

Appendix I

Tables for New Source Review Integrated Cases

Table I1. Total Energy Supply and Disposition Summary
(Quadrillion Btu per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
Production					
Crude Oil and Lease Condensate	12.45	10.96	10.95	11.44	11.49
Natural Gas Plant Liquids	2.62	3.67	3.71	4.34	4.39
Dry Natural Gas	19.16	26.24	26.53	31.55	31.92
Coal	23.11	14.41	14.14	12.06	11.64
Nuclear Power	7.79	7.91	7.91	7.32	7.24
Renewable Energy ¹	6.50	10.48	10.34	12.78	12.00
Other ²	1.65	0.30	0.30	0.33	0.34
Total	73.30	73.97	73.88	79.83	79.02
Imports					
Crude Oil ³	18.96	24.82	24.86	25.72	25.63
Petroleum Products ⁴	4.14	6.64	6.62	10.90	11.04
Natural Gas	3.63	6.64	6.66	7.97	8.06
Other Imports ⁵	0.64	0.75	0.75	0.69	0.69
Total	27.37	38.86	38.89	45.28	45.42
Exports					
Petroleum ⁶	1.98	1.77	1.78	1.93	1.93
Natural Gas	0.17	0.12	0.12	0.12	0.12
Coal	1.48	1.51	1.46	1.44	1.44
Total	3.62	3.41	3.36	3.49	3.49
Discrepancy⁷	0.95	0.25	0.31	0.01	0.14
Consumption					
Petroleum Products ⁸	38.03	44.62	44.65	50.98	51.09
Natural Gas	21.95	32.55	32.87	39.21	39.66
Coal	21.45	13.21	12.94	11.07	10.55
Nuclear Power	7.79	7.91	7.91	7.32	7.24
Renewable Energy ¹	6.51	10.49	10.35	12.79	12.01
Other ⁹	0.35	0.38	0.38	0.25	0.25
Total	96.09	109.17	109.10	121.61	120.81
Net Imports - Petroleum	21.12	29.69	29.70	34.69	34.74
Prices (1999 dollars per unit)					
World Oil Price (dollars per barrel) ¹⁰	17.35	21.37	21.37	22.41	22.41
Gas Wellhead Price (dollars per Mcf) ¹¹	2.08	4.33	4.33	4.23	4.48
Coal Minemouth Price (dollars per ton)	17.21	12.44	13.92	11.47	12.82
Average Electric Price (cents per Kwh)	6.6	8.4	8.1	7.7	7.8

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

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

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

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

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

⁶Includes crude oil and petroleum products.

⁷Balancing item. Includes unaccounted for supply, losses, gains, and net storage withdrawals.

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

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

¹⁰Average refiner acquisition cost for imported crude oil.

¹¹Represents lower 48 onshore and offshore supplies.

Btu = British thermal unit.

Mcf = Thousand cubic feet.

Kwh = Kilowatthour.

Note: Totals may not equal sum of components due to independent rounding. Data for 1999 are model results and may differ slightly from official EIA data reports.

Sources: 1999 natural gas values: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2000/06) (Washington, DC, June 2000). 1999 petroleum values: EIA, *Petroleum Supply Annual 1999*, DOE/EIA-0340(99/1) (Washington, DC, June 2000). Other 1999 values: EIA, *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000) and EIA, *Quarterly Coal Report*, DOE/EIA-0121(2000/1Q) (Washington, DC, August 2000). Projections: EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.

Table I2. Energy Consumption by Sector and Source
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
		Energy Consumption			
Residential					
Distillate Fuel	0.86	0.81	0.81	0.77	0.77
Kerosene	0.10	0.07	0.07	0.07	0.07
Liquefied Petroleum Gas	0.46	0.42	0.42	0.41	0.41
Petroleum Subtotal	1.42	1.31	1.31	1.25	1.24
Natural Gas	4.85	5.38	5.38	6.03	5.98
Coal	0.04	0.05	0.05	0.05	0.05
Renewable Energy ¹	0.41	0.42	0.42	0.42	0.42
Electricity	3.91	4.55	4.59	5.41	5.39
Delivered Energy	10.62	11.71	11.75	13.15	13.08
Electricity Related Losses	8.46	8.61	8.65	9.19	9.02
Total	19.09	20.32	20.40	22.34	22.10
Commercial					
Distillate Fuel	0.36	0.47	0.47	0.51	0.52
Residual Fuel	0.10	0.11	0.11	0.11	0.11
Kerosene	0.03	0.03	0.03	0.03	0.03
Liquefied Petroleum Gas	0.08	0.09	0.09	0.10	0.10
Motor Gasoline ²	0.03	0.03	0.03	0.03	0.03
Petroleum Subtotal	0.59	0.72	0.73	0.77	0.78
Natural Gas	3.15	3.60	3.59	3.99	3.91
Coal	0.07	0.07	0.07	0.08	0.08
Renewable Energy ³	0.08	0.08	0.08	0.08	0.08
Electricity	3.70	4.48	4.52	5.18	5.18
Delivered Energy	7.59	8.96	8.99	10.11	10.03
Electricity Related Losses	8.00	8.48	8.52	8.81	8.67
Total	15.59	17.44	17.52	18.91	18.70
Industrial⁴					
Distillate Fuel	1.07	1.29	1.28	1.46	1.46
Liquefied Petroleum Gas	2.32	2.67	2.68	3.04	3.11
Petrochemical Feedstock	1.29	1.53	1.53	1.69	1.69
Residual Fuel	0.22	0.39	0.38	0.41	0.41
Motor Gasoline ²	0.21	0.24	0.24	0.28	0.28
Other Petroleum ⁵	4.29	4.85	4.83	5.41	5.44
Petroleum Subtotal	9.39	10.96	10.95	12.29	12.39
Natural Gas ⁶	9.43	10.77	10.74	12.18	11.94
Metallurgical Coal	0.75	0.60	0.60	0.50	0.49
Steam Coal	1.73	1.92	1.70	2.00	1.78
Net Coal Coke Imports	0.06	0.16	0.16	0.23	0.23
Coal Subtotal	2.54	2.69	2.46	2.72	2.50
Renewable Energy ⁷	2.15	2.64	2.64	3.12	3.15
Electricity	3.63	3.94	3.96	4.32	4.35
Delivered Energy	27.15	31.00	30.75	34.62	34.33
Electricity Related Losses	7.85	7.46	7.46	7.33	7.28
Total	35.00	38.45	38.21	41.96	41.61

