification facility is assumed to have a capacity of 2,000 tons per day, which includes the main gasifier and other integrated units in the refinery such as an air separation unit (ASU), syngas clean-up, a sulfur recovery unit (SRU), and two downstream process options—CHP or hydrogen production. Currently, more than 5,000 tons per day of gasification capacity operates in the United States, producing combined heat and power (CHP) and hydrogen. Additional gasification capacity is projected in the *AEO2004* forecast, primarily for CHP production.

Ethanol and biodiesel. Fuel ethanol production is modeled in the Petroleum Market Module (PMM). Ethanol is produced in dedicated plants from corn or cellulose feedstocks. Most ethanol is produced from corn in the Midwest (Census divisions 3 and 4). Commercial cellulosic ethanol production from corn stover is assumed to be producible in the Midwest. Cellulosic ethanol may be produced from wood products in Census divisions 2, 3, 4, 7, and 9. Ethanol is blended into gasoline at up to 10 percent by volume to provide oxygen, octane, and gasoline volume. Ethanol is also sold as E85, a blend of up to 85 percent ethanol and at least 15 percent gasoline by volume. The historical annual average of the ethanol content in E85 is about 74 percent, due to the lower blending ratios for E85 in the fall and winter months for drivability

purposes [*51*]. Ethanol can also be used to make ethyl-tertiary-butyl ether (ETBE), another potential gasoline oxygenate. The PMM is capable of modeling ETBE, but it is expected to cause water contamination problems similar to those caused by MTBE and is therefore not in widespread use.

Biodiesel production is also modeled in the PMM. Biodiesel is the collective name for methyl esters of vegetable oil or animal fat, which are suitable for fueling diesel engines. Payments are offered by the Department of Agriculture's Commodity Credit Corporation for production of biodiesel. Based on data through the third quarter of 2002, biodiesel output is projected to grow by 8.9 million gallons per year until 2006 (biodiesel output was 15.3 million gallons in 2002), when the payments will no longer be offered. Thereafter, biodiesel output is projected to grow at 1.8 percent per year.

Transportation fuel taxes. State taxes on gasoline, diesel, jet fuel, and E85 are assumed to increase with inflation, as has occurred historically. Federal taxes, which have increased sporadically in the past, are assumed to stay at 2002 nominal levels (a decline in real terms). Extension of the excise tax exemption for blending corn-based ethanol with gasoline, passed in the Federal Highway Bill of 1998, is incorporated in the projections. The bill extends the tax exemption through 2007 but reduces the current exemption of 52 cents per gallon by 1 cent per gallon in 2005. It is assumed that the tax exemption will be extended beyond 2007 through 2025 at the nominal level of 51 cents per gallon (a decline in real terms).

High renewables case. 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 forecast year relative to the reference case, making larger quantities available at any given price earlier than are available in the reference case. Commercialization of cellulosic ethanol follows the same path from year to year but begins in 2006 rather than 2010.

Coal Market Assumptions

Productivity. Technological advances in the coal industry, such as improvements in coal haulage systems at underground mines, contribute to increases in productivity, as measured in average tons of coal per miner per hour. Productivity improvements are assumed to continue at a reduced rate over the forecast horizon. Rates of improvement are developed based on econometric estimates using historical data by region and by mine type (surface and underground). On a national basis, labor productivity is assumed to improve on average at a rate of 1.3 percent per year over the *AEO2004* forecast period, decreasing from an estimated annual improvement rate of 1.4 percent between 2002 and 2010 to a rate of 1.3 percent between 2010 and 2025. By comparison, productivity in the U.S. coal industry improved at an average rate of 5.9 percent per year between 1980 and 2002. Some reasons why future productivity improvements are expected to be lower than historical levels include increasing strip ratios, thinner coal seams and lower coal yields, longer trucking hauls, and tougher permitting standards. Sulfur dioxide emissions limits from electricity generators, as mandated in CAAA90, are explicitly modeled in the Coal Market Module.

