

# *Annual Energy Review 1996*



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# Preface

The *Annual Energy Review (AER)* is a compendium of historical energy statistics. It draws together the most important statistical series from all of the major energy sources, presents them in data tables and graphs, and uses them to create summary statistics for all energy.

It is the objective of the Energy Information Administration (EIA) with this report to distill the vast amount of historical data available into clear and well-organized presentations that invite the reader's interest and offer the opportunity to learn about this Nation's energy history in order to prepare for our future. Many of the data series in this report run from 1949 through 1996, providing nearly a half-century of data for analysis of long-term trends.

The AER emphasizes domestic energy statistics. Accordingly, Sections 1 through 10 and Section 12 are devoted to U.S. statistics (including U.S. trade data), while Section 11 reports international statistics, such as world production of energy. Readers interested in more detailed international data may wish to consult EIA's *International Energy Annual*.

In general, fuel-specific data in the AER are expressed in physical units, such as barrels of oil, cubic feet of natural gas, short tons of coal, and kilowatthours of electricity. The integrated summary data in Section 1 are expressed in British thermal units (Btu). The Btu values are calculated by using the physical unit data and the conversion factors in Appendix A. Statistics expressed in Btu are valuable because they make it possible to compare fuels that are otherwise in different data units and to calculate summaries of all energy, such as total energy consumption.

While most of the data tables in this report are updates of familiar presentations from the previous AER, there are several new tables this year, including:

- Table 2.3, "Manufacturing Sector Establishments by Inputs for Heat, Power, and Electricity Generation, 1994."
- Table 2.4, "Manufacturing Sector Floorspace, 1994."
- Table 3.12, "U.S. Energy Activities by Foreign-Affiliated U.S. Companies, 1978–1994."

- Table 10.11, "Alternative-Fueled Vehicles and Fuel Consumption by Type, 1992–1996."
- Table 10.12, "Fleet Vehicles Operated by Suppliers of Alternative Motor Fuels, 1993."
- Table 11.21, "World Carbon Emissions, 1980–1995."

Some noteworthy changes have been made for this edition. Table 7.3, "Coal Consumption by Sector, 1949–1996," for the first time incorporates coal used by independent power producers. Table 8.1, "Electricity Overview, 1949–1996," and Table 12.5, "Emissions From Electric Generating Units, 1992–1995," have been reconstructed to shift their focus from electric utilities alone to cover the entire electric power industry.

Other improvements this year:

- Table 1.7, "Energy Consumption, Prices, and Expenditures by State, 1994" adds State rankings of average energy prices and total expenditures for energy.
- Early data (1975–1980) about U.S. government use of energy have been recovered and Tables 1.12 and 1.13 reorganized.
- Table 3.3, "Consumer Price Estimates for Energy, 1970–1994," has been reformatted from last year's Table 3.7.
- Data for 1974 for many of the Financial Reporting System series (Tables 3.8–3.11, 4.8, and 4.9) have been recovered.
- New series have been added to several petroleum tables (imports of motor gasoline blending components in Table 5.3; imports and net imports from Algeria and subtotals for Persian Gulf and non-OPEC nations in Tables 5.4 and 5.7; exports of jet fuel and special naphthas in Table 5.5; exports to South Korea and Spain in Table 5.6; and landed costs from Kuwait, Angola, Colombia, Norway, Persian Gulf nations, and non-OPEC nations in Table 5.17).
- Many of the international tables in Section 11 have been revised to show additional countries.

EIA welcomes your comments on this product and encourages you to contact the analysts listed on page iii if you have questions or suggestions. We also encourage you to access this report and the many other EIA products via our homepage at <http://www.eia.doe.gov>.

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# 1. Energy Overview

## Production

Historically, three fossil fuels have accounted for the bulk of domestic energy production, which by 1996 totaled 72.6 quadrillion Btu (1.2).<sup>\*</sup> Coal accounted for the largest share of domestic energy production in 1949-1951 and, after a long hiatus, again in 1982 and in 1984 through 1996. In the interim, first crude oil and then natural gas dominated domestic production. In 1996, coal production totaled 22.6 quadrillion Btu. Dry natural gas production totaled 19.5 quadrillion Btu and crude oil production totaled 13.7 quadrillion Btu. Natural gas plant liquids accounted for another 2.5 quadrillion Btu.

Net generation of electricity by electric utilities increased throughout the 1949-through-1996 period (8.1), registering only two year-to-year declines (during the 1982 recession and again in 1992). However, the rate of growth of electricity net generation slowed during the 48-year period. From 1949 through 1979, the annual growth rate averaged 7.1 percent, whereas from 1980 through 1996, the annual growth rate averaged 1.9 percent. After the mid-1970's, coal and nuclear fuels provided increasing shares of fuel input for electricity generation, displacing substantial quantities of petroleum and, to a lesser extent, natural gas (8.3).

Hydroelectric generation (conventional and pumped storage) accounted for over 1.4 quadrillion Btu of electricity in 1949 and from the 1970's through 1995 usually provided about 3 quadrillion Btu per year (1.2). In 1988, the second year of a drought, hydroelectric generation totaled only 2.3 quadrillion Btu, but it reached a record high in 1996 of 3.6 quadrillion Btu.

Other renewable energy sources also contributed to the domestic energy supply. Biofuels (see Glossary) contributed 3.0 quadrillion Btu to the 1996 total (1.2). Geothermal, solar, and wind energy combined contributed 0.5 quadrillion Btu. Renewable energy production (including conventional hydroelectric power and excluding hydroelectric pumped storage) totaled 7.1 quadrillion Btu, 9.7 percent of U.S. total energy production.

*\*Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications. Percentage and numbers in text are calculated by using data in the tables.*

## Consumption

Energy consumption more than doubled during the 1949-through-1973 period, increasing from 30.5 quadrillion Btu in 1949 to 74.3 quadrillion Btu in 1973 (1.3), and the U.S. economy grew at about the same rate. The domestic energy market was dominated by rapid growth in petroleum and natural gas consumption, which more than tripled during the period. After the 1973 oil shock, energy consumption fluctuated, influenced by dramatic changes in oil prices, changes in the rate of growth of the domestic economy, and such factors as concerns about the effect of energy use on the environment. The post-1973 low point of energy consumption, 70.5 quadrillion Btu, occurred in 1983 following a period of very high oil prices. The highest level of energy

### Indicators of Energy Intensity

The relationship between total energy consumption and real gross domestic product (GDP) is a traditional indicator of the energy intensity of the economy. In 1970, 20 thousand Btu of energy were consumed for each chained (1992) dollar of GDP (1.6). Higher energy prices in the early 1970's led to increases in energy efficiency and a significant restructuring of the energy-intensive activities of the manufacturing sector. In 1985, the energy intensity of the economy as a whole fell below 14 thousand Btu per chained (1992) dollar, where it remained through 1996.

A second indicator of energy intensity is per capita consumption. Throughout the 1960's and early 1970's, the growth of end-use energy consumption was greater than the growth of the population (1.5). Per capita end-use consumption rose from 210 million Btu in 1961 to a peak of 285 million Btu in 1973. Thereafter, per capita end-use consumption trended downward to as low as 226 million Btu in 1983. In the 1990's, low petroleum prices encouraged energy use, and end-use energy consumption rose to 269 million Btu per capita in 1996.<sup>1</sup>

<sup>1</sup> The inclusion of non-electric consumption of renewable energy in the totals of U.S. energy consumption for 1990 through 1994 increased the per-capita values.



consumption, 93.8 quadrillion Btu,<sup>2</sup> occurred in 1996, following several years when oil prices were low.

The composition of demand after 1973 reflected an increasing emphasis on electricity generated by coal, nuclear, and renewable energy sources and on non-electric utility use of renewable sources. In 1973, petroleum and natural gas accounted for 77 percent of total energy consumption; by 1996, their share had declined to 62 percent.<sup>3</sup> Illustrated another way, the share of combined energy use in two major sectors (residential/commercial and industrial) that was accounted for by electricity (including system losses) nearly doubled between 1949 and 1996, rising from 19 percent to 35 percent.

### Energy Prices in a Volatile Market

Since the mid-1970's, changes in fossil fuel prices have become more frequent and more pronounced (3.1). Prior to the oil embargo of 1973-1974, the composite real price<sup>4</sup> per million Btu of crude oil, natural gas, and coal had declined to a post-World War II low of \$1.03 in 1968 and 1969. In 1974, however, the real price rose to \$1.76 and eventually peaked at \$4.16 in 1981 after a second round of crude oil price increases. Thereafter, overproduction of crude oil began to affect energy prices and, when crude oil prices plunged in 1986, the composite real price of the major fossil fuels fell to \$2.05. In 1995, the composite price was \$1.37, the lowest in 22 years. However, 1996 saw a worldwide rise in crude oil prices, and the composite real price rose 23 percent to \$1.69.

Throughout the 1949-through-1996 period, changes in the real price of oil dominated movements in the composite index. The real price of oil trended downward between 1959 and 1970 and then rose sharply in 1974 and again in 1979 through 1981. Thereafter, in the face of shrinking demand and excess production, price trends reversed sharply. Precipitous declines in 1986 and 1988 brought the real price of crude oil in 1988 to \$2.52 per million Btu, the lowest level since 1973. In 1989, the price rose to \$3.05. In 1990, the Iraqi invasion of Kuwait contributed to an increase in crude oil prices to \$3.69 per

<sup>2</sup>U.S. total energy consumption in 1990 through 1996 was roughly 3 quadrillion Btu higher due to the expanded coverage of non-electric utility use of renewable energy. Even without the additional renewable energy consumption, however, 1996 U.S. total energy consumption was the highest on record.

<sup>3</sup>The 1996 share was lower than it would have been had non-electric utility consumption of renewable energy not been included in U.S. total energy consumption.

<sup>4</sup>Real (inflation-adjusted) prices are expressed in chained (1992) dollars.

million Btu. Beginning in 1991, however, the ability of producers to supply replacement oil, coupled with a worldwide economic recession that depressed petroleum demand, led to a decrease in crude oil prices, which fell to a post-1973 low of \$2.17 in 1994. The real price of crude oil increased again in 1995 and reached \$2.90 per million Btu in 1996.

Prices of coal and natural gas were much less volatile than those of oil. However, the weakening of crude oil prices after 1985 triggered declines in the prices of the other fossil fuels, particularly that of natural gas. In 1995, the real price of crude oil per million Btu of \$2.34 was 56 percent below the 1985 price (3.1). The real price of natural gas was 55 percent lower and the real price of bituminous coal and lignite was 44 percent lower. In 1996, however, prices for crude oil and natural gas rebounded somewhat: crude oil by 24 percent (to \$2.90) and natural gas by 42 percent (to \$1.85). The real price of coal (excluding anthracite) fell for the eighteenth straight year, to \$0.78 per million Btu in 1996.

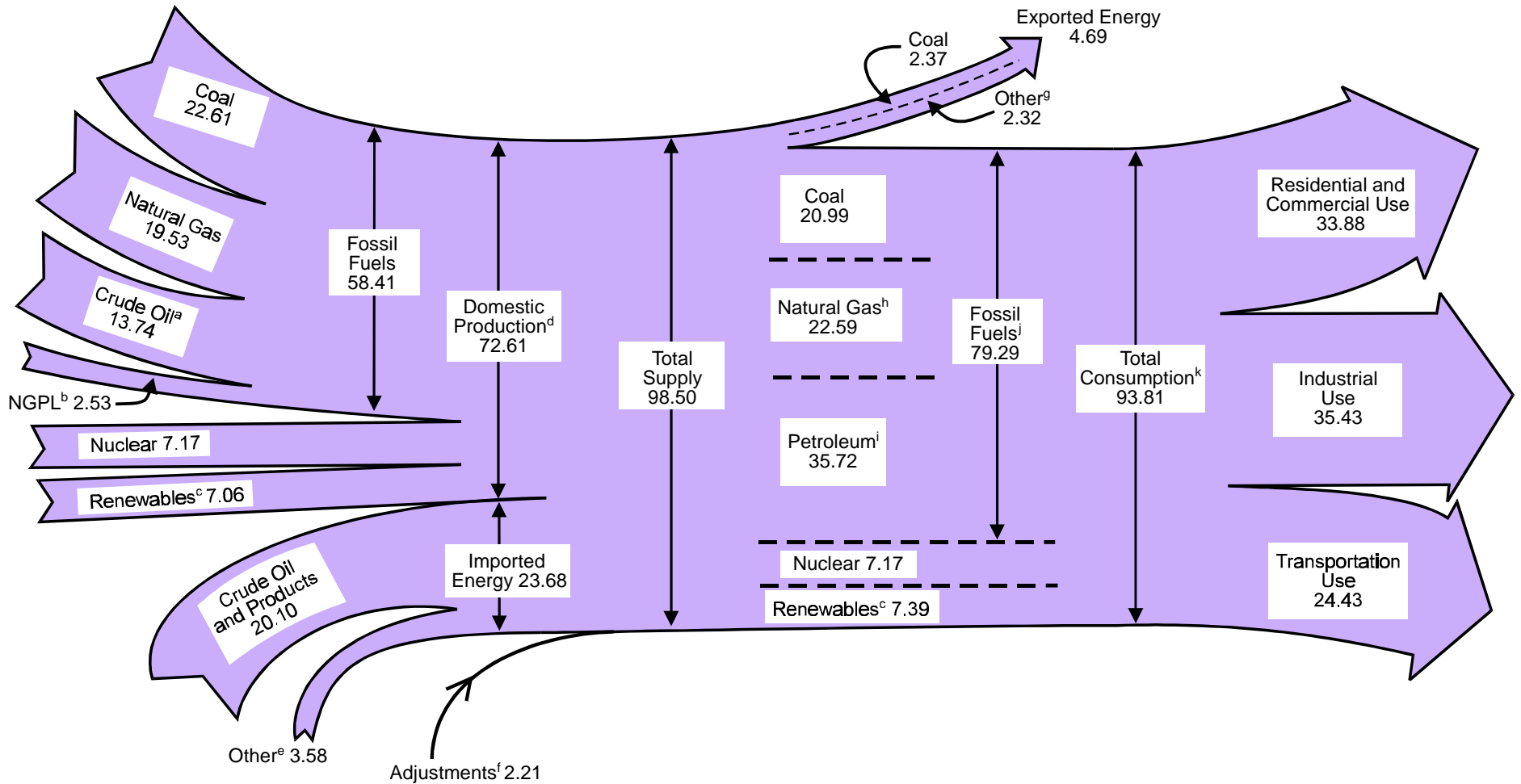
### Changing Patterns of Trade

From 1958 forward, the United States consumed more energy than it produced, and the difference was met by energy imports (1.2, 1.3, and 1.4). Net imports of energy (primarily petroleum) grew rapidly through 1973, as demand for cheap foreign oil eroded quotas on petroleum imports. The oil embargo of 1973-1974, coupled with the increase in the price of crude oil, interrupted growth in petroleum net imports; nevertheless, they climbed to a peak of 18 quadrillion Btu in 1977 (1.4). That year, U.S. dependence on foreign sources of petroleum reached an all-time high of 47 percent (5.7). A second round of price increases in 1979 through 1981 suppressed demand for foreign oil. In 1985, petroleum net imports totaled 9.0 quadrillion Btu, and U.S. dependence fell to 27 percent of consumption (1.4 and 5.7). Subsequently, petroleum net imports increased every year through 1989, when U.S. dependence on foreign sources of oil reached 42 percent of consumption. In 1996, petroleum net imports rose to 18 quadrillion Btu and U.S. dependence on them equaled 46 percent, the highest level in 19 years.

Natural gas trade was limited to border countries until the advent of shipping natural gas in liquefied form in the late 1960's. In 1996, natural gas net imports reached the record level of 2.8 quadrillion Btu (1.4).

Throughout the 1949-through-1996 period, the United States was a net exporter of coal (1.4). In 1996, coal net exports totaled 2.2 quadrillion Btu.

**Diagram 1. Energy Flow, 1996**  
(Quadrillion Btu)

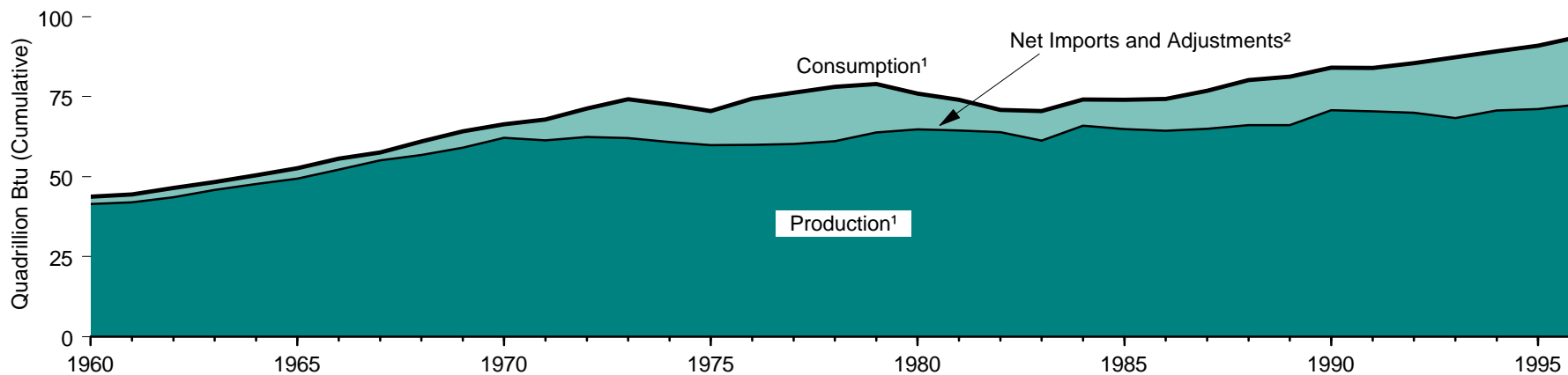


<sup>a</sup> Includes lease condensate.  
<sup>b</sup> Natural gas plant liquids.  
<sup>c</sup> Biofuels, conventional hydroelectric power, geothermal energy, solar energy, and wind energy.  
<sup>d</sup> Includes -0.03 quadrillion Btu for hydroelectric pumped storage.  
<sup>e</sup> Natural gas, coal, coal coke, and electricity.  
<sup>f</sup> Stock changes, losses, gains, miscellaneous blending components, and unaccounted-for supply.  
<sup>g</sup> Crude oil, petroleum products, natural gas, electricity, and coal coke.

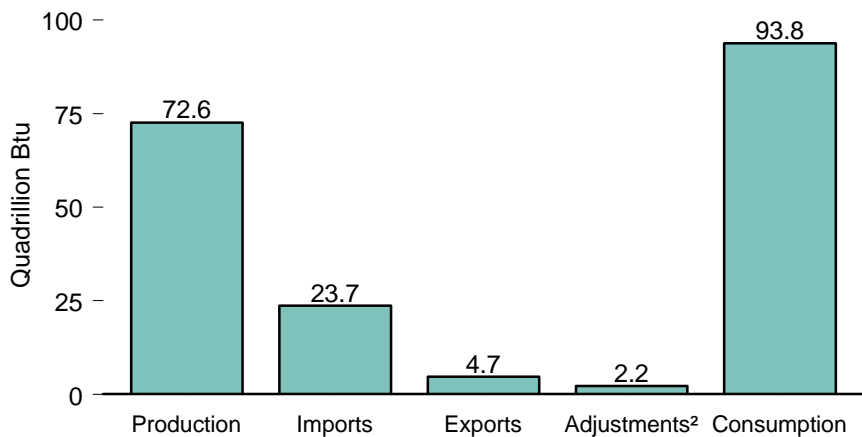
<sup>h</sup> Includes supplemental gaseous fuels.  
<sup>i</sup> Petroleum products, including natural gas plant liquids and crude oil consumed directly as fuel.  
<sup>j</sup> Includes a minuscule quantity of coal coke net imports.  
<sup>k</sup> Includes 0.07 quadrillion Btu for net imported electricity that was generated from nonrenewable energy sources and -0.03 quadrillion Btu for hydroelectric pumped storage.  
 Notes: • Data are preliminary. • Totals may not equal sum of components due to independent rounding.  
 Sources: Tables 1.1 and 2.1.

**Figure 1.1 Energy Overview**

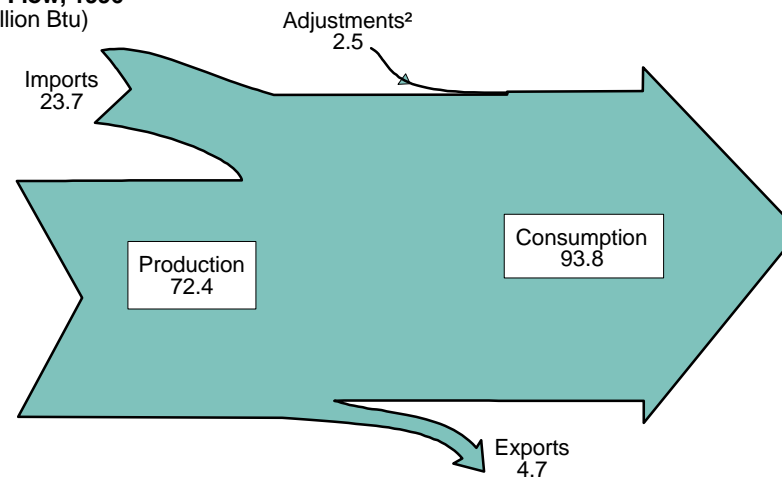
**Overview, 1960-1996**



**Overview, 1996**



**Energy Flow, 1996**  
(Quadrillion Btu)



<sup>1</sup> There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

<sup>2</sup> Stock changes, losses, gains, miscellaneous blending components, and unaccounted-for supply.

Note: Data for 1996 are preliminary.

Source: Table 1.1.

**Table 1.1 Energy Overview, Selected Years, 1960-1996**  
(Quadrillion Btu)

Activity and Energy Source	1960	1965	1970	1975	1980	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996 <sup>P</sup>
<b>Production</b> .....	<b>41.49</b>	<b>49.34</b>	<b>62.07</b>	<b>59.86</b>	<b>64.76</b>	<b>64.87</b>	<b>64.35</b>	<b>64.95</b>	<b>66.10</b>	<b>66.13</b>	<sup>R,1</sup> <b>70.76</b>	<sup>R</sup> <b>70.42</b>	<b>69.96</b>	<b>68.32</b>	<sup>R</sup> <b>70.68</b>	<sup>R</sup> <b>71.12</b>	<b>72.61</b>
Fossil Fuels .....	39.87	47.23	59.19	54.73	59.01	57.54	56.58	57.17	57.87	57.47	58.56	57.83	57.55	55.71	<sup>R</sup> 57.91	<sup>R</sup> 57.41	58.41
Coal .....	10.82	13.06	14.61	14.99	18.60	19.33	19.51	20.14	20.74	21.35	22.46	21.59	21.59	20.22	22.07	<sup>R</sup> 21.98	22.61
Natural Gas (Dry) .....	12.66	15.78	21.67	19.64	19.91	16.98	16.54	17.14	17.60	17.85	18.36	18.23	18.38	18.58	<sup>R</sup> 19.35	<sup>R</sup> 19.10	19.53
Crude Oil <sup>2</sup> .....	14.93	16.52	20.40	17.73	18.25	18.99	18.38	17.67	17.28	16.12	15.57	15.70	15.22	14.49	14.10	<sup>R</sup> 13.89	13.74
Natural Gas Plant Liquids .....	1.46	1.88	2.51	2.37	2.25	2.24	2.15	2.22	2.26	2.16	2.17	2.31	2.36	2.41	2.39	2.44	2.53
Nuclear Electric Power <sup>3</sup> .....	0.01	0.04	0.24	1.90	2.74	4.15	4.47	4.91	5.66	5.68	6.16	6.58	6.61	6.52	6.84	<sup>R</sup> 7.18	7.17
Hydroelectric Pumped Storage <sup>4</sup> .....	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )
Renewable Energy .....	1.61	2.07	2.65	3.23	3.01	3.18	3.30	2.88	2.57	2.98	<sup>R,16</sup> 16.07	<sup>R</sup> 6.06	5.84	6.13	<sup>R</sup> 5.97	<sup>R</sup> 6.56	7.06
Conventional Hydroelectric Power .....	1.61	2.06	2.63	3.15	2.90	2.97	3.07	2.63	2.33	2.77	<sup>6</sup> 3.01	2.98	2.61	2.88	2.67	<sup>R</sup> 3.21	3.59
Geothermal Energy .....	(s)	(s)	0.01	0.07	0.11	0.20	0.22	0.23	0.22	0.20	<sup>R,10</sup> 10.33	0.34	0.35	0.36	0.36	0.31	0.34
Biofuels <sup>7</sup> .....	(s)	(s)	(s)	(s)	(s)	0.01	0.01	0.02	0.02	0.02	12.63	2.64	2.79	2.78	<sup>R</sup> 2.84	<sup>R</sup> 2.95	3.02
Solar Energy .....	0	0	0	0	0	0	0	0	0	(s)	10.07	0.07	0.07	0.07	0.07	0.07	0.07
Wind Energy .....	0	0	0	0	0	(s)	(s)	(s)	(s)	(s)	10.02	0.03	0.03	0.03	0.04	<sup>R</sup> 0.03	0.04
<b>Imports</b> .....	<b>4.23</b>	<b>5.92</b>	<b>8.39</b>	<b>14.11</b>	<b>15.97</b>	<b>12.10</b>	<b>14.44</b>	<b>15.76</b>	<b>17.56</b>	<b>18.95</b>	<b>18.99</b>	<b>18.58</b>	<b>19.66</b>	<b>21.54</b>	<b>22.71</b>	<sup>R</sup> <b>22.48</b>	<b>23.68</b>
Natural Gas .....	0.16	0.47	0.85	0.98	1.01	0.95	0.75	0.99	1.30	1.39	1.55	1.80	2.16	2.40	2.68	<sup>R</sup> 2.90	2.90
Crude Oil <sup>8</sup> .....	2.20	2.65	2.81	8.72	11.19	6.81	9.00	10.07	11.03	12.60	12.77	12.55	13.25	14.75	15.34	<sup>R</sup> 15.63	16.24
Petroleum Products <sup>9</sup> .....	1.80	2.75	4.66	4.23	3.46	3.80	4.20	4.10	4.72	4.57	4.35	3.79	3.71	3.76	3.91	<sup>R</sup> 3.23	3.86
Other <sup>10</sup> .....	0.07	0.04	0.07	0.19	0.31	0.54	0.49	0.61	0.52	0.40	0.32	0.44	0.53	0.63	0.78	<sup>R</sup> 0.72	0.68
<b>Exports</b> .....	<b>1.48</b>	<b>1.85</b>	<b>2.66</b>	<b>2.36</b>	<b>3.72</b>	<b>4.23</b>	<b>4.06</b>	<b>3.85</b>	<b>4.42</b>	<b>4.77</b>	<b>4.91</b>	<b>5.22</b>	<b>5.02</b>	<b>4.35</b>	<b>4.12</b>	<b>4.58</b>	<b>4.69</b>
Coal .....	1.02	1.38	1.94	1.76	2.42	2.44	2.25	2.09	2.50	2.64	2.77	2.85	2.68	1.96	1.88	2.32	2.37
Crude Oil .....	0.43	0.39	0.55	0.44	1.16	1.66	1.67	1.63	1.74	1.84	1.82	2.13	2.01	2.12	1.99	1.99	2.06
Other <sup>11</sup> .....	0.03	0.09	0.18	0.16	0.14	0.14	0.14	0.13	0.18	0.29	0.31	0.24	0.33	0.27	0.26	0.27	0.26
<b>Adjustments</b> <sup>12</sup> .....	<b>-0.43</b>	<b>-0.72</b>	<b>-1.37</b>	<b>-1.07</b>	<b>-1.05</b>	<b>1.24</b>	<b>-0.44</b>	<b>0.03</b>	<b>0.96</b>	<sup>R,1</sup> <b>1.01</b>	<sup>R</sup> <b>-0.75</b>	<sup>R</sup> <b>0.21</b>	<sup>R</sup> <b>0.92</b>	<sup>R</sup> <b>1.83</b>	<sup>R</sup> <b>-0.05</b>	<sup>R</sup> <b>1.92</b>	<b>2.21</b>
<b>Consumption</b> <sup>13</sup> .....	<b>43.80</b>	<b>52.68</b>	<b>66.43</b>	<b>70.55</b>	<b>75.96</b>	<b>73.98</b>	<b>74.30</b>	<b>76.89</b>	<b>80.22</b>	<sup>R</sup> <b>81.32</b>	<sup>R,1</sup> <b>84.09</b>	<sup>R</sup> <b>83.99</b>	<sup>R</sup> <b>85.52</b>	<sup>R</sup> <b>87.34</b>	<sup>R</sup> <b>89.21</b>	<sup>R</sup> <b>90.94</b>	<b>93.81</b>
Fossil Fuels .....	42.14	50.58	63.52	65.35	69.98	66.22	66.15	68.63	71.66	72.55	<sup>R</sup> 71.95	71.23	<sup>R</sup> 72.89	<sup>R</sup> 74.51	<sup>R</sup> 76.06	<sup>R</sup> 76.94	79.29
Coal .....	9.84	11.58	12.26	12.66	15.42	17.48	17.26	18.01	18.85	<sup>R</sup> 18.92	19.10	18.77	<sup>R</sup> 19.21	<sup>R</sup> 19.83	<sup>R</sup> 20.02	<sup>R</sup> 20.08	20.99
Coal Coke Net Imports .....	-0.01	-0.02	-0.06	0.01	-0.04	-0.01	-0.02	0.01	0.04	0.03	(s)	0.01	0.03	0.02	0.02	0.03	(s)
Natural Gas <sup>14</sup> .....	12.39	15.77	21.79	19.95	20.39	17.83	16.71	17.74	18.55	19.38	19.30	19.61	20.13	20.83	<sup>R</sup> 21.29	<sup>R</sup> 22.16	22.59
Petroleum <sup>15</sup> .....	19.92	23.25	29.52	32.73	34.20	30.92	32.20	32.87	34.22	34.21	33.55	32.85	33.53	33.84	34.73	<sup>R</sup> 34.66	35.72
Nuclear Electric Power .....	0.01	0.04	0.24	1.90	2.74	4.15	4.47	4.91	5.66	5.68	6.16	6.58	6.61	6.52	6.84	<sup>R</sup> 7.18	7.17
Hydroelectric Pumped Storage <sup>4</sup> .....	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )
Renewable Energy .....	1.66	2.06	2.67	3.29	3.23	3.61	3.68	3.36	2.90	3.10	<sup>R,16</sup> 16.17	6.27	6.11	6.40	<sup>R</sup> 6.28	<sup>R</sup> 6.85	7.39
Conventional Hydroelectric Power <sup>16</sup> .....	1.66	2.06	2.65	3.22	3.12	3.40	3.45	3.12	2.66	2.88	<sup>6</sup> 3.10	3.18	2.85	3.14	2.96	<sup>R</sup> 3.47	3.91
Geothermal Energy <sup>17</sup> .....	(s)	(s)	0.01	0.07	0.11	0.20	0.22	0.23	0.22	0.20	<sup>R,10</sup> 10.35	0.35	0.37	0.38	0.38	<sup>R</sup> 0.33	0.35
Biofuels <sup>7</sup> .....	(s)	(s)	(s)	(s)	(s)	0.01	0.01	0.02	0.02	0.02	2.63	2.64	2.79	2.78	<sup>R</sup> 2.84	<sup>R</sup> 2.95	3.02
Solar Energy .....	0	0	0	0	0	0	0	0	0	(s)	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Wind Energy .....	0	0	0	0	0	(s)	(s)	(s)	(s)	(s)	10.02	0.03	0.03	0.03	0.04	<sup>R</sup> 0.03	0.04

<sup>1</sup> There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

<sup>2</sup> Includes lease condensate.

<sup>3</sup> See Note 1 at end of section.

<sup>4</sup> Represents total pumped storage facility production minus energy used for pumping.

<sup>5</sup> Through 1989, pumped storage is included in conventional hydroelectric power.

<sup>6</sup> There is a discontinuity in this time series between 1989 and 1990; beginning in 1990, pumped storage is removed and expanded coverage of industrial use of hydroelectric power is included.

<sup>7</sup> Includes wood, wood waste, peat, wood liquors, railroad ties, pitch, wood sludge, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oils, and/or other waste.

<sup>8</sup> Includes imports of crude oil for the Strategic Petroleum Reserve, which began in 1977.

<sup>9</sup> Includes imports of unfinished oils and natural gas plant liquids.

<sup>10</sup> "Other" imports are coal, electricity, and coal coke.

<sup>11</sup> "Other" exports are natural gas, petroleum products, electricity, and coal coke.

<sup>12</sup> A balancing item. Includes stock changes, losses, gains, miscellaneous blending components, and unaccounted-for supply.

<sup>13</sup> From 1990, the portion of net imports of electricity that is derived from nonrenewable energy sources is included directly in "Consumption."

<sup>14</sup> Includes supplemental gaseous fuels.

<sup>15</sup> Petroleum products supplied, including natural gas plant liquids and crude oil burned as fuel.

<sup>16</sup> Through 1989, includes all net imports of electricity. From 1990, includes only the portion of net imports of electricity that is derived from hydroelectric power.

<sup>17</sup> Includes electricity imports from Mexico that are derived from geothermal energy.

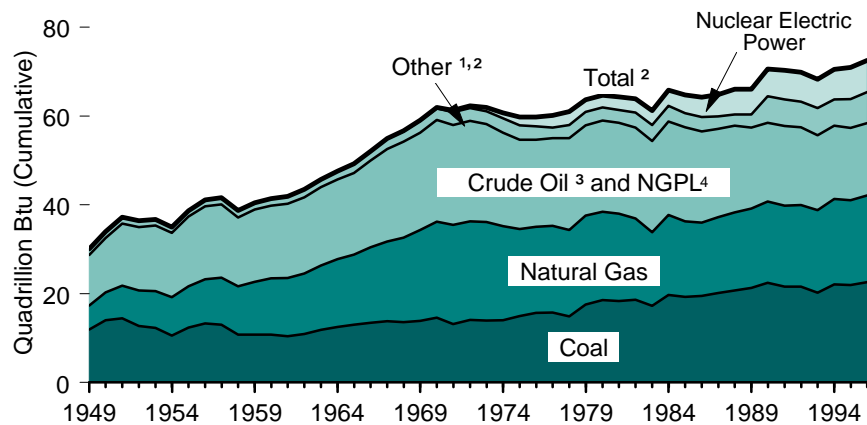
R=Revised data. P=Preliminary data. (s)=Less than 0.005 quadrillion Btu.

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

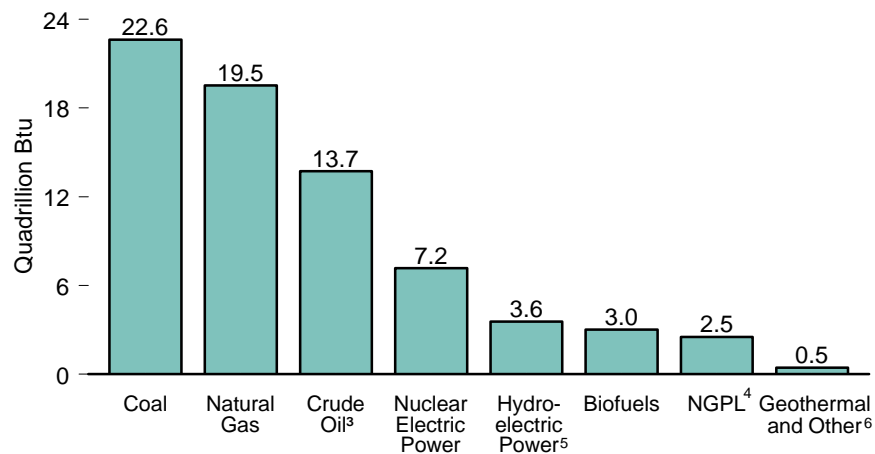
Sources: Tables 5.1, 6.1, 7.1, 7.7, 8.1, 8.4, 10.1, Energy Information Administration estimates for industrial hydroelectric power, and conversion factors in Appendix A.