Table I2. Energy Consumption by Sector and Source (Continued)
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
Transportation					
Distillate Fuel	5.13	6.87	6.87	8.09	8.08
Jet Fuel ⁸	3.46	4.49	4.49	5.96	5.96
Motor Gasoline ²	15.92	18.94	18.94	21.25	21.24
Residual Fuel	0.74	0.85	0.85	0.86	0.86
Liquefied Petroleum Gas	0.02	0.04	0.04	0.06	0.06
Other Petroleum ⁹	0.26	0.31	0.31	0.35	0.35
Petroleum Subtotal	25.54	31.50	31.50	36.57	36.55
Pipeline Fuel Natural Gas	0.66	0.99	1.01	1.19	1.21
Compressed Natural Gas	0.02	0.09	0.09	0.15	0.15
Renewable Energy (E85) ¹⁰	0.01	0.03	0.03	0.04	0.04
Methanol (M85) ¹¹	0.00	0.00	0.00	0.00	0.00
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00
Electricity	0.06	0.12	0.12	0.17	0.17
Delivered Energy	26.28	32.73	32.75	38.12	38.12
Electricity Related Losses	0.13	0.22	0.22	0.28	0.28
Total	26.41	32.96	32.97	38.40	38.40
Delivered Energy Consumption for All Sectors					
Distillate Fuel	7.42	9.44	9.43	10.82	10.82
Kerosene	0.15	0.13	0.13	0.12	0.12
Jet Fuel ⁸	3.46	4.49	4.49	5.96	5.96
Liquefied Petroleum Gas	2.88	3.23	3.24	3.61	3.67
Motor Gasoline ²	16.17	19.21	19.22	21.56	21.55
Petrochemical Feedstock	1.29	1.53	1.53	1.69	1.69
Residual Fuel	1.05	1.34	1.34	1.38	1.38
Other Petroleum ¹²	4.53	5.13	5.12	5.74	5.77
Petroleum Subtotal	36.95	44.49	44.48	50.87	50.97
Natural Gas ⁵	18.11	20.82	20.81	23.54	23.18
Metallurgical Coal	0.75	0.60	0.60	0.50	0.49
Steam Coal	1.84	2.05	1.82	2.12	1.91
Net Coal Coke Imports	0.06	0.16	0.16	0.23	0.23
Coal Subtotal	2.65	2.81	2.59	2.85	2.63
Renewable Energy ¹³	2.65	3.18	3.18	3.67	3.69
Methanol (M85) ¹¹	0.00	0.00	0.00	0.00	0.00
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00
Electricity	11.29	13.10	13.19	15.07	15.08
Delivered Energy	71.65	84.40	84.25	96.00	95.56
Electricity Related Losses	24.44	24.76	24.85	25.61	25.25
Total	96.09	109.17	109.10	121.61	120.81
Electric Generators¹⁴					
Distillate Fuel	0.05	0.03	0.02	0.02	0.02
Residual Fuel	1.03	0.11	0.15	0.08	0.10
Petroleum Subtotal	1.08	0.13	0.17	0.10	0.11
Natural Gas	3.85	11.74	12.07	15.67	16.48
Steam Coal	18.80	10.40	10.36	8.22	7.93
Nuclear Power	7.79	7.91	7.91	7.32	7.24
Renewable Energy ¹⁵	3.86	7.31	7.17	9.12	8.32
Electricity Imports ¹⁶	0.35	0.37	0.37	0.24	0.24
Total	35.73	37.86	38.04	40.68	40.32

Table I2. Energy Consumption by Sector and Source (Continued)
(Quadrillion Btu per Year, Unless Otherwise Noted)

Sector and Source	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
		Total Energy Consumption			
Distillate Fuel	7.47	9.46	9.45	10.84	10.84
Kerosene	0.15	0.13	0.13	0.12	0.12
Jet Fuel ⁸	3.46	4.49	4.49	5.96	5.96
Liquefied Petroleum Gas	2.88	3.23	3.24	3.61	3.67
Motor Gasoline ²	16.17	19.21	19.22	21.56	21.55
Petrochemical Feedstock	1.29	1.53	1.53	1.69	1.69
Residual Fuel	2.08	1.45	1.49	1.46	1.48
Other Petroleum ¹²	4.53	5.13	5.12	5.74	5.77
Petroleum Subtotal	38.03	44.62	44.65	50.98	51.09
Natural Gas	21.95	32.55	32.87	39.21	39.66
Metallurgical Coal	0.75	0.60	0.60	0.50	0.49
Steam Coal	20.64	12.45	12.18	10.35	9.83
Net Coal Coke Imports	0.06	0.16	0.16	0.23	0.23
Coal Subtotal	21.45	13.21	12.94	11.07	10.55
Nuclear Power	7.79	7.91	7.91	7.32	7.24
Renewable Energy ¹⁷	6.51	10.49	10.35	12.79	12.01
Methanol (M85) ¹¹	0.00	0.00	0.00	0.00	0.00
Liquid Hydrogen	0.00	0.00	0.00	0.00	0.00
Electricity Imports ¹⁶	0.35	0.37	0.37	0.24	0.24
Total	96.09	109.17	109.10	121.61	120.81
Energy Use and Related Statistics					
Delivered Energy Use	71.65	84.40	84.25	96.00	95.56
Total Energy Use	96.09	109.17	109.10	121.61	120.81
Population (millions)	273.13	300.17	300.17	325.24	325.24
Gross Domestic Product (billion 1996 dollars)	8876	12630	12632	16521	16521
Total Carbon Dioxide Emissions (million metric tons carbon equivalent) ...	1510.8	1562.5	1560.0	1711.9	1706.5

¹Includes wood used for residential heating.

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

³Includes commercial sector electricity cogenerated by using wood and wood waste, landfill gas, municipal solid waste, and other biomass.

⁴Fuel consumption includes consumption for cogeneration, which produces electricity and other useful thermal energy.

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

⁶Includes lease and plant fuel and consumption by cogenerators, excludes consumption by nonutility generators.

⁷Includes consumption of energy from hydroelectric, wood and wood waste, municipal solid waste, and other biomass; includes cogeneration, both for sale to the grid and for own use.

⁸Includes only kerosene type.

⁹Includes aviation gas and lubricants.

¹⁰E85 is 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable).

¹¹M85 is 85 percent methanol and 15 percent motor gasoline.

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

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

¹⁴Includes consumption of energy by all electric power generators for grid-connected power except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators.