Coal transportation costs. Transportation rates are escalated or de-escalated over the forecast period to reflect projected changes in input factor costs. The escalators used to adjust the rates year by year are generated endogenously from a regression model based on the current-year diesel price, employee wage cost index, user cost of capital for transportation equipment, and a producer time trend.

Coal exports. Coal exports are modeled as part of a linear program that provides annual forecasts of U.S. steam and coking coal exports in the context of world coal trade. The linear program determines the pattern of world coal trade flows that minimizes the production and transportation costs of meeting a specified set of regional world coal import demands.

Coal imports. Projections of annual U.S. coal imports, specified by demand region and economic sector, are developed exogenously. The forecast is based primarily on the capability and plans of existing coal-fired generating plants to import coal and announced plans to expand coal import infrastructure. Projections of coal imports do not vary across the alternative *AEO2004* cases. Total sulfur dioxide emissions from imports and domestically produced coal are subject to the restrictions on emissions specified in CAAA90.

High and low mining cost cases. Two alternative mining cost cases examine the impacts of different labor productivity, labor cost, and equipment cost assumptions. The annual growth rates for productivity were increased and decreased by region and mine type, based on historical variations in labor productivity.

The high and low mining cost cases were developed by adjusting the *AEO2004* reference case productivity path by one standard deviation, corresponding to an adjustment of 1.9 percent in the annual growth rates of coal mine labor productivity which are specified by region and mine type. The resulting national average productivities in 2025 (in short tons per hour) were 13.1 in the *high mining cost case* and 5.94 in the *low mining cost case*, compared with 9.19 in the reference case. These are fully integrated cases, with feedback from the Macroeconomic Activity, International, supply, conversion, and end-use demand modules.

In the reference case, labor wage rates for coal mine production workers and equipment costs are assumed to remain constant in real terms over the forecast period. In the low and high mining cost cases, wages and equipment costs are assumed to decline and increase by 0.5 percent per year in real terms, respectively.

Notes

[*1*] Energy Information Administration, *Annual Energy Review 2002*, DOE/EIA-0384(2001) (Washington, DC, October 2003).

[*2*] Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2002*, DOE/EIA-0573(2001) (Washington, DC, October 2003).

[*3*] 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 PMM projection.

[*4*] Jet Information Services, Inc., *World Jet Inventory Year-End 2002* (Woodinville, WA, March 2003), and personal communications with Bill Francoins at Jet Information Services and Thomas C. Hoang at Boeing.

[*5*] National Energy Policy Act of 1992, P.L. 102-486, Title III, Section 303, and Title V, Sections 501 and 507.

[*6*] Maine has passed legislation that provides a goal of phasing out MTBE, although at this time no MTBE is used in Maine.

[*7*] The hurdle rate for petroleum coke gasification is assumed to be 15 percent because of the higher economic risk involved in this technology.

[*8*] "Worldwide Look at Reserves and Production," *Oil & Gas Journal* (December 23, 2002), pp. 114-115.

[*9*] U.S. Geological Survey, *World Petroleum Assessment 2000: Description and Results*, Data Series DDS-60, Version 1.1 (Washington, DC, June 2000).

[*10*] Petroconsultants, Inc., "DESTINY: International Forecast Software, Petroleum Exploration and Production Database" (Houston, TX, 1996).

[*11*] Lawrence Berkeley Laboratory, *U.S. Residential Appliance Energy Efficiency: Present Status and Future Direction*; and U.S. Department of Energy, Office of Codes and Standards.

[*12*] Energy Information Administration, 2001 *Residential Energy Consumption Survey*, web site www.eia.doe.gov/emeu/recs/contents.html.

[*13*] For additional information on green programs see web site www.energystar.gov.

[*14*] For further information see web site www.pathnet.org/about/about.html.

[*15*] High technology assumptions are based on Energy Information Administration, *Technology Forecast Updates—Residential and Commercial Building Technologies—Advanced Adoption Case* (Arthur D. Little, Inc., October 2001).