**Figure 1.2 Energy Production by Source**

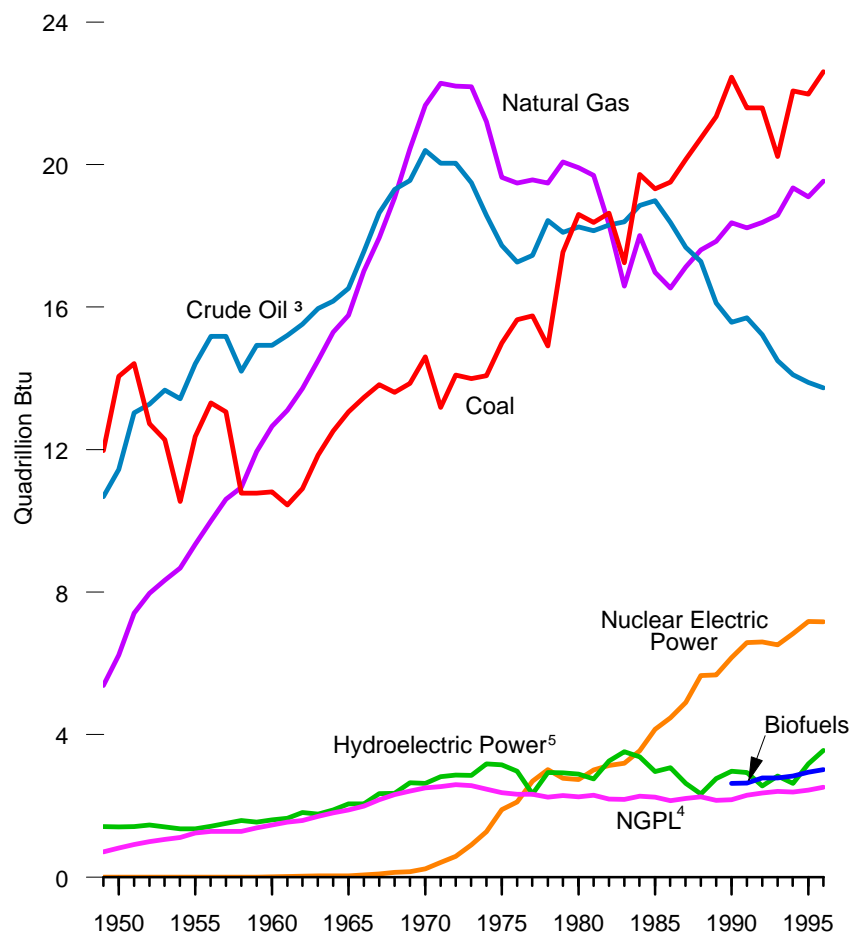
**By Source, 1949-1996**



**By Source, 1996**



**By Major Source, 1949-1996**



<sup>1</sup> "Other" is renewable energy and pumped-storage hydroelectric power.

<sup>2</sup> There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

<sup>3</sup> Includes lease condensate.

<sup>4</sup> Natural gas plant liquids.

<sup>5</sup> Conventional and pumped-storage hydroelectric power.

<sup>6</sup> "Other" is solar energy and wind energy.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 1.2.

**Table 1.2 Energy Production by Source, 1949-1996**  
(Quadrillion Btu)

Year	Fossil Fuels					Nuclear Electric Power <sup>2</sup>	Hydroelectric Pumped Storage <sup>3</sup>	Renewable Energy					Total	
	Coal	Natural Gas (Dry)	Crude Oil <sup>1</sup>	Natural Gas Plant Liquids	Total Fossil Fuels			Conventional Hydroelectric Power	Geothermal Energy	Biofuels <sup>4</sup>	Solar Energy	Wind Energy		Total Renewable Energy
1949	11.974	5.377	10.683	0.714	28.748	0	( <sup>5</sup> )	1.425	0	0.006	0	0	1.431	30.179
1950	14.060	6.233	11.447	0.823	32.563	0	( <sup>5</sup> )	1.415	0	0.005	0	0	1.421	33.983
1951	14.419	7.416	13.037	0.920	35.792	0	( <sup>5</sup> )	1.424	0	0.005	0	0	1.429	37.221
1952	12.735	7.964	13.281	0.998	34.977	0	( <sup>5</sup> )	1.466	0	0.006	0	0	1.472	36.449
1953	12.278	8.339	13.671	1.062	35.349	0	( <sup>5</sup> )	1.413	0	0.005	0	0	1.418	36.767
1954	10.542	8.682	13.427	1.113	33.764	0	( <sup>5</sup> )	1.360	0	(s)	0	0	1.363	35.127
1955	12.370	9.345	14.410	1.240	37.364	0	( <sup>5</sup> )	1.360	0	(s)	0	0	1.363	38.727
1956	13.306	10.002	15.180	1.283	39.771	0	( <sup>5</sup> )	1.435	0	(s)	0	0	1.436	41.208
1957	13.061	10.605	15.178	1.289	40.133	(s)	( <sup>5</sup> )	1.516	0	(s)	0	0	1.518	41.651
1958	10.783	10.942	14.204	1.287	37.216	(s)	( <sup>5</sup> )	1.592	0	(s)	0	0	1.594	38.812
1959	10.778	11.952	14.933	1.383	39.045	(s)	( <sup>5</sup> )	1.548	0	(s)	0	0	1.550	40.598
1960	10.817	12.656	14.935	1.461	39.869	0.006	( <sup>5</sup> )	1.608	(s)	(s)	0	0	1.610	41.485
1961	10.447	13.105	15.206	1.549	40.307	0.020	( <sup>5</sup> )	1.656	(s)	(s)	0	0	1.660	41.987
1962	10.901	13.717	15.522	1.593	41.732	0.026	( <sup>5</sup> )	1.816	(s)	(s)	0	0	1.820	43.578
1963	11.849	14.513	15.966	1.709	44.037	0.038	( <sup>5</sup> )	1.771	(s)	(s)	0	0	1.776	45.852
1964	12.524	15.298	16.164	1.803	45.789	0.040	( <sup>5</sup> )	1.886	0.005	(s)	0	0	1.892	47.721
1965	13.055	15.775	16.521	1.883	47.235	0.043	( <sup>5</sup> )	2.059	(s)	(s)	0	0	2.066	49.344
1966	13.468	17.011	17.561	1.996	50.036	0.064	( <sup>5</sup> )	2.062	(s)	(s)	0	0	2.069	52.169
1967	13.826	17.943	18.651	2.177	52.597	0.088	( <sup>5</sup> )	2.347	0.007	(s)	0	0	2.357	55.043
1968	13.608	19.068	19.308	2.321	54.306	0.142	( <sup>5</sup> )	2.349	0.009	(s)	0	0	2.362	56.809
1969	13.864	20.446	19.556	2.420	56.286	0.154	( <sup>5</sup> )	2.648	0.013	(s)	0	0	2.665	59.104
1970	14.607	21.666	20.401	2.512	59.186	0.239	( <sup>5</sup> )	2.634	0.011	(s)	0	0	2.649	62.074
1971	13.185	22.280	20.033	2.544	58.041	0.413	( <sup>5</sup> )	2.824	0.012	(s)	0	0	2.839	61.294
1972	14.091	22.208	20.041	2.598	58.938	0.584	( <sup>5</sup> )	2.864	0.031	(s)	0	0	2.899	62.420
1973	13.993	22.187	19.493	2.569	58.242	0.910	( <sup>5</sup> )	2.861	0.043	(s)	0	0	2.907	62.060
1974	14.074	21.210	18.575	2.471	56.331	1.272	( <sup>5</sup> )	3.177	0.053	(s)	0	0	3.232	60.835
1975	14.990	19.640	17.729	2.374	54.734	1.900	( <sup>5</sup> )	3.155	0.070	(s)	0	0	3.227	59.860
1976	15.654	19.480	17.262	2.327	54.723	2.111	( <sup>5</sup> )	2.976	0.078	(s)	0	0	3.057	59.892
1977	15.755	19.565	17.454	2.327	55.101	2.702	( <sup>5</sup> )	2.333	0.077	0.005	0	0	2.416	60.219
1978	14.910	19.485	18.434	2.245	55.074	3.024	( <sup>5</sup> )	2.937	0.064	(s)	0	0	3.005	61.103
1979	17.539	20.076	18.104	2.286	58.005	2.776	( <sup>5</sup> )	2.931	0.084	0.005	0	0	3.020	63.801
1980	18.597	19.908	18.249	2.254	59.007	2.739	( <sup>5</sup> )	2.900	0.110	0.005	0	0	3.014	64.761
1981	18.376	19.699	18.146	2.307	58.529	3.008	( <sup>5</sup> )	2.758	0.123	(s)	0	0	2.885	64.421
1982	18.639	18.319	18.309	2.191	57.458	3.131	( <sup>5</sup> )	3.266	0.105	(s)	0	0	3.374	63.962
1983	17.246	16.593	18.392	2.184	54.416	3.203	( <sup>5</sup> )	3.527	0.129	(s)	0	(s)	3.661	61.279
1984	19.719	18.008	18.848	2.274	58.849	3.553	( <sup>5</sup> )	3.386	0.165	0.009	0	(s)	3.560	65.962
1985	19.325	16.980	18.992	2.241	57.539	4.149	( <sup>5</sup> )	2.970	0.198	0.014	0	(s)	3.183	64.871
1986	19.510	16.541	18.376	2.149	56.576	4.471	( <sup>5</sup> )	3.071	0.219	0.012	0	(s)	3.303	64.350
1987	20.142	17.136	17.675	2.215	57.167	4.906	( <sup>5</sup> )	2.635	0.229	0.015	0	(s)	2.879	64.952
1988	20.737	17.599	17.279	2.260	57.874	5.661	( <sup>5</sup> )	2.334	0.217	0.017	0	(s)	2.569	66.105
1989	21.345	17.847	16.117	2.158	57.468	5.677	( <sup>5</sup> )	2.767	0.197	0.020	(s)	(s)	2.985	66.129
1990	22.456	18.362	15.571	2.175	58.564	6.161	-0.036	R,63.014	R,70.334	T,2.632	T,0.067	R,70.023	R,76.069	R,70.758
1991	21.594	18.229	15.701	2.306	57.829	6.579	-0.047	2.984	0.338	2.642	0.068	0.027	R,6.059	R,70.420
1992	21.593	18.375	15.223	2.363	57.554	6.607	-0.043	2.608	0.349	2.788	0.068	0.030	5.843	69.961
1993	20.221	18.584	14.494	2.408	55.708	6.519	-0.041	2.885	0.362	2.784	0.069	0.031	6.131	68.316
1994	22.068	R,19.348	14.103	2.391	R,57.909	6.837	-0.035	2.674	0.357	R,2.838	0.069	0.036	R,5.973	R,70.685
1995	R,21.978	R,19.101	R,13.887	2.442	R,57.408	R,7.177	-0.028	R,3.205	0.307	R,2.946	0.072	R,0.033	R,6.563	R,71.119
1996 <sup>P</sup>	22.614	19.532	13.737	2.531	58.414	7.168	-0.032	3.591	0.341	3.017	0.075	0.036	7.060	72.610

<sup>1</sup> Includes lease condensate.

<sup>2</sup> See Note 1 at end of section.

<sup>3</sup> Represents total pumped storage facility production minus energy used for pumping.

<sup>4</sup> Includes wood, wood waste, peat, wood liquors, railroad ties, pitch, wood sludge, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oils, and/or other waste.

<sup>5</sup> Through 1989, pumped storage is included in conventional hydroelectric power.

<sup>6</sup> There is a discontinuity in this time series between 1989 and 1990; beginning in 1990, pumped

storage is removed and expanded coverage of industrial use of hydroelectric power is included.

<sup>7</sup> There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

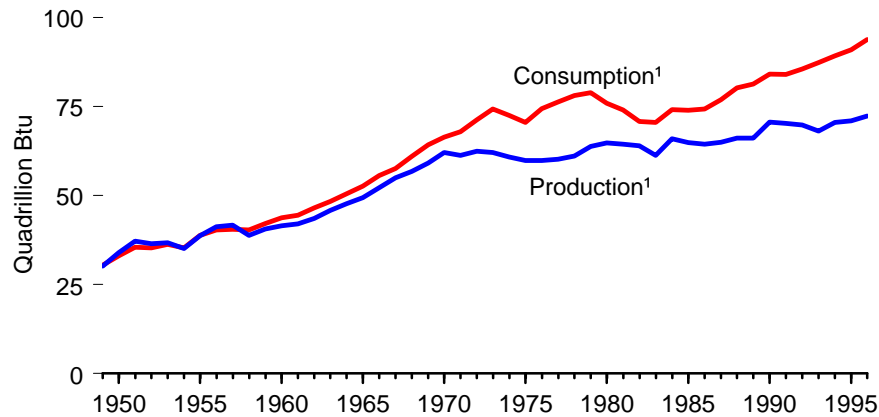
R=Revised data. P=Preliminary data. (s)=Less than 0.005 quadrillion Btu.

Note: • Totals may not equal sum of components due to independent rounding.

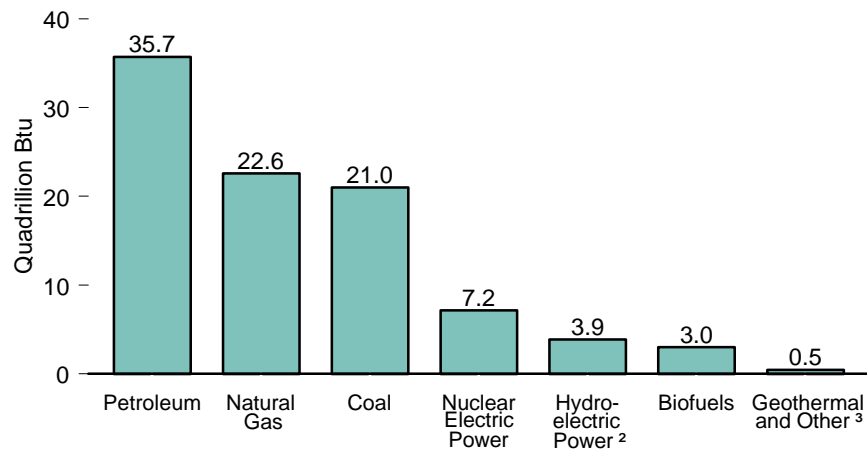
Sources: Tables 5.1, 6.1, 7.1, 7.7, 8.1, 8.4, 10.1, Energy Information Administration estimates for industrial hydroelectric power, and conversion factors in Appendix A.

**Figure 1.3 Energy Consumption by Source**

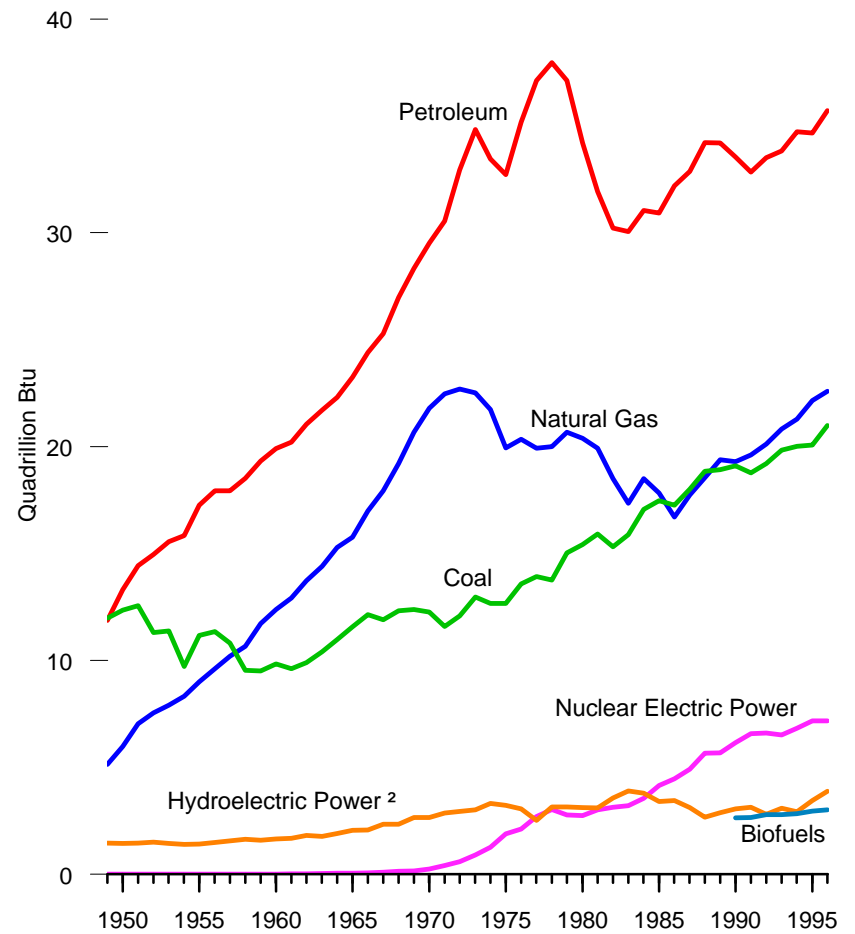
**Production and Consumption, 1949-1996**



**By Source, 1996**



**By Major Source, 1949-1996**



<sup>1</sup> There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

<sup>2</sup> Conventional and pumped-storage hydroelectric power.

<sup>3</sup> "Other" is solar energy and wind energy.

Note: Because vertical scales differ, graphs should not be compared.

Sources: Tables 1.2 and 1.3.

**Table 1.3 Energy Consumption by Source, 1949-1996**  
(Quadrillion Btu)

Year	Fossil Fuels					Nuclear Electric Power	Hydroelectric Pumped Storage <sup>3</sup>	Renewable Energy						Total <sup>7</sup>
	Coal	Coal Coke Net Imports	Natural Gas <sup>1</sup>	Petroleum <sup>2</sup>	Total Fossil Fuels			Conventional Hydroelectric Power <sup>4</sup>	Geothermal Energy <sup>5</sup>	Biofuels <sup>6</sup>	Solar Energy	Wind Energy	Total Renewable Energy	
1949	11.981	-0.007	5.145	11.883	29.002	0	( <sup>8</sup> )	1.449	0	0.006	0	0	1.454	30.457
1950	12.347	(s)	5.968	13.315	31.632	0	( <sup>8</sup> )	1.440	0	0.005	0	0	1.446	33.078
1951	12.553	-0.021	7.049	14.428	34.008	0	( <sup>8</sup> )	1.454	0	0.005	0	0	1.459	35.467
1952	11.307	-0.012	7.550	14.956	33.800	0	( <sup>8</sup> )	1.496	0	0.006	0	0	1.503	35.302
1953	11.373	-0.009	7.907	15.556	34.826	0	( <sup>8</sup> )	1.439	0	0.005	0	0	1.444	36.270
1954	9.715	-0.007	8.330	15.839	33.877	0	( <sup>8</sup> )	1.388	0	(s)	0	0	1.391	35.269
1955	11.167	-0.010	8.998	17.255	37.410	0	( <sup>8</sup> )	1.407	0	(s)	0	0	1.411	38.821
1956	11.350	-0.013	9.614	17.937	38.888	0	( <sup>8</sup> )	1.487	0	(s)	0	0	1.489	40.377
1957	10.821	-0.017	10.191	17.932	38.926	(s)	( <sup>8</sup> )	1.557	0	(s)	0	0	1.559	40.484
1958	9.533	-0.007	10.663	18.527	38.717	(s)	( <sup>8</sup> )	1.629	0	(s)	0	0	1.631	40.349
1959	9.518	-0.008	11.717	19.323	40.550	(s)	( <sup>8</sup> )	1.587	0	(s)	0	0	1.589	42.141
1960	9.838	-0.006	12.385	19.919	42.137	0.006	( <sup>8</sup> )	1.657	(s)	(s)	0	0	1.659	43.802
1961	9.623	-0.008	12.926	20.216	42.758	0.020	( <sup>8</sup> )	1.680	(s)	(s)	0	0	1.684	44.462
1962	9.906	-0.006	13.731	21.049	44.681	0.026	( <sup>8</sup> )	1.822	(s)	(s)	0	0	1.825	46.533
1963	10.412	-0.007	14.403	21.701	46.509	0.038	( <sup>8</sup> )	1.772	(s)	(s)	0	0	1.777	48.325
1964	10.965	-0.010	15.288	22.301	48.543	0.040	( <sup>8</sup> )	1.907	0.005	(s)	0	0	1.913	50.496
1965	11.580	-0.018	15.769	23.246	50.576	0.043	( <sup>8</sup> )	2.058	(s)	(s)	0	0	2.065	52.684
1966	12.143	-0.025	16.995	24.401	53.514	0.064	( <sup>8</sup> )	2.073	(s)	(s)	0	0	2.081	55.659
1967	11.914	-0.015	17.945	25.284	55.127	0.088	( <sup>8</sup> )	2.344	0.007	(s)	0	0	2.354	57.569
1968	12.331	-0.017	19.210	26.979	58.502	0.142	( <sup>8</sup> )	2.342	0.009	(s)	0	0	2.355	60.999
1969	12.382	-0.036	20.678	28.338	61.362	0.154	( <sup>8</sup> )	2.659	0.013	(s)	0	0	2.676	64.191
1970	12.264	-0.058	21.795	29.521	63.522	0.239	( <sup>8</sup> )	2.654	0.011	(s)	0	0	2.669	66.431
1971	11.599	-0.033	22.469	30.561	64.596	0.413	( <sup>8</sup> )	2.861	0.012	(s)	0	0	2.876	67.885
1972	12.077	-0.026	22.698	32.947	67.696	0.584	( <sup>8</sup> )	2.944	0.031	(s)	0	0	2.979	71.258
1973	12.971	-0.007	22.512	34.840	70.316	0.910	( <sup>8</sup> )	3.010	0.043	(s)	0	0	3.056	74.282
1974	12.663	0.056	21.732	33.455	67.906	1.272	( <sup>8</sup> )	3.309	0.053	(s)	0	0	3.365	72.543
1975	12.663	0.014	19.948	32.731	65.355	1.900	( <sup>8</sup> )	3.219	0.070	(s)	0	0	3.291	70.546
1976	13.584	(s)	20.345	35.175	69.104	2.111	( <sup>8</sup> )	3.066	0.078	(s)	0	0	3.146	74.362
1977	13.922	0.015	19.931	37.122	70.989	2.702	( <sup>8</sup> )	2.515	0.077	0.005	0	0	2.597	76.288
1978	13.765	0.125	20.000	37.965	71.856	3.024	( <sup>8</sup> )	3.141	0.064	(s)	0	0	3.209	78.089
1979	15.040	0.063	20.666	37.123	72.892	2.776	( <sup>8</sup> )	3.141	0.084	0.005	0	0	3.230	78.898
1980	15.423	-0.035	20.394	34.202	69.985	2.739	( <sup>8</sup> )	3.118	0.110	0.005	0	0	3.232	75.956
1981	15.907	-0.016	19.928	31.931	67.750	3.008	( <sup>8</sup> )	3.105	0.123	(s)	0	0	3.232	73.990
1982	15.321	-0.022	18.505	30.232	64.037	3.131	( <sup>8</sup> )	3.572	0.105	(s)	0	0	3.680	70.848
1983	15.895	-0.016	17.357	30.054	63.290	3.203	( <sup>8</sup> )	3.899	0.129	(s)	0	(s)	4.032	70.525
1984	17.070	-0.011	18.507	31.051	66.617	3.553	( <sup>8</sup> )	3.800	0.165	0.009	0	(s)	3.974	74.144
1985	17.478	-0.013	17.834	30.922	66.221	4.149	( <sup>8</sup> )	3.398	0.198	0.014	0	(s)	3.611	73.980
1986	17.260	-0.017	16.708	32.196	66.148	4.471	( <sup>8</sup> )	3.446	0.219	0.012	0	(s)	3.678	74.297
1987	18.008	0.009	17.744	32.865	68.626	4.906	( <sup>8</sup> )	3.117	0.229	0.015	0	(s)	3.362	76.894
1988	18.846	0.040	18.552	34.222	71.660	5.661	( <sup>8</sup> )	2.662	0.217	0.017	0	(s)	2.897	80.218
1989	R18.921	0.030	19.384	34.211	72.546	5.677	( <sup>8</sup> )	2.881	0.197	0.020	(s)	(s)	3.098	R81.321
1990	19.101	0.005	19.296	33.553	R71.955	6.161	-0.036	R,93.104	R,10.345	102.632	10.067	R,10.023	R,10.6171	R,1084.093
1991	18.770	0.009	19.606	32.845	71.230	6.579	-0.047	3.182	0.354	2.642	0.068	0.027	6.273	R83.995
1992	R,1119.209	0.027	20.131	33.527	R,1172.893	6.607	-0.043	2.852	0.367	2.788	0.068	0.030	6.106	R,1185.523
1993	R19.829	0.017	20.827	33.841	R74.514	6.519	-0.041	3.138	0.381	2.784	0.069	0.031	6.403	R87.337
1994	R20.018	0.024	R21.288	34.735	R76.064	6.837	-0.035	2.958	0.381	R2.838	0.069	0.036	R6.282	R89.213
1995	R20.085	0.026	R22.163	R34.663	R76.938	R7.177	-0.028	R3.471	R0.325	R2.946	0.072	R0.033	R6.847	R90.942
1996P	20.988	(s)	22.587	35.717	79.292	7.168	-0.032	3.911	0.354	3.017	0.075	0.036	7.393	93.813

<sup>1</sup> Includes supplemental gaseous fuels.

<sup>2</sup> Petroleum products supplied, including natural gas plant liquids and crude oil burned as fuel.

<sup>3</sup> Represents total pumped storage facility production minus energy used for pumping.

<sup>4</sup> Through 1989, includes all net imports of electricity. From 1990, includes only the portion of net imports of electricity that is derived from hydroelectric power.

<sup>5</sup> Includes electricity imports from Mexico that are derived from geothermal energy.

<sup>6</sup> Includes wood, wood waste, peat, wood liquors, railroad ties, pitch, wood sludge, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oils, and/or other waste.

<sup>7</sup> From 1990, the portion of net imports of electricity that is derived from nonrenewable energy sources is included directly in the "Total."

<sup>8</sup> Through 1989, pumped storage is included in conventional hydroelectric power.

<sup>9</sup> There is a discontinuity in this time series between 1989 and 1990; beginning in 1990, pumped storage is removed and expanded coverage of industrial use of hydroelectric power is included.

<sup>10</sup> There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of nonutility use of renewable energy beginning in 1990.

<sup>11</sup> Independent power producers' use of coal is included beginning in 1992. See Table 7.3.

R=Revised data. P=Preliminary data. (s)=Less than 0.005 quadrillion Btu.

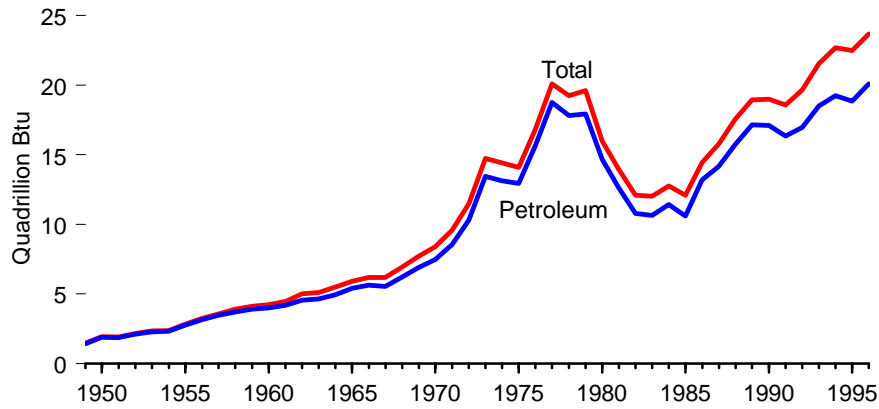
Note: • Totals may not equal sum of components due to independent rounding.

Sources: Tables 5.1, 6.1, 7.1, 7.7, 8.1, 8.3, 10.1, Energy Information Administration estimates for industrial hydroelectric power, and conversion factors in Appendix A.

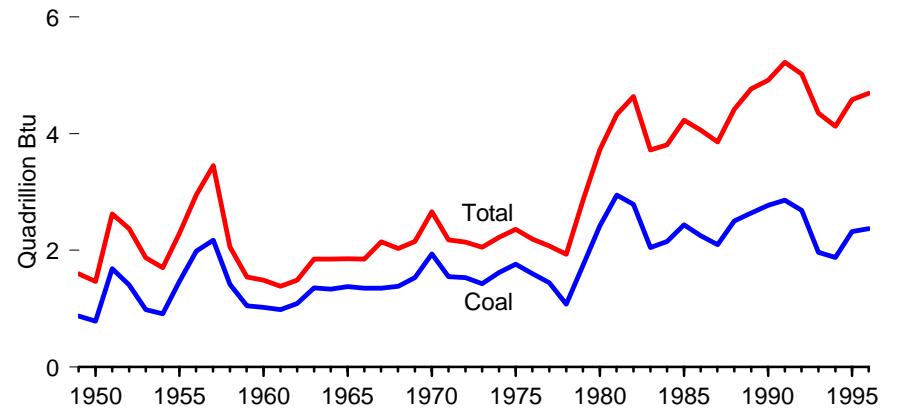


**Figure 1.4 Energy Imports, Exports, and Net Imports, 1949-1996**

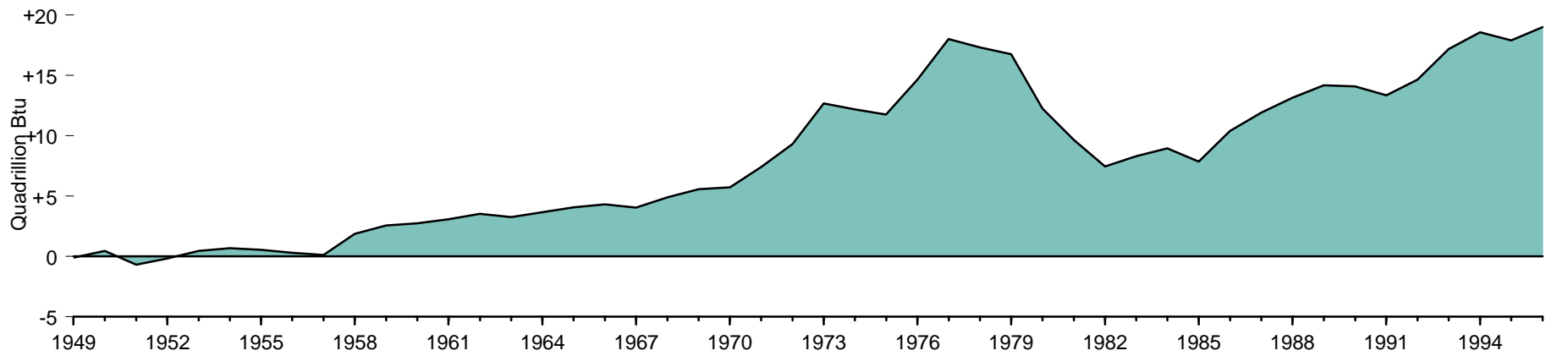
**Energy Imports**



**Energy Exports**



**Energy Net Imports**



Notes: • Negative net imports are net exports. • Because vertical scales differ, graphs should not be compared.

Source: Table 1.4.

**Table 1.4 Energy Imports, Exports, and Net Imports, 1949-1996**  
(Quadrillion Btu)

Year	Imports					Exports					Net Imports <sup>1</sup>				
	Coal	Natural Gas (Dry)	Petroleum <sup>2</sup>	Other <sup>3</sup>	Total	Coal	Natural Gas (Dry)	Petroleum	Other <sup>3</sup>	Total	Coal	Natural Gas (Dry)	Petroleum <sup>2</sup>	Other <sup>3</sup>	Total
1949	0.01	0.00	1.43	0.03	1.47	0.88	0.02	0.68	0.02	1.59	-0.87	-0.02	0.75	0.02	-0.13
1950	0.01	0.00	1.89	0.04	1.93	0.79	0.03	0.64	0.01	1.47	-0.78	-0.03	1.24	0.03	0.47
1951	0.01	0.00	1.87	0.04	1.92	1.68	0.03	0.89	0.03	2.62	-1.67	-0.03	0.98	0.01	-0.71
1952	0.01	0.01	2.11	0.04	2.17	1.40	0.03	0.91	0.02	2.37	-1.40	-0.02	1.20	0.02	-0.20
1953	0.01	0.01	2.28	0.04	2.34	0.98	0.03	0.84	0.02	1.87	-0.97	-0.02	1.44	0.02	0.47
1954	0.01	0.01	2.32	0.04	2.37	0.91	0.03	0.75	0.01	1.70	-0.91	-0.02	1.58	0.02	0.67
1955	0.01	0.01	2.75	0.06	2.83	1.46	0.03	0.77	0.02	2.29	-1.46	-0.02	1.98	0.04	0.54
1956	0.01	0.01	3.17	0.06	3.25	1.98	0.04	0.91	0.02	2.95	-1.98	-0.03	2.26	0.04	0.30
1957	0.01	0.04	3.46	0.06	3.57	2.17	0.04	1.20	0.03	3.45	-2.16	(s)	2.26	0.02	0.12
1958	0.01	0.14	3.72	0.05	3.92	1.42	0.04	0.58	0.02	2.06	-1.41	0.10	3.14	0.03	1.86
1959	0.01	0.14	3.91	0.05	4.11	1.05	0.02	0.45	0.02	1.54	-1.04	0.12	3.46	0.03	2.57
1960	0.01	0.16	4.00	0.06	4.23	1.02	0.01	0.43	0.02	1.48	-1.02	0.15	3.57	0.04	2.74
1961	(s)	0.23	4.19	0.04	4.46	0.98	0.01	0.37	0.02	1.38	-0.98	0.22	3.82	0.02	3.08
1962	0.01	0.42	4.56	0.03	5.01	1.08	0.02	0.36	0.03	1.48	-1.08	0.40	4.20	(s)	3.53
1963	0.01	0.42	4.65	0.03	5.10	1.36	0.02	0.44	0.03	1.85	-1.35	0.40	4.21	-0.01	3.25
1964	0.01	0.46	4.96	0.07	5.49	1.34	0.02	0.43	0.06	1.84	-1.33	0.44	4.53	0.01	3.65
1965	(s)	0.47	5.40	0.04	5.92	1.38	0.03	0.39	0.06	1.85	-1.37	0.44	5.01	-0.02	4.06
1966	(s)	0.50	5.63	0.05	6.18	1.35	0.03	0.41	0.06	1.85	-1.35	0.47	5.21	-0.01	4.32
1967	0.01	0.58	5.56	0.04	6.19	1.35	0.08	0.65	0.06	2.15	-1.35	0.50	4.91	-0.02	4.04
1968	0.01	0.67	6.21	0.04	6.93	1.38	0.10	0.49	0.06	2.03	-1.37	0.58	5.73	-0.02	4.90
1969	(s)	0.75	6.90	0.06	7.71	1.53	0.05	0.49	0.08	2.15	-1.53	0.70	6.42	-0.02	5.56
1970	(s)	0.85	7.47	0.07	8.39	1.94	0.07	0.55	0.11	2.66	-1.93	0.77	6.92	-0.04	5.72
1971	(s)	0.96	8.54	0.08	9.58	1.55	0.08	0.47	0.07	2.18	-1.54	0.88	8.07	(s)	7.41
1972	(s)	1.05	10.30	0.11	11.46	1.53	0.08	0.47	0.06	2.14	-1.53	0.97	9.83	0.05	9.32
1973	(s)	1.06	13.47	0.20	14.73	1.43	0.08	0.49	0.06	2.05	-1.42	0.98	12.98	0.14	12.68
1974	0.05	0.99	13.13	0.25	14.41	1.62	0.08	0.46	0.06	2.22	-1.57	0.91	12.66	0.19	12.19
1975	0.02	0.98	12.95	0.16	14.11	1.76	0.07	0.44	0.08	2.36	-1.74	0.90	12.51	0.08	11.75
1976	0.03	0.99	15.67	0.15	16.84	1.60	0.07	0.47	0.06	2.19	-1.57	0.92	15.20	0.09	14.65
1977	0.04	1.04	18.76	0.26	20.09	1.44	0.06	0.51	0.06	2.07	-1.40	0.98	18.24	0.20	18.02
1978	0.07	0.99	17.82	0.36	19.25	1.08	0.05	0.77	0.03	1.93	-1.00	0.94	17.06	0.33	17.32
1979	0.05	1.30	17.93	0.33	19.62	1.75	0.06	1.00	0.06	2.87	-1.70	1.24	16.93	0.27	16.75
1980	0.03	1.01	14.66	0.28	15.97	2.42	0.05	1.16	0.09	3.72	-2.39	0.96	13.50	0.18	12.25
1981	0.03	0.92	12.64	0.39	13.97	2.94	0.06	1.26	0.06	4.33	-2.92	0.86	11.38	0.33	9.65
1982	0.02	0.95	10.78	0.35	12.09	2.79	0.05	1.73	0.06	4.63	-2.77	0.90	9.05	0.28	7.46
1983	0.03	0.94	10.65	0.41	12.03	2.04	0.06	1.57	0.05	3.72	-2.01	0.89	9.08	0.36	8.31
1984	0.03	0.85	11.43	0.46	12.77	2.15	0.06	1.54	0.05	3.80	-2.12	0.79	9.89	0.40	8.96
1985	0.05	0.95	10.61	0.49	12.10	2.44	0.06	1.66	0.08	4.23	-2.39	0.90	8.95	0.41	7.87
1986	0.06	0.75	13.20	0.43	14.44	2.25	0.06	1.67	0.08	4.06	-2.19	0.69	11.53	0.36	10.38
1987	0.04	0.99	14.16	0.57	15.76	2.09	0.05	1.63	0.08	3.85	-2.05	0.94	12.53	0.49	11.91
1988	0.05	1.30	15.75	0.47	17.56	2.50	0.07	1.74	0.10	4.42	-2.45	1.22	14.01	0.37	13.15
1989	0.07	1.39	17.16	0.33	18.95	2.64	0.11	1.84	0.18	4.77	-2.57	1.28	15.33	0.14	14.18
1990	0.07	1.55	17.12	0.26	18.99	2.77	0.09	1.82	0.23	4.91	-2.70	1.46	15.29	0.03	14.08
1991	0.08	1.80	16.35	0.35	18.58	2.85	0.13	2.13	0.11	5.22	-2.77	1.67	14.22	0.25	13.36
1992	0.10	2.16	16.97	0.44	19.66	2.68	0.22	2.01	0.11	5.02	-2.59	1.94	14.96	0.33	14.64
1993	0.18	2.40	18.51	0.45	21.54	1.96	0.14	2.12	0.13	4.35	-1.78	2.25	16.40	0.32	17.19
1994	0.19	2.68	19.25	0.59	22.71	1.88	0.16	1.99	0.09	4.12	-1.69	2.52	17.26	0.49	18.58
1995	0.18	<sup>R</sup> 2.90	<sup>R</sup> 18.86	<sup>R</sup> 0.54	<sup>R</sup> 22.48	2.32	0.16	1.99	<sup>R</sup> 0.11	4.58	-2.14	<sup>R</sup> 2.74	<sup>R</sup> 16.87	0.42	<sup>R</sup> 17.90
1996 <sup>P</sup>	0.18	2.90	20.10	0.50	23.68	2.37	0.15	2.06	0.10	4.69	-2.19	2.75	18.04	0.40	19.00

<sup>1</sup> Net imports = imports minus exports.