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

¹⁶In 1998 approximately 70 percent of the U.S. electricity imports were provided by renewable sources (hydroelectricity); EIA does not project future proportions for the fuel source of imported electricity.

¹⁷Includes 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 1999 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: 1999 electric utility fuel consumption: Energy Information Administration, (EIA) *Electric Power Annual 1998, Volume 1*, DOE/EIA-0348(98)/1 (Washington, DC, April 1999). 1999 nonutility consumption estimates: EIA, Form EIA-860B: "Annual Electric Generator Report - Nonutility." Other 1999 values: EIA, *Short-Term Energy Outlook, September 2000*, <http://www.eia.doe.gov/pub/forecasting/steo/oldsteos/sep00.pdf>. Projections: EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.

Table I3. Energy Prices by Sector and Source
(1999 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
Residential	13.12	16.57	16.31	16.11	16.41
Primary Energy ¹	6.72	8.19	8.18	7.91	8.10
Petroleum Products ²	7.55	9.32	9.34	9.72	9.80
Distillate Fuel	6.27	7.45	7.46	7.99	8.03
Liquefied Petroleum Gas	10.36	12.97	13.03	13.02	13.23
Natural Gas	6.52	7.97	7.97	7.59	7.80
Electricity	23.46	28.99	28.25	27.24	27.62
Commercial	13.20	16.51	16.09	15.44	15.80
Primary Energy ¹	5.22	6.68	6.68	6.59	6.77
Petroleum Products ²	5.00	6.05	6.06	6.41	6.44
Distillate Fuel	4.37	5.21	5.21	5.75	5.77
Residual Fuel	2.63	3.69	3.69	3.84	3.85
Natural Gas ³	5.34	6.92	6.92	6.73	6.94
Electricity	21.44	26.13	25.23	23.71	24.12
Industrial⁴	5.32	6.90	6.86	6.80	7.02
Primary Energy	3.92	5.02	5.07	5.22	5.40
Petroleum Products ²	5.55	6.06	6.09	6.37	6.45
Distillate Fuel	4.65	5.40	5.40	5.99	6.01
Liquefied Petroleum Gas	8.50	8.10	8.16	8.14	8.34
Residual Fuel	2.78	3.34	3.34	3.49	3.50
Natural Gas ⁵	2.79	4.81	4.81	4.84	5.06
Metallurgical Coal	1.65	1.54	1.53	1.44	1.43
Steam Coal	1.43	1.17	1.18	1.05	1.05
Electricity	13.02	17.72	16.93	15.94	16.22
Transportation	8.30	9.58	9.57	9.34	9.34
Primary Energy	8.29	9.55	9.55	9.31	9.32
Petroleum Products ²	8.28	9.54	9.54	9.31	9.31
Distillate Fuel ⁶	8.22	8.92	8.93	9.05	9.06
Jet Fuel ⁷	4.70	5.46	5.46	5.88	5.88
Motor Gasoline ⁸	9.45	11.11	11.10	10.68	10.68
Residual Fuel	2.46	3.18	3.18	3.33	3.33
Liquid Petroleum Gas ⁹	12.87	14.28	14.32	14.01	14.26
Natural Gas ¹⁰	7.02	8.47	8.47	8.30	8.49
Ethanol (E85) ¹¹	14.42	19.28	19.28	19.50	19.52
Methanol (M85) ¹²	10.38	14.33	14.26	14.42	14.42
Electricity	15.60	16.75	15.70	14.78	14.76
Average End-Use Energy	8.53	10.46	10.38	10.16	10.32
Primary Energy	6.33	7.65	7.68	7.61	7.72
Electricity	19.40	24.51	23.71	22.65	22.99
Electric Generators¹³					
Fossil Fuel Average	1.49	2.88	2.95	3.41	3.66
Petroleum Products	2.49	4.09	3.93	4.58	4.41
Distillate Fuel	4.05	4.80	4.83	5.26	5.28
Residual Fuel	2.41	3.92	3.80	4.42	4.28
Natural Gas	2.54	4.62	4.71	4.77	5.03
Steam Coal	1.21	0.89	0.88	0.79	0.78

Table I3. Energy Prices by Sector and Source (Continued)
(1999 Dollars per Million Btu, Unless Otherwise Noted)

Sector and Source	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
		Average Price to All Users¹⁴			
Petroleum Products ²	7.44	8.69	8.69	8.63	8.65
Distillate Fuel	7.27	8.12	8.13	8.40	8.42
Jet Fuel	4.70	5.46	5.46	5.88	5.88
Liquefied Petroleum Gas	8.84	8.92	8.97	8.88	9.06
Motor Gasoline ⁸	9.45	11.11	11.10	10.68	10.68
Residual Fuel	2.48	3.31	3.32	3.48	3.48
Natural Gas	4.05	5.57	5.60	5.49	5.71
Coal	1.23	0.94	0.93	0.84	0.84
Ethanol (E85) ¹¹	14.42	19.28	19.28	19.50	19.52
Methanol (M85) ¹²	10.38	14.33	14.26	14.42	14.42
Electricity	19.40	24.51	23.71	22.65	22.99
Non-Renewable Energy Expenditures					
by Sector (billion 1999 dollars)					
Residential	134.06	187.16	184.84	205.19	207.73
Commercial	99.15	146.52	143.43	154.75	157.20
Industrial	110.64	161.79	158.90	176.47	180.28
Transportation	212.64	303.38	303.22	343.98	343.96
Total Non-Renewable Expenditures	556.48	798.85	790.39	880.39	889.17
Transportation Renewable Expenditures	0.14	0.62	0.62	0.86	0.86
Total Expenditures	556.62	799.46	791.01	881.24	890.02

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

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

³Excludes independent power producers.

⁴Includes cogenerators.

⁵Excludes uses for lease and plant fuel.

⁶Low sulfur diesel fuel. Price includes Federal and State taxes while excluding county and local taxes.

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

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

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

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

¹¹E85 is 85 percent ethanol (renewable) and 15 percent motor gasoline (nonrenewable).

¹²M85 is 85 percent methanol and 15 percent motor gasoline.

¹³Includes all electric power generators except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators.

¹⁴Weighted 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 1999 are model results and may differ slightly from official EIA data reports.