[*16*] Energy Information Administration, 1999 CBECS Public Use Data Files (October 2002), web site www.eia.doe.gov/emeu/cbecs/.

[*17*] National Energy Policy Act of 1992, P.L. 102-486, Title I, Subtitle C, Sections 122 and 124.

[*18*] Efficiency typically refers to the ratio of energy delivered to energy consumed. In the case of lighting, the measure used is efficacy, which is the ratio of light delivered (in lumens) to energy consumed.

[*19*] High technology assumptions are based on Energy Information Administration, *Technology Forecast Updates—Residential and Commercial Building Technologies—Advanced Adoption Case* (Arthur D. Little, Inc., October 2001).

[*20*] Navigant Consulting, Inc., *The Changing Face of Renewable Energy* (June 2003).

[*21*] The National Renewable Energy Laboratory's Renewable Electric Plant Information System is available at web site www.eere.energy.gov/repis/.

[*22*] For current DOE technology characterizations for photovoltaic systems see web site www.eren.doe.gov/power/pdfs/techchar.pdf.

[*23*] Energy Information Administration, *1998 Manufacturing Energy Consumption Survey*, web site www.eia.doe.gov/emeu/mecs/mecs98/datatables/contents.html.

[*24*] The data sources and methodology used to develop the nonmanufacturing portion of the Industrial Demand Module are described in Energy Information Administration, *Model Documentation Report: Industrial Sector Demand Module of the National Energy Modeling System*, DOE/EIA-M064(2002) (Washington, DC, December 2001).

[*25*] National Energy Policy Act of 1992, P.L. 102-486, Title II, Subtitle C, Section 342.

[*26*] S.R. Nadal et al., *Energy-Efficient Motor Systems: A Handbook on Technology, Program, and Policy Opportunities*, 2nd Edition (Washington, DC: American Council for an Energy-Efficient Economy, 2002).

[*27*] U.S. Department of Energy, Motor Master+ 4.0 software database (2003), web site http://mm3.energy.wsu.edu/mmplus/default.stm.

[*28*] These assumptions are based in part on Energy Information Administration, *Industrial Model—Updates on*

Energy Use and Industrial Characteristics (Arthur D. Little, Inc., September 2001).

[*29*] National Energy Policy Act of 1992, P.L. 102-486, Title III, Section 303, and Title V, Sections 501 and 507.

[*30*] California Air Resources Board, Resolution 01-1 (January 25, 2001).

[*31*] California Air Resources Board, Resolution 03-4 (April 24, 2003).

[*32*] Energy Information Administration, *Documentation of Technologies Included in the NEMS Fuel Economy Model for Passenger Cars and Light Trucks* (Energy and Environmental Analysis, September 2002).

[*33*] 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).

[*34*] S. Davis, *Transportation Energy Databook No. 22*, prepared for the Office of Transportation Technologies, U.S. Department of Energy (Oak Ridge, TN: Oak Ridge National Laboratory, September 2002).

[*35*] D. Greene, *Energy Efficiency Improvement Potential of Commercial Aircraft to 2010*, ORNL-6622 (Oak Ridge, TN: Oak Ridge National Laboratory, June 1990), and Oak Ridge National Laboratory, Air Transportation Energy Use Model.

[*36*] Vehicle-miles traveled are the miles traveled yearly by light-duty vehicles.

[*37*] Ton-miles traveled are the miles traveled and their corresponding tonnage for freight modes, such as trucks, rail, air, and shipping.

[*38*] U.S. Department of Commerce, Bureau of the Census, "Vehicle Inventory and Use Survey," EC97TV (Washington, DC, October 1999); Federal Highway Administration, *Highway Statistics 1998* (Washington, DC, November 1999); and S. Davis, *Transportation Energy Databook No. 19*, prepared for the Office of Transportation Technologies, U.S. Department of Energy (Oak Ridge, TN: Oak Ridge National Laboratory, September 1999).