<sup>2</sup> Includes imports into the Strategic Petroleum Reserve, which began in 1977.

<sup>3</sup> Coal coke and small amounts of electricity transmitted across U.S. borders with Canada and Mexico.

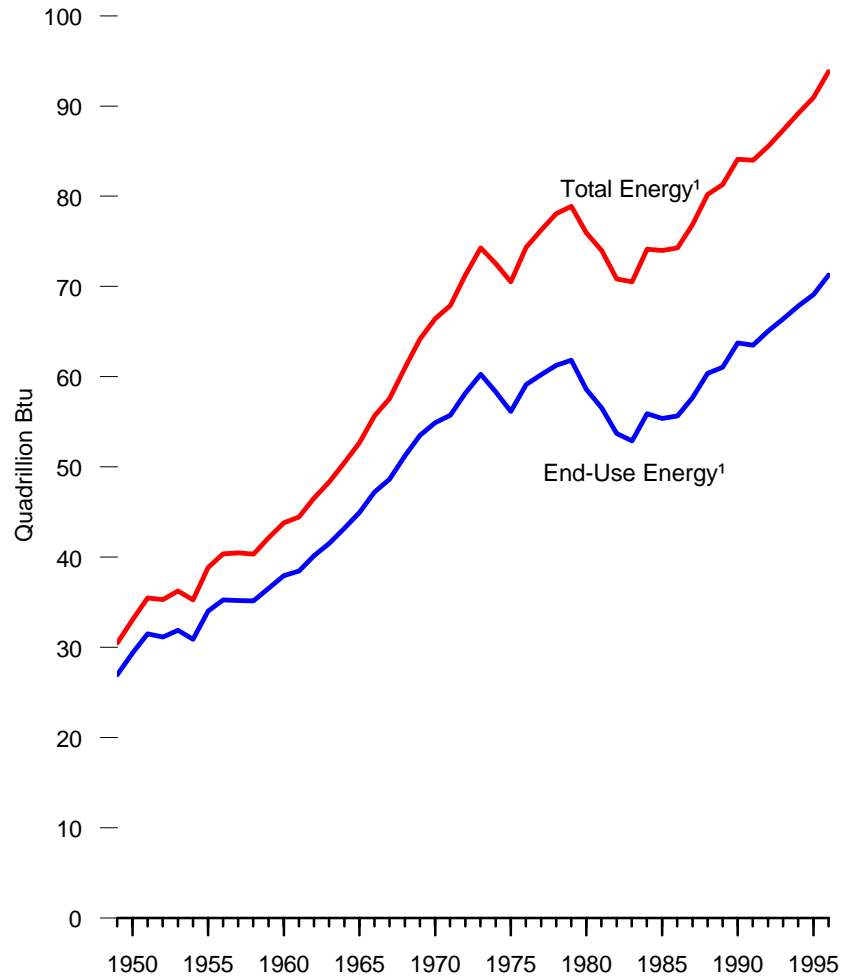
R=Revised data. P=Preliminary data. (s)=Less than 0.005 quadrillion Btu.

Notes: • Includes trade between the United States (50 States and the District of Columbia) and its territories and possessions. • Totals or net import items may not equal sum of components due to independent rounding.

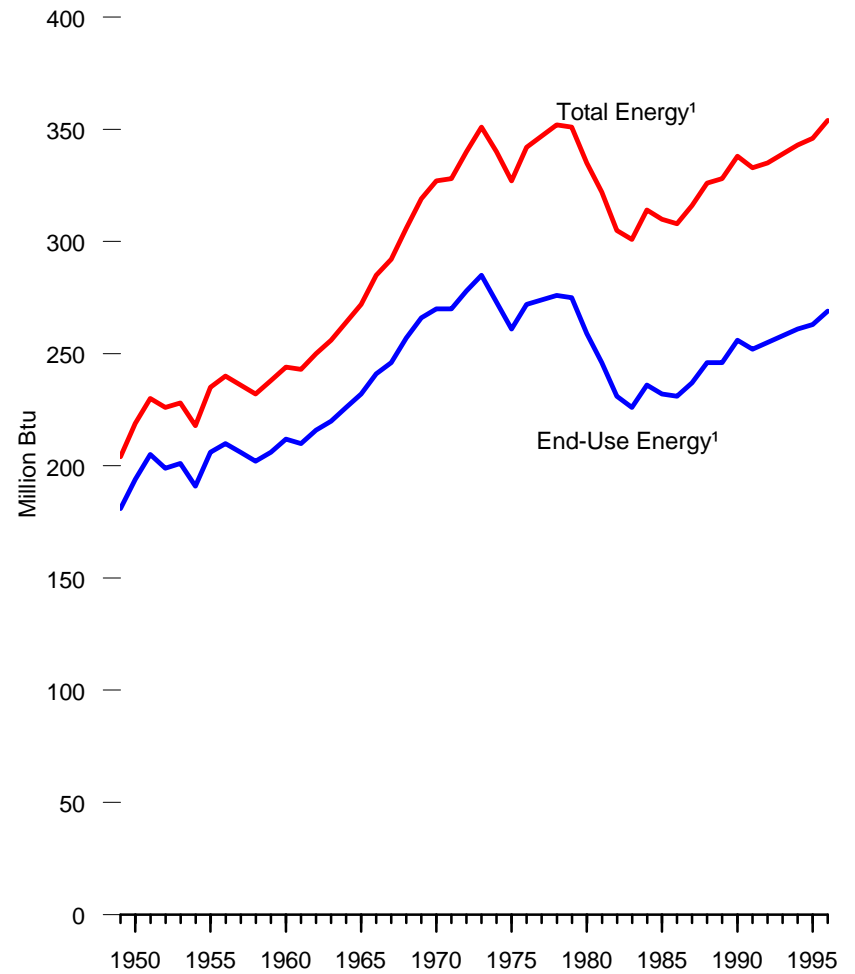
Sources: Tables 5.1, 5.5, 6.1, 7.1, 7.7, and 8.1, and conversion factors in Appendix A.

**Figure 1.5 Energy Consumption and Energy Consumption per Capita, 1949-1996**

**Energy Consumption**



**Energy Consumption per Capita**



<sup>1</sup> There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

Source: Table 1.5.

**Table 1.5 Energy Consumption and Energy Consumption per Capita, 1949-1996**

Year	Total Energy Consumption (quadrillion Btu)	End-Use Energy Consumption <sup>1</sup> (quadrillion Btu)	Population <sup>2</sup> (million)	Consumption per Capita			
				Total Energy		End-Use Energy <sup>1</sup>	
				Quantity (million Btu)	Change from Previous Year (percent) <sup>3</sup>	Quantity (million Btu)	Change from Previous Year (percent) <sup>3</sup>
1949	30.46	26.97	149.3	204	—	181	—
1950	33.08	29.37	151.3	219	7.4	194	7.2
1951	35.47	31.50	154.0	230	5.0	205	5.7
1952	35.30	31.16	156.4	226	-1.7	199	-2.9
1953	36.27	31.87	159.0	228	0.9	201	1.0
1954	35.27	30.92	161.9	218	-4.4	191	-5.0
1955	38.82	34.02	165.1	235	7.8	206	7.9
1956	40.38	35.26	168.1	240	2.1	210	1.9
1957	40.48	35.19	171.2	236	-1.7	206	-1.9
1958	40.35	35.13	174.1	232	-1.7	202	-1.9
1959	42.14	36.53	177.1	238	2.6	206	2.0
1960	43.80	37.96	179.3	244	2.5	212	2.9
1961	44.46	38.46	183.0	243	-0.4	210	-0.9
1962	46.53	40.15	185.8	250	2.9	216	2.9
1963	48.32	41.54	188.5	256	2.4	220	1.9
1964	50.50	43.22	191.1	264	3.1	226	2.7
1965	52.68	<sup>R</sup> 44.92	193.5	272	3.0	232	2.7
1966	55.66	<sup>R</sup> 47.20	195.6	285	4.8	241	3.9
1967	57.57	48.62	197.5	292	2.5	246	2.1
1968	61.00	51.22	199.4	306	4.8	257	4.5
1969	64.19	53.49	201.4	319	4.2	266	3.5
1970	66.43	54.91	203.2	327	2.5	270	1.5
1971	67.89	55.75	206.8	328	0.3	270	0.0
1972	71.26	58.18	209.3	340	3.7	278	3.0
1973	74.28	60.27	211.4	351	3.2	285	2.5
1974	72.54	58.34	213.3	340	-3.1	273	-4.2
1975	70.55	56.16	215.5	327	-3.8	261	-4.4
1976	74.36	59.12	217.6	342	4.6	272	4.2
1977	76.29	60.22	219.8	347	1.5	274	0.7
1978	78.09	61.25	222.1	352	1.4	276	0.7
1979	78.90	61.84	224.6	351	-0.3	275	-0.4
1980	75.96	58.60	226.5	335	-4.6	259	-5.8
1981	73.99	56.56	229.6	322	-3.9	246	-5.0
1982	70.85	53.70	232.0	305	-5.3	231	-6.1
1983	70.52	52.91	234.3	301	-1.3	226	-2.2
1984	74.14	55.92	236.5	314	4.3	236	4.4
1985	73.98	55.39	238.7	310	-1.3	232	-1.7
1986	74.30	55.68	241.1	308	-0.6	231	-0.4
1987	76.89	57.68	243.4	316	2.6	237	2.6
1988	80.22	60.37	245.8	326	3.2	246	3.8
1989	<sup>R</sup> 81.32	61.07	248.2	328	0.6	246	0.0
1990	<sup>R</sup> 84.09	<sup>R</sup> 63.74	248.7	<sup>R</sup> 338	<sup>R</sup> 3.0	<sup>R</sup> 256	<sup>R</sup> 4.1
1991	<sup>R</sup> 83.99	<sup>R</sup> 63.50	252.1	333	-1.5	252	<sup>R</sup> -1.6
1992	<sup>R</sup> 85.52	<sup>R</sup> 65.05	255.0	<sup>R</sup> 335	<sup>R</sup> 0.6	255	1.2
1993	<sup>R</sup> 87.34	<sup>R</sup> 66.39	257.8	<sup>R</sup> 339	1.2	258	1.2
1994	<sup>R</sup> 89.21	<sup>R</sup> 67.86	<sup>R</sup> 260.4	<sup>R</sup> 343	<sup>R</sup> 1.2	261	1.2
1995	<sup>R</sup> 90.94	<sup>R</sup> 69.11	<sup>R</sup> 262.9	<sup>R</sup> 346	<sup>R</sup> 0.9	<sup>R</sup> 263	<sup>R</sup> 0.8
1996 <sup>P</sup>	93.81	71.27	265.3	354	2.3	269	2.3

<sup>1</sup> End-use energy consumption is total energy consumption less losses incurred in the generation, transmission, and distribution of electricity, less power plant electricity use and unaccounted for electrical system energy losses. (See Glossary.)

<sup>2</sup> Resident population of the 50 States and the District of Columbia estimated for July 1 of each year, except for the April 1 census count in 1950, 1960, 1970, 1980, and 1990.

<sup>3</sup> Percent change calculated from data prior to rounding.

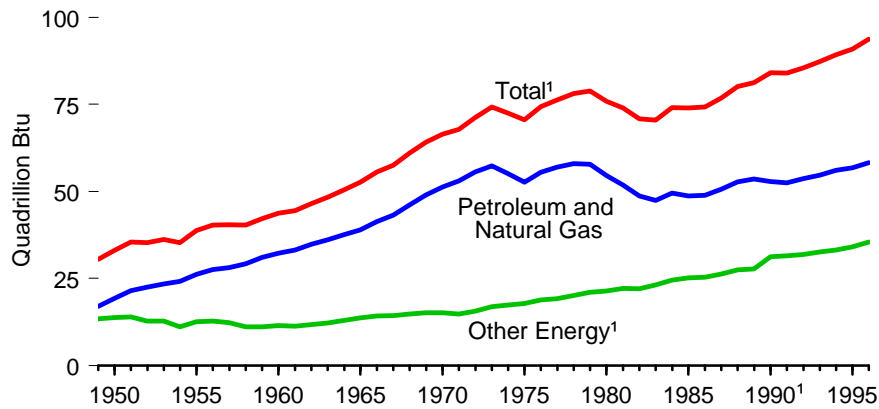
<sup>4</sup> There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

R=Revised data. P=Preliminary data. — = Not applicable.

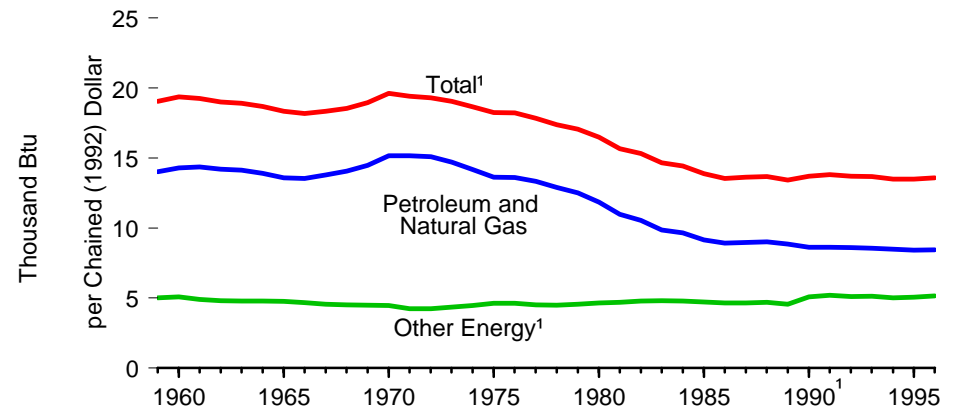
Sources: **Total Energy Consumption:** Table 1.3. **End-Use Energy Consumption:** Table 1.3. **Population:** • 1949—Bureau of the Census, *Current Population Reports*, "Population Estimates and Projections," Series P-25, No. 802, May 1979. • 1950-1979—Bureau of the Census, *Current Population Reports*, "Population Estimates and Projections," Series P-25, No. 990, July 1986. • 1980-1989—*Current Population Reports*, "Population Estimates and Projections," Series P-25, No. 1058, March 1990. • 1990-forward—unpublished data consistent with the Bureau of the Census Press Release CB96-224, December 1996. **Consumption per Capita:** calculated by Energy Information Administration.

**Figure 1.6 Energy Consumption per Dollar of Gross Domestic Product**

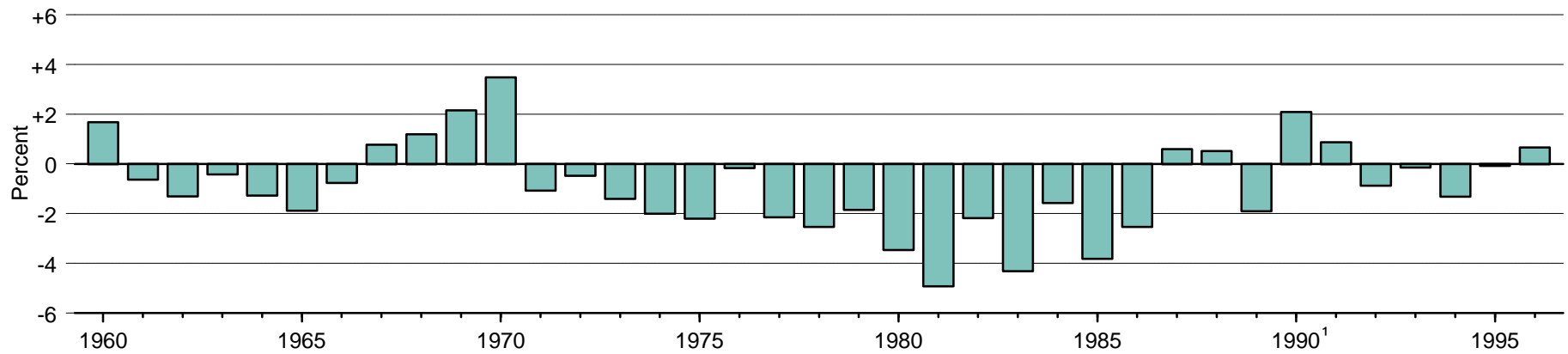
**Energy Consumption, 1949-1996**



**Energy Consumption per Dollar of Gross Domestic Product, 1959-1996**



**Total Energy Consumption per Dollar of Gross Domestic Product, Change from Previous Year, 1960-1996**



<sup>1</sup> There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

Source: Table 1.6.

**Table 1.6 Energy Consumption per Dollar of Gross Domestic Product, 1949-1996**

Year	Energy Consumption			Gross Domestic Product (GDP) <sup>1</sup>	Energy Consumption per Dollar of GDP			
	Petroleum and Natural Gas	Other Energy	Total		Petroleum and Natural Gas	Other Energy	Total	Change from Previous Year
	Quadrillion Btu				Billion Chained (1992) Dollars	Thousand Btu per Chained (1992) Dollar		
1949	17.03	13.43	30.46	(1)	(1)	(1)	(1)	(1)
1950	19.28	13.79	33.08	(1)	(1)	(1)	(1)	(1)
1951	21.48	13.99	35.47	(1)	(1)	(1)	(1)	(1)
1952	22.51	12.80	35.30	(1)	(1)	(1)	(1)	(1)
1953	23.46	12.81	36.27	(1)	(1)	(1)	(1)	(1)
1954	24.17	11.10	35.27	(1)	(1)	(1)	(1)	(1)
1955	26.25	12.57	38.82	(1)	(1)	(1)	(1)	(1)
1956	27.55	12.83	40.38	(1)	(1)	(1)	(1)	(1)
1957	28.12	12.36	40.48	(1)	(1)	(1)	(1)	(1)
1958	29.19	11.16	40.35	(1)	(1)	(1)	(1)	(1)
1959	31.04	11.10	42.14	2,212.3	14.03	5.02	19.05	(1)
1960	32.30	11.50	43.80	2,261.7	14.28	5.08	19.37	1.7
1961	33.14	11.32	44.46	2,309.8	14.35	4.90	19.25	-0.6
1962	34.78	11.75	46.53	2,449.1	14.20	4.80	19.00	-1.3
1963	36.10	12.22	48.32	2,554.0	14.14	4.78	18.92	-0.4
1964	37.59	12.91	50.50	2,702.9	13.91	4.78	18.68	-1.3
1965	39.01	13.67	52.68	2,874.8	13.57	4.76	18.33	-1.9
1966	41.40	14.26	55.66	3,060.2	13.53	4.66	18.19	-0.8
1967	43.23	14.34	57.57	3,140.2	13.77	4.57	18.33	0.8
1968	46.19	14.81	61.00	3,288.6	14.05	4.50	18.55	1.2
1969	49.02	15.18	64.19	3,388.0	14.47	4.48	18.95	2.2
1970	51.32	15.12	66.43	3,388.2	15.15	4.46	19.61	3.5
1971	53.03	14.85	67.89	3,500.1	15.15	4.24	19.40	-1.1
1972	55.64	15.61	71.26	3,690.3	15.08	4.23	19.31	-0.5
1973	57.35	16.93	74.28	3,902.3	14.70	4.34	19.04	-1.4
1974	55.19	17.36	72.54	3,888.2	14.19	4.46	18.66	-2.0
1975	52.68	17.87	70.55	3,865.1	13.63	4.62	18.25	-2.2
1976	55.52	18.84	74.36	4,081.1	13.60	4.62	18.22	-0.2
1977	57.05	19.24	76.29	4,279.3	13.33	4.50	17.83	-2.1
1978	57.97	20.12	78.09	4,493.7	12.90	4.48	17.38	-2.5
1979	57.79	21.11	78.90	4,624.0	12.50	4.56	17.06	-1.8
1980	54.60	21.36	75.96	4,611.9	11.84	4.63	16.47	-3.5
1981	51.86	22.13	73.99	4,724.9	10.98	4.68	15.66	-4.9
1982	48.74	22.11	70.85	4,623.6	10.54	4.78	15.32	-2.2
1983	47.41	23.11	70.52	4,810.0	9.86	4.81	14.66	-4.3
1984	49.56	24.59	74.14	5,138.2	9.65	4.78	14.43	-1.6
1985	48.76	25.22	73.98	5,329.5	9.15	4.73	13.88	-3.8
1986	48.90	25.39	74.30	5,489.9	8.91	4.63	13.53	-2.5
1987	50.61	26.28	76.89	5,648.4	8.96	4.65	13.61	0.6
1988	52.77	27.44	80.22	5,862.9	9.00	4.68	13.68	0.5
1989	53.59	27.73	R81.32	6,060.4	8.84	R4.57	13.42	-1.9
1990	52.85	R31.24	R384.09	6,138.7	8.61	R35.09	R13.70	R32.1
1991	52.45	R31.54	R83.99	6,079.0	8.63	R5.19	R13.82	0.9
1992	53.66	R31.87	R85.52	6,244.4	8.59	R5.10	R13.70	R0.9
1993	54.67	R32.67	R87.34	R6,386.4	8.56	R5.12	R13.68	-0.1
1994	R56.02	R33.19	R89.21	R6,608.7	R8.48	R5.02	R13.50	R-1.3
1995	56.83	R34.12	R90.94	R6,742.9	8.43	R5.06	R13.49	-0.1
1996 <sup>P</sup>	58.30	35.51	93.81	6,907.4	8.44	5.14	13.58	0.7

<sup>1</sup> A comprehensive revision of the National Income and Product Accounts was released by the U. S. Department of Commerce in early 1996 that resulted in changes to the entire Gross Domestic Product series; the revised values for 1949-1958 were not available in time to include in this table.

<sup>2</sup> Percent change calculated from data prior to rounding.

<sup>3</sup> There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of

non-electric utility use of renewable energy beginning in 1990.

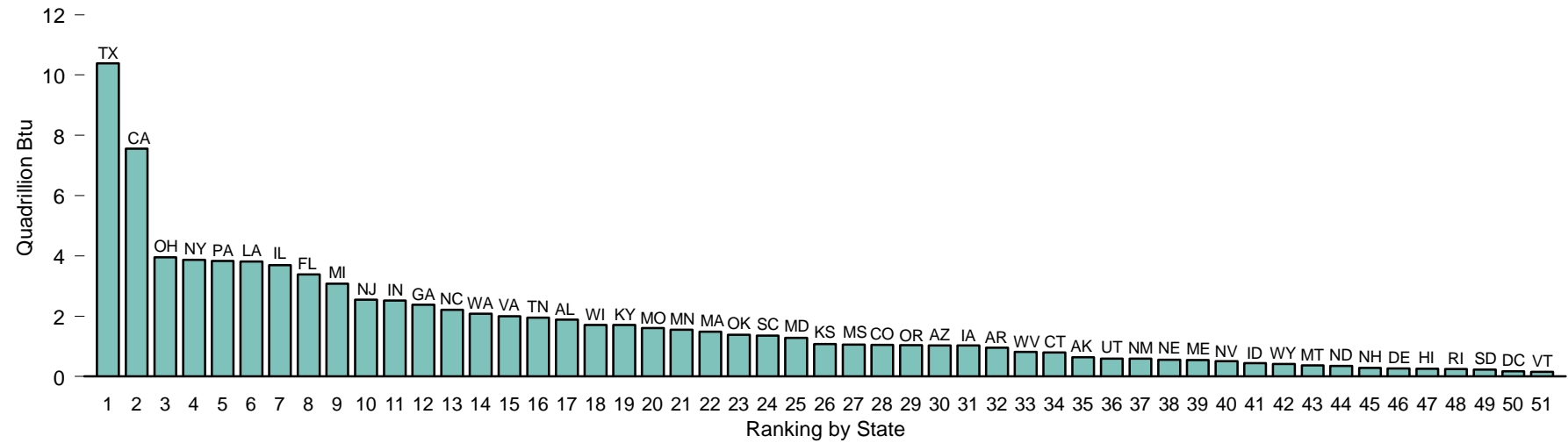
R=Revised data. P=Preliminary data.

Note: See "Chained Dollars" in the Glossary.

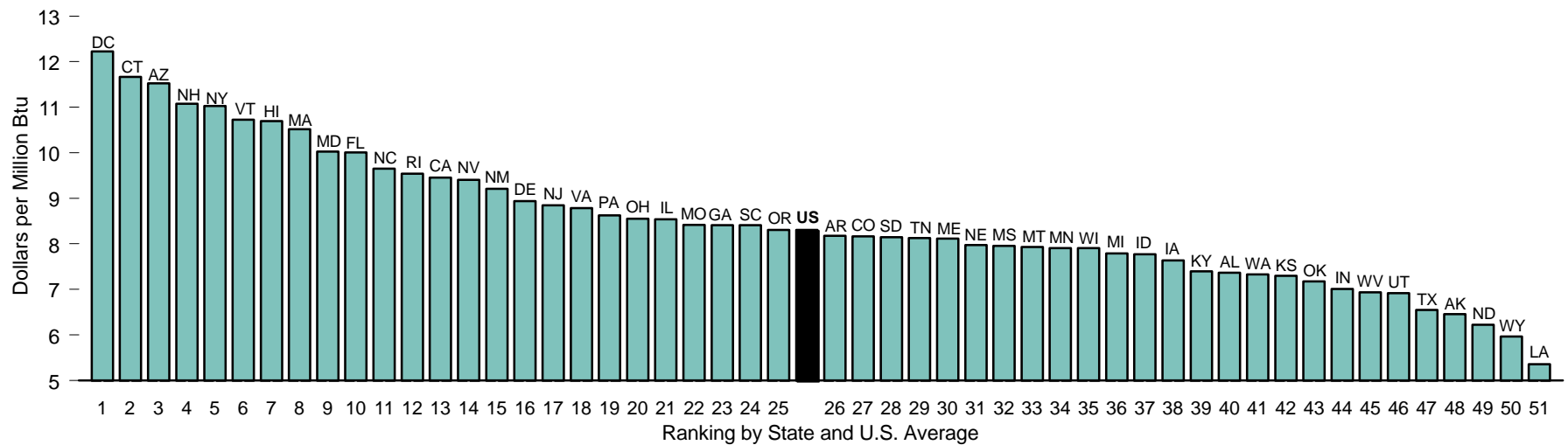
Sources: Tables 1.3 and E1.

**Figure 1.7 Energy Consumption and Prices by State, 1994**

**Consumption**



**Prices**



Source: Table 1.7.

**Table 1.7 Energy Consumption, Prices, and Expenditures by State, 1994**

Consumption			Prices			Expenditures		
Rank	State	Trillion Btu	Rank	State	Dollars per Million Btu	Rank	State	Million Dollars
1	Texas	10,387.6	1	District of Columbia	12.23	1	California	50,216
2	California	7,554.8	2	Connecticut	11.67	2	Texas	47,246
3	Ohio	3,954.1	3	Arizona	11.53	3	New York	31,041
4	New York	3,867.4	4	New Hampshire	11.08	4	Pennsylvania	23,542
5	Pennsylvania	3,830.7	5	New York	11.03	5	Ohio	22,892
6	Louisiana	3,817.0	6	Vermont	10.73	6	Illinois	22,632
7	Illinois	3,694.7	7	Hawaii	10.70	7	Florida	21,654
8	Florida	3,382.1	8	Massachusetts	10.52	8	Michigan	17,777
9	Michigan	3,085.5	9	Maryland	10.03	9	New Jersey	17,190
10	New Jersey	2,546.6	10	Florida	10.01	10	Georgia	13,777
11	Indiana	2,523.6	11	North Carolina	9.65	11	North Carolina	13,677
12	Georgia	2,377.6	12	Rhode Island	9.54	12	Louisiana	13,320
13	North Carolina	2,214.2	13	California	9.46	13	Indiana	12,825
14	Washington	2,082.6	14	Nevada	9.41	14	Virginia	11,858
15	Virginia	1,996.0	15	New Mexico	9.21	15	Massachusetts	11,580
16	Tennessee	1,953.2	16	Delaware	8.94	16	Tennessee	10,203
17	Alabama	1,882.4	17	New Jersey	8.85	17	Missouri	9,856
18	Wisconsin	1,713.4	18	Virginia	8.79	18	Washington	9,185
19	Kentucky	1,704.6	19	Pennsylvania	8.63	19	Wisconsin	8,956
20	Missouri	1,611.1	20	Ohio	8.55	20	Alabama	8,912
21	Minnesota	1,553.1	21	Illinois	8.54	21	Maryland	8,692
22	Massachusetts	1,487.5	22	Missouri	8.42	22	Minnesota	8,502
23	Oklahoma	1,381.6	23	Georgia	8.41	23	Kentucky	8,046
24	South Carolina	1,359.6	24	South Carolina	8.41	24	Arizona	7,545
25	Maryland	1,283.0	25	Oregon	8.31	25	South Carolina	7,245
26	Kansas	1,071.6	26	Arkansas	8.18	26	Connecticut	6,620
27	Mississippi	1,062.6	27	Colorado	8.17	27	Oklahoma	6,450
28	Colorado	1,049.0	28	South Dakota	8.15	28	Colorado	6,100
29	Oregon	1,038.2	29	Tennessee	8.13	29	Iowa	5,944
30	Arizona	1,033.3	30	Maine	8.12	30	Oregon	5,528
31	Iowa	1,030.0	31	Nebraska	7.98	31	Kansas	5,391
32	Arkansas	956.5	32	Mississippi	7.96	32	Mississippi	5,282
33	West Virginia	817.1	33	Montana	7.93	33	Arkansas	5,147
34	Connecticut	796.9	34	Minnesota	7.91	34	West Virginia	3,858
35	Alaska	633.3	35	Wisconsin	7.91	35	Nebraska	3,279
36	Utah	594.8	36	Michigan	7.79	36	New Mexico	3,113
37	New Mexico	590.4	37	Idaho	7.77	37	Nevada	3,099
38	Nebraska	558.7	38	Iowa	7.64	38	Utah	2,959
39	Maine	546.9	39	Kentucky	7.40	39	Maine	2,807
40	Nevada	514.4	40	Alabama	7.37	40	New Hampshire	2,180
41	Idaho	441.2	41	Washington	7.33	41	Idaho	2,176
42	Wyoming	410.3	42	Kansas	7.30	42	Hawaii	2,065
43	Montana	368.8	43	Oklahoma	7.18	43	Montana	1,918
44	North Dakota	344.0	44	Indiana	7.01	44	Rhode Island	1,894
45	New Hampshire	285.5	45	West Virginia	6.94	45	Alaska	1,765
46	Delaware	265.4	46	Utah	6.92	46	Wyoming	1,672
47	Hawaii	259.6	47	Texas	6.55	47	North Dakota	1,645
48	Rhode Island	248.1	48	Alaska	6.46	48	Delaware	1,510
49	South Dakota	231.1	49	North Dakota	6.23	49	South Dakota	1,429
50	District of Columbia	176.0	50	Wyoming	5.97	50	District of Columbia	1,241
51	Vermont	152.6	51	Louisiana	5.36	51	Vermont	1,158
	<b>United States</b>	<b>88,788.6</b>		<b>United States</b>	<b>8.31</b>		<b>United States</b>	<b>504,688</b>

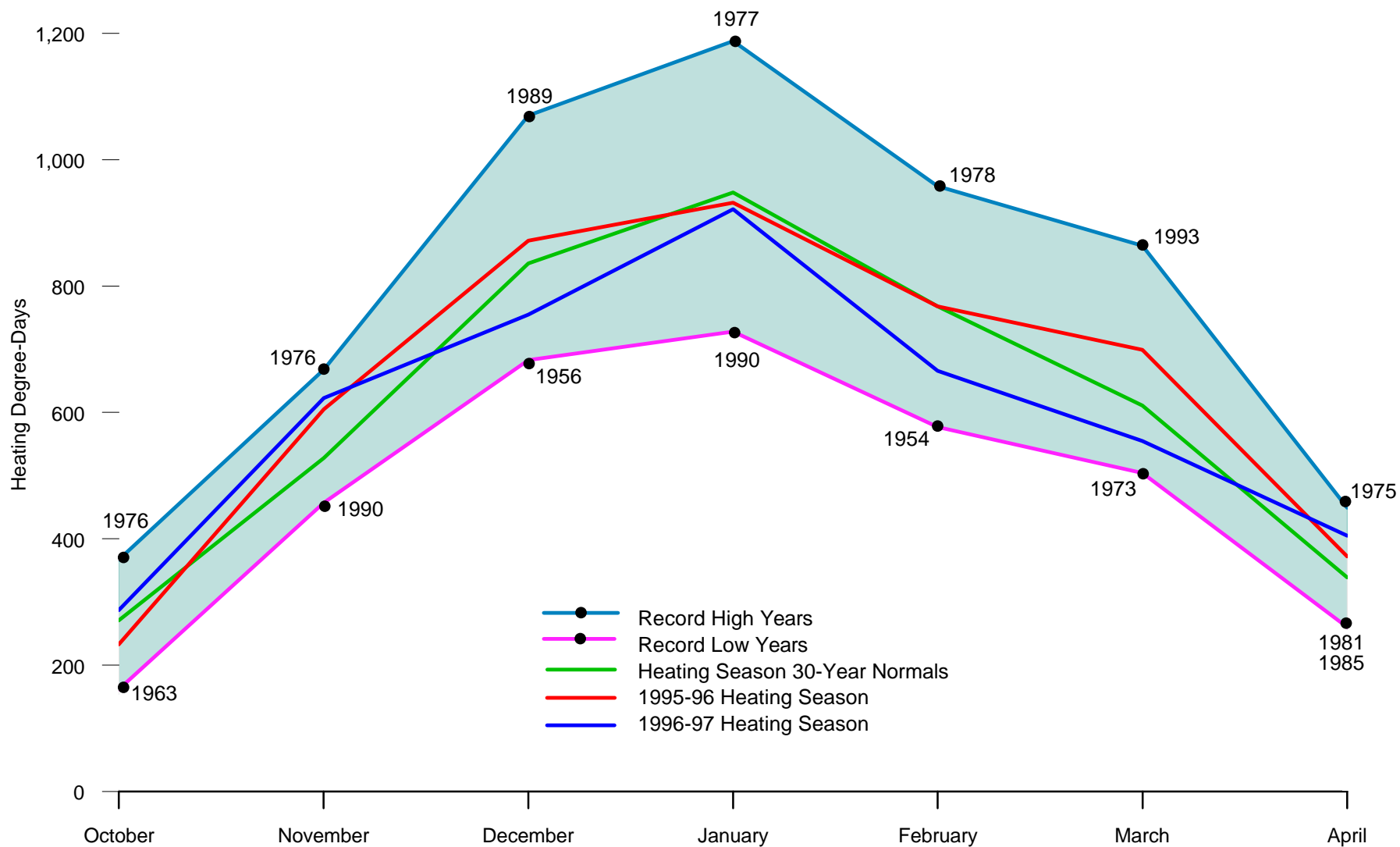
Note: Rankings based on unrounded data.