Sources: 1999 prices for gasoline, distillate, and jet fuel are based on prices in various issues of Energy Information Administration (EIA), *Petroleum Marketing Monthly*, DOE/EIA-0380 (99/03-2000/04) (Washington, DC, 1999-2000). 1999 prices for all other petroleum products are derived from the EIA, *State Energy Price and Expenditure Report 1997*, DOE/EIA-0376(97) (Washington, DC, July 2000). 1999 industrial gas delivered prices are based on EIA, *Manufacturing Energy Consumption Survey 1994*. 1999 residential and commercial natural gas delivered prices: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2000/06) (Washington, DC, June 2000). 1999 coal prices based on EIA, *Quarterly Coal Report*, DOE/EIA-0121(2000/1Q) (Washington, DC, August 2000), and EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A. 1999 electricity prices for commercial, industrial, and transportation: EIA, AEO2001 National Energy Modeling System runs MCBASE.D082400A, MCNOX05.D082400A, and MCNOX08.D082500A.

Projections: EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.

Table I4. Electricity Supply, Disposition, Prices, and Emissions
(Billion Kilowatthours, Unless Otherwise Noted)

Supply, Disposition, and Prices	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
Generation by Fuel Type					
Electric Generators¹					
Coal	1834	1035	997	818	768
Petroleum	100	14	17	11	12
Natural Gas ²	370	1575	1668	2267	2388
Nuclear Power	730	741	741	686	678
Pumped Storage	-1	-1	-1	-1	-1
Renewable Sources ³	353	519	513	652	610
Total	3386	3884	3935	4434	4457
Non-Utility Generation for Own Use	16	20	22	20	22
Distributed Generation	0	0	0	0	0
Cogenerators⁴					
Coal	47	51	34	51	34
Petroleum	9	10	10	10	10
Natural Gas	206	328	320	487	468
Other Gaseous Fuels ⁵	4	7	7	8	8
Renewable Sources ³	31	39	39	48	49
Other ⁶	5	5	5	5	5
Total	302	441	416	610	575
Other End-Use Generators⁷	5	5	5	5	5
Sales to Utilities	150	190	171	240	222
Generation for Own Use	156	255	250	375	358
Net Imports⁸	33	35	35	23	23
Electricity Sales by Sector					
Residential	1146	1334	1345	1584	1580
Commercial	1083	1314	1325	1519	1518
Industrial	1063	1156	1160	1265	1274
Transportation	17	34	34	48	48
Total	3309	3839	3866	4416	4419
End-Use Prices (1999 cents per kwh)⁹					
Residential	8.0	9.9	9.6	9.3	9.4
Commercial	7.3	8.9	8.6	8.1	8.2
Industrial	4.4	6.0	5.8	5.4	5.5
Transportation	5.3	5.7	5.4	5.0	5.0
All Sectors Average	6.6	8.4	8.1	7.7	7.8
Prices by Service Category⁹					
(1999 cents per kwh)					
Generation	4.1	5.6	5.3	5.0	5.2
Transmission	0.6	0.8	0.8	0.7	0.7
Distribution	2.0	2.1	2.1	2.0	2.0
Emissions (million short tons)					
Sulfur Dioxide	13.79	3.92	0.98	3.27	0.73
Nitrogen Oxide	5.46	1.31	0.85	1.14	0.78

¹Includes grid-connected generation at all utilities and nonutilities except for cogenerators. Includes small power producers and exempt wholesale generators.

²Includes electricity generation by fuel cells.

³Includes conventional hydroelectric, geothermal, wood, wood waste, municipal solid waste, landfill gas, other biomass, solar, and wind power.

⁴Cogenerators produce electricity and other useful thermal energy. Includes sales to utilities and generation for own use.

⁵Other gaseous fuels include refinery and still gas.

⁶Other includes hydrogen, sulfur, batteries, chemicals, fish oil, and spent sulfite liquor.

⁷Includes 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.

⁸In 1998 approximately 70 percent of the U.S. electricity imports were provided by renewable sources (hydroelectricity); EIA does not project future proportions for the fuel source of imported electricity.

⁹Prices represent average revenue per kilowatthour.

Kwh = Kilowatthour.

Note: Totals may not equal sum of components due to independent rounding. Data for 1999 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.

**Table I5. Electricity Generating Capability
(Gigawatts)**

Net Summer Capability ¹	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
		Electric Generators²			
Capability					
Coal Steam	306.2	232.8	174.6	213.2	173.9
Other Fossil Steam ³	138.2	105.0	100.6	97.8	97.3
Combined Cycle	20.2	185.6	210.7	288.9	305.8
Combustion Turbine/Diesel	79.9	118.0	140.2	163.2	191.2
Nuclear Power	97.4	96.9	96.9	88.4	87.3
Pumped Storage	19.3	19.5	19.5	19.5	19.5
Fuel Cells	0.0	0.1	0.1	0.3	0.3
Renewable Sources ⁴	88.1	107.0	106.2	137.7	129.7
Distributed Generation ⁵	0.0	1.7	2.1	5.2	7.1
Total	749.4	866.6	851.0	1014.1	1012.1
Cumulative Planned Additions⁶					
Coal Steam	0.0	0.0	0.0	0.0	0.0
Other Fossil Steam ³	0.0	0.1	0.1	0.1	0.1
Combined Cycle	0.0	8.3	8.3	8.3	8.3
Combustion Turbine/Diesel	0.0	0.7	0.7	0.7	0.7
Nuclear Power	0.0	0.0	0.0	0.0	0.0
Pumped Storage	0.0	0.0	0.0	0.0	0.0
Fuel Cells	0.0	0.1	0.1	0.3	0.3
Renewable Sources ⁴	0.0	4.3	4.3	5.4	5.4
Distributed Generation ⁵	0.0	0.0	0.0	0.0	0.0
Total	0.0	13.6	13.6	14.8	14.8
Cumulative Unplanned Additions⁶					
Coal Steam	0.0	0.0	0.0	0.0	0.0
Other Fossil Steam ³	0.0	0.0	0.0	0.0	0.0
Combined Cycle	0.0	157.5	182.7	260.8	278.1
Combustion Turbine/Diesel	0.0	45.3	66.6	90.9	118.0
Nuclear Power	0.0	0.0	0.0	0.0	0.0
Pumped Storage	0.0	0.0	0.0	0.0	0.0
Fuel Cells	0.0	0.0	0.0	0.0	0.0
Renewable Sources ⁴	0.0	14.2	13.4	43.8	35.8
Distributed Generation ⁵	0.0	1.7	2.1	5.2	7.1
Total	0.0	218.7	264.8	400.7	438.9
Cumulative Total Additions	0.0	232.3	278.4	415.5	453.7
Cumulative Retirements⁷					
Coal Steam	0.0	74.2	133.4	93.8	134.0
Other Fossil Steam	0.0	33.1	38.5	40.3	41.8
Combined Cycle	0.0	0.5	0.6	0.6	0.9
Combustion Turbine/Diesel	0.0	8.2	8.9	8.5	9.2
Nuclear Power	0.0	0.6	0.6	9.1	10.2
Pumped Storage	0.0	0.0	0.0	0.0	0.0
Fuel Cells	0.0	0.0	0.0	0.0	0.0
Renewable Sources	0.0	0.1	0.1	0.1	0.1
Total	0.0	116.7	182.2	152.5	196.3
Cogenerators⁸					
Capability					
Coal	8.4	8.9	5.8	8.9	5.8
Petroleum	2.7	2.8	2.8	2.8	2.8
Natural Gas	33.8	52.1	51.5	74.8	72.1
Other Gaseous Fuels	0.2	0.9	0.9	1.1	1.1
Renewable Sources ⁴	5.3	6.8	6.8	8.3	8.5
Other	1.1	0.9	0.9	0.9	0.9
Total	51.6	72.3	68.7	96.9	91.2
Cumulative Additions⁶	0.0	20.7	17.1	45.2	39.5