[*39*] Energy Information Administration, *Documentation of Technologies Included in the NEMS Fuel Economy Model for Passenger Cars and Light Trucks* (Energy and Environmental Analysis, September 2002).

[*40*] 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).

[*41*] The source of the cost data is the CUECOST3.xls model, as updated February 9, 2000, which was developed for the U.S. Environmental Protection Agency by Raytheon Engineers and Constructors, Inc., EPA Contract Number 68-D7-0001. The EPA model estimates costs for adding SCRs, FGDs, and SNCRs for plants based on a number of design parameters. For retrofits, a retrofit factor is assigned to reflect the additional costs of retrofitting an existing plant rather than adding it as part of a Greenfield plant. The EPA model was run for each individual plant assuming a 1.3 retrofit factor for FGDs and 1.6 for SCRs, based on historical evidence.

[*42*] Pacific Northwest Laboratory, *An Assessment of the Available Windy Land Area and Wind Energy Potential in the Contiguous United States*, PNL-7789, prepared for the U.S. Department of Energy under Contract DE-AC06-76RLO 1830 (August 1991); and M.N. Schwartz, O.L. Elliott, and G.L. Gower, *Gridded State Maps of Wind Electric Potential. Proceedings, Wind Power 1992* (Seattle, WA, October 19-23, 1992). Also, National Renewable Energy Laboratory, "Subtask A: Incorporation of Existing Validated Wind Data into NEMS," draft final report to EIA (November 2003).

[*43*] Based on technology characterizations from National Renewable Energy Laboratory, *2003 Power Technologies Databook*, web site www.nrel.gov/analysis/power_databook/. Cost and performance projections in the Databook are sourced to U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, publications and documents.

[*44*] D.L. Goutier et al., *1995 National Assessment of the United States Oil and Gas Resources* (Washington, DC: U.S. Department of the Interior, U.S. Geological Survey, 1995); U.S. Department of the Interior, Minerals Management Service, *An Assessment of the Undiscovered Hydrocarbon Potential of the Nation's Outer Continental Shelf*, OCS Report MMS 96-0034 (Washington, DC, June 1997); U.S. Department of the Interior, Minerals Management Service, *2000 Assessment of the Conventionally Recoverable Hydrocarbon Resources of the Gulf of Mexico and Atlantic Outer Continental Shelf, as of January 1, 1999*, OCS Report MMS 2001-087 (New Orleans, LA, October 2001); National Petroleum Council, *Natural Gas: Meeting the Challenges of the Nation's Growing Natural Gas Demand* (Washington, DC, December 1999).

[*45*] Required areas: Baltimore, Chicago, Hartford, Houston, Los Angeles, Milwaukee, New York City, Philadelphia, San Diego, Sacramento and San Joaquin Valley. Opt-in areas are in the following States: Connecticut, Delaware, Kentucky, Massachusetts, Maryland, Missouri, New Hampshire, New Jersey, New York, Rhode Island, Texas, Virginia, and the District of Columbia. Excludes areas that "opted-out" prior to June 1997.

[*46*] U.S. Environmental Protection Agency, Office of Transportation and Air Quality, *Information on Reformulated Gasoline (RFG) Properties and Emissions Performance by Area and Season*, web site www.epa.gov/otaq/regs/fuels/rfg/properf/rfgperf.htm.

[*47*] California Air Resource Board, "California Phase 3 Reformulated Gasoline," web site www.arb.ca.gov/fuels/gasoline/carfg3/carfg3.htm.

[*48*] The State of Maine has passed legislation that provides a goal of phasing out MTBE.

[*49*] Based on the methodology described in D. Gray and G. Tomlinson, *Coproduction: A Green Coal Technology*, Technical Report MP 2001-28 (Mitretek, March 2001).

[*50*] National Energy Technology Laboratory, *Refinery Technology Profiles—Gasification and Supporting Technologies* (June 2003).