Sources: • **Consumption:** Energy Information Administration (EIA), *State Energy Data Report 1994, Consumption Estimates*, Table 10. • **Prices and Expenditures:** EIA, *State Energy Price and Expenditure Report 1994*, Tables 1 and 2. • Both publications include State-level data by end-use sector

and type of energy. Consumption estimates are annual 1960 through 1994, and price and expenditures estimates are annual 1970 through 1994. They are also available via internet at <http://www.eia.doe.gov/fueloverview.html#state>.



**Figure 1.8 Heating Degree-Days by Month, 1949-1997**



Source: Table 1.8.

**Table 1.8 Heating Degree-Days by Month, 1949-1997**

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
1949	858	701	611	330	128	21	7	9	94	209	503	763	4,234
1950	761	721	693	412	162	40	11	18	85	196	565	872	4,536
1951	863	724	632	359	135	45	8	17	74	231	645	814	4,547
1952	807	677	670	315	154	32	5	11	54	324	540	785	4,374
1953	754	667	557	378	142	33	5	11	51	208	492	765	4,063
1954	886	577	646	261	192	32	8	18	56	224	523	809	4,232
1955	927	759	600	272	121	48	9	6	56	237	600	886	4,521
1956	900	723	648	387	157	27	10	14	82	215	541	683	4,387
1957	977	628	610	308	148	23	6	16	61	315	536	711	4,339
1958	909	866	690	324	143	54	7	8	60	250	484	917	4,712
1959	944	762	619	305	112	26	4	6	48	249	594	734	4,403
1960	884	780	831	278	160	33	7	11	48	254	502	936	4,724
1961	982	670	565	413	199	29	5	7	48	238	532	852	4,540
1962	976	747	689	337	118	35	14	13	91	234	554	886	4,694
1963	1,061	841	562	325	163	35	8	18	76	162	471	1,012	4,734
1964	871	803	636	339	124	39	5	22	72	301	489	814	4,515
1965	907	780	738	355	114	48	11	14	78	271	494	739	4,549
1966	1,010	790	580	377	188	30	6	14	81	298	496	830	4,700
1967	816	820	600	352	229	34	8	17	82	270	588	793	4,609
1968	979	832	567	309	192	35	6	14	59	240	548	894	4,675
1969	939	778	735	307	134	47	7	9	60	296	564	860	4,736
1970	1,063	758	685	344	120	31	4	9	55	253	541	801	4,664
1971	976	760	681	375	194	29	10	12	47	187	553	723	4,547
1972	890	785	608	377	137	49	7	12	65	330	613	832	4,705
1973	893	772	504	356	182	22	6	9	61	212	497	799	4,313
1974	838	754	556	310	171	42	6	13	94	303	524	795	4,406
1975	821	742	686	449	117	37	5	13	100	235	462	805	4,472
1976	974	609	544	309	178	28	8	19	81	367	668	941	4,726
1977	1,188	751	529	270	119	38	6	13	59	295	493	844	4,605
1978	1,061	958	677	350	157	31	7	11	59	283	517	847	4,958
1979	1,079	950	575	364	148	37	6	15	58	271	528	750	4,781
1980	887	831	680	338	142	49	5	10	54	316	564	831	4,707
1981	984	689	620	260	165	25	6	11	76	327	504	845	4,512
1982	1,067	776	620	408	114	62	7	19	75	264	515	692	4,619
1983	874	706	588	421	189	35	6	5	53	251	509	990	4,627
1984	1,000	645	704	371	172	28	7	7	88	223	565	704	4,514
1985	1,057	807	557	260	123	47	5	17	69	243	506	951	4,642
1986	859	734	542	295	123	30	9	18	76	258	558	793	4,295
1987	920	714	573	309	107	20	8	13	61	345	491	773	4,334
1988	1,004	778	594	344	134	30	3	5	72	352	506	831	4,653
1989	789	832	603	344	163	32	5	14	73	259	542	1,070	4,726
1990	728	655	535	321	184	29	6	10	56	246	457	789	4,016
1991	921	639	564	287	98	30	6	7	69	242	586	751	4,200
1992	852	644	603	345	152	46	14	24	74	301	564	822	4,441
1993	860	827	<sup>R</sup> 664	368	128	38	11	9	89	302	580	824	<sup>R</sup> 4,700
1994	1,031	813	594	293	174	21	6	16	65	268	479	723	4,483
1995	<sup>R</sup> 847	<sup>R</sup> 750	<sup>R</sup> 556	<sup>R</sup> 375	<sup>R</sup> 174	<sup>R</sup> 31	<sup>R</sup> 4	<sup>R</sup> 7	<sup>R</sup> 77	<sup>R</sup> 233	<sup>R</sup> 605	<sup>R</sup> 872	<sup>R</sup> 4,531
1996 <sup>P</sup>	932	768	699	372	<sup>R</sup> 181	<sup>R</sup> 43	<sup>R</sup> 19	<sup>R</sup> 17	<sup>R</sup> 92	<sup>R</sup> 287	<sup>R</sup> 623	<sup>R</sup> 755	<sup>R</sup> 4,790
1997 <sup>P</sup>	922	666	555	405	NA	NA	NA	NA	NA	NA	NA	NA	NA
Normals <sup>1</sup>	948	768	611	339	150	36	7	13	69	271	528	836	4,576

<sup>1</sup> Based on calculations of data from 1961 through 1990.

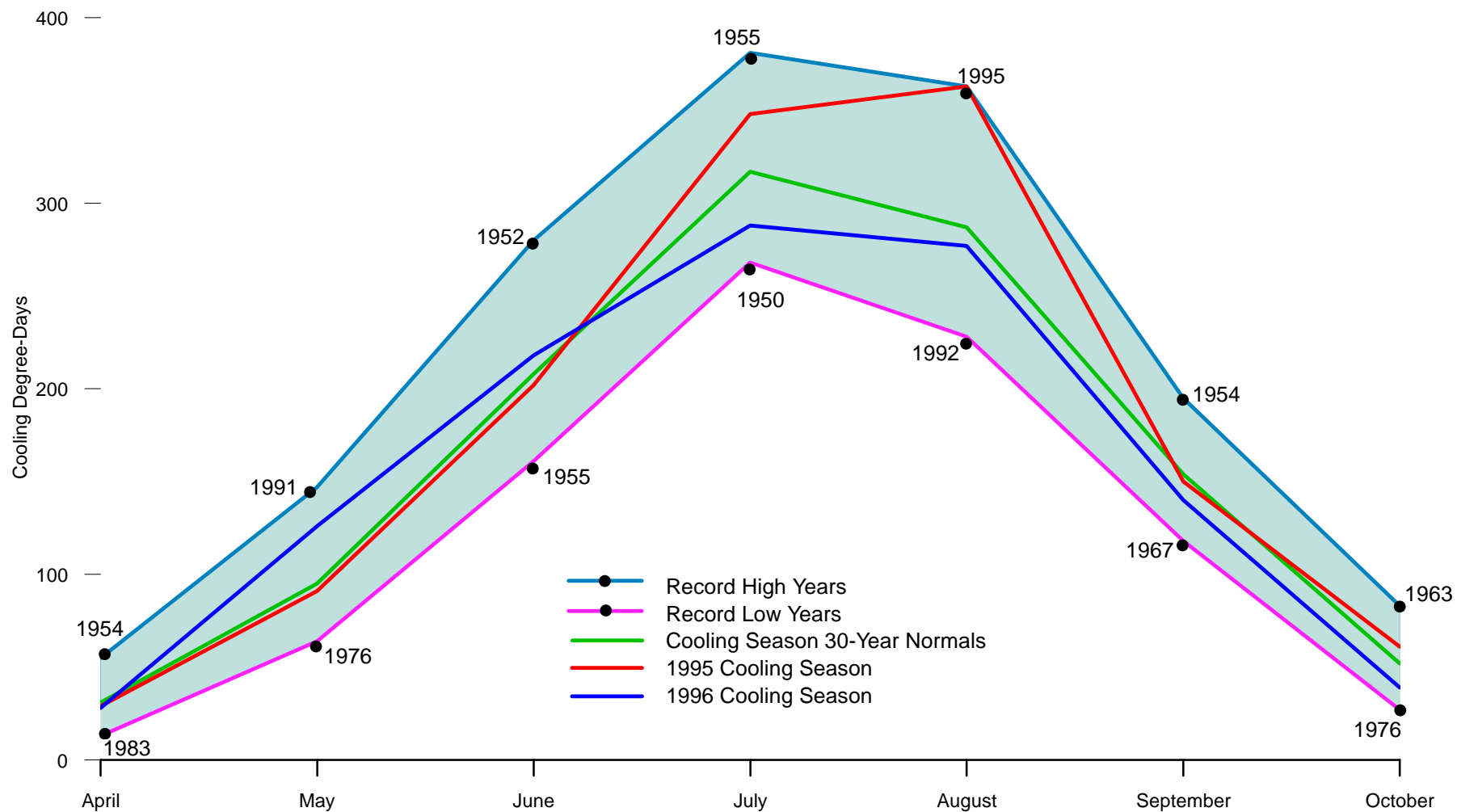
R=Revised data. P=Preliminary data. NA=Not available.

Notes: • This table excludes Alaska and Hawaii. • Degree-days are relative measurements of outdoor air temperature. Heating degree-days are deviations of the mean daily temperature below 65° F. For example, a weather station recording a mean daily temperature of 40° F would report 25 heating degree-days. • Temperature information recorded by weather stations is used to calculate statewide degree-day averages based on resident State population estimated for 1990. The population-weighted

State figures are aggregated into Census divisions and the national average.

Sources: • 1949-1995 and Normals—U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center, Asheville, North Carolina. Historical Climatology Series 5-1. • 1996 and 1997—Energy Information Administration, *Monthly Energy Review*, (MER) February 1996-May 1997 issues, Table 1.11, which reports data from NOAA, National Weather Service Climate Analysis Center, Camp Springs, Maryland.

**Figure 1.9 Cooling Degree-Days by Month, 1949-1996**



Source: Table 1.9.

**Table 1.9 Cooling Degree-Days by Month, 1949-1997**

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
1949	16	14	14	27	110	253	367	294	131	70	12	10	1,318
1950	27	12	13	21	105	201	268	244	128	78	9	4	1,110
1951	8	5	15	22	95	198	318	293	158	65	7	11	1,195
1952	17	8	15	20	96	280	368	303	159	38	10	4	1,318
1953	12	8	26	25	118	263	338	292	168	58	11	7	1,326
1954	11	12	11	55	65	241	356	296	195	60	9	4	1,315
1955	6	7	20	45	121	161	381	355	182	50	10	6	1,344
1956	4	12	14	23	112	232	297	290	151	66	9	11	1,221
1957	12	17	13	33	96	243	337	275	155	30	13	6	1,230
1958	3	1	8	27	101	187	315	304	166	53	18	6	1,189
1959	6	12	13	31	129	228	325	344	179	64	12	5	1,348
1960	7	4	6	37	76	215	301	302	181	59	15	3	1,206
1961	5	9	23	20	71	195	306	287	186	47	12	7	1,168
1962	6	15	9	26	144	204	276	289	136	64	7	3	1,179
1963	5	5	22	42	94	213	308	266	153	83	11	2	1,204
1964	6	3	14	37	114	214	327	256	146	42	17	9	1,185
1965	9	7	10	42	125	179	280	273	155	48	19	6	1,153
1966	4	5	12	28	81	201	353	273	132	43	12	4	1,148
1967	9	5	24	48	70	206	278	253	118	45	12	9	1,077
1968	6	3	9	32	75	204	307	292	145	53	7	4	1,137
1969	7	4	4	33	94	200	331	304	153	48	8	4	1,190
1970	3	4	10	36	104	201	323	313	185	48	6	9	1,242
1971	8	7	10	22	68	244	288	269	182	77	12	17	1,204
1972	15	6	22	36	88	174	299	276	169	44	9	8	1,146
1973	7	3	24	18	75	236	318	303	166	66	21	4	1,241
1974	21	6	28	29	101	173	317	267	120	40	10	5	1,117
1975	14	11	14	24	117	203	301	296	120	55	12	5	1,172
1976	5	11	23	27	64	208	282	243	127	27	8	4	1,029
1977	2	5	21	35	121	212	351	293	180	44	15	6	1,285
1978	3	1	10	31	93	218	310	300	180	52	19	9	1,226
1979	4	4	13	32	82	187	295	266	160	53	11	6	1,113
1980	9	4	13	23	95	199	374	347	192	42	10	5	1,313
1981	3	6	10	52	75	257	333	275	138	43	12	5	1,209
1982	6	10	21	26	115	165	318	262	140	47	15	11	1,136
1983	6	5	9	13	72	193	353	362	172	58	12	5	1,260
1984	5	6	14	24	92	233	291	312	143	70	9	15	1,214
1985	3	5	22	39	108	193	313	269	145	68	25	4	1,194
1986	8	10	17	33	106	231	340	259	161	52	23	9	1,249
1987	5	7	13	23	127	244	334	298	156	40	14	8	1,269
1988	5	5	13	28	89	218	359	348	149	45	18	6	1,283
1989	15	7	19	36	88	208	312	266	138	49	16	2	1,156
1990	15	14	21	29	86	234	316	291	172	57	16	9	1,260
1991	10	9	19	42	147	235	336	305	149	62	8	9	1,331
1992	6	10	15	29	77	170	286	228	150	49	13	7	1,040
1993	13	5	11	19	91	207	347	317	146	47	11	4	1,218
1994	7	9	18	37	76	262	328	263	141	50	20	9	1,220
1995	R <sup>7</sup>	R <sup>7</sup>	R <sup>18</sup>	29	R <sup>91</sup>	R <sup>202</sup>	R <sup>348</sup>	R <sup>363</sup>	R <sup>150</sup>	R <sup>61</sup>	R <sup>12</sup>	R <sup>5</sup>	R <sup>1,293</sup>
1996 <sup>P</sup>	4	8	7	28	R <sup>126</sup>	R <sup>218</sup>	R <sup>288</sup>	R <sup>277</sup>	R <sup>140</sup>	R <sup>39</sup>	R <sup>10</sup>	R <sup>5</sup>	R <sup>1,148</sup>
1997 <sup>P</sup>	5	8	16	45	NA	NA	NA	NA	NA	NA	NA	NA	NA
Normals <sup>1</sup>	7	7	16	31	95	208	317	287	154	52	13	7	1,193

<sup>1</sup> Based on calculations of data from 1961 through 1990.

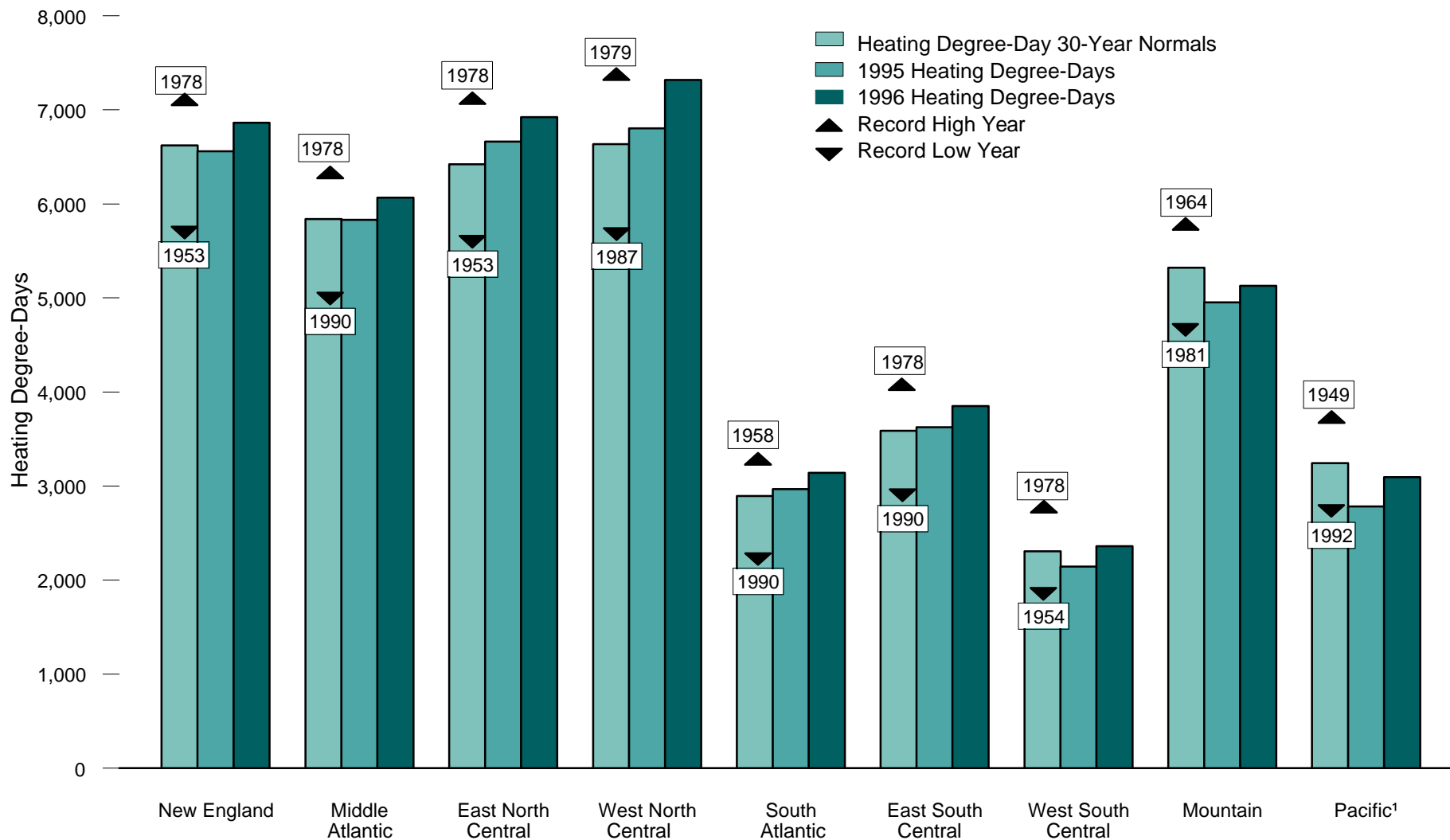
R=Revised data. P=Preliminary data. NA=Not available.

Notes: • This table excludes Alaska and Hawaii. • Degree-days are relative measurements of outdoor air temperature. Cooling degree-days are deviations of the mean daily temperature above 65° F. For example, a weather station recording a mean daily temperature of 78° F would report 13 cooling degree-days. • Temperature information recorded by weather stations is used to calculate statewide degree-day averages based on resident State population estimated for 1990. The population-weighted

State figures are aggregated into Census divisions and the national average.

Sources: • 1949-1995 and Normals—U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center, Asheville, North Carolina. Historical Climatology Series 5-2. • 1996 and 1997—Energy Information Administration, *Monthly Energy Review*, February 1996-May 1997 issues, Table 1.12, which reports data from NOAA, National Weather Service Climate Analysis Center, Camp Springs, Maryland.

**Figure 1.10 Heating Degree-Days by Census Division, 1949-1996**



<sup>1</sup> Excludes Alaska and Hawaii.  
 Note: See Appendix E for Census divisions.

Source: Table 1.10.

**Table 1.10 Heating Degree-Days by Census Division, 1949-1996**

Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific <sup>1</sup>	United States <sup>1</sup>
1949	5,829	5,091	5,801	6,479	2,367	2,942	2,133	5,483	3,729	4,234
1950	6,470	5,765	6,619	7,136	2,713	3,315	1,974	4,930	3,355	4,536
1951	6,137	5,497	6,549	7,246	2,728	3,340	2,154	5,513	3,469	4,547
1952	6,180	5,443	5,977	6,386	2,684	3,276	2,074	5,404	3,586	4,374
1953	5,650	5,027	5,626	5,994	2,486	3,132	2,024	4,925	3,224	4,063
1954	6,291	5,473	5,841	6,063	2,713	3,211	1,876	4,679	3,296	4,232
1955	6,577	5,708	6,101	6,630	2,786	3,314	2,083	5,517	3,723	4,521
1956	6,702	5,731	6,019	6,408	2,642	3,113	2,032	5,146	3,382	4,387
1957	6,158	5,469	6,166	6,525	2,594	3,112	2,068	5,203	3,322	4,339
1958	6,907	6,237	6,585	6,585	3,271	4,004	2,590	4,929	2,819	4,712
1959	6,363	5,535	6,303	6,665	2,698	3,415	2,398	5,138	2,925	4,403
1960	6,561	5,901	6,544	6,884	3,147	3,958	2,551	5,328	3,309	4,724
1961	6,632	5,895	6,275	6,591	2,869	3,497	2,296	5,299	3,221	4,540
1962	6,981	6,089	6,545	6,691	3,022	3,627	2,264	5,165	3,400	4,694
1963	6,816	6,103	6,691	6,485	3,138	3,890	2,438	5,060	3,326	4,734
1964	6,594	5,694	6,030	6,303	2,828	3,462	2,272	5,769	3,583	4,515
1965	6,825	5,933	6,284	6,646	2,830	3,374	2,078	5,318	3,378	4,549
1966	6,662	6,012	6,606	6,872	3,118	3,758	2,416	5,275	3,170	4,700
1967	6,987	6,127	6,477	6,569	2,864	3,403	2,082	5,232	3,316	4,609
1968	6,800	5,981	6,331	6,556	3,160	3,927	2,522	5,415	3,198	4,675
1969	6,593	5,933	6,603	6,903	3,205	3,910	2,325	5,324	3,377	4,736
1970	6,839	5,943	6,455	6,835	2,997	3,685	2,396	5,436	3,257	4,664
1971	6,695	5,761	6,236	6,594	2,763	3,395	1,985	5,585	3,698	4,547
1972	7,001	6,064	6,772	7,094	2,759	3,438	2,259	5,352	3,376	4,705
1973	6,120	5,327	5,780	6,226	2,718	3,309	2,256	5,562	3,383	4,313
1974	6,621	5,670	6,259	6,478	2,551	3,171	2,080	5,281	3,294	4,406
1975	6,362	5,477	6,169	6,678	2,640	3,336	2,187	5,693	3,623	4,472
1976	6,839	6,097	6,768	6,670	3,040	3,881	2,446	5,303	3,115	4,726
1977	6,579	5,889	6,538	6,506	3,047	3,812	2,330	5,060	3,135	4,605
1978	7,061	6,330	7,095	7,324	3,187	4,062	2,764	5,370	3,168	4,958
1979	6,348	5,851	6,921	7,369	2,977	3,900	2,694	5,564	3,202	4,781
1980	6,900	6,143	6,792	6,652	3,099	3,855	2,378	5,052	2,986	4,707
1981	6,612	5,989	6,446	6,115	3,177	3,757	2,162	4,671	2,841	4,512
1982	6,697	5,866	6,542	7,000	2,721	3,357	2,227	5,544	3,449	4,619
1983	6,305	5,733	6,423	6,901	3,057	3,892	2,672	5,359	3,073	4,627
1984	6,442	5,777	6,418	6,582	2,791	3,451	2,194	5,592	3,149	4,514
1985	6,571	5,660	6,546	7,119	2,736	3,602	2,466	5,676	3,441	4,642
1986	6,517	5,665	6,150	6,231	2,686	3,294	2,058	4,870	2,807	4,295
1987	6,546	5,699	5,810	5,712	2,937	3,466	2,292	5,153	3,013	4,334
1988	6,715	6,088	6,590	6,634	3,122	3,800	2,346	5,148	2,975	4,653
1989	6,887	6,134	6,834	6,996	2,944	3,713	2,439	5,173	3,061	4,726
1990	5,848	4,998	5,681	6,011	2,230	2,929	1,944	5,146	3,148	4,016
1991	5,960	5,177	5,906	6,319	2,503	3,211	2,178	5,259	3,109	4,200
1992	6,844	5,964	6,297	6,262	2,852	3,498	2,145	5,054	2,763	4,441
1993	6,728	5,948	6,646	7,168	2,981	3,768	2,489	5,514	3,052	R4,700
1994	6,672	5,934	6,378	6,509	2,724	3,394	2,108	5,002	3,155	4,483
1995	R6,559	R5,831	R6,664	R6,804	R2,967	R3,626	R2,145	R4,953	R2,784	R4,531
1996 <sup>P</sup>	6,863	6,067	6,923	7,319	3,141	3,850	2,362	5,128	3,094	4,790
Normals <sup>2</sup>	6,621	5,839	6,421	6,635	2,895	3,589	2,306	5,321	3,245	4,576

<sup>1</sup> Excludes Alaska and Hawaii.

<sup>2</sup> Based on calculations of data from 1961 through 1990.

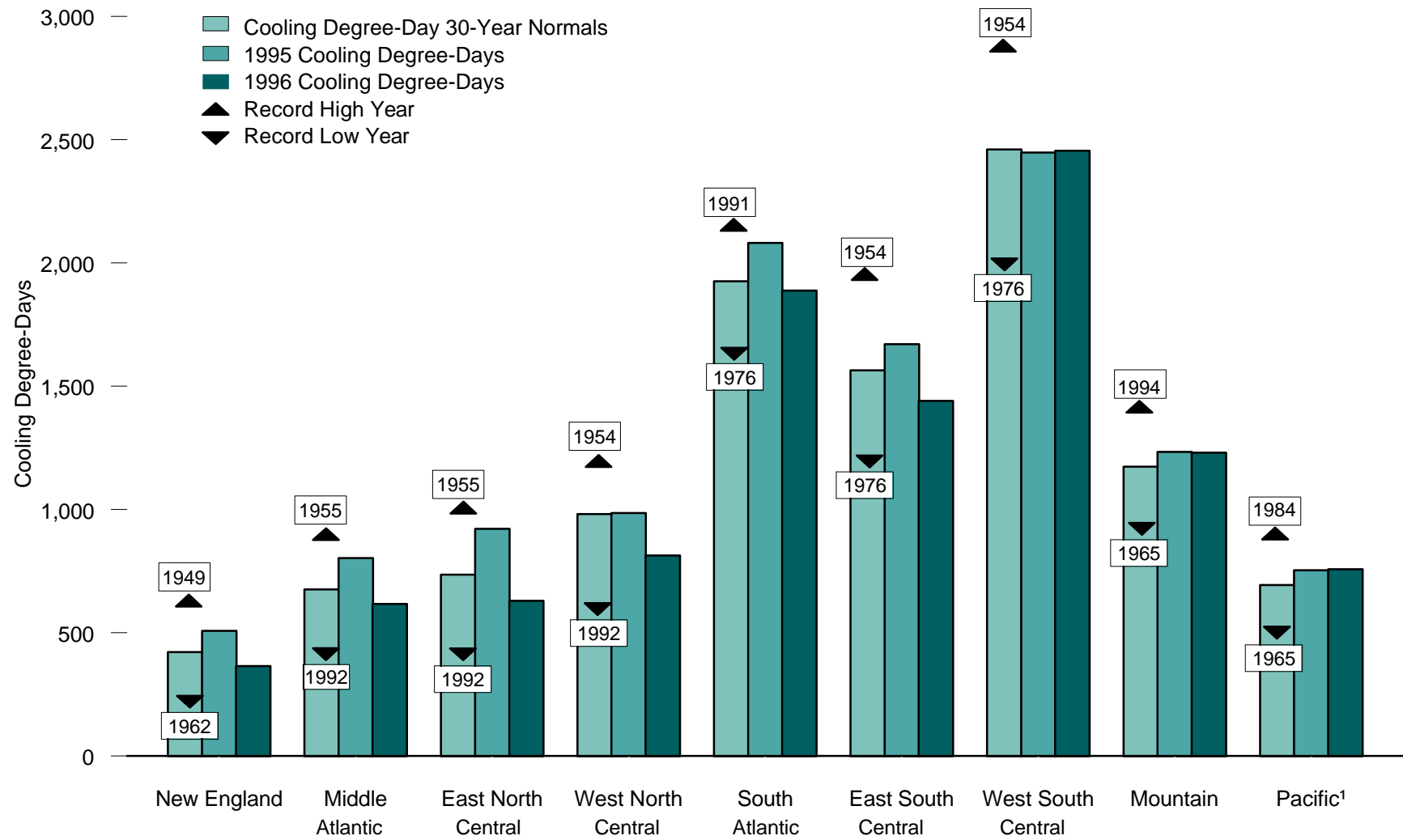
R=Revised data. P=Preliminary data.

Notes: • Degree-days are relative measurements of outdoor air temperature. Heating degree-days are deviations of the mean daily temperature below 65° F. For example, a weather station recording a mean daily temperature of 40° F would report 25 heating degree-days. • Temperature information recorded by weather stations is used to calculate statewide degree-day averages based on resident State population estimated for 1990. The population-weighted State figures are aggregated into Census divisions and the

national average. • See Appendix E for Census divisions.

Sources: • 1949-1995 and Normals—U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center, Asheville, North Carolina. Historical Climatology Series 5-1. • 1996—Energy Information Administration, *Monthly Energy Review*, February 1996-January 1997 issues, Table 1.11, which reports data from NOAA, National Weather Service Climate Analysis Center, Camp Springs, Maryland. Data for 1996 are the sums of the current year monthly statistics shown in the cited issues of the *MER*.

**Figure 1.11 Cooling Degree-Days by Census Division, 1949-1996**



<sup>1</sup> Excludes Alaska and Hawaii.  
 Note: See Appendix E for Census divisions.

Source: Table 1.11.

**Table 1.11 Cooling Degree-Days by Census Division, 1949-1996**

Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific <sup>1</sup>	United States <sup>1</sup>
1949	654	901	949	1,038	2,128	1,776	2,510	1,198	593	1,318
1950	353	542	602	729	1,919	1,568	2,473	1,120	597	1,110
1951	400	653	644	777	2,028	1,781	2,684	1,137	593	1,195
1952	581	825	897	1,109	2,097	1,864	2,543	1,278	657	1,318
1953	441	768	945	1,183	2,137	1,893	2,727	1,193	571	1,326
1954	303	646	858	1,250	2,082	1,998	2,907	1,292	590	1,315
1955	602	934	1,043	1,238	2,045	1,791	2,643	1,124	560	1,344
1956	336	566	750	1,155	1,913	1,685	2,833	1,247	596	1,221
1957	428	738	754	1,004	2,050	1,692	2,465	1,155	660	1,230
1958	344	592	638	878	1,922	1,582	2,517	1,328	836	1,189
1959	532	903	997	1,083	2,128	1,745	2,456	1,258	776	1,348
1960	368	640	722	961	1,926	1,613	2,492	1,308	770	1,206
1961	482	787	745	867	1,888	1,370	2,230	1,223	709	1,168
1962	264	561	742	974	1,908	1,738	2,700	1,147	559	1,179
1963	373	571	712	1,196	1,812	1,580	2,899	1,235	605	1,204
1964	312	634	787	1,030	1,905	1,591	2,608	1,095	574	1,185
1965	352	638	688	914	1,931	1,634	2,579	961	542	1,153
1966	421	731	724	919	1,788	1,440	2,309	1,239	680	1,148
1967	420	602	548	713	1,697	1,257	2,385	1,120	817	1,077
1968	410	725	740	902	1,842	1,517	2,247	1,015	632	1,137
1969	447	706	701	940	1,887	1,572	2,505	1,228	680	1,190
1970	479	779	827	1,066	2,007	1,662	2,375	1,163	689	1,242
1971	465	730	783	960	1,932	1,577	2,448	1,074	685	1,204
1972	364	614	643	908	1,843	1,525	2,513	1,141	698	1,146
1973	551	830	864	1,009	2,000	1,665	2,359	1,123	624	1,241
1974	393	614	626	878	1,842	1,382	2,342	1,188	690	1,117
1975	467	708	788	1,003	2,011	1,520	2,261	1,031	547	1,172
1976	402	597	619	939	1,675	1,232	2,035	1,058	620	1,029
1977	407	689	823	1,122	2,020	1,808	2,720	1,256	715	1,285
1978	378	615	741	1,027	1,972	1,685	2,638	1,174	738	1,226
1979	434	588	618	871	1,833	1,412	2,242	1,164	770	1,113
1980	487	793	816	1,217	2,075	1,834	2,734	1,202	658	1,313
1981	436	657	658	924	1,889	1,576	2,498	1,331	876	1,209
1982	321	541	643	859	1,958	1,537	2,502	1,121	619	1,136
1983	538	799	934	1,178	1,925	1,579	2,288	1,174	776	1,260
1984	468	649	724	955	1,865	1,508	2,469	1,190	956	1,214
1985	372	627	643	830	2,004	1,596	2,599	1,210	737	1,194
1986	301	626	738	1,021	2,149	1,792	2,618	1,188	664	1,249
1987	406	729	918	1,115	2,067	1,718	2,368	1,196	706	1,269
1988	545	782	975	1,230	1,923	1,582	2,422	1,320	729	1,283
1989	426	658	652	864	1,977	1,417	2,295	1,330	685	1,156
1990	477	656	647	983	2,143	1,622	2,579	1,294	827	1,260
1991	511	854	959	1,125	2,197	1,758	2,499	1,182	672	1,331
1992	276	460	449	637	1,777	1,293	2,201	1,206	905	1,040
1993	486	764	735	817	2,092	1,622	2,369	1,113	708	1,218
1994	548	722	664	887	2,005	1,448	2,422	1,436	801	1,220
1995	<sup>R</sup> 507	<sup>R</sup> 803	<sup>R</sup> 921	<sup>R</sup> 985	<sup>R</sup> 2,081	<sup>R</sup> 1,671	<sup>R</sup> 2,448	<sup>R</sup> 1,234	<sup>R</sup> 754	<sup>R</sup> 1,293
1996 <sup>P</sup>	365	617	629	813	1,888	1,440	2,455	1,230	757	1,148
Normals <sup>2</sup>	421	675	736	981	1,926	1,565	2,460	1,174	694	1,193

<sup>1</sup> Excludes Alaska and Hawaii.

<sup>2</sup> Based on calculations of data from 1961 through 1990.

R=Revised data. P=Preliminary data.

Notes: • Degree-days are relative measurements of outdoor air temperature. Cooling degree-days are deviations of the mean daily temperature above 65° F. For example, a weather station recording a mean daily temperature of 78° F would report 13 cooling degree-days. • Temperature information recorded by weather stations is used to calculate statewide degree-day averages based on resident State population

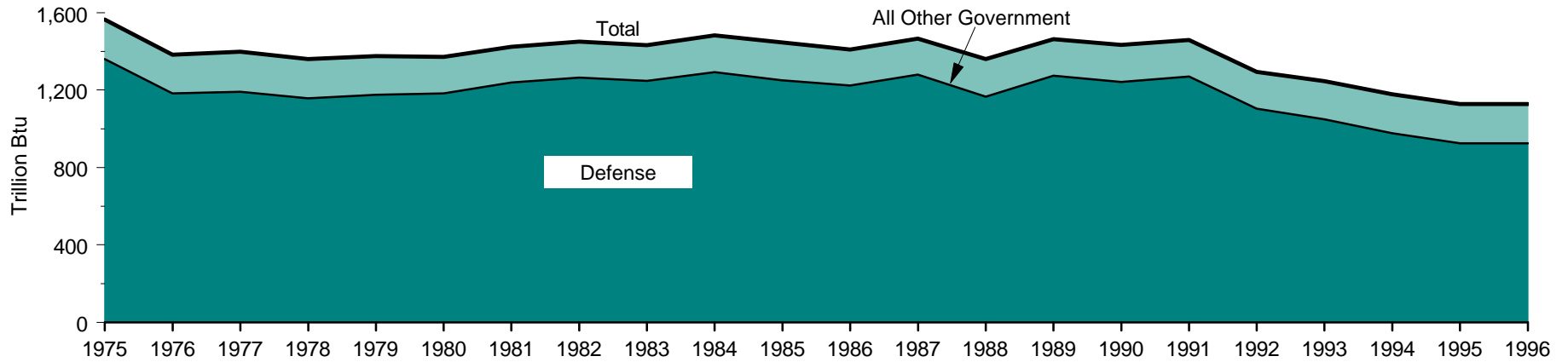
estimated for 1990. The population-weighted State figures are aggregated into Census divisions and the national average. • See Appendix E for Census divisions.