Table I5. Electricity Generating Capability (Continued)
(Gigawatts)

Net Summer Capability ¹	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
Other End-Use Generators⁹					
Renewable Sources	1.0	1.3	1.3	1.3	1.3
Cumulative Additions	0.0	0.3	0.3	0.3	0.3

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

²Includes grid-connected utilities and nonutilities except for cogenerators. Includes small power producers and exempt wholesale generators.

³Includes oil-, gas-, and dual-fired capability.

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

⁵Primarily peak-load capacity fueled by natural gas.

⁶Cumulative additions after December 31, 1999.

⁷Cumulative total retirements after December 31, 1999.

⁸Nameplate capacity is reported for nonutilities on Form EIA-860B: "Annual Electric Generator Report - Nonutility." Nameplate capacity is designated by the manufacturer. The nameplate capacity has been converted to the net summer capability based on historic relationships.

⁹Includes 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.

Note: Totals may not equal sum of components due to independent rounding. Data for 1999 are model results and may differ slightly from official EIA data reports. Net summer capability has been estimated for nonutility generators to be consistent with capability for electric utility generators.

Source: Energy Information Administration, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.

Table I6. Electricity Trade
(Billion Kilowatthours, Unless Otherwise Noted)

Electricity Trade	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
		Interregional Electricity Trade			
Gross Domestic Firm Power Trade	182.2	102.9	102.9	0.0	0.0
Gross Domestic Economy Trade	147.3	90.5	156.3	148.4	169.2
Gross Domestic Trade	329.5	193.4	259.2	148.4	169.2
Gross Domestic Sales					
Gross Domestic Firm Power Sales (million 1999 dollars)	8588.1	4851.2	4851.2	0.0	0.0
Gross Domestic Economy Sales (million 1999 dollars)	4264.5	4416.1	7037.4	6311.3	7444.6
Gross Domestic Sales (million 1999 dollars)	12852.7	9267.4	11888.7	6311.3	7444.6
International Electricity Trade					
Firm Power Imports From Canada and Economy Imports From Canada and Mexico ¹ .	27.0	5.8	5.8	0.0	0.0
Gross Imports From Canada and Mexico¹ .	48.9	51.7	51.7	30.6	30.6
Firm Power Exports To Canada and Mexico .	9.2	8.7	8.7	0.0	0.0
Economy Exports To Canada and Mexico . . .	6.3	7.7	7.7	7.7	7.7
Gross Exports To Canada and Mexico . . .	15.5	16.4	16.4	7.7	7.7

¹Historically electricity imports were primarily from renewable resources, principally hydroelectric.

Note: Totals may not equal sum of components due to independent rounding. Data for 1999 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, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.

Table 17. Natural Gas Supply and Disposition
(Trillion Cubic Feet per Year)

Supply, Disposition, and Prices	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
Production					
Dry Gas Production ¹	18.67	25.57	25.86	30.75	31.11
Supplemental Natural Gas ²	0.10	0.06	0.06	0.06	0.06
Net Imports	3.38	6.37	6.39	7.68	7.76
Canada	3.29	5.28	5.30	6.00	6.09
Mexico	-0.01	0.32	0.32	0.36	0.36
Liquefied Natural Gas	0.10	0.77	0.77	1.32	1.32
Total Supply	22.15	32.00	32.31	38.48	38.93
Consumption by Sector					
Residential	4.72	5.24	5.24	5.87	5.82
Commercial	3.07	3.50	3.50	3.89	3.81
Industrial ³	7.95	8.87	8.83	9.94	9.69
Electric Generators ⁴	3.77	11.52	11.84	15.38	16.17
Lease and Plant Fuel ⁵	1.23	1.61	1.63	1.92	1.94
Pipeline Fuel	0.64	0.97	0.98	1.16	1.18
Transportation ⁶	0.02	0.09	0.09	0.14	0.14
Total	21.41	31.79	32.11	38.30	38.75
Discrepancy⁷	0.74	0.21	0.20	0.18	0.18

¹Marketed production (wet) minus extraction losses.

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

³Includes consumption by cogenerators.

⁴Includes all electric power generators except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators.

⁵Represents natural gas used in the field gathering and processing plant machinery.

⁶Compressed natural gas used as vehicle fuel.

⁷Balancing 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, 1998 values include net storage injections.

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 1999 are model results and may differ slightly from official EIA data reports.

Sources: 1999 supplemental natural gas: Energy Information Administration (EIA), *Natural Gas Monthly*, DOE/EIA-0130(2000/06) (Washington, DC, June 2000). 1999 transportation sector consumption: EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A. Other 1999 consumption: EIA, *Short-Term Energy Outlook, September 2000*, <http://www.eia.doe.gov/pub/forecasting/steo/oldsteos/sep00.pdf> with adjustments to end-use sector consumption levels for consumption of natural gas by electric wholesale generators based on EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A. Projections: EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.