[*51*] National Ethanol Vehicles Coalition, *E85 Blending, Tax Incentives, and Pump Pricing*. A copy of the report may be obtained by calling (877) 485-8595.

Appendix H
Conversion Factors

Table H1. Heat Rates

Fuel	Units	Approximate Heat Content
Coal[1]		
Production	million Btu per short ton	20.620
Consumption	million Btu per short ton	20.814
Coke Plants	million Btu per short ton	27.426
Industrial	million Btu per short ton	23.361
Residential and Commercial	million Btu per short ton	24.836
Electric Power Sector	million Btu per short ton	20.479
Imports	million Btu per short ton	25.000
Exports	million Btu per short ton	26.062
Coal Coke	million Btu per short ton	24.800
Crude Oil		
Production	million Btu per barrel	5.800
Imports	million Btu per barrel	5.948
Petroleum Products		
Consumption[2]	million Btu per barrel	5.325
Motor Gasoline[2]	million Btu per barrel	5.198
Jet Fuel	million Btu per barrel	5.670
Distillate Fuel Oil	million Btu per barrel	5.825
Residual Fuel Oil	million Btu per barrel	6.287
Liquefied Petroleum Gas[2]	million Btu per barrel	3.603
Kerosene	million Btu per barrel	5.670
Petrochemical Feedstocks[2]	million Btu per barrel	5.545
Unfinished Oils	million Btu per barrel	5.825
Imports[2]	million Btu per barrel	5.345
Exports[2]	million Btu per barrel	5.767
Natural Gas Plant Liquids		
Production[2]	million Btu per barrel	3.782
Natural Gas		
Production, Dry	Btu per cubic foot	1,027
Consumption	Btu per cubic foot	1,027
End-Use Sectors	Btu per cubic foot	1,028
Electric Power Sector	Btu per cubic foot	1,019
Imports	Btu per cubic foot	1,022
Exports	Btu per cubic foot	1,006
Electricity Consumption	Btu per kilowatthour	3,412

Btu = British thermal unit.

[1]Coal conversion factors vary from year to year. Values correspond to those published by EIA for 2002 and may differ slightly from model results.

[2]Conversion factors vary from year to year. 2010 values are reported.

Sources: Energy Information Administration (EIA), *Annual Energy Review 2002*, DOE/EIA-0384(2002) (Washington, DC, October 2003), and EIA, AEO2004 National Energy Modeling System run AEO2004.D101703E.

Table H2. Metric Conversion Factors

United States Unit	multiplied by	Conversion Factor	equals	Metric Unit
Mass				
Pounds (lb)	X	0.453 592 37	=	kilograms (kg)
Short Tons (2000 lb)	X	0.907 184 7	=	metric tons (t)
Length				
Miles	X	1.609 344	=	kilometers (km)
Energy				
British Thermal Unit (Btu)	X	1055.056[a]	=	joules(J)
Quadrillion Btu	X	25.2	=	million tons of oil equivalent (Mtoe)
Kilowatthours (kWh)	X	3.6	=	megajoules(MJ)
Volume				
Barrels of Oil (bbl)	X	0.158 987 3	=	cubic meters (m^3)
Cubic Feet (ft^3)	X	0.028 316 85	=	cubic meters (m^3)
U.S. Gallons (gal)	X	3.785 412	=	liters (L)
Area				
Square feet (ft^2)	X	0.092 903 04	=	square meters (m^2)

Note: Spaces have been inserted after every third digit to the right of the decimal for ease of reading.
[a]The Btu used in this table is the International Table Btu adopted by the Fifth International Conference on Properties of Steam, London, 1956.
Source: Energy Information Administration, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002).

Table H3. Metric Prefixes

Unit Multiple	Prefix	Symbol
10^3	kilo	k
10^6	mega	M
10^9	giga	G
10^{12}	tera	T
10^{15}	peta	P
10^{18}	exa	E

Source: Energy Information Administration, *Annual Energy Review 2001*, DOE/EIA-0384(2001) (Washington, DC, October 2002), Table B2.