Sources: • 1949-1995 and Normals—U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center, Asheville, North Carolina. Historical Climatology Series 5-2. • 1996—Energy Information Administration, *Monthly Energy Review*, January 1997 issue, Table 1.12, which reports data from NOAA, National Weather Service Climate Analysis Center, Camp Springs, Maryland.

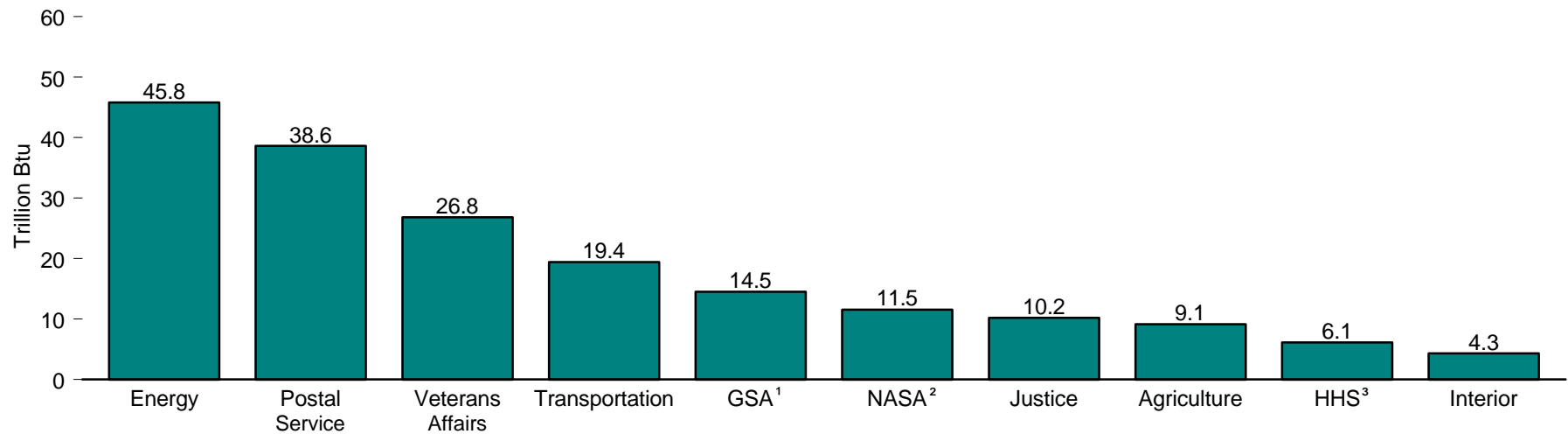


**Figure 1.12 U.S. Government Energy Consumption by Agency**

**Total and U.S. Department of Defense, Fiscal Years 1975-1996**



**Selected Non-Defense Agencies, Fiscal Year 1996**



<sup>1</sup> General Services Administration.

<sup>2</sup> National Aeronautics and Space Administration.

<sup>3</sup> Health and Human Services.

Notes: • The U.S. Government's fiscal year was October 1 through September 30, except in 1975 and 1976 when it was July 1 through June 30. • Because vertical scales differ, graphs should not be compared.

Source: Table 1.12.

**Table 1.12 U.S. Government Energy Consumption by Agency, Fiscal Years 1975-1996**  
(Trillion Btu)

Year	Agencies												Total
	Agriculture	Defense	Energy	GSA <sup>1</sup>	HHS <sup>2</sup>	Interior	Justice	NASA <sup>3</sup>	Postal Service	Transportation	Veterans Affairs	Other <sup>4</sup>	
1975	9.5	1,360.2	50.4	22.3	6.5	9.4	5.9	13.4	30.5	19.3	27.1	10.5	1,565.0
1976	9.3	1,183.2	50.3	20.6	6.7	9.4	5.7	12.4	30.0	19.5	25.0	11.2	1,383.3
1977	8.9	1,192.3	51.6	20.4	6.9	9.5	5.9	12.0	32.7	20.4	25.9	11.9	1,398.4
1978	9.1	1,157.8	50.1	20.4	6.5	9.2	5.9	11.2	30.9	20.6	26.8	12.4	1,360.9
1979	9.2	1,175.8	49.6	19.6	6.4	10.4	6.4	11.1	29.3	19.6	25.7	12.3	1,375.4
1980	8.6	1,183.1	47.4	18.1	6.0	8.5	5.7	10.4	27.2	19.2	24.8	12.3	1,371.3
1981	7.9	1,239.5	47.3	18.0	6.7	7.6	5.4	10.0	27.9	18.8	24.0	11.1	1,424.2
1982	7.6	1,264.5	49.0	18.1	6.4	7.4	5.8	10.1	27.5	19.1	24.2	11.6	1,451.4
1983	7.4	1,248.3	49.5	16.1	6.2	7.7	5.5	10.3	26.5	19.4	24.1	10.8	1,431.8
1984	7.9	1,292.1	51.6	16.2	6.4	8.4	6.4	10.6	27.7	19.8	24.6	10.7	1,482.5
1985	8.4	1,250.6	52.3	17.3	7.0	7.8	8.2	10.8	27.8	19.5	25.1	<sup>R</sup> 11.0	<sup>R</sup> 1,445.9
1986	6.8	1,222.8	49.9	14.0	6.2	6.9	8.6	11.2	28.0	19.4	25.0	<sup>R</sup> 10.8	<sup>R</sup> 1,409.6
1987	7.3	1,280.5	48.2	13.1	6.6	6.6	8.1	11.1	28.5	19.0	24.9	<sup>R</sup> 11.9	<sup>R</sup> 1,465.9
1988	7.8	1,165.8	49.8	12.4	6.4	7.0	9.4	11.2	29.6	18.7	26.3	<sup>R</sup> 15.8	<sup>R</sup> 1,360.2
1989	8.7	1,274.4	43.9	12.7	6.7	7.1	7.7	12.1	30.3	18.5	26.2	<sup>R</sup> 15.6	<sup>R</sup> 1,464.1
1990	9.5	1,241.7	43.4	14.2	8.0	7.4	7.0	12.3	30.6	19.0	24.9	<sup>R</sup> 15.4	<sup>R</sup> 1,433.3
1991	9.6	1,269.3	41.8	14.0	7.1	7.1	8.0	12.4	30.8	<sup>R</sup> 19.0	25.1	<sup>R</sup> 13.8	<sup>R</sup> 1,457.9
1992	9.1	1,104.0	44.4	13.8	8.0	7.0	7.5	12.5	31.7	<sup>R</sup> 17.0	25.3	<sup>R</sup> 14.0	<sup>R</sup> 1,294.3
1993	9.3	1,048.8	43.6	14.1	8.1	7.5	9.1	12.4	33.7	<sup>R</sup> 19.4	25.7	14.7	<sup>R</sup> 1,246.5
1994	9.4	977.0	<sup>R</sup> 41.4	14.0	8.4	7.9	10.3	<sup>R</sup> 12.6	35.0	<sup>R</sup> 19.8	25.6	<sup>R</sup> 17.0	<sup>R</sup> 1,178.2
1995	<sup>R</sup> 9.7	<sup>R</sup> 926.0	<sup>R</sup> 46.1	13.7	<sup>R</sup> 6.1	<sup>R</sup> 6.4	<sup>R</sup> 10.2	12.4	<sup>R</sup> 36.2	18.4	25.4	<sup>R</sup> 16.8	<sup>R</sup> 1,127.4
1996 <sup>P</sup>	9.1	926.0	45.8	14.5	6.1	4.3	10.2	11.5	38.6	19.4	26.8	16.5	1,128.9

<sup>1</sup> General Services Administration.

<sup>2</sup> Health and Human Services.

<sup>3</sup> National Aeronautics and Space Administration.

<sup>4</sup> Includes National Archives and Records Administration, U.S. Department of Commerce, Panama Canal Commission, Tennessee Valley Authority, U.S. Department of Labor, National Science Foundation, Federal Trade Commission, Federal Communications Commission, Environmental Protection Agency, U.S. Department of Housing and Urban Development, Railroad Retirement Board, Commodity Futures Trading Commission, Equal Employment Opportunity Commission, Nuclear Regulatory Commission, U.S. Department of State, U.S. Department of the Treasury, Small Business Administration, Office of Personnel Management, Federal Emergency Management Agency, and U.S. Information Agency.

R = Revised data. P = Preliminary data.

Notes: • The U.S. Government's fiscal year was October 1 through September 30, except in 1975 and 1976 when it was July 1 through June 30. • Data include energy consumed at foreign installations and in foreign operations, including aviation and ocean bunkering, primarily by the U.S. Department of Defense.

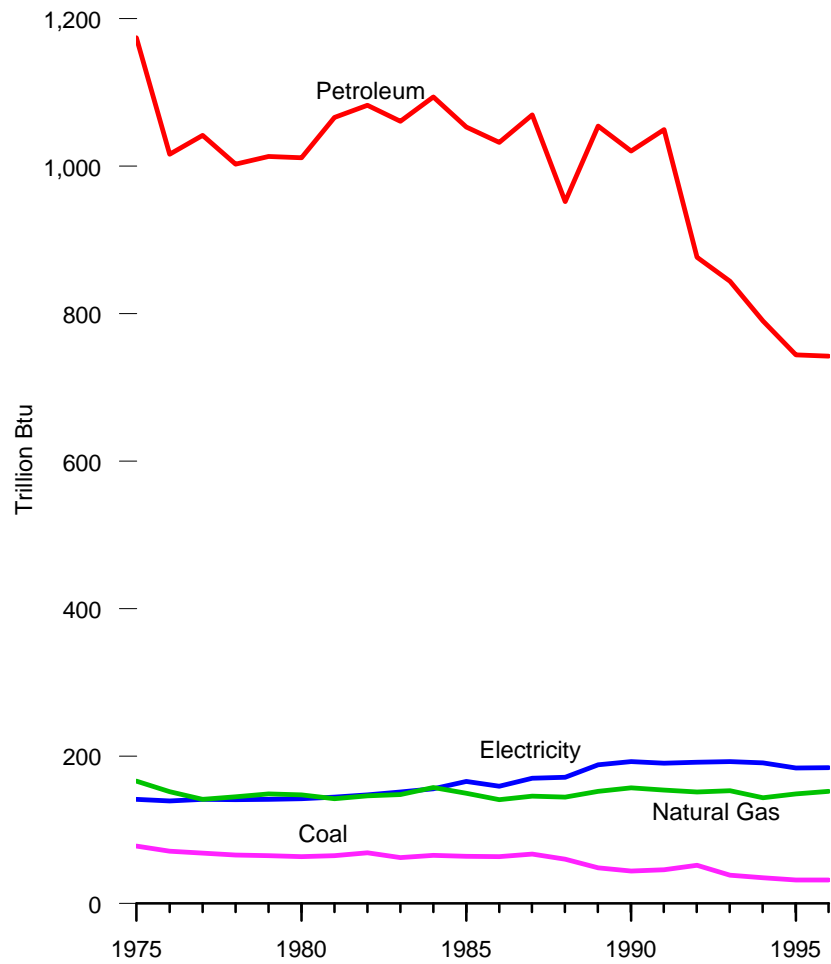
U.S. Government energy use for electricity generation and uranium enrichment is excluded. However, other energy used by U.S. agencies that produce electricity or enriched uranium is included.

• Totals may not equal sum of components due to independent rounding.

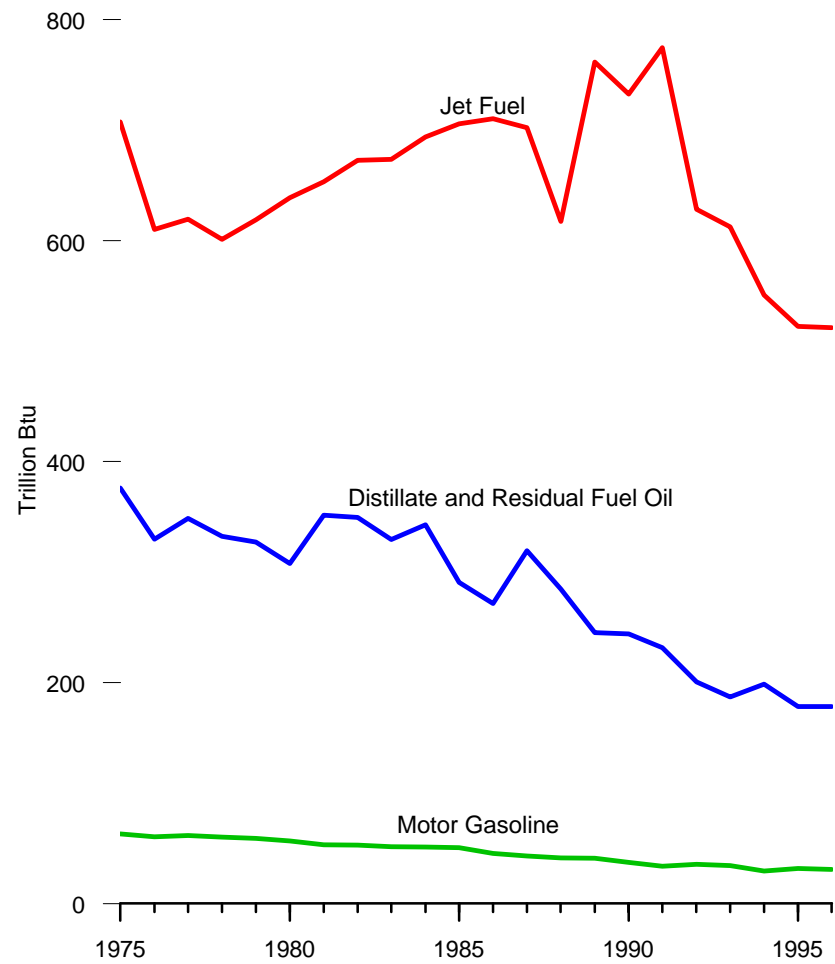
Source: U.S. Department of Energy, Energy Efficiency and Renewable Energy, Office of Federal Energy Management Programs.

**Figure 1.13 U.S. Government Energy Consumption by Source, Fiscal Years 1975-1996**

**By Major Energy Source**



**By Petroleum Product**



Notes: • The U.S. Government's fiscal year was October 1 through September 30, except in 1975 and 1976 when it was July 1 through June 30. • Because vertical scales differ, graphs should not be compared.

Source: Table 1.13.

**Table 1.13 U.S. Government Energy Consumption by Source, Fiscal Years 1975-1996**  
(Trillion Btu)

Year	Coal	Natural Gas	Petroleum						Electricity	Purchased Steam	Total
			Aviation Gasoline	Distillate and Residual Fuel Oil	Jet Fuel	LPG <sup>1</sup>	Motor Gasoline	Total			
1975	77.9	166.3	22.0	376.0	707.4	5.6	63.2	1,174.2	141.5	5.1	1,565.0
1976	71.3	151.8	11.6	329.7	610.0	4.7	60.4	1,016.4	139.3	4.6	1,383.3
1977	68.4	141.2	8.8	348.5	619.2	4.1	61.4	1,042.0	141.1	5.7	1,398.4
1978	66.0	144.7	6.2	332.3	601.1	3.0	60.1	1,002.7	141.0	6.4	1,360.9
1979	65.1	148.9	4.7	327.1	618.6	3.7	59.1	1,013.2	141.2	7.1	1,375.4
1980	63.5	147.3	4.9	307.7	638.7	4.0	56.5	1,011.8	141.9	6.8	1,371.3
1981	65.1	142.2	4.6	351.3	653.3	3.7	53.2	1,066.1	144.5	6.2	1,424.2
1982	68.6	146.2	3.6	349.4	672.7	3.9	53.1	1,082.7	147.5	6.2	1,451.4
1983	62.4	147.8	2.6	329.5	673.4	4.0	51.6	1,061.1	151.5	9.0	1,431.8
1984	65.3	157.4	1.9	342.9	693.7	4.1	51.2	1,093.8	155.9	10.1	1,482.5
1985	64.0	<sup>R</sup> 149.5	1.9	290.8	705.7	4.0	50.5	1,052.9	165.7	13.8	<sup>R</sup> 1,445.9
1986	63.8	<sup>R</sup> 140.9	1.4	271.5	710.2	3.9	45.3	1,032.3	<sup>R</sup> 159.0	13.5	<sup>R</sup> 1,409.6
1987	67.0	<sup>R</sup> 145.6	1.0	319.4	702.3	4.0	43.1	1,069.8	<sup>R</sup> 169.8	13.7	<sup>R</sup> 1,465.9
1988	60.2	<sup>R</sup> 144.6	6.0	284.7	617.2	3.2	41.2	952.3	<sup>R</sup> 171.2	31.9	<sup>R</sup> 1,360.2
1989	48.6	<sup>R</sup> 152.1	0.8	<sup>R</sup> 245.2	761.7	5.7	41.1	<sup>R</sup> 1,054.5	<sup>R</sup> 188.4	20.6	<sup>R</sup> 1,464.1
1990	44.2	<sup>R</sup> 157.3	0.5	244.1	732.4	6.3	37.2	1,020.5	<sup>R</sup> 192.6	18.8	<sup>R</sup> 1,433.3
1991	45.9	<sup>R</sup> 154.0	0.4	<sup>R</sup> 231.7	774.5	<sup>R</sup> 9.0	34.0	<sup>R</sup> 1,049.6	<sup>R</sup> 190.1	18.2	<sup>R</sup> 1,457.9
1992	51.8	<sup>R</sup> 151.5	1.0	<sup>R</sup> 200.5	628.2	<sup>R</sup> 11.4	35.6	<sup>R</sup> 876.7	<sup>R</sup> 191.6	22.8	<sup>R</sup> 1,294.3
1993	38.5	153.1	0.7	<sup>R</sup> 187.1	612.4	<sup>R</sup> 9.3	34.5	<sup>R</sup> 844.0	192.3	18.7	<sup>R</sup> 1,246.5
1994	35.0	<sup>R</sup> 143.8	0.6	<sup>R</sup> 198.6	550.7	<sup>R</sup> 10.9	<sup>R</sup> 29.5	790.3	<sup>2</sup> 190.9	18.3	<sup>R</sup> 1,178.2
1995	<sup>R</sup> 31.7	<sup>R</sup> 148.7	<sup>R</sup> 0.3	<sup>R</sup> 178.4	<sup>R</sup> 522.3	<sup>R</sup> 11.4	<sup>R</sup> 31.9	<sup>R</sup> 744.3	<sup>R</sup> 183.8	<sup>R</sup> 18.9	<sup>R</sup> 1,127.4
1996 <sup>P</sup>	31.7	152.1	0.3	178.4	521.1	11.6	30.8	742.2	184.3	18.6	1,128.9

<sup>1</sup> Liquefied petroleum gases.

<sup>2</sup> Increase from previous years is result of initial reporting by TVA of electricity consumed for utility station service use.

R = Revised data. P = Preliminary data.

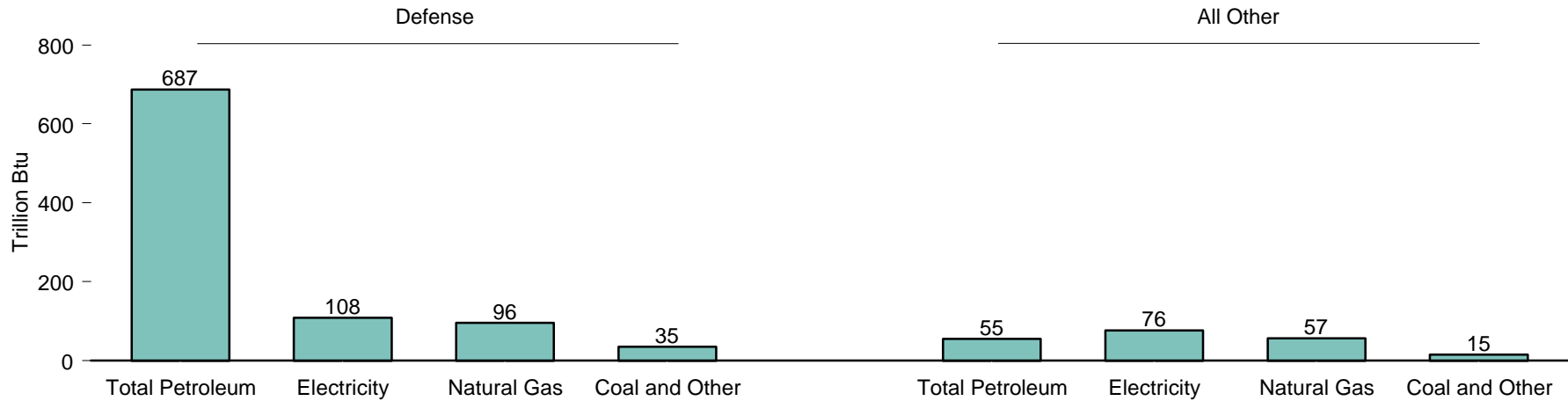
Notes: • The U.S. Government's fiscal year was October 1 through September 30, except in 1975 and 1976 when it was July 1 through June 30. • This table uses a conversion factor for electricity of 3,412 Btu per kilowatt-hour and a conversion factor for purchased steam of 1,000 Btu per pound. • Data include

energy consumed at foreign installations and in foreign operations, including aviation and ocean bunkering, primarily by the U.S. Department of Defense. U.S. Government energy use for electricity generation and uranium enrichment is excluded. However, other energy used by U.S. agencies that produce electricity or enriched uranium is included. • Totals may not equal sum of components due to independent rounding.

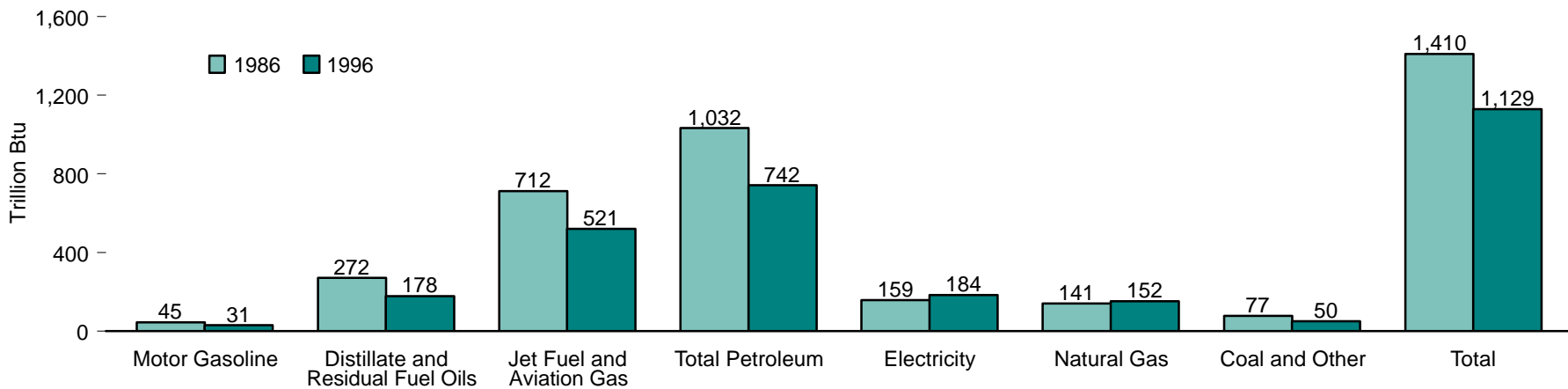
Source: U.S. Department of Energy, Energy Efficiency and Renewable Energy, Office of Federal Energy Management Programs.

**Figure 1.14 U.S. Government Energy Consumption by Agency and Source**

**By Agency, Fiscal Year 1996**



**By Source, Fiscal Years 1986 and 1996**



Notes: • The U.S. Government's fiscal year runs from October 1 through September 30.  
 • Because vertical scales differ, graphs should not be compared.

Source: Table 1.14.

**Table 1.14 U.S. Government Energy Consumption by Agency and Source, Fiscal Years 1986 and 1996**  
(Trillion Btu)

Agency	Petroleum					Electricity	Natural Gas	Coal and Other <sup>2</sup>	Total
	Motor Gasoline	Distillate and Residual Fuel Oil	Jet Fuel and Aviation Gas	Other <sup>1</sup>	Total				
<b>Total, 1986</b> .....	<b>45.3</b>	<b>271.5</b>	<b>711.6</b>	<b>3.9</b>	<b>1,032.4</b>	<b>159.0</b>	<b>140.9</b>	<b>77.3</b>	<b>1,409.6</b>
Defense .....	22.3	245.5	704.0	2.2	974.0	98.4	99.5	50.9	1,222.8
Energy .....	1.4	3.4	0.5	0.2	5.5	17.5	6.4	20.6	49.9
Postal Service .....	9.5	3.5	0.0	0.2	13.2	9.6	4.5	0.7	28.0
Veterans Affairs .....	0.5	2.2	0.0	0.0	2.7	7.0	14.2	1.1	25.0
Transportation .....	1.3	8.5	4.8	0.0	14.6	3.8	1.0	0.0	19.4
General Services Administration .....	0.1	0.7	0.0	0.0	0.8	8.0	2.8	2.4	14.0
NASA .....	0.3	0.8	1.4	0.0	2.6	5.6	2.6	0.4	11.2
Interior .....	1.9	0.4	0.1	0.0	2.5	1.3	4.4	0.4	8.6
Agriculture .....	2.1	1.4	0.2	0.9	4.5	1.3	0.8	0.2	6.9
Health and Human Services .....	3.0	0.5	0.1	0.2	3.7	1.6	1.3	0.1	6.8
Justice .....	0.3	2.6	0.0	0.1	3.0	1.8	1.3	0.0	6.2
Other <sup>3</sup> .....	2.6	2.0	0.5	0.0	5.1	3.1	2.1	0.5	10.8
<b>Total, 1996 <sup>P</sup></b> .....	<b>30.8</b>	<b>178.4</b>	<b>521.4</b>	<b>11.6</b>	<b>742.2</b>	<b>184.3</b>	<b>152.1</b>	<b>50.3</b>	<b>1,128.9</b>
Defense .....	6.8	163.7	513.2	3.5	687.2	108.0	95.6	35.2	926.0
Energy .....	1.0	2.5	0.3	0.2	4.0	15.9	16.1	9.8	45.8
Postal Service .....	12.3	2.5	0.0	0.0	14.8	15.1	8.2	0.5	38.6
Veterans Affairs .....	0.6	2.2	0.0	0.0	2.8	8.9	13.8	1.4	26.8
Transportation .....	0.5	0.8	4.8	6.9	13.1	5.0	1.2	0.1	19.4
General Services Administration .....	0.1	0.3	0.0	0.0	0.4	9.0	3.4	1.6	14.5
NASA .....	0.2	0.7	1.2	0.0	2.2	6.3	2.7	0.2	11.5
Justice .....	2.3	0.4	0.8	0.0	3.5	2.8	3.7	0.3	10.2
Agriculture .....	4.3	0.5	0.1	0.2	5.0	2.0	1.6	0.4	9.1
Health and Human Services .....	0.1	1.0	0.0	0.1	1.3	2.4	2.4	0.0	6.1
Interior .....	0.9	1.0	0.1	0.4	2.5	1.3	0.4	0.1	4.3
Other <sup>4</sup> .....	1.6	2.8	1.0	0.1	5.5	7.3	3.1	0.6	16.5

<sup>1</sup> Includes liquefied petroleum gases and other.

<sup>2</sup> Includes purchased steam, coal, and other.

<sup>3</sup> Includes U.S. Department of Commerce, Panama Canal Commission, Tennessee Valley Authority, U.S. Department of Labor, National Science Foundation, U.S. Department of Housing and Urban Development, Federal Communications Commission, Office of Personnel Management, U.S. Department of State, U.S. Department of the Treasury, Small Business Administration, and Environmental Protection Agency.

<sup>4</sup> Includes National Archives and Records Administration, U.S. Department of Commerce, U.S. Department of Labor, U.S. Department of State, Environmental Protection Agency, Federal Communications Commission, Federal Trade Commission, Panama Canal Commission, Equal Employment Opportunity Commission, Nuclear Regulatory Commission, Office of Personnel Management, U.S. Department of Housing and Urban Development, U.S. Department of the Treasury, Railroad

Retirement Board, Tennessee Valley Authority, Federal Emergency Management Agency, and U.S. Information Agency.

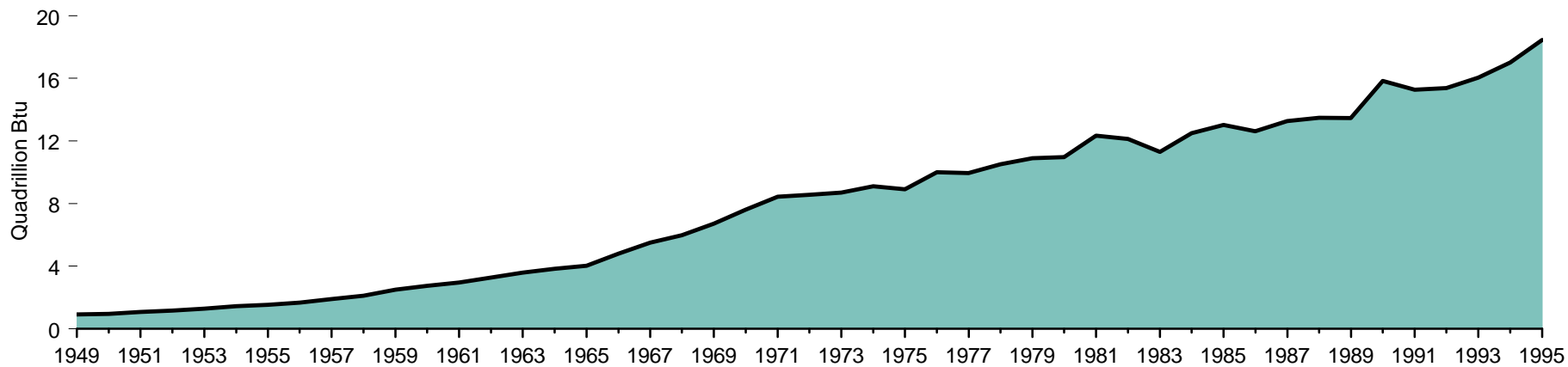
P=Preliminary data.

Notes: • This table uses a conversion factor for electricity of 3,412 Btu per kilowatthour and a conversion factor for purchased steam of 1,000 Btu per pound. • Data include energy consumed at foreign installations and in foreign operations, including aviation and ocean bunkering, primarily by the U.S. Department of Defense. U.S. Government energy use for electricity generation and uranium enrichment is excluded. However, other energy used by U.S. agencies that produce electricity or enriched uranium is included. • The U.S. Government's fiscal year runs from October 1 through September 30. • Totals may not equal sum of components due to independent rounding.

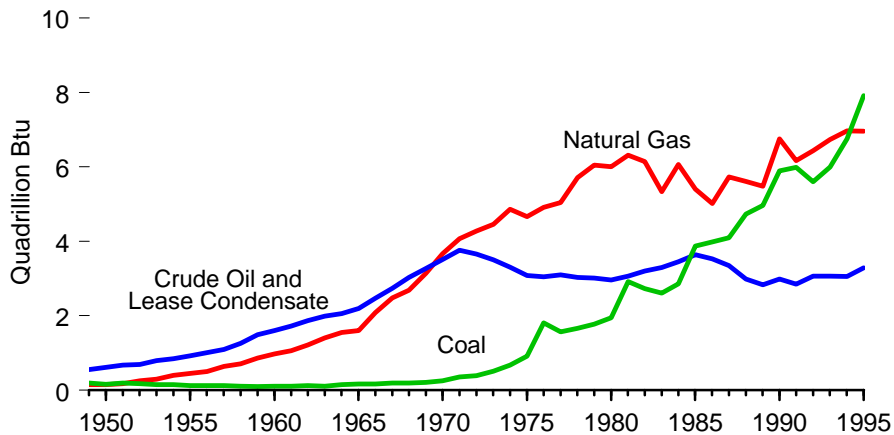
Source: U.S. Department of Energy, Energy Efficiency and Renewable Energy, Office of Federal Energy Management Programs.

**Figure 1.15 Fossil Fuel Production on Federally Administered Lands**

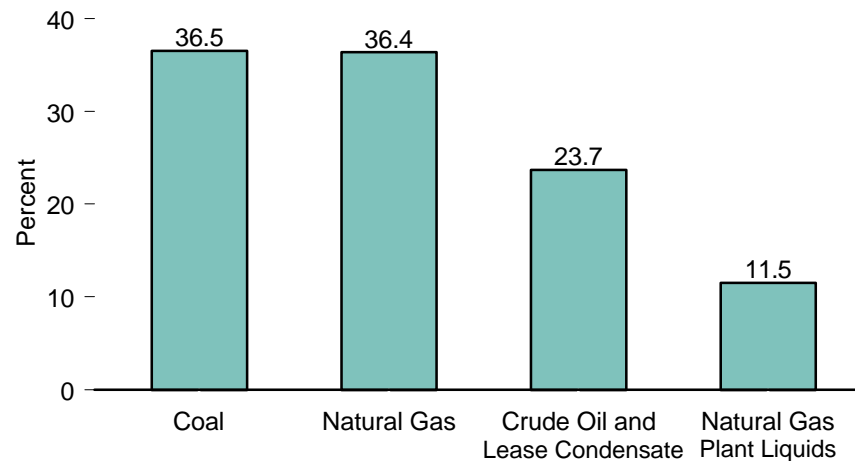
**Total, 1949-1995**



**By Source, 1949-1995**



**Production on Federal Lands as Share of U.S. Total Production, by Source, 1995**



Notes: • Federally Administered Lands include all classes of land owned by the Federal Government, including acquired military, Outer Continental Shelf, and public lands.

• Because vertical scales differ, graphs should not be compared.  
Source: Table 1.15.