Table I8. Natural Gas Prices, Margins, and Revenue
(1999 Dollars per Thousand Cubic Feet, Unless Otherwise Noted)

Prices, Margins, and Revenue	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
Source Price					
Average Lower 48 Wellhead Price ¹	2.08	4.33	4.33	4.23	4.48
Average Import Price	2.29	2.88	2.88	3.19	3.27
Average²	2.11	4.04	4.04	4.02	4.24
Delivered Prices					
Residential	6.69	8.19	8.18	7.79	8.01
Commercial	5.49	7.10	7.10	6.91	7.13
Industrial ³	2.87	4.94	4.94	4.97	5.20
Electric Generators ⁴	2.59	4.71	4.80	4.86	5.13
Transportation ⁵	7.21	8.70	8.70	8.52	8.72
Average⁶	4.16	5.71	5.74	5.64	5.86
Transmission & Distribution Margins⁷					
Residential	4.58	4.15	4.14	3.77	3.78
Commercial	3.37	3.07	3.06	2.88	2.89
Industrial ³	0.75	0.90	0.90	0.95	0.97
Electric Generators ⁴	0.47	0.67	0.76	0.84	0.89
Transportation ⁵	5.10	4.66	4.66	4.50	4.48
Average⁶	2.04	1.68	1.70	1.61	1.63
Transmission & Distribution Revenue (billion 1999 dollars)					
Residential	21.61	21.75	21.70	22.14	21.98
Commercial	10.36	10.74	10.71	11.21	11.01
Industrial ³	6.00	7.99	7.97	9.42	9.35
Electric Generators ⁴	1.79	7.77	9.03	12.91	14.44
Transportation ⁵	0.08	0.40	0.40	0.64	0.63
Total	39.84	48.65	49.82	56.31	57.42

¹Represents lower 48 onshore and offshore supplies.

²Quantity-weighted average of the average lower 48 wellhead price and the average price of imports at the U.S. border.

³Includes consumption by cogenerators.

⁴Includes all electric power generators except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators.

⁵Compressed natural gas used as a vehicle fuel. Price includes estimated motor vehicle fuel taxes.

⁶Weighted average prices and margins. Weights used are the sectoral consumption values excluding lease, plant, and pipeline fuel.

⁷Within 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 1999 are model results and may differ slightly from official EIA data reports.

Sources: 1999 industrial delivered prices based on Energy Information Administration (EIA), *Manufacturing Energy Consumption Survey 1994*. 1999 residential and commercial delivered prices, average lower 48 wellhead price, and average import price: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2000/06) (Washington, DC, June 2000). **Other 1999 values, and projections:** EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.

Table I9. Oil and Gas Supply

Production and Supply	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
		Crude Oil			
Lower 48 Average Wellhead Price¹ (1999 dollars per barrel)	16.49	20.72	20.71	21.46	21.47
Production (million barrels per day)²					
U.S. Total	5.88	5.18	5.17	5.41	5.43
Lower 48 Onshore	3.27	2.56	2.56	2.74	2.77
Conventional	2.59	1.95	1.95	2.10	2.12
Enhanced Oil Recovery	0.68	0.61	0.61	0.64	0.64
Lower 48 Offshore	1.56	1.97	1.96	2.02	2.02
Alaska	1.05	0.64	0.64	0.64	0.64
Lower 48 End of Year Reserves (billion	18.33	14.32	14.22	14.48	14.43
Natural Gas					
Lower 48 Average Wellhead Price¹ (1999 dollars per thousand cubic feet) . . .	2.08	4.33	4.33	4.23	4.48
Production (trillion cubic feet)³					
U.S. Total	18.67	25.57	25.86	30.75	31.11
Lower 48 Onshore	12.83	18.49	18.65	22.49	22.73
Associated-Dissolved ⁴	1.80	1.41	1.41	1.42	1.43
Non-Associated	11.03	17.09	17.24	21.07	21.30
Conventional	6.64	9.47	9.64	10.60	10.82
Unconventional	4.39	7.61	7.60	10.47	10.49
Lower 48 Offshore	5.43	6.58	6.71	7.69	7.81
Associated-Dissolved ⁴	0.93	1.05	1.05	1.07	1.07
Non-Associated	4.50	5.52	5.65	6.62	6.74
Alaska	0.42	0.50	0.50	0.57	0.57
Lower 48 End of Year Reserves³ (trillion cubic feet)	157.41	186.99	187.02	223.15	221.84
Supplemental Gas Supplies (trillion cubic	0.10	0.06	0.06	0.06	0.06
Total Lower 48 Wells (thousands)	17.94	39.46	39.41	50.85	52.51

¹Represents lower 48 onshore and offshore supplies.

²Includes lease condensate.

³Market production (wet) minus extraction losses.

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

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

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 1999 are model results and may differ slightly from official EIA data reports.

Sources: 1999 lower 48 onshore, lower 48 offshore, and Alaska crude oil production: Energy Information Administration (EIA), *Petroleum Supply Annual 1999*, DOE/EIA-0340(99/1) (Washington, DC, June 2000). 1999 natural gas lower 48 average wellhead price, Alaska and total natural gas production, and supplemental gas supplies: EIA, *Natural Gas Monthly*, DOE/EIA-0130(2000/06) (Washington, DC, June 2000). Other 1999 values: EIA, Office of Integrated Analysis and Forecasting. Projections: EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.

Table I10. Coal Supply, Disposition, and Prices
(Million Short Tons per Year, Unless Otherwise Noted)

Supply, Disposition, and Prices	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
Production¹					
Appalachia	434	257	260	213	214
Interior	185	84	132	72	107
West	485	353	282	296	231
East of the Mississippi	561	313	351	264	291
West of the Mississippi	543	381	323	317	261
Total	1104	695	674	581	552
Net Imports					
Imports	9	9	9	9	9
Exports	58	60	58	58	58
Total	-49	-51	-49	-49	-49
Total Supply²	1055	644	625	532	503
Consumption by Sector					
Residential and Commercial	5	5	5	5	5
Industrial ³	79	88	78	92	82
Coke Plants	28	23	23	19	18
Electric Generators ⁴	922	527	515	419	394
Total	1034	642	621	534	500
Discrepancy and Stock Change⁵	22	1	4	-2	3
Average Minemouth Price					
(1999 dollars per short ton)	17.21	12.44	13.92	11.47	12.82
(1999 dollars per million Btu)	0.82	0.60	0.66	0.55	0.61
Delivered Prices (1999 dollars per short					
Industrial	31.44	25.51	25.59	22.92	22.80
Coke Plants	44.27	41.16	40.99	38.58	38.36
Electric Generators					
(1999 dollars per short ton)	24.76	17.56	17.70	15.45	15.72
(1999 dollars per million Btu)	1.21	0.89	0.88	0.79	0.78
Average	25.81	19.50	19.55	17.55	17.74
Exports ⁷	37.45	34.12	33.44	31.20	30.85

¹Includes anthracite, bituminous coal, lignite, and waste coal delivered to independent power producers. Waste coal deliveries totaled 8.5 million tons in 1995, 8.8 million tons in 1996, 8.1 million tons in 1997, 8.6 million tons in 1998, and are projected to reach 9.6 million tons in 1999, and 12.2 million tons in 2000.