**Table 1.15 Fossil Fuel Production on Federally Administered Lands, 1949-1995**

Year	Crude Oil and Lease Condensate <sup>1</sup>			Natural Gas Plant Liquids <sup>2</sup>			Natural Gas <sup>3</sup>			Coal <sup>4</sup>			Total	
	Million Barrels	Quadrillion Btu	Percent U.S. Total <sup>5</sup>	Million Barrels	Quadrillion Btu	Percent U.S. Total <sup>5</sup>	Trillion Cubic Feet	Quadrillion Btu	Percent U.S. Total <sup>5</sup>	Million Short Tons	Quadrillion Btu	Percent U.S. Total <sup>5</sup>	Quadrillion Btu	Percent U.S. Total
1949	95.2	0.55	5.2	4.4	0.02	2.8	0.15	0.15	2.8	9.5	0.20	2.0	0.92	3.2
1950	105.9	0.61	5.4	4.4	0.02	2.4	0.14	0.15	2.4	7.7	0.16	1.4	0.94	2.9
1951	117.3	0.68	5.2	5.3	0.02	2.6	0.17	0.18	2.4	9.3	0.20	1.6	1.08	3.0
1952	118.7	0.69	5.2	5.5	0.02	2.5	0.25	0.25	3.2	8.7	0.18	1.7	1.15	3.3
1953	136.9	0.79	5.8	5.7	0.03	2.4	0.29	0.30	3.6	7.5	0.16	1.5	1.28	3.6
1954	146.5	0.85	6.3	6.1	0.03	2.4	0.39	0.40	4.6	7.4	0.16	1.8	1.43	4.2
1955	159.5	0.92	6.4	6.0	0.03	2.1	0.43	0.45	4.8	5.9	0.12	1.2	1.53	4.1
1956	174.1	1.01	6.7	6.4	0.03	2.2	0.49	0.51	5.1	5.8	0.12	1.1	1.67	4.2
1957	189.4	1.10	7.2	6.6	0.03	2.2	0.62	0.64	6.1	5.7	0.12	1.1	1.89	4.7
1958	216.8	1.26	8.9	8.0	0.04	2.7	0.69	0.71	6.5	5.3	0.11	1.2	2.11	5.7
1959	258.2	1.50	10.0	9.5	0.04	3.0	0.83	0.86	7.2	4.9	0.10	1.1	2.50	6.4
1960	277.3	1.61	10.8	11.6	0.05	3.4	0.95	0.98	7.8	5.2	0.11	1.2	2.75	6.9
1961	297.3	1.72	11.3	13.5	0.06	3.7	1.03	1.06	8.1	5.2	0.11	1.2	2.95	7.3
1962	321.7	1.87	12.0	15.3	0.07	4.1	1.18	1.22	8.9	5.8	0.12	1.3	3.27	7.8
1963	342.8	1.99	12.5	16.0	0.07	4.0	1.37	1.41	9.7	5.4	0.11	1.1	3.58	8.1
1964	356.0	2.07	12.8	15.5	0.07	3.7	1.51	1.55	10.2	7.1	0.15	1.4	3.84	8.4
1965	378.6	2.20	13.3	14.3	0.06	3.2	1.56	1.61	10.2	8.2	0.17	1.6	4.04	8.5
1966	426.7	2.47	14.1	15.2	0.06	3.2	2.02	2.09	12.3	8.3	0.17	1.5	4.80	9.6
1967	472.6	2.74	14.7	20.1	0.09	3.9	2.41	2.48	13.8	9.5	0.20	1.7	5.51	10.5
1968	523.7	3.04	15.7	13.7	0.06	2.5	2.61	2.69	14.1	9.1	0.19	1.6	5.97	11.0
1969	563.8	3.27	16.7	19.9	0.08	3.4	3.05	3.14	15.4	10.1	0.21	1.8	6.70	11.9
1970	605.6	3.51	17.2	40.6	0.17	6.7	3.56	3.67	16.9	12.0	0.25	2.0	7.60	12.8
1971	648.9	3.76	18.8	54.0	0.22	8.7	3.95	4.08	18.3	17.3	0.36	3.1	8.42	14.5
1972	630.5	3.66	18.2	56.7	0.23	8.9	4.17	4.28	19.3	19.0	0.40	3.1	8.56	14.5
1973	604.3	3.51	18.0	54.9	0.22	8.7	4.37	4.46	20.1	24.2	0.51	4.1	8.70	14.9
1974	570.2	3.31	17.8	61.9	0.25	10.1	4.75	4.87	22.9	32.1	0.67	5.3	9.10	16.1
1975	531.5	3.08	17.4	59.7	0.24	10.0	4.57	4.67	23.8	43.6	0.92	6.7	8.90	16.3
1976	525.7	3.05	17.7	57.2	0.23	9.7	4.81	4.91	25.2	86.4	1.82	12.6	10.00	18.3
1977	535.0	3.10	17.8	57.4	0.23	9.7	4.94	5.04	25.8	74.8	1.57	10.7	9.94	18.0
1978	523.6	3.04	16.5	25.9	0.10	4.5	5.60	5.71	29.3	79.2	1.66	11.8	10.51	19.1
1979	519.8	3.01	16.7	11.9	0.05	2.1	5.93	6.05	30.1	84.9	1.78	10.9	10.89	18.8
1980	510.4	2.96	16.2	10.5	0.04	1.8	5.85	6.01	30.2	92.9	1.95	11.2	10.96	18.6
1981	529.3	3.07	16.9	12.3	0.05	2.1	6.15	6.31	32.1	138.8	2.91	16.8	12.35	21.1
1982	552.3	3.20	17.5	15.0	0.06	2.7	5.97	6.14	33.5	130.0	2.73	15.5	12.13	21.1
1983	568.8	3.30	17.9	14.0	0.05	2.5	5.17	5.33	32.1	124.3	2.61	15.9	11.30	20.8
1984	595.8	3.46	18.3	25.4	0.10	4.3	5.88	6.07	33.7	136.3	2.86	15.2	12.48	21.2
1985	628.3	3.64	19.2	26.6	0.10	4.5	5.24	5.41	31.8	184.6	3.88	20.9	13.03	22.6
1986	608.4	3.53	19.2	23.3	0.09	4.1	4.87	5.01	30.3	189.7	3.98	21.3	12.61	22.3
1987	577.3	3.35	18.9	23.7	0.09	4.1	5.56	5.73	33.4	195.2	4.10	21.2	13.27	23.2
1988	516.3	2.99	17.3	37.0	0.14	6.2	5.45	5.61	31.9	225.4	4.73	23.7	13.48	23.3
1989	488.9	2.84	17.6	45.1	0.17	8.0	5.32	5.49	30.7	236.3	4.96	24.1	13.46	23.4
1990	515.9	2.99	19.2	50.9	0.19	8.9	6.55	6.75	36.8	280.6	5.89	27.3	15.83	27.0
1991	491.0	2.85	18.1	72.7	0.28	12.0	5.99	6.17	33.8	285.1	5.99	28.6	15.28	26.4
1992	529.1	3.07	20.2	70.7	0.27	11.4	6.25	6.43	35.0	266.7	5.60	26.7	15.37	26.7
1993	529.3	3.07	21.2	64.4	0.24	10.2	6.56	6.74	36.3	285.7	6.00	30.2	16.05	28.8
1994	527.7	3.06	21.7	60.0	0.23	9.5	6.78	6.97	<sup>R</sup> 36.0	321.4	6.75	31.1	17.01	29.4
1995	567.4	3.29	23.7	74.0	0.28	11.5	6.78	6.96	36.4	376.9	7.91	36.5	18.45	32.1

<sup>1</sup> Production from Naval Petroleum Reserve No. 1 (NPR#1) for 1974 and earlier years is for fiscal years (July through June).

<sup>2</sup> Includes only those quantities for which the royalties were paid on the basis of the value of the natural gas plant liquids produced. Additional quantities of natural gas plant liquids were produced; however, the royalties paid were based on the value of natural gas processed. These latter quantities are included with natural gas.

<sup>3</sup> Includes some quantities of natural gas processed into liquids at natural gas processing plants and fractionators.

<sup>4</sup> Converted to British thermal units (Btu) on the basis of an estimated heat content of coal produced on Federally administered lands of 21.0 million Btu per short ton.

<sup>5</sup> Based on physical units.

Note: Federally Administered Lands include all classes of land owned by the Federal Government, including acquired military, Outer Continental Shelf, and public lands.

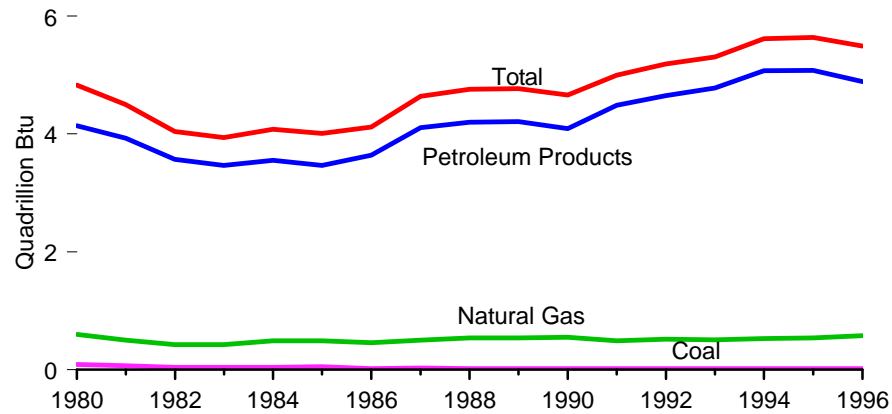
R=Revised data.

Source: See Note 2 at end of section.

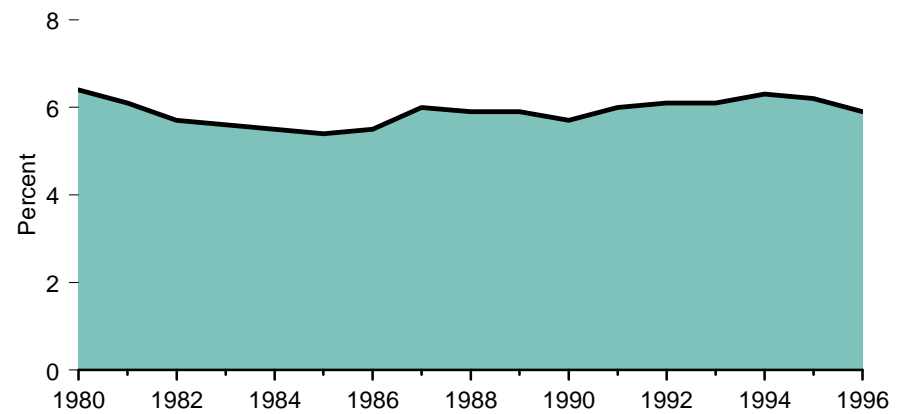


**Figure 1.16 Fossil Fuel Consumption for Nonfuel Use**

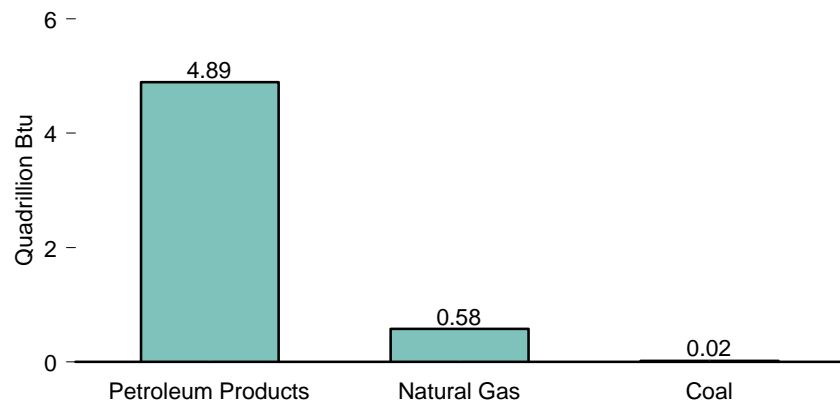
**Total, 1980-1996**



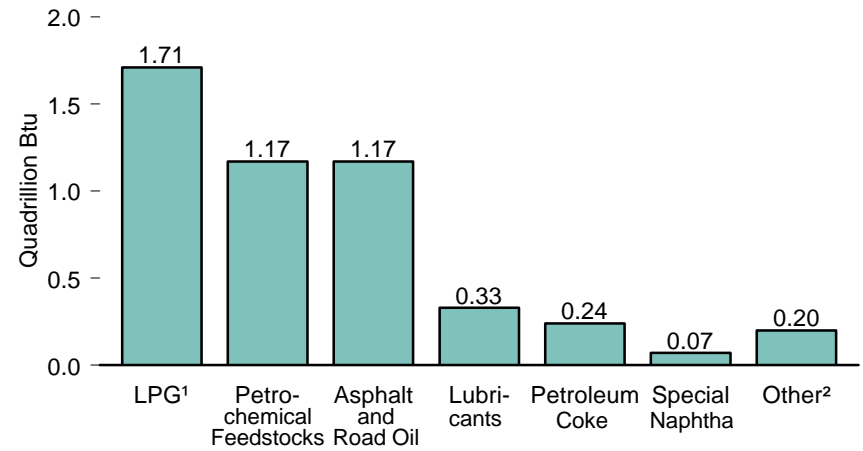
**As Share of Total Energy Consumption, 1980-1996**



**By Fuel, 1996**



**By Petroleum Product, 1996**



<sup>1</sup> Liquefied petroleum gases.

<sup>2</sup> "Other" is distillate fuel, residual fuel oil, waxes, and miscellaneous products.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 1.16.

**Table 1.16 Fossil Fuel Consumption for Nonfuel Use, 1980-1996**

Year	Petroleum Products								Natural Gas	Coal	Total	Percent of Total Energy Consumption
	Asphalt and Road Oil	Liquefied Petroleum Gases <sup>1</sup>	Lubricants	Petro-chemical Feedstocks	Petroleum Coke	Special Naptha	Other <sup>2</sup>	Total				
Physical Units <sup>3</sup>												
1980	145	231	58	253	8	37	58	790	589	2.6	—	—
1981	125	230	56	236	26	27	54	754	482	2.3	—	—
1982	125	259	51	169	20	25	48	697	415	1.5	—	—
1983	136	267	53	153	7	30	45	691	418	1.4	—	—
1984	149	260	57	144	14	40	38	702	471	1.6	—	—
1985	153	255	53	143	14	30	38	686	475	1.8	—	—
1986	164	268	47	180	13	24	41	737	444	0.8	—	—
1987	170	316	59	170	24	28	40	807	490	0.9	—	—
1988	171	340	56	174	25	22	45	833	526	0.8	—	—
1989	165	349	58	172	23	20	44	831	528	0.7	—	—
1990	164	362	60	153	32	20	40	831	533	0.8	—	—
1991	162	404	53	203	27	17	43	909	475	0.7	—	—
1992	166	411	54	214	42	20	35	942	503	0.8	—	—
1993	173	444	56	214	31	20	35	973	495	0.8	—	—
1994	176	493	58	224	33	15	37	1,036	517	0.8	—	—
1995	<sup>R</sup> 178	<sup>R</sup> 515	57	207	<sup>R</sup> 35	13	36	<sup>R</sup> 1,041	<sup>R</sup> 529	0.8	—	—
1996 <sup>P</sup>	177	482	55	209	39	14	34	1,010	568	<sup>E</sup> 0.8	—	—
Quadrillion Btu												
1980	0.96	0.82	0.35	1.43	0.05	0.19	0.34	4.14	0.60	0.09	4.83	6.4
1981	0.83	0.81	0.34	1.33	0.16	0.14	0.32	3.93	0.50	0.07	4.50	6.1
1982	0.83	0.90	0.31	0.95	0.12	0.13	0.28	3.57	0.43	0.04	4.04	5.7
1983	0.90	0.93	0.32	0.86	0.04	0.16	0.26	3.47	0.43	0.04	3.94	5.6
1984	0.99	0.89	0.35	0.81	0.08	0.21	0.22	3.55	0.49	0.04	4.08	5.5
1985	1.02	0.86	0.32	0.81	0.08	0.16	0.22	3.47	0.49	0.05	4.01	5.4
1986	1.09	0.82	0.29	1.02	0.08	0.13	0.21	3.64	0.46	0.02	4.12	5.5
1987	1.13	1.12	0.35	1.00	0.14	0.14	0.23	4.11	0.50	0.03	4.64	6.0
1988	1.14	1.21	0.35	1.00	0.15	0.11	0.24	4.20	0.54	0.02	4.76	5.9
1989	1.10	1.26	0.35	1.00	0.14	0.11	0.25	4.21	0.54	0.02	4.77	5.9
1990	1.09	1.28	0.37	0.82	0.19	0.11	0.23	4.09	0.55	0.02	4.66	5.7
1991	1.08	1.42	0.33	1.15	0.16	0.09	0.26	4.49	0.49	0.02	5.00	6.0
1992	1.10	1.45	0.33	1.20	0.26	0.10	0.21	4.65	0.52	0.02	5.19	6.1
1993	1.15	1.60	0.34	1.21	0.18	0.10	0.20	4.78	0.51	0.02	5.31	6.1
1994	1.17	1.80	0.35	1.26	<sup>R</sup> 0.21	0.08	0.22	5.07	0.53	0.02	5.62	6.3
1995	1.18	<sup>R</sup> 1.89	0.35	1.17	<sup>R</sup> 0.21	0.07	0.21	<sup>R</sup> 5.08	<sup>R</sup> 0.54	0.02	<sup>R</sup> 5.64	<sup>R</sup> 6.2
1996 <sup>P</sup>	1.17	1.71	0.33	1.17	0.24	0.07	0.20	4.89	0.58	<sup>E</sup> 0.02	5.49	5.9

<sup>1</sup> Includes pentanes plus which are natural gas liquids.

<sup>2</sup> "Other" is distillate fuel oil, residual fuel oil, waxes, and miscellaneous products.

<sup>3</sup> Petroleum - million barrels; natural gas - billion cubic feet; and coal - million short tons.

R=Revised data. E=Estimated. P=Preliminary data. — = Not applicable.

Sources: **Petroleum Products:** • 1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual and Sales of Liquefied Petroleum Gases and Ethane in 1980*. • 1981-1985—EIA, *Petroleum Supply Annual* and unpublished data. • 1986 forward—EIA, *Petroleum*

*Supply Monthly* and EIA estimates. **Natural Gas:** • 1980—Bureau of the Census, 1980 Survey of Manufactures, *Hydrocarbon, Coal, and Coke Materials Consumed*. • 1981 forward—U.S. Department of Commerce estimates. **Coal:** • 1960-1995—U.S. International Trade Commission, *Synthetic Organic Chemicals, United States Production and Sales, 1995* (January 1997). • 1996—Estimated because the data series has been discontinued. **Percent of Total Energy Consumption:** Derived by dividing total by total consumption on Table 1.3.

## Energy Overview Notes

1. Data on the generation of electricity in the United States represent net generation, which is gross output of electricity (measured at the generator terminals) minus power plant use. Nuclear electricity generation data identified by individual countries in Section 11 are gross outputs of electricity.

2. Table 1.15 Sources: Coal: 1949–1980—U.S. Geological Survey, *Coal, Phosphate, Potash, Sodium, and Other Mineral Production, Royalty Income, and Related Statistics*, June 1981. 1981 forward—U.S. Minerals Management Service, *Mineral Revenues—The 1995 Report on Receipts from Federal and Indian Leases*, and predecessor annual reports.

**All Other Data:** 1949–1980—U.S. Geological Survey, *Oil and Gas Production, Royalty Income, and Related Statistics*, June 1981; Department of Energy, Office of Naval Petroleum and Oil Shale Reserves, unpublished data; and U.S. Geological Survey, National Petroleum Reserve in Alaska, unpublished data. 1981–1983—U.S. Minerals Management Service, *Mineral Revenues—The 1983 Report on Receipts from Federal and Indian Leases*, and predecessor annual reports; Department of Energy, Office of Naval Petroleum and Oil Shale Reserves, unpublished data; and U.S. Geological Survey, National Petroleum Reserve in Alaska, unpublished data. 1984 forward—U.S. Minerals Management Service, *Mineral Revenues—The 1995 Report on Receipts from Federal and Indian Leases*, and predecessor annual reports; Department of Energy, Office of Naval Petroleum and Oil Shale Reserves, unpublished data.

## 2. End-Use Energy Consumption

### Types of Consumption Data

The Energy Information Administration publishes two sets of statistics on end-use energy consumption. The first set, based on surveys directed to suppliers and marketers, provides continuous series for the years 1949 through 1996 and allocates U.S. total energy consumption to one of three end-use sectors: industrial, residential and commercial, or transportation. The second set, based on periodic (non-annual) surveys of end-users of energy provides detailed information on the types of energy consumed and the energy-related characteristics of manufacturing establishments, commercial buildings, households, and household vehicles.

### End-Use Energy Overview (1949-1996)

**Industrial.** Energy consumption by the industrial sector increased throughout the 1960's and in 1973 reached 32 quadrillion Btu. Of the three end-use sectors, the industrial sector proved to be the most responsive to the turmoil in energy markets after the 1973-1974 embargo (2.1).<sup>\*</sup> In 1979, industrial consumption of energy reached the then-record level of 33 quadrillion Btu. In the early 1980's, a stagnant economy restrained industrial consumption, which declined to a 16-year low of 26 quadrillion Btu in 1983. In 1988 and 1989, economic growth spurred demand for energy in the industrial sector, and industrial energy consumption in 1989 rose to 29 quadrillion Btu. Despite slow economic growth in the early 1990's, industrial energy consumption trended upward. In 1996, industrial consumption of energy reached 35 quadrillion Btu, the highest level recorded.

**Residential and commercial.** Substantial growth in energy consumption during the 1949-through-1996 period occurred in the residential

*\*Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications. Percentages and numbers in text are calculated by using data in the tables.*

and commercial sector (2.1). Residential and commercial consumption leveled off in response to higher energy prices in the late 1970's and early 1980's, but lower prices in the 1986-through-1996 period played a role in boosting residential and commercial energy consumption to the record level of 34 quadrillion Btu in 1996.

**Transportation.** Energy consumption by the transportation sector was primarily petroleum consumption. The transportation sector's consumption of petroleum has nearly quadrupled since 1949, but growth was slower during the 1980's than in previous decades. In 1996, consumption of petroleum in the transportation sector totaled 24 quadrillion Btu, also a record level.

### Consumption of Energy for Manufacturing (1994)

The U.S. manufacturing sector consumed an estimated 21.7 quadrillion Btu of energy in 1994<sup>1</sup> (2.2). Natural gas accounted for 6.8 quadrillion Btu, a 32-percent share of total energy consumption. Electricity<sup>2</sup> accounted for 2.7 quadrillion Btu, a 12-percent share, and coal consumption accounted for 2.1 quadrillion Btu, a 10-percent share. Fuel oil consumption of 0.6 quadrillion Btu accounted for a 3.0-percent share. Forty-six percent of energy consumption was provided by "other" types of manufacturing energy, such as petroleum coke and wood residues.

Of all the industries, the petroleum and coal products industry was the largest user of energy in 1994, consuming 6.3 quadrillion Btu. At 5.3 quadrillion Btu, the chemicals and allied products industry was the second largest user. Together, the two industries accounted for more than half of the energy consumption in the manufacturing sector.

<sup>1</sup>The manufacturing sector is composed of establishments that use mechanical or chemical processes to transform raw materials into intermediate or final products. It does not include the remainder of the industrial sector (construction, mining, agricultural, fishing, and forestry establishments) or electric utilities. The 21.7 quadrillion Btu total is the *first use of energy* (previously called *primary consumption*); it includes energy consumed to produce heat and power and to generate electricity, as well as sources of energy consumed as petrochemical feedstocks and raw material inputs, but it excludes byproduct fuels produced from other energy sources.

<sup>2</sup>Net electricity, which is obtained by summing purchases, transfers in, and generation from noncombustible renewable resources, minus quantities sold and transferred out. It excludes electricity generated from combustible fuels.

Manufacturing establishments, not surprisingly, make significantly different uses of energy than do commercial establishments, where most energy is consumed for space conditioning (heating and cooling), ventilation, and lighting. Of the 10.7 quadrillion Btu consumed for end-uses by manufacturers, only about 0.8 quadrillion Btu (7 percent) goes for space conditioning, ventilation, and lighting (2.6). About half of all manufacturing energy is consumed in process uses: process heating (32 percent), motors (14 percent), electrochemical processes, (3 percent), process cooling and refrigeration (1 percent), and other uses such as welding and paint drying.

Manufacturers use several different fuels as energy inputs, but natural gas accounted for 57 percent of the total in 1994 and electricity accounted for 25 percent (2.6). Coal accounted for 11 percent; the balance is distributed among residual fuel oil, distillate fuel oil, and liquefied petroleum gases and natural gas liquids.

### Household Uses of Energy (1993)

In 1993, household energy consumption totaled 10 quadrillion Btu and energy consumption per household averaged 104 million Btu (2.7). Household energy consumption is strongly influenced by climate. Households in the West and South consumed the least amount of energy in 1993, an average of 76 million Btu per household in the West and 88 million Btu per household in the South. Consumption in the colder climates was higher in 1993; households in the Midwest averaged 134 million Btu per household and those in the Northeast 122 million Btu per household.

Energy consumed by households can be attributed to four primary applications: space heating, air conditioning, water heating, and appliance operation (2.8). Of these applications, space heating used the most energy in 1993, 5.3 quadrillion Btu. Natural gas was the primary source of energy for space heating and provided the main source of heat in 51 million households (2.9). Natural gas was also the primary source of energy for water heating (2.8).

About 2.4 quadrillion Btu were used to operate appliances and, as would be expected, electricity was the major source of energy for that application (2.8). In order of prevalence, refrigerators, color television sets, ovens (regular and microwave), and clothes washers were the most common household appliances (2.10).

Although air conditioning accounted for only 4.6 percent of household energy consumption, it accounted for 9.1 percent (\$11.3 billion) of total household energy expenditures of \$124 billion (2.8). Electricity was essentially the only source of energy used for air conditioning.

The cost of energy used to operate appliances totaled \$56 billion in 1993, and the cost for space heating was \$40 billion. Energy expenses for water heating came to about \$17 billion.

### Energy Consumption by Household Vehicles

In 1994, nearly 85 million households owned or had access to at least one vehicle (2.12). The 157 million household vehicles traveled a total of 1.8 trillion miles, up from 1.2 trillion miles in 1983, and consumed 91 billion gallons of motor gasoline, of which 96 percent was unleaded. (In 1983, by comparison, 59 percent of the 79 billion gallons consumed was unleaded.) The average real price (in chained 1992 dollars) of unleaded motor gasoline fell from \$1.67 per gallon in 1983 to \$1.10 per gallon in 1994.

Because motor gasoline consistently accounts for the largest share of all petroleum products supplied (5.11), motor gasoline consumption has a significant effect on U.S. dependence on foreign sources of crude oil. Following the oil embargo in the mid-1970's, concerns about U.S. dependence on foreign oil led to interest in improving motor vehicle efficiency.

In 1973, average annual mileage exceeded 10 thousand miles per passenger car (2.13). The average fuel rate of passenger cars, which make up a sizable proportion of the U.S. motor vehicle fleet, was 13.3 miles per gallon. That measure of fuel efficiency had declined for the previous several years.

In 1973 and 1974, however, crude oil supply interruptions and rising prices led to public concern over the continued availability of motor gasoline. The immediate effect of higher prices was a decline in mileage to an average of 9.6 thousand miles per passenger car in 1974. At the same time, the average fuel rate of the passenger car fleet began to improve and reached a record high of 22.6 miles per gallon in 1995. The Federal Corporate Average Fuel Economy standards, which required automobile manufacturers to meet fleet fuel-rate minimum averages, played a major role in the increase in fuel rates.

## Energy-Related Characteristics of Commercial Buildings

Commercial buildings are those which house mercantile, service, office, education, and other activities. In 1995, there were approximately 59 billion square feet of commercial floorspace in the United States, excluding parking garages and commercial buildings at multi-building manufacturing facilities (2.15). Among the four census regions, the largest amount of commercial floorspace, 21 billion square feet, was found in the South and accounted for 35 percent of the U.S. total. On the basis of the amount of commercial floorspace in which a given energy source is consumed, electricity was the most prevalent. Electricity was an energy source for 57 billion square feet of commercial floorspace. Natural gas was also commonly used and supplied energy for 39 billion square feet. Fuel oil, district heat,<sup>4</sup> and propane

<sup>4</sup>District heat is steam or hot water that circulates from a central plant or utility.

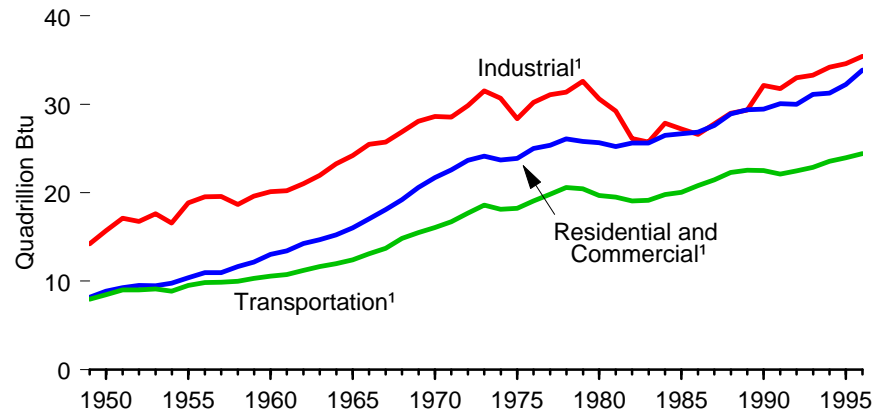
were consumed in smaller, but still significant, amounts in commercial buildings.

On a Btu basis, electricity and natural gas were the most common sources of energy in commercial buildings (2.18). In 1992, 2.6 quadrillion Btu of electricity and 2.2 quadrillion Btu of natural gas were consumed in commercial buildings. Consumption of district heat totaled 0.4 quadrillion Btu and consumption of fuel oil totaled 0.3 quadrillion Btu. (Propane also supplied small amounts of energy in commercial buildings, but propane data were not collected in 1992.)

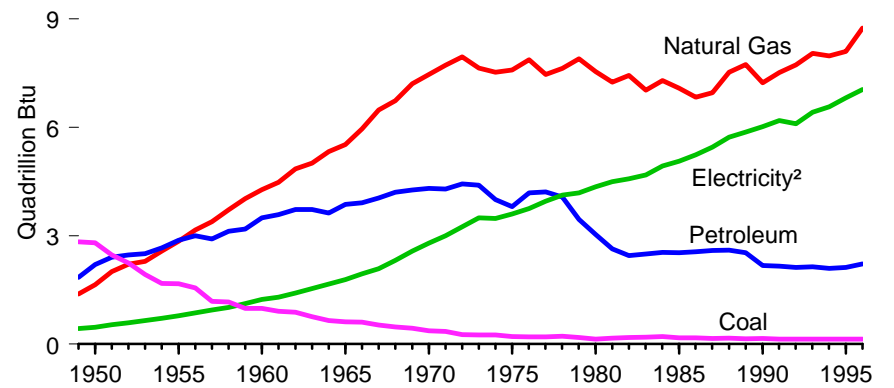
Of the \$72 billion spent on energy for commercial buildings in 1992, by far the largest amount went for electricity (2.18). Electricity expenditures came to \$58 billion, whereas expenditures for natural gas came to \$9.9 billion. Expenditures for district heat were \$2.9 billion and expenditures for fuel oil were \$1.4 billion.

**Figure 2.1 Energy Consumption by End-Use Sector, 1949-1996**

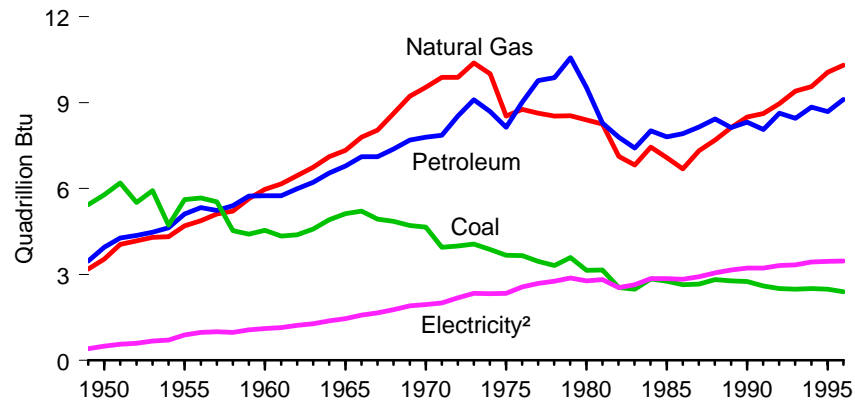
**By End-Use Sector**



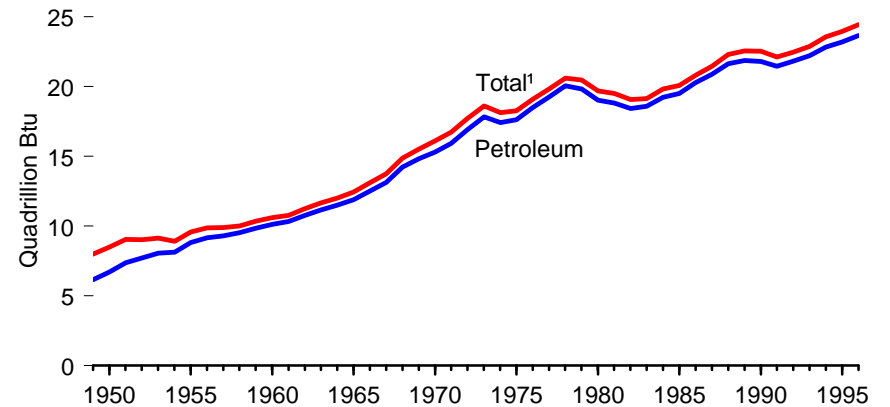
**Residential and Commercial Sector**



**Industrial Sector**



**Transportation Sector**



<sup>1</sup> There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

<sup>2</sup> Does not include electrical system energy losses.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 2.1.

**Table 2.1 Energy Consumption by End-Use Sector, 1949-1996**  
(Quadrillion Btu)

Year	Residential and Commercial						Industrial						Transportation		Total <sup>3</sup>
	Coal	Natural Gas <sup>1</sup>	Petroleum	Electricity	Losses <sup>2</sup>	Total <sup>3</sup>	Coal	Natural Gas <sup>1</sup>	Petroleum	Electricity	Losses <sup>2</sup>	Total <sup>3,4</sup>	Petroleum	Total <sup>5</sup>	
1949	2.83	1.39	1.85	0.43	1.72	8.21	5.43	3.19	3.47	0.42	1.68	14.26	6.15	7.99	30.46
1950	2.80	1.64	2.20	0.47	1.76	8.87	5.78	3.55	3.95	0.50	1.86	15.71	6.69	8.49	33.08
1951	2.47	2.01	2.40	0.54	1.89	9.30	6.20	4.05	4.27	0.57	2.00	17.13	7.36	9.04	35.47
1952	2.25	2.21	2.46	0.59	2.02	9.54	5.52	4.18	4.36	0.60	2.05	16.76	7.71	9.00	35.30
1953	1.93	2.29	2.50	0.65	2.12	9.50	5.93	4.30	4.48	0.68	2.20	17.65	8.06	9.12	36.27
1954	1.68	2.57	2.67	0.72	2.15	9.78	4.73	4.32	4.63	0.71	2.14	16.58	8.12	8.90	35.27
1955	1.67	2.85	2.87	0.79	2.23	10.41	5.62	4.70	5.11	0.89	2.51	18.86	8.80	9.55	38.82
1956	1.55	3.15	3.00	0.87	2.39	10.96	5.67	4.87	5.34	0.98	2.68	19.55	9.15	9.86	40.38
1957	1.19	3.39	2.91	0.95	2.55	10.98	5.54	5.11	5.24	1.00	2.70	19.60	9.29	9.90	40.48
1958	1.16	3.71	3.12	1.01	2.64	11.65	4.53	5.21	5.41	0.98	2.54	18.70	9.51	10.00	40.35
1959	0.99	4.02	3.18	1.12	2.84	12.15	4.41	5.65	5.74	1.08	2.73	19.64	9.85	10.35	42.14
1960	0.99	4.27	3.49	1.23	3.06	13.04	4.54	5.97	5.75	1.11	2.76	20.16	10.13	10.60	43.80
1961	0.90	4.48	3.58	1.30	3.18	13.44	4.35	6.17	5.75	1.15	2.80	20.25	10.32	10.77	44.46
1962	0.88	4.85	3.72	1.41	3.40	14.27	4.38	6.45	6.00	1.23	2.95	21.04	10.77	11.23	46.53
1963	0.76	5.01	3.72	1.54	3.68	14.71	4.59	6.75	6.23	1.29	3.08	21.95	11.17	11.66	48.32
1964	0.65	5.33	3.62	1.67	3.96	15.23	4.91	7.11	6.55	1.38	3.29	23.27	11.50	12.00	50.50
1965	0.62	5.52	3.87	1.78	4.25	16.03	5.13	7.34	6.79	1.46	3.49	24.22	11.87	12.43	52.68
1966	0.61	5.95	3.91	1.94	4.65	17.06	5.21	7.80	7.11	1.58	3.79	25.50	12.50	13.10	55.66
1967	0.52	6.47	4.04	2.09	4.98	18.10	4.93	8.04	7.12	1.65	3.95	25.72	13.11	13.75	57.57
1968	0.47	6.73	4.20	2.32	5.52	19.23	4.85	8.63	7.39	1.78	4.24	26.90	14.21	14.86	61.00
1969	0.44	7.20	4.26	2.57	6.12	20.59	4.71	9.23	7.70	1.91	4.56	28.10	14.81	15.50	64.19
1970	0.37	7.46	4.31	2.79	6.78	21.71	4.66	9.54	7.79	1.95	4.72	28.63	15.31	16.09	66.43
1971	0.35	7.71	4.29	2.99	7.25	22.59	3.94	9.89	7.86	2.01	4.87	28.57	15.92	16.72	67.89
1972	0.27	7.94	4.43	3.25	7.80	23.69	3.99	9.88	8.53	2.19	5.25	29.86	16.89	17.71	71.26
1973	0.25	7.63	4.39	3.50	8.38	24.14	4.06	10.39	9.10	2.34	5.61	31.53	17.83	18.60	74.28
1974	0.26	7.52	4.00	3.47	8.48	23.72	3.87	10.00	8.69	2.34	5.70	30.70	17.40	18.12	72.54
1975	0.21	7.58	3.80	3.60	8.70	23.90	3.67	8.53	8.15	2.35	5.66	28.40	17.62	18.25	70.55
1976	0.20	7.87	4.18	3.75	9.02	25.02	3.66	8.76	9.01	2.57	6.20	30.24	18.51	19.10	74.36
1977	0.21	7.46	4.21	3.96	9.56	25.39	3.45	8.64	9.78	2.68	6.48	31.08	19.24	19.82	76.29
1978	0.21	7.62	4.07	4.12	10.07	26.09	3.31	8.54	9.87	2.76	6.75	31.39	20.04	20.61	78.09
1979	0.19	7.89	3.45	4.18	10.10	25.81	3.59	8.55	10.57	2.87	6.94	32.61	19.82	20.47	78.90
1980	0.15	7.54	3.04	4.35	10.58	25.65	3.16	8.39	9.53	2.78	6.76	30.61	19.01	19.69	75.96
1981	0.17	7.24	2.63	4.50	10.70	25.24	3.16	8.26	8.29	2.82	6.70	29.24	18.81	19.51	73.99
1982	0.19	7.43	2.45	4.57	11.00	25.63	2.55	7.12	7.80	2.54	6.12	26.14	18.42	19.07	70.85
1983	0.19	7.02	2.50	4.68	11.24	25.63	2.49	6.83	7.42	2.65	6.36	25.75	18.59	19.13	70.52
1984	0.21	7.29	2.54	4.93	11.51	26.48	2.84	7.45	8.01	2.86	6.68	27.86	19.22	19.80	74.14
1985	0.18	7.08	2.52	5.06	11.87	26.70	2.76	7.08	7.81	2.86	6.69	27.22	19.50	20.07	73.98
1986	0.18	6.82	2.56	5.24	12.06	26.85	2.64	6.69	7.92	2.83	6.53	26.63	20.27	20.81	74.30
1987	0.16	6.95	2.59	5.44	12.48	27.62	2.67	7.32	8.15	2.93	6.71	27.83	20.87	21.45	76.89
1988	0.17	7.51	2.60	5.72	12.92	28.92	2.83	7.70	8.43	3.06	6.90	28.99	21.63	22.30	80.22
1989	0.15	7.73	2.53	5.86	13.14	29.40	2.79	8.13	8.13	3.16	7.08	29.35	21.87	22.56	81.32
1990	0.16	7.22	2.17	6.02	R13.27	R29.48	2.76	8.50	8.32	3.23	R7.12	R632.14	21.81	R622.54	R684.09
1991	0.14	7.51	2.15	6.18	R13.43	R30.09	2.60	8.62	8.06	3.23	7.02	31.76	21.46	R22.12	R83.99
1992	0.14	7.73	2.13	6.10	R13.21	R30.00	2.51	8.97	8.64	3.32	R7.19	R33.01	21.81	R22.46	R85.52
1993	0.14	8.04	2.14	6.42	R13.74	R31.13	2.50	9.41	8.45	3.33	R7.14	R33.30	22.20	R22.88	R87.34
1994	0.14	7.97	2.09	6.56	R13.88	R31.29	2.51	R9.56	8.85	3.44	R7.28	R34.19	R22.82	R23.57	R89.21
1995	0.13	R8.09	2.12	R6.81	R14.39	R32.26	2.48	R10.06	R8.69	R3.46	R7.30	R34.60	R23.20	R23.96	R90.94
1996 <sup>P</sup>	0.14	8.73	2.22	7.04	15.04	33.88	2.40	10.31	9.11	3.47	7.41	35.43	23.66	24.43	93.81

<sup>1</sup> Includes supplemental natural gas.

<sup>2</sup> Electrical system energy losses. See Glossary and Diagram 5. Total losses are calculated as the sum of energy consumed at electric utilities to generate electricity, utility purchases of electricity from nonutility power producers, and imported electricity, minus exported electricity and electricity consumed by end users. Total losses are allocated to the end-use sectors in proportion to each sector's share of total electricity use.

<sup>3</sup> Beginning in 1990, includes renewable energy. See Table 10.2.

<sup>4</sup> Also includes hydroelectric power and net imports of coal coke.

<sup>5</sup> Also includes coal, natural gas, electricity, and electrical system energy losses.

<sup>6</sup> There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990. See Table 10.2 for quantities.

R=Revised data. P=Preliminary data.

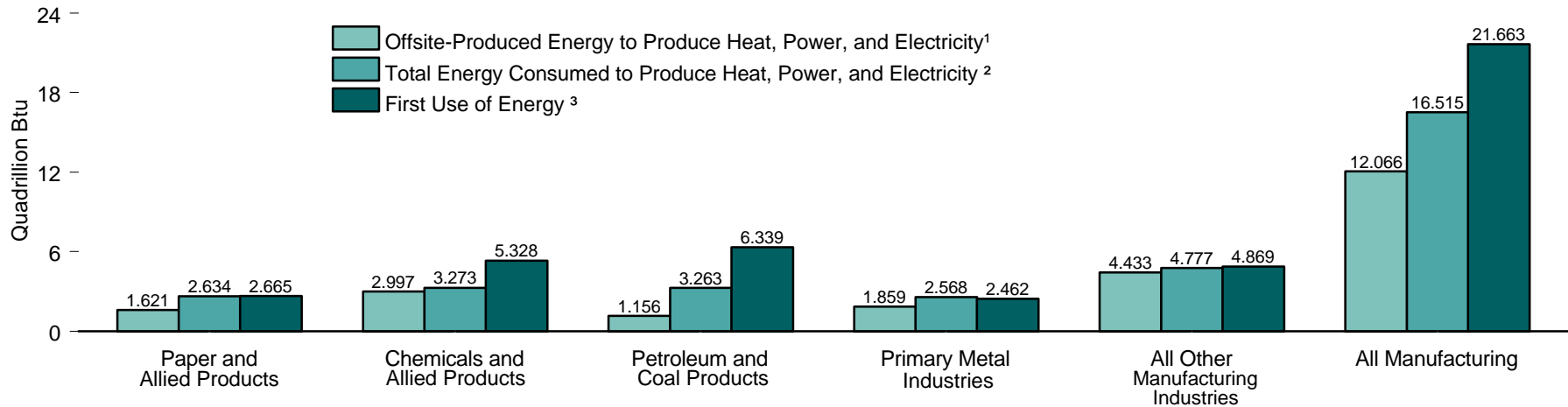
Note: Totals may not equal sum of components due to independent rounding.

Sources: Tables 5.12a, 5.12b, 6.6, 7.3, 7.7, 8.1, 8.4, 8.6, 10.9, A3-A7, and Energy Information Administration estimates for industrial hydroelectric power. "Other" from Table 8.6 is allocated to the Residential and Commercial Sector, except for approximately 4 percent used by railroads and railways and attributed to the Transportation Sector.

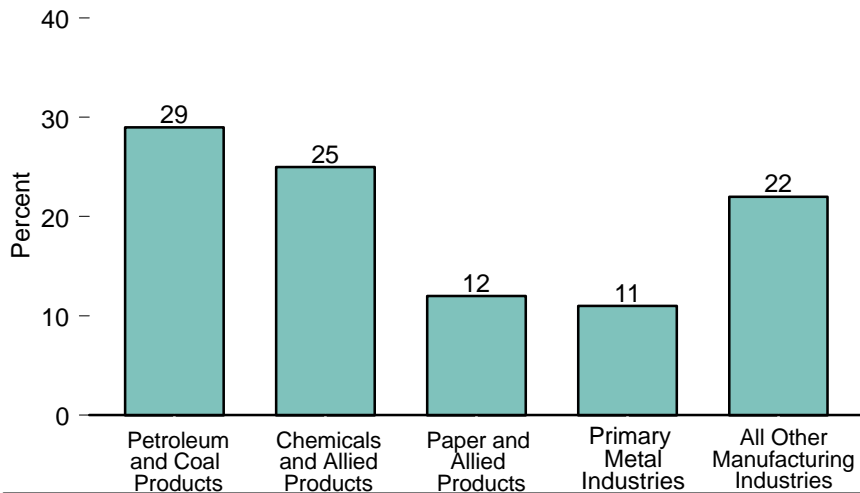


**Figure 2.2 Manufacturing Energy Consumption Measures, 1994**

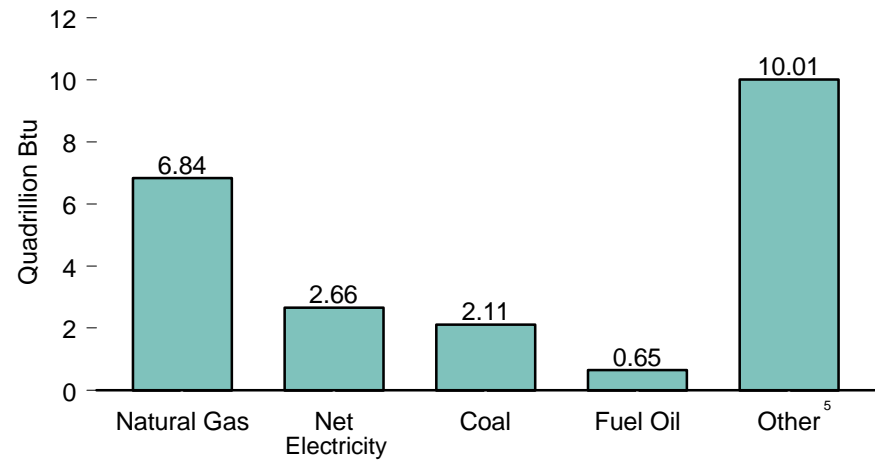
**By Industry and Type of Consumption**



**First Use of Energy by Industry**



**First Use of Energy by Source**



<sup>1</sup> Energy that was produced offsite and then acquired by purchase or transfer and consumed onsite for the production of heat or power.

<sup>2</sup> Includes byproduct energy.

<sup>3</sup> Includes feedstocks; does not include byproduct fuels.

<sup>4</sup> "Other" includes all other types of energy that respondents indicated were consumed; included are feedstocks and raw materials for nonenergy products, such as asphalt.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 2.2.

**Table 2.2 Manufacturing Energy Consumption Measures, 1994**  
(Quadrillion Btu, Except as Noted)

Type of Consumption	Net Electricity <sup>1</sup>	Fuel Oil	Natural Gas	Coal	Other <sup>2</sup>	Shipments of Energy Sources <sup>3</sup>	Total	Percent
<b>First Use of Energy<sup>4</sup></b> .....	<b>2.656</b>	<b>0.648</b>	<b>6.835</b>	<b>2.105</b>	<b>10.006</b>	<b>0.587</b>	<sup>5</sup> <b>21.663</b>	<b>100</b>
Paper and Allied Products .....	0.223	0.182	0.575	0.307	1.378	0.000	<sup>5</sup> 2.665	12
Chemicals and Allied Products .....	0.520	0.124	2.569	0.293	1.988	0.166	<sup>5</sup> 5.328	25
Petroleum and Coal Products .....	0.121	0.093	0.811	W	W	0.087	<sup>5</sup> 6.339	29
Primary Metal Industries .....	0.493	0.056	0.811	0.922	0.514	0.334	<sup>5</sup> 2.462	11
All Other Manufacturing Industries .....	1.299	0.193	2.069	W	W	0.000	<sup>5</sup> 4.869	22
<b>Total Inputs for Heat, Power, and Electricity Generation<sup>6</sup></b> .....	<b>2.656</b>	<b>0.593</b>	<b>6.141</b>	<b>1.198</b>	<b>5.928</b>	—	<b>16.515</b>	<b>100</b>
Paper and Allied Products .....	0.223	0.182	0.574	0.307	1.348	—	2.634	16
Chemicals and Allied Products .....	0.520	0.073	1.895	0.257	0.528	—	3.273	20
Petroleum and Coal Products .....	0.121	0.093	W	W	W	—	3.263	20
Primary Metal Industries .....	0.493	0.055	0.801	0.052	1.167	—	2.568	16
All Other Manufacturing Industries .....	1.299	0.190	W	W	W	—	4.777	29
<b>Offsite-Produced Energy Consumed for Heat, Power, and Electricity Generation</b> .....	<b>2.742</b>	<b>0.545</b>	<b>6.107</b>	<b>1.198</b>	<b>1.474</b>	—	<b>12.066</b>	<b>100</b>
Paper and Allied Products .....	0.247	0.182	0.574	0.307	0.311	—	1.621	13
Chemicals and Allied Products .....	0.547	W	1.894	0.257	W	—	2.997	25
Petroleum and Coal Products .....	0.128	0.046	0.781	W	W	—	1.156	10
Primary Metal Industries .....	0.510	0.055	0.801	0.052	0.440	—	1.859	15
All Other Manufacturing Industries .....	1.310	W	2.057	W	W	—	4.433	37

<sup>1</sup> "Net Electricity" is obtained by summing purchases, transfers in, and generation from noncombustible renewable resources, minus quantities sold and transferred out. It excludes electricity generated from combustible fuels.

<sup>2</sup> Includes all other types of energy that respondents indicated were consumed.

<sup>3</sup> Shipments are energy sources produced onsite but sold to another entity.

<sup>4</sup> "First Use" was "Primary Consumption" in previous releases of this table. The estimates are for the primary consumption of energy for heat and power and as feedstocks or raw material inputs. Primary consumption is defined as the consumption of the energy that was originally produced offsite or was produced onsite from input materials not classified as energy.

<sup>5</sup> Total is the sum of net electricity, fuel oil, natural gas, coal, and other minus shipments of energy

sources. Previous surveys did not subtract shipments.

<sup>6</sup> Estimates are for total consumption of energy for the production of heat and power regardless of where the energy was produced. Specifically, the estimates include the quantities of energy that were originally produced offsite and purchased by or transferred to the establishment, plus those that were produced onsite from other energy or input materials not classified as energy, or were extracted from captive (onsite) mines or wells.

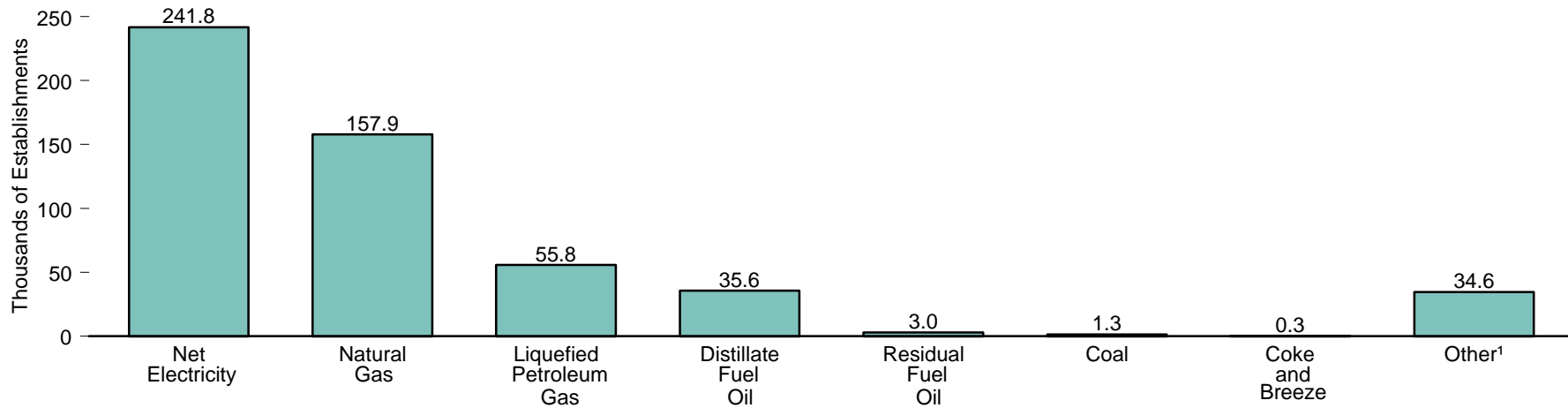
— = Not applicable. W=Withheld to avoid disclosure of data for individual establishments.

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

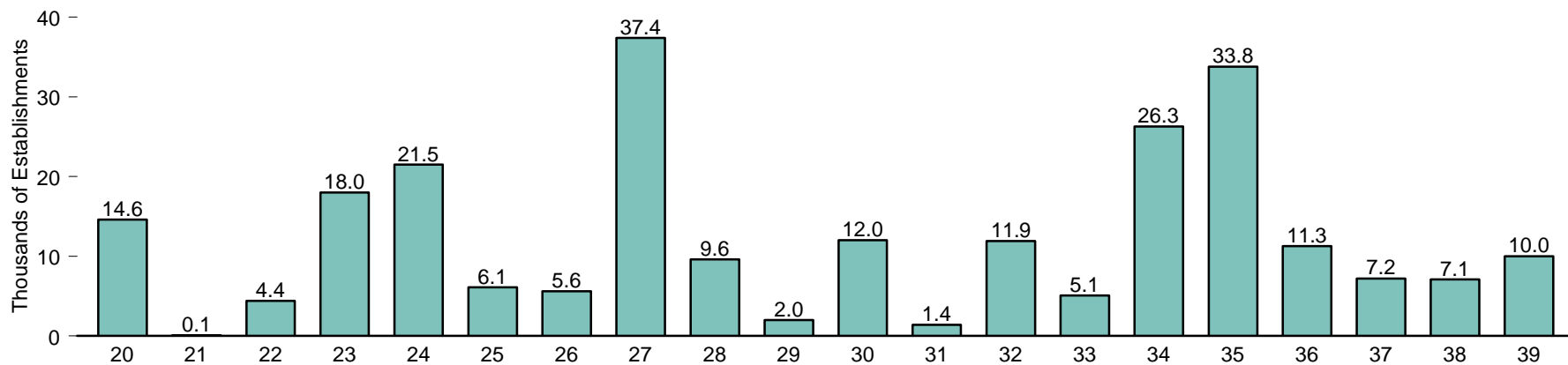
Source: Energy Information Administration, Form EIA-846, "1994 Manufacturing Energy Consumption Survey."

**Figure 2.3 Manufacturing Sector Establishments by Inputs for Heat, Power, and Electricity Generation, 1994**

**By Energy Source**



**Any Energy Source Reported² by Standard Industrial Classification (SIC) Code³**



<sup>1</sup> Net steam and other energy reported by respondents.

<sup>2</sup> Includes only those establishments that reported any energy consumption for fuel purposes.

<sup>3</sup> See Table 2.3 for Major Group titles of industries that correspond to the 2-digit SIC codes.

Source: Table 2.3.

**Table 2.3 Manufacturing Sector Establishments by Inputs for Heat, Power, and Electricity Generation, 1994**  
(Number of Establishments)

SIC <sup>1</sup> Code	Major Group	Net Electricity <sup>2</sup>	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	Liquefied Petroleum Gas	Coal	Coke and Breeze	Other <sup>3</sup>	Any Energy Source Reported <sup>4</sup>
20	Food and Kindred Products .....	14,545	562	3,211	10,954	3,681	154	31	1,921	14,603
21	Tobacco Products .....	121	42	42	94	48	31	0	48	121
22	Textile Mill Products .....	4,427	441	668	2,517	1,282	85	0	448	4,427
23	Apparel and Other Textile Products .....	17,754	20	876	8,885	1,330	5	0	528	18,019
24	Lumber and Wood Products .....	18,896	83	9,251	7,557	5,075	8	0	5,788	21,481
25	Furniture and Fixtures .....	5,992	Q	333	4,333	2,209	Q	0	363	6,143
26	Paper and Allied Products .....	5,547	382	878	4,290	2,321	173	0	807	5,582
27	Printing and Publishing .....	37,335	82	1,853	22,680	3,601	0	0	759	37,384
28	Chemicals and Allied Products .....	9,555	340	2,541	6,723	2,768	125	3	1,955	9,565
29	Petroleum and Coal Products .....	1,960	117	783	1,148	675	15	W	436	1,971
30	Rubber and Miscellaneous Plastics Products .....	11,942	208	1,036	8,927	4,193	23	0	1,304	11,952
31	Leather and Leather Products .....	1,356	54	108	975	158	0	0	83	1,356
32	Stone, Clay, and Glass Products .....	11,815	76	3,829	6,990	2,320	233	43	2,047	11,866
33	Primary Metal Industries .....	5,073	86	1,251	4,610	2,232	78	230	1,506	5,127
34	Fabricated Metal Products .....	26,251	72	2,924	20,023	8,278	64	12	5,776	26,262
35	Industrial Machinery and Equipment .....	33,655	97	2,773	24,422	9,191	Q	W	6,475	33,837
36	Electronic and Other Electric Equipment .....	11,254	65	721	7,362	1,849	12	W	1,302	11,254
37	Transportation Equipment .....	7,240	46	811	4,300	2,643	31	4	1,790	7,240
38	Instruments and Related Products .....	7,059	Q	866	4,591	825	Q	0	208	7,059
39	Miscellaneous Manufacturing Industries .....	9,994	161	856	6,488	1,079	3	0	1,015	9,994
—	Total Manufacturing .....	241,773	3,040	35,613	157,868	55,759	1,317	330	34,558	245,243

<sup>1</sup> Based on 1987 Standard Industrial Classification system.

<sup>2</sup> "Net Electricity" is obtained by summing purchases, transfers in, and generation from noncombustible renewable resources, minus quantities sold and transferred out. It does not include electricity inputs from onsite cogeneration or generation from combustible fuels because that energy has already been included as generating fuel (for example, coal).

<sup>3</sup> "Other" includes net steam (the sum of purchases, generation from renewables, and net transfers), and other energy that respondents indicated was used to produce heat and power.

<sup>4</sup> Includes only those establishments that reported any energy consumption for fuel purposes. An establishment is not counted if its energy consumption could not be ascertained due to reasons such as inactivity at the establishment; cessation of operations, whether temporary or permanent; and inability or unwillingness to report this information.

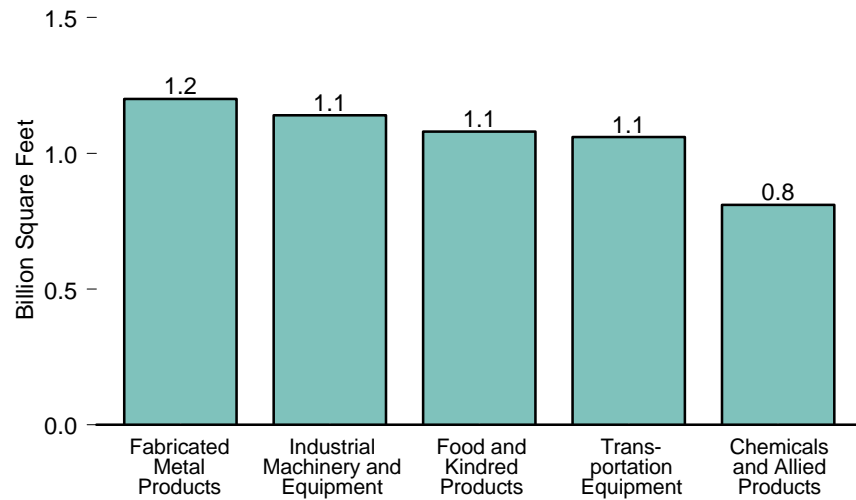
Q=Withheld because relative standard error is greater than 50 percent. NA=Not available. W=Withheld to avoid disclosure of data for individual establishments.

Notes: • Totals may not equal sum of components because of independent rounding. • The estimates presented in this table are for the total consumption of energy for the production of heat and power, regardless of where the energy was produced. Specifically, the estimates include the quantities of energy that were originally produced offsite and purchased by or transferred to the establishment, plus those that were produced onsite from other energy or input materials not classified as energy, or were extracted from captive (onsite) mines or wells.

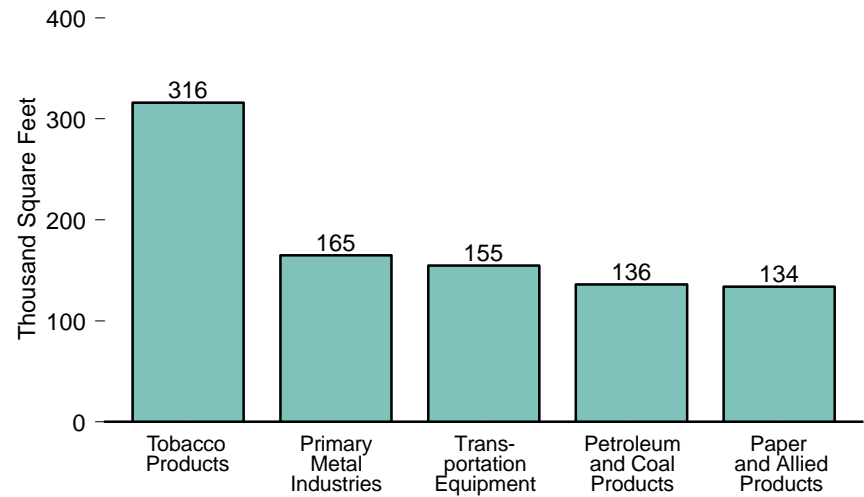
Sources: • Energy Information Administration, Form EIA-846, "1994 Manufacturing Energy Consumption Survey,"

**Figure 2.4 Manufacturing Sector Floorspace, 1994**

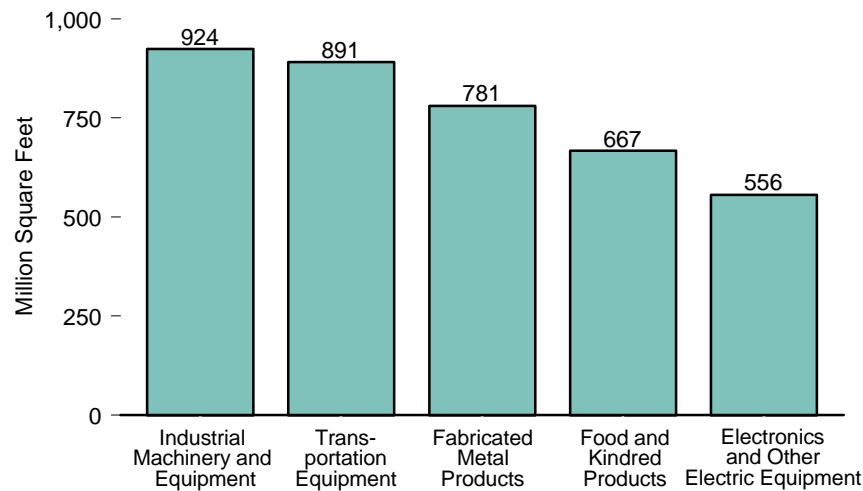
**Five Top Major Groups in Approximate Enclosed Floorspace<sup>1</sup>**



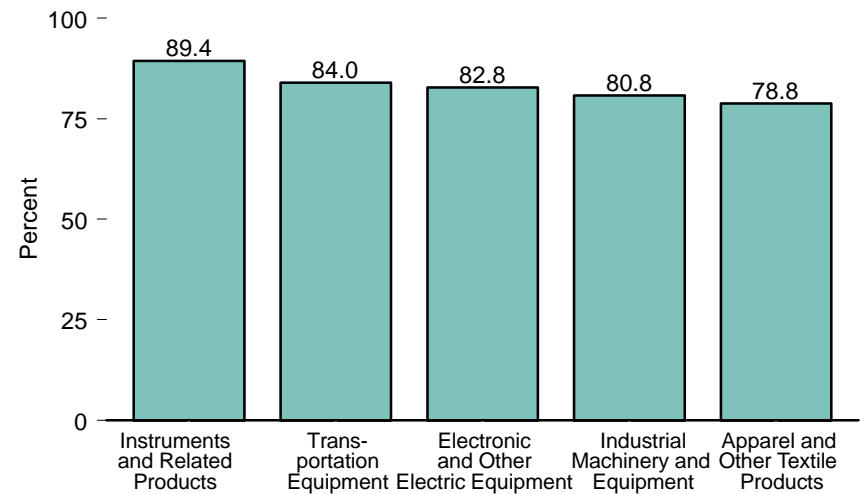
**Five Top Major Groups in Average Enclosed Floorspace<sup>1</sup>**



**Five Top Major Groups in Conditioned<sup>2</sup> Floorspace<sup>1</sup>**



**Five Top Major Groups in Share of Total Floorspace<sup>1</sup> That Is Conditioned<sup>2</sup>**



<sup>1</sup>Of reporting establishments.

<sup>2</sup>Floorspace with controlled heating or cooling through the use of equipment designed to modify internal building temperature.

Source: Table 2.4.

**Table 2.4 Manufacturing Sector Floorspace, 1994**

SIC <sup>4</sup> Code	Major Group	Establishments <sup>3</sup>  Number	Approximate Enclosed Floorspace of Reporting <sup>1</sup> Establishments	Average Enclosed Floorspace of Reporting <sup>1</sup> Establishments	Conditioned <sup>2</sup> Floorspace of Reporting <sup>1</sup> Establishments	
			Million Square Feet	Thousand Square Feet	Million Square Feet	Percent of Total Floorspace
20	Food and Kindred Products .....	14,698	1,082.6	80.8	666.9	61.6
21	Tobacco Products .....	121	38.3	316.3	21.0	54.9
22	Textile Mill Products .....	4,428	480.3	124.0	329.6	68.6
23	Apparel and Other Textile Products .....	18,019	469.4	29.3	369.8	78.8
24	Lumber and Wood Products .....	21,623	545.9	31.7	229.3	42.0
25	Furniture and Fixtures .....	7,691	490.7	86.5	362.8	73.9
26	Paper and Allied Products .....	5,582	707.0	134.3	442.7	62.6
27	Printing and Publishing .....	37,384	613.8	18.3	482.0	78.5
28	Chemicals and Allied Products .....	9,565	807.5	91.2	548.3	67.9
29	Petroleum and Coal Products .....	1,971	245.2	136.4	165.8	67.6
30	Rubber and Miscellaneous Plastics Products .....	11,952	719.8	64.0	505.7	70.3
31	Leather and Leather Products .....	1,356	42.4	39.0	31.0	73.1
32	Stone, Clay, and Glass Products .....	11,970	611.7	57.3	240.2	39.3
33	Primary Metal Industries .....	5,171	788.4	164.7	378.2	48.0
34	Fabricated Metal Products .....	26,262	1,196.3	48.2	781.3	65.3
35	Industrial Machinery and Equipment .....	33,837	1,143.3	36.5	924.3	80.8
36	Electronic and Other Electric Equipment .....	11,264	671.4	63.5	555.8	82.8
37	Transportation Equipment .....	7,240	1,060.4	154.5	891.2	84.0
38	Instruments and Related Products .....	7,071	387.2	58.1	346.0	89.4
39	Miscellaneous Manufacturing Industries .....	9,994	227.5	23.7	163.8	72.0
—	Total Manufacturing .....	247,199	12,329.0	55.2	8,435.8	68.4

<sup>1</sup> Not all establishments reported floorspace. To obtain the number of reporting establishments for any SIC, divide the entry in the "Approximate Enclosed Floorspace" column by the corresponding entry in the "Average Enclosed Floorspace" column. For example, in the "Total" row, (12,329.0 million square feet) divided by (55.2 thousand square feet) equals 223,351, which is the number of reporting establishments (weighted) of the 247,199 total establishments from column 1.

<sup>2</sup> Conditioned floorspace is floorspace with controlled heating or cooling through the use of equipment designed to modify internal building temperature.

<sup>3</sup> The reporting unit is the establishment, which may have more than one building onsite. The

"Establishments (Number)" column includes those units that reported floorspace, plus those units where floorspace was not ascertained.

<sup>4</sup> Based on 1987 Standard Industrial Classification system.

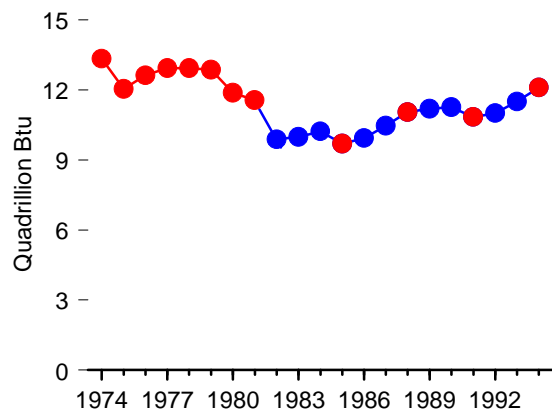
Q=Withheld because relative standard error is greater than 50 percent. W=Withheld to avoid disclosure of data for individual establishments.

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

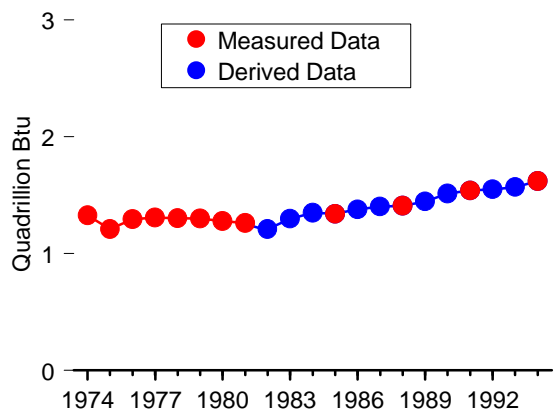
Source: Energy Information Administration, Form EIA-846, "1994 Manufacturing Energy Consumption Survey."

**Figure 2.5 Offsite-Produced Energy Consumed for Heat, Power, and Electricity Generation by Major Industry Group, 1974-1994**

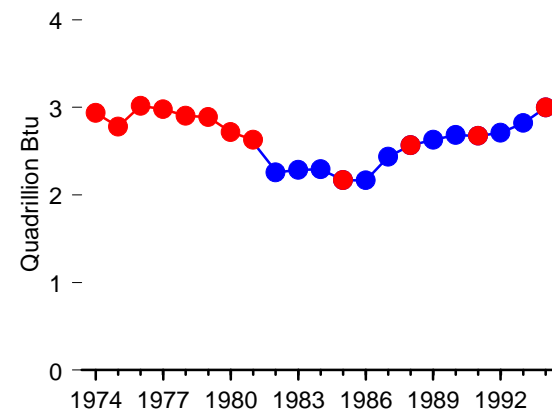
**Total Manufacturing**



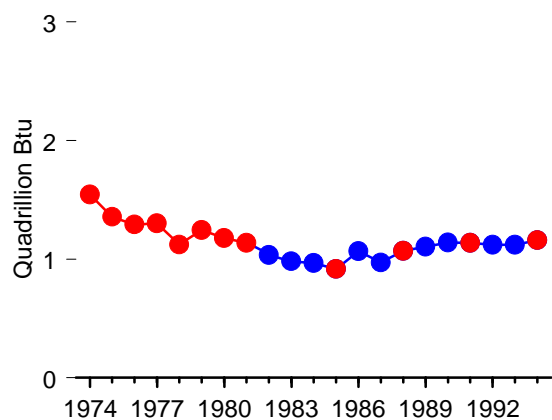
**SIC 26: Paper and Allied Products**



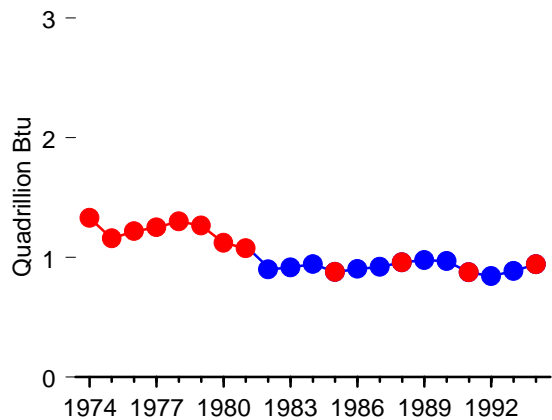
**SIC 28: Chemicals and Allied Products**



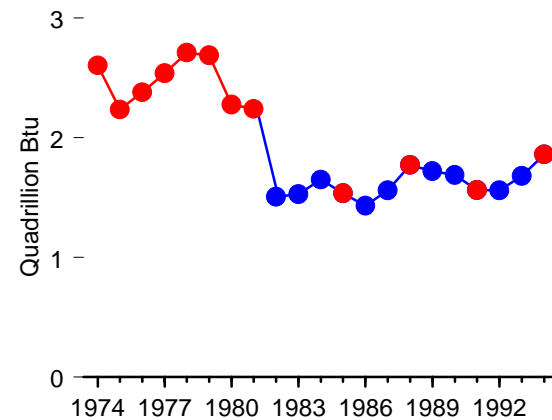
**SIC 29: Petroleum and Coal Products**



**SIC 32: Stone, Clay, and Glass Products**



**SIC 33: Primary Metal Industries**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 2.5.

**Table 2.5 Offsite-Produced Energy Consumed for Heat, Power, and Electricity Generation by Major Industry Group, 1974-1994**  
(Trillion Btu)

Year	Data Source <sup>2</sup>	Major Group by SIC Code <sup>1</sup>													Total
		SIC 20	SIC 22	SIC 26	SIC 28	SIC 29	SIC 30	SIC 32	SIC 33	SIC 34	SIC 35	SIC 36	SIC 37	Others <sup>3</sup>	
1974	ASM	959	323	1,327	2,937	1,545	247	1,332	2,604	408	367	251	375	661	13,337
1975	ASM	916	307	1,210	2,780	1,357	227	1,159	2,235	367	330	227	348	575	12,037
1976	ASM	938	329	1,295	3,017	1,292	237	1,220	2,380	381	330	233	380	594	12,625
1977	CM	952	339	1,308	2,979	1,303	272	1,252	2,539	395	340	249	390	610	12,929
1978	ASM	980	327	1,301	2,905	1,123	261	1,300	2,711	400	351	255	398	617	12,929
1979	ASM	949	315	1,300	2,889	1,245	249	1,266	2,689	386	353	250	385	592	12,867
1980	ASM	948	295	1,278	2,717	1,178	223	1,122	2,277	359	334	240	344	558	11,874
1981	ASM	913	292	1,262	2,630	1,137	223	1,077	2,241	352	325	235	329	546	11,563
1982	Derived	900	256	1,210	2,258	1,035	231	901	1,507	298	278	218	293	496	9,881
1983	Derived	889	274	1,299	2,285	982	238	916	1,528	288	257	229	307	499	9,990
1984	Derived	898	266	1,349	2,295	966	236	945	1,650	319	268	235	325	510	10,221
1985	MECS	876	247	1,340	2,170	917	211	878	1,537	297	241	209	322	452	9,698
1986	Derived	894	258	1,379	2,167	1,068	232	903	1,431	302	243	219	339	502	9,935
1987	Derived	921	278	1,402	2,436	972	250	921	1,560	323	261	207	348	583	10,461
1988	MECS	946	276	1,409	2,568	1,070	251	959	1,773	343	278	215	350	616	11,052
1989	Derived	946	280	1,446	2,630	1,105	259	978	1,720	345	284	217	356	617	11,183
1990	Derived	942	273	1,514	2,683	1,140	255	970	1,690	335	277	215	352	612	11,256
1991	MECS	922	272	1,540	2,674	1,138	235	877	1,563	305	236	196	318	561	10,837
1992	Derived	980	281	1,546	2,707	1,122	246	845	1,562	313	238	207	332	579	10,958
1993	Derived	1,027	303	1,570	2,823	1,123	270	887	1,679	340	244	222	353	614	11,453
1994	MECS	1,081	311	1,621	2,997	1,156	285	943	1,859	365	244	230	356	617	12,066

<sup>1</sup> Standard Industrial Classification (SIC) major groups displayed are:

- SIC 20 Food and Kindred Products
- SIC 22 Textile Mill Products
- SIC 26 Paper and Allied Products
- SIC 28 Chemicals and Allied Products
- SIC 29 Petroleum and Coal Products
- SIC 30 Rubber and Misc. Plastics Products
- SIC 32 Stone, Clay, and Glass Products
- SIC 33 Primary Metal Industries
- SIC 34 Fabricated Metal Products
- SIC 35 Industrial Machinery and Equipment
- SIC 36 Electronic and Other Electric Equipment
- SIC 37 Transportation Equipment.