²Production plus net imports and net storage withdrawals.

³Includes consumption by cogenerators.

⁴Includes all electric power generators except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators.

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

⁶Sectoral prices weighted by consumption tonnage; weighted average excludes residential/ commercial prices and export free-alongside-ship (f.a.s.) prices.

⁷F.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 1999 are model results and may differ slightly from official EIA data reports.

Sources: 1999 data based on Energy Information Administration (EIA), *Quarterly Coal Report*, DOE/EIA-0121(2000/1Q) (Washington, DC, August 2000), and EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A. **Projections:** EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.

Table I11. Renewable Energy Generating Capability and Generation
(Gigawatts, Unless Otherwise Noted)

Capacity and Generation	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
		Electric Generators¹			
(excluding cogenerators)					
Net Summer Capability					
Conventional Hydropower	78.14	80.21	80.04	80.21	80.05
Geothermal ²	2.87	12.14	11.81	15.25	13.10
Municipal Solid Waste ³	2.59	4.37	4.31	4.90	4.90
Wood and Other Biomass ⁴	1.52	3.17	3.40	12.05	10.81
Solar Thermal	0.33	0.40	0.40	0.48	0.48
Solar Photovoltaic	0.01	0.21	0.21	0.54	0.54
Wind	2.60	6.54	6.05	24.30	19.85
Total	88.07	107.03	106.23	137.73	129.73
Generation (billion kilowatthours)					
Conventional Hydropower	307.43	303.96	303.41	302.90	302.34
Geothermal ²	13.07	96.22	93.62	120.79	103.85
Municipal Solid Waste ³	18.05	31.32	30.89	35.39	35.34
Wood and Other Biomass ⁴	9.52	71.10	69.90	120.00	108.64
Dedicated Plants	7.56	18.46	20.02	77.93	69.69
Cofiring	1.96	52.65	49.88	42.07	38.95
Solar Thermal	0.89	1.11	1.11	1.37	1.37
Solar Photovoltaic	0.03	0.51	0.51	1.36	1.36
Wind	4.46	15.20	13.87	70.21	57.32
Total	353.45	519.42	513.32	652.01	610.23
Cogenerators⁵					
Net Summer Capability					
Municipal Solid Waste	0.70	0.70	0.70	0.70	0.70
Biomass	4.65	6.06	6.07	7.65	7.81
Total	5.35	6.76	6.77	8.34	8.51
Generation (billion kilowatthours)					
Municipal Solid Waste	4.03	4.03	4.03	4.03	4.03
Biomass	27.08	34.95	34.98	44.10	45.16
Total	31.10	38.97	39.00	48.12	49.19
Other End-Use Generators⁶					
Net Summer Capability					
Conventional Hydropower ⁷	0.99	0.99	0.99	0.99	0.99
Geothermal	0.00	0.00	0.00	0.00	0.00
Solar Photovoltaic	0.01	0.35	0.35	0.35	0.35
Total	1.00	1.34	1.34	1.34	1.34
Generation (billion kilowatthours)					
Conventional Hydropower ⁷	4.57	4.43	4.43	4.41	4.41
Geothermal	0.00	0.00	0.00	0.00	0.00
Solar Photovoltaic	0.02	0.75	0.75	0.75	0.75
Total	4.59	5.18	5.18	5.17	5.17

¹Includes grid-connected utilities and nonutilities other than cogenerators. These nonutility facilities include small power producers and exempt wholesale generators.

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

³Includes landfill gas.

⁴Includes projections for energy crops after 2010.

⁵Cogenerators produce electricity and other useful thermal energy.

⁶Includes 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.

⁷Represents own-use industrial hydroelectric power.

Notes: Totals may not equal sum of components due to independent rounding. Data for 1999 are model results and may differ slightly from official EIA data reports. Net summer capability has been estimated for nonutility generators for AEO2001. Net summer capability 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: 1999 electric utility capability: Energy Information Administration (EIA), Form EIA-860A: "Annual Electric Generator Report - Utility." 1999 nonutility and cogenerator capability: EIA, Form EIA-860B: "Annual Electric Generator Report - Nonutility." 1999 generation: EIA, *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000). Projections: EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.

Table I12. Renewable Energy Consumption by Sector and Source¹
(Quadrillion Btu per Year)

Sector and Source	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
		Marketed Renewable Energy²			
Residential	0.41	0.42	0.42	0.42	0.42
Wood	0.41	0.42	0.42	0.42	0.42
Commercial	0.08	0.08	0.08	0.08	0.08
Biomass	0.08	0.08	0.08	0.08	0.08
Industrial³	2.15	2.64	2.64	3.12	3.15
Conventional Hydroelectric	0.18	0.18	0.18	0.18	0.18
Municipal Solid Waste	0.00	0.00	0.00	0.00	0.00
Biomass	1.97	2.46	2.46	2.93	2.96
Transportation	0.12	0.21	0.21	0.24	0.24
Ethanol used in E85 ⁴	0.00	0.03	0.03	0.03	0.03
Ethanol used in Gasoline Blending	0.12	0.19	0.19	0.21	0.21
Electric Generators⁵	3.86	7.31	7.17	9.12	8.32
Conventional Hydroelectric	3.17	3.13	3.12	3.11	3.11
Geothermal	0.27	2.84	2.72	3.59	3.03
Municipal Solid Waste ⁶	0.25	0.43	0.42	0.48	0.48
Biomass	0.12	0.75	0.75	1.18	1.09
Dedicated Plants	0.10	0.19	0.21	0.77	0.70
Cofiring	0.03	0.55	0.53	0.41	0.39
Solar Thermal	0.01	0.02	0.02	0.03	0.03
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00
Wind	0.05	0.16	0.14	0.72	0.59
Total Marketed Renewable Energy	6.62	10.67	10.53	12.99	12.21
Non-Marketed Renewable Energy⁷					
Selected Consumption					
Residential	0.02	0.03	0.03	0.03	0.04
Solar Hot Water Heating	0.01	0.00	0.00	0.00	0.00
Geothermal Heat Pumps	0.02	0.03	0.03	0.03	0.03
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00
Commercial	0.02	0.03	0.03	0.03	0.03
Solar Thermal	0.02	0.02	0.02	0.03	0.03
Solar Photovoltaic	0.00	0.00	0.00	0.00	0.00
Ethanol					
From Corn	0.12	0.19	0.19	0.17	0.17
From Cellulose	0.00	0.02	0.02	0.07	0.07
Total	0.12	0.21	0.21	0.24	0.24

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

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

³Includes all electricity production by industrial and other cogenerators for the grid and for own use.

⁴Excludes motor gasoline component of E85.

⁵Includes renewable energy delivered to the grid from electric utilities and nonutilities. Renewable energy used in generating electricity for own use is included in the individual sectoral electricity energy consumption values.

⁶Includes landfill gas.

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

Btu = British thermal unit.

Note: Totals may not equal sum of components due to independent rounding. Data for 1999 are model results and may differ slightly from official EIA data reports.

Sources: 1999 ethanol: Energy Information Administration (EIA), *Annual Energy Review 1999*, DOE/EIA-0384(99) (Washington, DC, July 2000). 1999 electric generators: EIA, Form EIA-860A: "Annual Electric Generator Report - Utility," and EIA, Form EIA-860B: "Annual Electric Generator Report - Nonutility." Other 1999: EIA, Office of Integrated Analysis and Forecasting. Projections: EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.

Table I13. Carbon Dioxide Emissions by Sector and Source
(Million Metric Tons Carbon Equivalent per Year)

Sector and Source	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
Residential					
Petroleum	26.0	24.8	24.7	23.5	23.5
Natural Gas	69.5	77.5	77.4	86.9	86.1
Coal	1.1	1.3	1.3	1.2	1.2
Electricity	192.6	152.3	153.8	157.3	158.0
Total	289.3	255.9	257.3	269.0	268.8
Commercial					
Petroleum	13.7	14.2	14.2	15.1	15.4
Natural Gas	45.4	51.8	51.7	57.5	56.3
Coal	1.7	1.9	1.9	2.0	2.0
Electricity	182.1	150.1	151.5	150.8	151.8
Total	242.9	217.9	219.3	225.4	225.5
Industrial¹					
Petroleum	104.2	112.7	112.4	125.1	126.9
Natural Gas ²	141.6	152.7	152.3	172.8	169.3
Coal	55.9	68.1	62.4	69.0	63.4
Electricity	178.8	131.9	132.6	125.6	127.4
Total	480.4	465.4	459.8	492.4	487.1
Transportation					
Petroleum ³	485.8	603.8	603.8	700.9	700.6
Natural Gas ⁴	9.5	15.5	15.8	19.3	19.6
Other ⁵	0.0	0.1	0.1	0.1	0.1
Electricity	2.9	3.9	3.9	4.8	4.9
Total³	498.2	623.4	623.6	725.1	725.1
Total Carbon Dioxide Emissions by Delivered Fuel					
Petroleum ³	629.7	755.4	755.2	864.6	866.4
Natural Gas	266.0	297.4	297.2	336.4	331.3
Coal	58.8	71.3	65.6	72.2	66.6
Other ⁵	0.0	0.1	0.1	0.1	0.1
Electricity	556.3	438.3	441.9	438.6	442.1
Total³	1510.8	1562.5	1560.0	1711.9	1706.5
Electric Generators⁶					
Petroleum	20.0	2.7	3.5	2.1	2.4
Natural Gas	45.8	169.0	173.8	225.6	237.3
Coal	490.5	266.5	264.6	210.8	202.4
Total	556.3	438.3	441.9	438.6	442.1
Total Carbon Dioxide Emissions by Primary Fuel⁷					
Petroleum ³	649.7	758.2	758.7	866.8	868.8
Natural Gas	311.8	466.4	471.0	562.0	568.5
Coal	549.3	337.8	330.2	283.0	269.1
Other ⁵	0.0	0.1	0.1	0.1	0.1
Total³	1510.8	1562.5	1560.0	1711.9	1706.5
Carbon Dioxide Emissions (tons carbon equivalent per person) ...	5.5	5.2	5.2	5.3	5.2

¹Includes consumption by cogenerators.

²Includes lease and plant fuel.

³This includes international bunker fuel which, by convention are excluded from the international accounting of carbon dioxide emissions. In the years from 1990 through 1998, international bunker fuels accounted for 25 to 30 million metric tons carbon equivalent of carbon dioxide annually.

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

⁵Includes methanol and liquid hydrogen.

⁶Includes all electric power generators except cogenerators, which produce electricity and other useful thermal energy. Includes small power producers and exempt wholesale generators. Does not include emissions from the nonbiogenic component of municipal solid waste because under international guidelines these are accounted for as waste not energy.

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

Note: Totals may not equal sum of components due to independent rounding. Data for 1999 are model results and may differ slightly from official EIA data reports.

Sources: 1999 emissions and emission factors: Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 1999*, DOE/EIA-0573(99), (Washington, DC, October 2000). Projections: EIA, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.

Table I14. Impacts of the Clean Air Act Amendments of 1990

Impacts	1999	2010		2020	
		NSR 32 Integrated	NSR All Integrated	NSR 32 Integrated	NSR All Integrated
Scrubber Retrofits (gigawatts)¹	0.00	21.36	102.69	21.36	102.69
SO₂ Allowance Price (1999 dollars per ton)	0.00	118.61	0.00	86.27	0.00
NO_x Controls (gigawatts)					
Combustion	0.00	102.50	64.97	102.50	64.97
SCR Post-combustion	0.00	133.89	231.88	133.89	231.88
SNCR Post-combustion	0.00	39.15	34.03	39.15	34.03
Coal Production by Sulfur Category (million tons)					
Low Sulfur (< .61 lbs. S/mmBtu)	472.15	348.60	242.14	286.63	199.19
Medium Sulfur (.61-1.67 lbs. S/mmBtu) ..	433.19	243.91	268.18	208.06	217.87
High Sulfur (> 1.67 lbs. S/mmBtu)	198.95	102.12	163.82	86.05	135.00

¹Represents scrubbers added by the model. Planned scrubbers added by utilities are not shown here.

SO₂ = Sulfur dioxide.

lbs. S/mmBtu = Pounds sulfur per million British thermal units.

Note: Totals may not equal sum of components due to independent rounding. Data for 1999 are model results and may differ slightly from official EIA data reports.

Source: Energy Information Administration, AEO2001 National Energy Modeling System runs FDP_N32.D121900A, FDP_ALL.D121900A.