<sup>2</sup> ASM = *Annual Survey of Manufactures*. See "Sources."

CM = *Census of Manufactures*. See "Sources."

MECS = *Manufacturing Energy Consumption Survey*. See "Sources."

Derived = Estimates derived by using consumption data from MECS and ASM and Federal Reserve Board production indices from the *Statistical Abstract of the United States, 1984, 1990, and*

*1993.*

<sup>3</sup> "Others" are SIC 21 Tobacco Products; SIC 23 Apparel and Other Textile Products; SIC 24 Lumber and Wood Products; SIC 25 Furniture and Fixtures; SIC 27 Printing and Publishing; SIC 31 Leather and Leather Products; SIC 38 Instruments and Related Products; and SIC 39 Miscellaneous Manufacturing Industries.

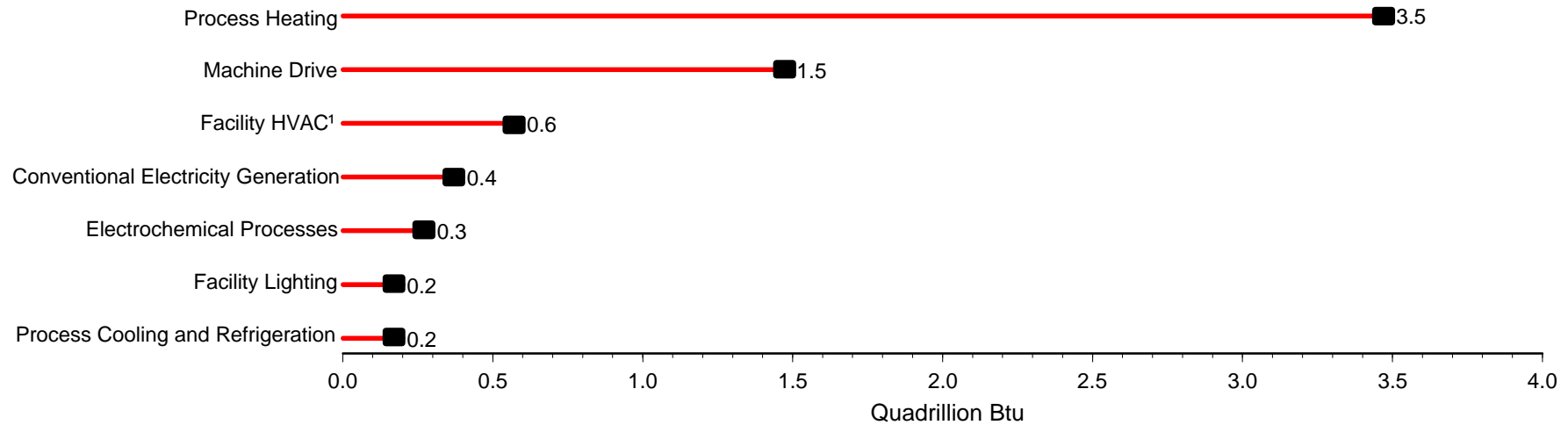
Note: • Totals may not equal sum of components due to independent rounding. • Data represent the consumption of energy that was originally produced offsite and acquired as a purchase or transfer and consumed onsite for the production of heat and power. • 1974-1986 data based on 1972 Standard Industrial Classification system. 1987-1991 data based on 1987 Standard Industrial Classification system.

Sources: **Survey Data:** • 1974-1976, 1978-1981—U.S. Department of Commerce, Bureau of the Census, *Annual Survey of Manufactures: Fuels and Electric Energy Consumed (ASM)*. • 1977—Bureau of the Census, *Census of Manufactures: Fuels and Electric Energy Consumed (CM)*. • 1985, 1988, 1991—Energy Information Administration (EIA), *Manufacturing Consumption of Energy*. • 1994—EIA, Form EIA-846, "1994 Manufacturing Energy Consumption Survey (MECS)." **Derived Data:** • 1982-1994, 1986, 1987—EIA, *Derived Annual Estimates of Manufacturing Energy Consumption, 1974-1988* (August 1992), Table 1. • 1989, 1990, 1992 and 1993—EIA, unpublished estimates. See methodology in *Derived Annual Estimates of Manufacturing Energy Consumption*.

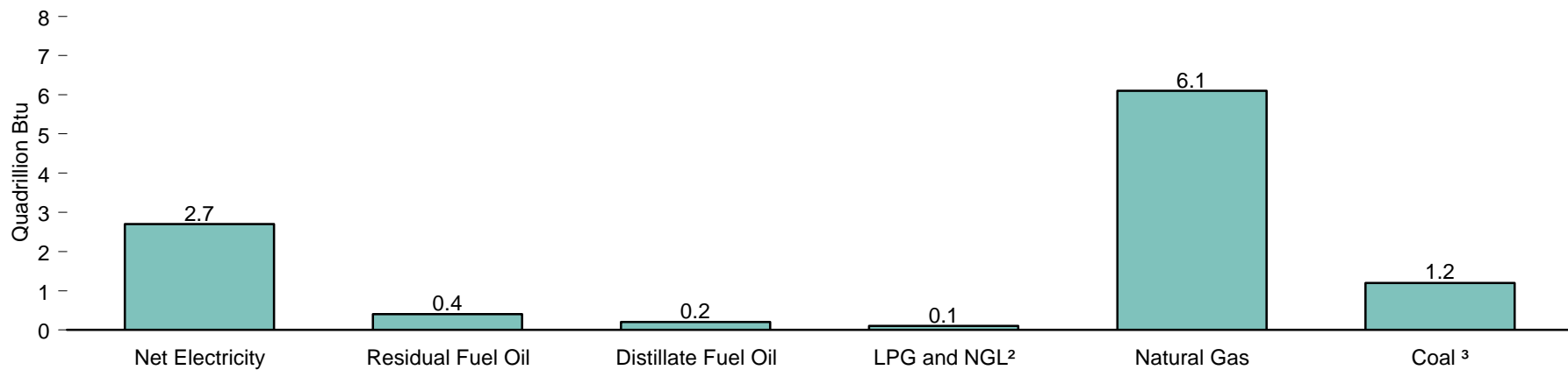


**Figure 2.6 Manufacturing Sector Inputs for Heat, Power, and Electricity Generation, 1994**

**By Selected End Uses**



**By Energy Source**



<sup>1</sup> Heating, ventilation, and air conditioning.

<sup>2</sup> Liquefied petroleum gases and natural gas liquids.

<sup>3</sup> Excluding coal coke and breeze.

Source: Table 2.6.

**Table 2.6 Manufacturing Sector Inputs for Heat, Power, and Electricity Generation by End Use, 1994**

End-Use Category	Net Electricity <sup>1</sup>	Residual Fuel Oil	Distillate Fuel Oil	Liquefied Petroleum Gases and Natural Gas Liquids	Natural Gas	Coal (Excluding Coal Coke and Breeze)	Total <sup>2</sup>
	Million Kilowatthours	Thousand Barrels			Billion Cubic Feet	Thousand Short Tons	
<b>Indirect End Use</b> (Boiler Fuel) .....	<b>8,250</b>	<b>49,731</b>	<b>7,296</b>	<b>3,829</b>	<b>2,326</b>	<b>39,496</b>	
<b>Direct End Use</b>							
<b>All Process Uses</b> .....	<b>608,190</b>	<b>16,825</b>	<b>8,795</b>	<b>14,051</b>	<b>2,788</b>	<b>13,697</b>	
Process Heating .....	83,151	16,326	4,919	12,515	2,623	13,545	
Process Cooling and Refrigeration .....	40,583	19	44	413	20	3	
Machine Drive .....	400,545	406	3,161	869	93	149	
Electrochemical Processes .....	79,549	—	—	—	—	—	
Other Process Uses .....	4,363	74	671	254	52	Q	
<b>All Non-Process Uses</b> .....	<b>134,020</b>	<b>2,197</b>	<b>8,394</b>	<b>6,860</b>	<b>705</b>	<b>378</b>	
Facility Heating, Ventilation, and Air Conditioning <sup>3</sup> .....	63,662	777	1,274	1,373	341	118	
Facility Lighting .....	54,332	—	—	—	—	—	
Other Facility Support .....	13,545	455	203	156	29	1	
Onsite Transportation .....	1,192	—	5,997	5,168	1	—	
Conventional Electricity Generation .....	—	797	604	119	325	259	
Other Non-Process Use .....	1,290	167	316	44	9	0	
<b>End Use Not Reported</b> .....	<b>27,874</b>	<b>1,359</b>	<b>1,622</b>	<b>1,209</b>	<b>143</b>	<b>571</b>	
<b>Total</b> .....	<b>778,335</b>	<b>70,111</b>	<b>26,107</b>	<b>25,949</b>	<b>5,962</b>	<b>54,143</b>	
Trillion Btu							
<b>Indirect End Use</b> (Boiler Fuel) .....	<b>28</b>	<b>313</b>	<b>42</b>	<b>15</b>	<b>2,396</b>	<b>875</b>	<b>3,669</b>
<b>Direct End Use</b>							
<b>All Process Uses</b> .....	<b>2,075</b>	<b>106</b>	<b>51</b>	<b>54</b>	<b>2,872</b>	<b>302</b>	<b>5,460</b>
Process Heating .....	284	103	29	49	2,702	299	3,466
Process Cooling and Refrigeration .....	138	(s)	(s)	2	21	(s)	161
Machine Drive .....	1,367	3	18	3	95	3	1,489
Electrochemical Processes .....	271	—	—	—	—	—	271
Other Process Uses .....	15	(s)	4	1	53	(s)	73
<b>All Non-Process Uses</b> .....	<b>457</b>	<b>14</b>	<b>49</b>	<b>25</b>	<b>726</b>	<b>8</b>	<b>1,279</b>
Facility Heating, Ventilation, and Air Conditioning <sup>3</sup> .....	217	5	7	5	351	3	588
Facility Lighting .....	185	—	—	—	—	—	185
Other Facility Support .....	46	3	1	1	30	(s)	81
Onsite Transportation .....	4	—	35	19	1	—	59
Conventional Electricity Generation .....	—	5	4	1	335	6	351
Other Non-Process Use .....	4	1	2	(s)	9	0	16
<b>End Use Not Reported</b> .....	<b>96</b>	<b>9</b>	<b>9</b>	<b>4</b>	<b>148</b>	<b>13</b>	<b>279</b>
<b>Total</b> .....	<b>2,656</b>	<b>441</b>	<b>152</b>	<b>99</b>	<b>6,141</b>	<b>1,198</b>	<b>10,687</b>

<sup>1</sup> "Net Electricity" is obtained by summing purchases, transfers in, and generation from noncombustible renewable resources, minus quantities sold and transferred out.

<sup>2</sup> Total of listed energy sources. The top half of the "Total" column is blank because different physical units cannot be added.

<sup>3</sup> Excludes steam and hot water.

— = Estimation of energy input quantity is not applicable. (s)=Less than 0.5 rounded to zero.

Q=Withheld because relative standard error is greater than 50 percent.

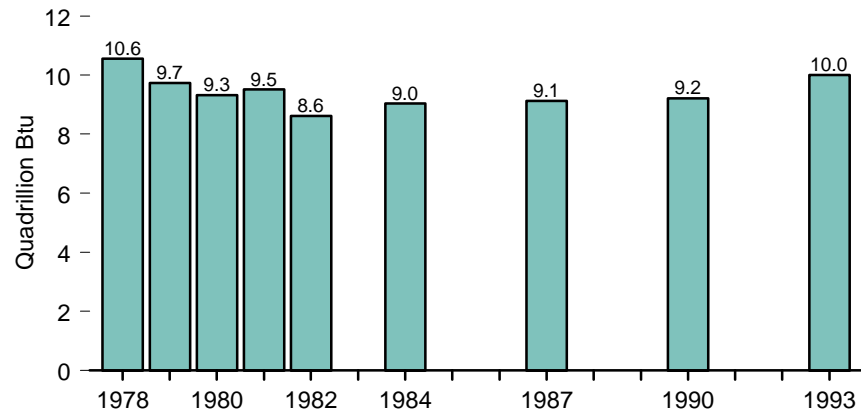
Notes: • Totals may not equal sum of components due to independent rounding. • The estimates

presented in this table are for the total consumption of energy for the production of heat and power, regardless of where the energy was produced. Specifically, the estimates include the quantities of energy that were originally produced offsite and purchased by or transferred to the establishment, plus those that were produced onsite from other energy or input materials not classified as energy, or were extracted from captive (onsite) mines or wells. • Allocations to end uses are made on the basis of reasonable approximations by respondents.

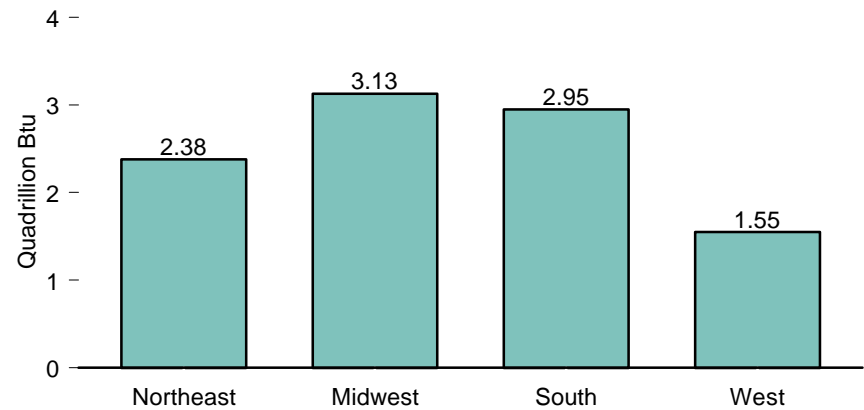
Source: Energy Information Administration, Form EIA-846, "1994 Manufacturing Energy Consumption Survey."

**Figure 2.7 Household Energy Consumption**

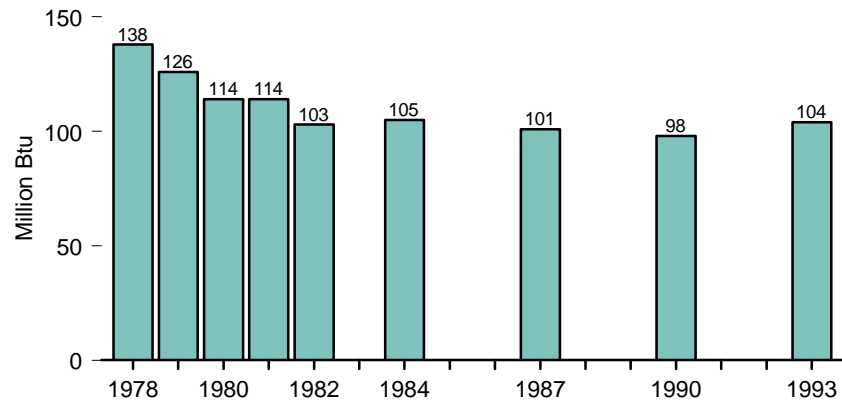
**Consumption by All Households, Selected Years, 1978-1993**



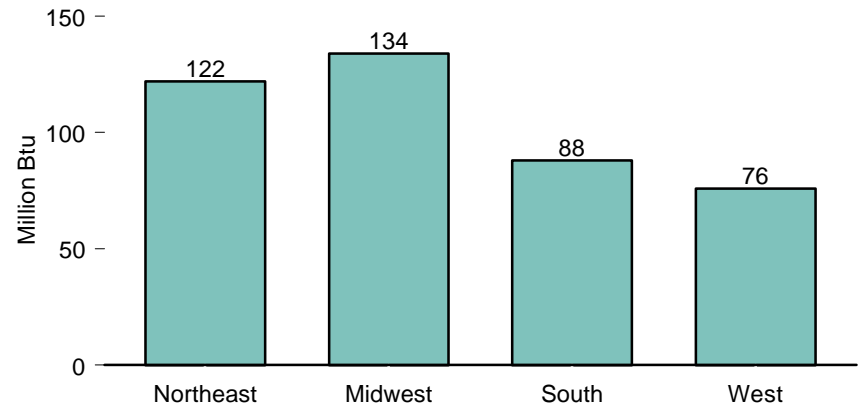
**Consumption by All Households, by Census Region, 1993**



**Consumption per Household, Selected Years, 1978-1993**



**Consumption per Household, by Census Region, 1993**



Notes: • No data are available for years not shown. Data for 1978 through 1984 are for April of the year shown through March of the following year; data for 1987, 1990, and 1993 are for the calendar year. • Because vertical scales differ, graphs should not be compared.

Source: Table 2.7. See Appendix E for Census regions.

**Table 2.7 Household Energy Consumption by Census Region, Selected Years, 1978-1993**

(Quadrillion Btu, Except as Noted)

Census Region <sup>1</sup>	1978	1979	1980	1981	1982	1984	1987	1990	1993
<b>Northeast</b> .....	<b>2.89</b>	<b>2.50</b>	<b>2.43</b>	<b>2.47</b>	<b>2.18</b>	<b>2.29</b>	<b>2.37</b>	<b>2.30</b>	<b>2.38</b>
Natural Gas .....	1.14	1.05	0.92	1.06	0.99	0.93	1.03	1.03	1.11
Electricity <sup>2</sup> .....	0.39	0.39	0.39	0.42	0.38	0.41	0.44	0.47	0.47
Distillate Fuel Oil and Kerosene .....	1.32	1.03	1.09	0.96	0.79	0.93	0.87	0.78	0.78
Liquefied Petroleum Gases .....	0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.02	0.03
Consumption per Household (million Btu) .....	166	145	138	138	122	125	124	120	122
<b>Midwest</b> .....	<b>3.70</b>	<b>3.48</b>	<b>2.92</b>	<b>3.12</b>	<b>2.60</b>	<b>2.80</b>	<b>2.73</b>	<b>2.81</b>	<b>3.13</b>
Natural Gas .....	2.53	2.48	2.02	2.24	1.76	1.99	1.83	1.88	2.07
Electricity <sup>2</sup> .....	0.60	0.59	0.60	0.57	0.57	0.55	0.61	0.66	0.74
Distillate Fuel Oil and Kerosene .....	0.46	0.31	0.16	0.17	0.15	0.13	0.16	0.13	0.13
Liquefied Petroleum Gases .....	0.12	0.10	0.15	0.13	0.11	0.13	0.13	0.13	0.19
Consumption per Household (million Btu) .....	180	168	139	147	122	129	123	122	134
<b>South</b> .....	<b>2.43</b>	<b>2.30</b>	<b>2.59</b>	<b>2.46</b>	<b>2.46</b>	<b>2.50</b>	<b>2.61</b>	<b>2.60</b>	<b>2.95</b>
Natural Gas .....	0.96	0.91	1.11	1.16	1.13	1.15	1.09	1.03	1.18
Electricity <sup>2</sup> .....	1.00	0.97	1.06	1.03	1.05	1.06	1.22	1.36	1.51
Distillate Fuel Oil and Kerosene .....	0.32	0.28	0.27	0.16	0.17	0.16	0.17	0.11	0.13
Liquefied Petroleum Gases .....	0.15	0.14	0.15	0.12	0.12	0.12	0.12	0.10	0.13
Consumption per Household (million Btu) .....	99	92	96	89	88	85	84	81	88
<b>West</b> .....	<b>1.54</b>	<b>1.47</b>	<b>1.38</b>	<b>1.47</b>	<b>1.38</b>	<b>1.45</b>	<b>1.42</b>	<b>1.51</b>	<b>1.55</b>
Natural Gas .....	0.95	0.88	0.89	0.93	0.89	0.91	0.88	0.92	0.91
Electricity <sup>2</sup> .....	0.48	0.47	0.41	0.46	0.42	0.47	0.48	0.54	0.56
Distillate Fuel Oil and Kerosene .....	0.09	0.09	0.04	0.03	0.03	0.04	0.02	0.02	0.03
Liquefied Petroleum Gases .....	0.03	0.04	0.04	0.04	0.04	0.03	0.05	0.03	0.04
Consumption per Household (million Btu) .....	110	100	86	90	84	85	78	78	76
<b>United States</b> .....	<b>10.56</b>	<b>9.74</b>	<b>9.32</b>	<b>9.51</b>	<b>8.62</b>	<b>9.04</b>	<b>9.13</b>	<b>9.22</b>	<b>10.01</b>
Natural Gas .....	5.58	5.31	4.94	5.39	4.77	4.98	4.83	4.86	5.27
Electricity <sup>2</sup> .....	2.47	2.42	2.46	2.48	2.42	2.48	2.76	3.03	3.28
Distillate Fuel Oil and Kerosene .....	2.19	1.71	1.55	1.33	1.14	1.26	1.22	1.04	1.07
Liquefied Petroleum Gases .....	0.33	0.31	0.36	0.31	0.29	0.31	0.32	0.28	0.38
Consumption per Household (million Btu) <sup>3</sup> .....	138	126	114	114	103	105	101	98	104

<sup>1</sup> See Appendix E for Census regions.

<sup>2</sup> Includes site electricity generated for distribution from wood, waste, geothermal, wind, photovoltaic, and solar thermal energy.

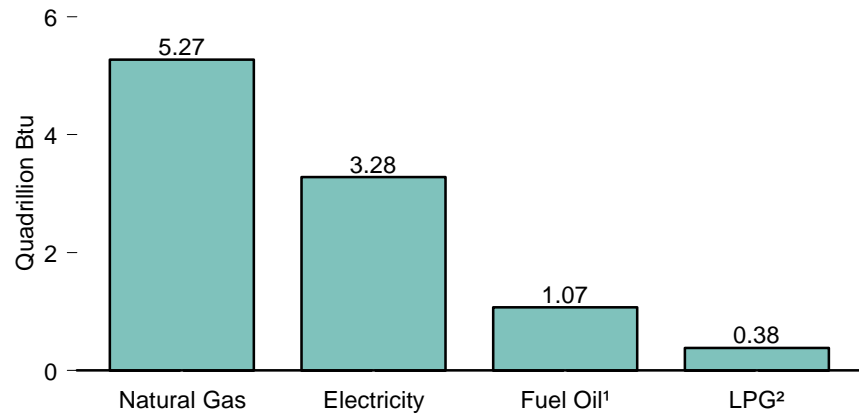
<sup>3</sup> Data not adjusted to account for more severe winter weather in earlier years when the survey was fielded. 1993 weather was normal, similar to that for 1982 and 1984.

Notes: • This table shows major energy items only. • No data are available for years not shown. • One Btu of electricity = 0.000293 (1 ÷ 3,412) kWh. • Data for 1978-1984 are for April of year shown through March of following year; data for 1987, 1990, and 1993 are for the calendar year. • Totals may not equal sum of components due to independent rounding.

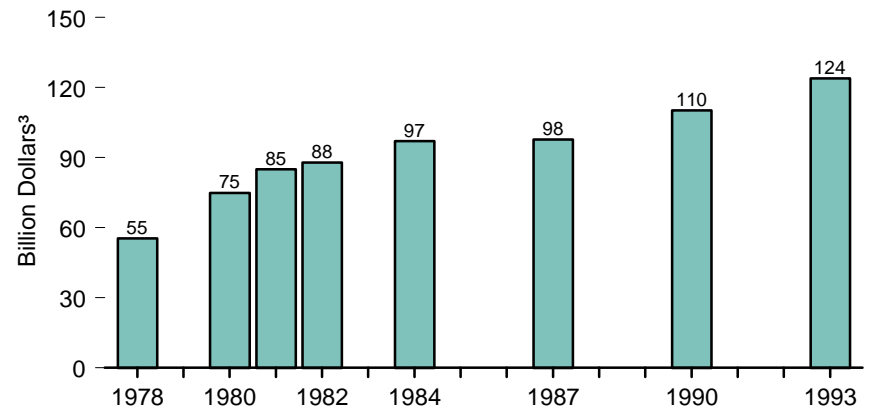
Sources: • 1978 and 1979—Energy Information Administration (EIA), Form EIA-84, "Residential Energy Consumption Survey." • 1980 forward—EIA, Form EIA-457, "Residential Energy Consumption Survey."

**Figure 2.8 Household Energy Consumption and Expenditures**

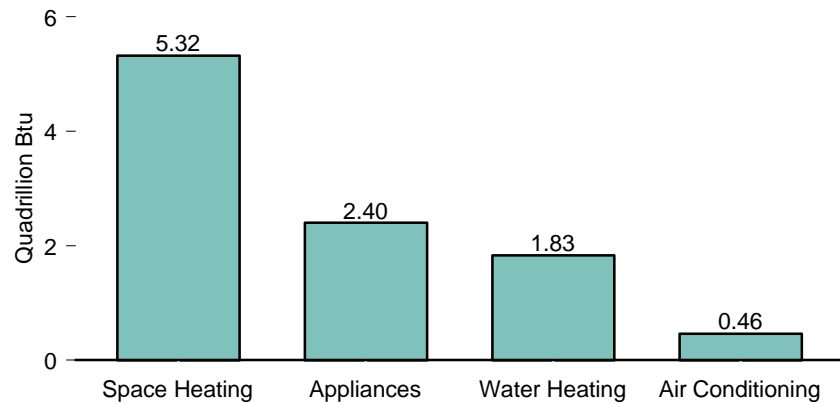
**Consumption by Energy Source, 1993**



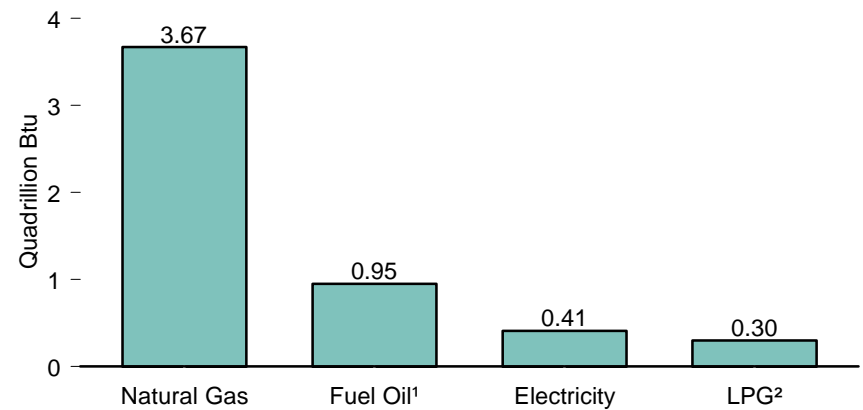
**Expenditures, Selected Years, 1978-1993**



**Consumption by End Use, 1993**



**Consumption for Space Heating, 1993**



<sup>1</sup> Fuel oil is distillate fuel oil and kerosene.

<sup>2</sup> Liquefied petroleum gases.

<sup>3</sup> Nominal dollars.

Notes: • No data are available for years not shown. • Because vertical scales differ, graphs should not be compared.

Source: Table 2.8.

**Table 2.8 Household Energy Consumption and Expenditures by End Use and Energy Source, Selected Years, 1978-1993**

Year	Space Heating				A/C <sup>1,2</sup>	Water Heating				Appliances <sup>3</sup>			Total <sup>2</sup>			
	Natural Gas	Electricity <sup>4</sup>	Fuel Oil <sup>5</sup>	LPG <sup>6</sup>	Electricity <sup>4</sup>	Natural Gas	Electricity <sup>4</sup>	Fuel Oil <sup>5</sup>	LPG <sup>6</sup>	Natural Gas	Electricity <sup>4</sup>	LPG <sup>6</sup>	Natural Gas	Electricity <sup>4</sup>	Fuel Oil <sup>5</sup>	LPG <sup>6</sup>
Consumption (quadrillion Btu)																
1978	4.26	0.40	2.05	0.23	0.31	1.04	0.29	0.14	0.06	0.28	1.46	0.03	5.58	2.47	2.19	0.33
1980	3.32	0.28	1.32	0.25	0.32	1.24	0.31	0.24	0.07	0.38	1.55	0.04	4.94	2.46	1.55	0.36
1981	3.80	0.30	1.12	0.22	0.33	1.10	0.33	0.20	0.06	0.49	1.53	0.03	5.39	2.48	1.33	0.31
1982	3.31	0.27	1.05	0.19	0.30	1.08	0.33	0.09	0.06	0.39	1.52	0.04	4.77	2.42	1.14	0.29
1984	3.51	0.30	1.11	0.21	0.33	1.10	0.32	0.15	0.06	0.35	1.53	0.04	4.98	2.48	1.26	0.31
1987	3.38	0.28	1.05	0.22	0.44	1.10	0.31	0.17	0.06	0.34	1.72	0.04	4.83	2.76	1.22	0.32
1990	3.37	0.30	0.93	0.19	0.48	1.16	0.34	0.11	0.06	0.33	1.91	0.03	4.86	3.03	1.04	0.28
1993	3.67	0.41	0.95	0.30	0.46	1.31	0.34	0.12	0.05	0.29	2.08	0.03	5.27	3.28	1.07	0.38
Expenditures (billion dollars <sup>7</sup> )																
1978	11.49	3.53	8.06	1.05	3.97	2.88	3.15	0.56	0.36	0.93	19.24	0.25	15.30	29.89	8.62	1.66
1980	12.80	3.71	10.59	1.90	5.07	4.79	4.54	1.89	0.59	1.71	26.82	0.40	19.30	40.14	12.48	2.89
1981	17.07	4.60	9.99	1.84	5.96	4.93	5.32	1.83	0.53	2.50	30.02	0.37	24.50	45.90	11.82	2.74
1982	18.55	4.45	8.84	1.68	6.05	6.08	5.90	0.75	0.57	2.42	32.02	0.47	27.06	48.42	9.59	2.72
1984	20.66	5.71	8.51	2.00	7.37	6.63	6.44	1.09	0.58	2.31	34.96	0.54	29.78	54.48	9.60	3.12
1987	18.05	5.53	6.25	1.85	9.77	6.02	6.45	0.94	0.50	2.02	39.83	0.46	26.15	61.58	7.21	2.81
1990	18.59	6.16	7.42	2.01	11.19	6.59	7.21	0.83	0.65	2.03	46.95	0.48	27.26	71.54	8.25	3.14
1993	21.95	8.66	6.24	2.81	11.30	8.08	7.58	0.74	0.58	1.98	53.52	0.42	32.04	81.08	6.98	3.81

<sup>1</sup> A/C = Air conditioning.

<sup>2</sup> A small amount of natural gas used for air conditioning is included in "Natural Gas" under "Total."

<sup>3</sup> Includes refrigerators.

<sup>4</sup> Includes electricity generated for distribution from wood, waste, geothermal, wind, photovoltaic, and solar thermal electricity.

<sup>5</sup> Fuel oil is distillate fuel oil and kerosene. Includes a small amount of fuel oil or kerosene used for appliances.

<sup>6</sup> Liquefied petroleum gases.

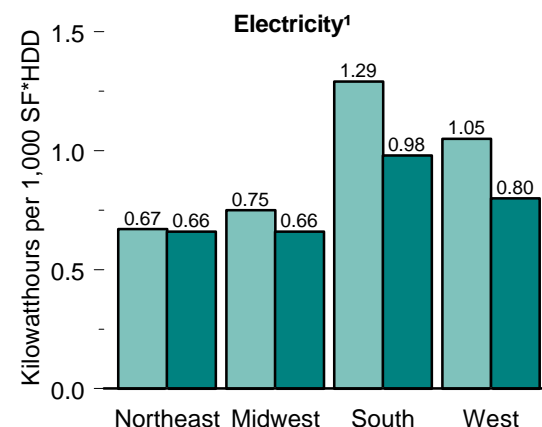
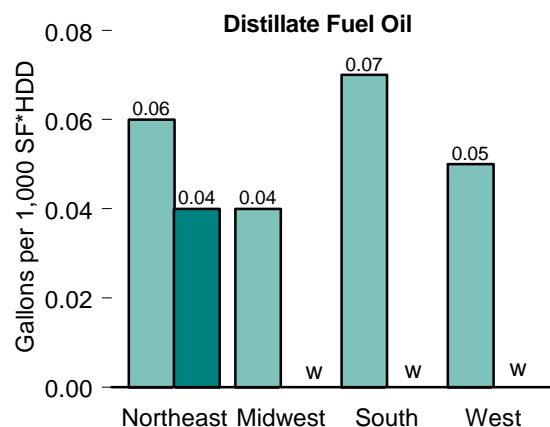
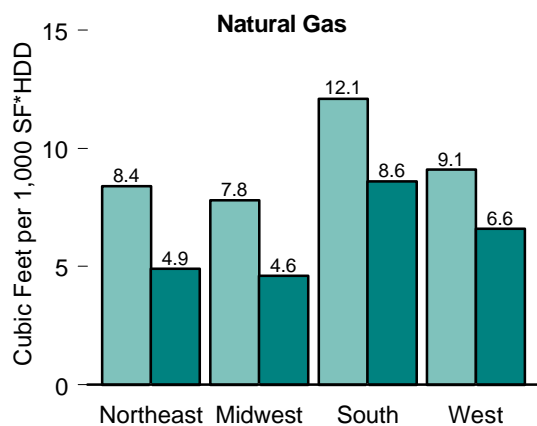
<sup>7</sup> Nominal dollars.

Notes: • No data are available for years not shown. Consumption totals for 1979 are available on Table 2.9. • One Btu of electricity = 0.000293 (1 ÷ 3,412) kWh. • Totals may not equal sum of components due to independent rounding.

Sources: • 1978—Energy Information Administration (EIA), Form EIA-84, "Residential Energy Consumption Survey." • 1980 forward—EIA, Form EIA-457, "Residential Energy Consumption Survey."

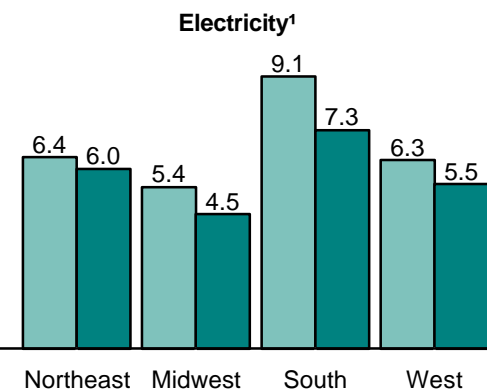
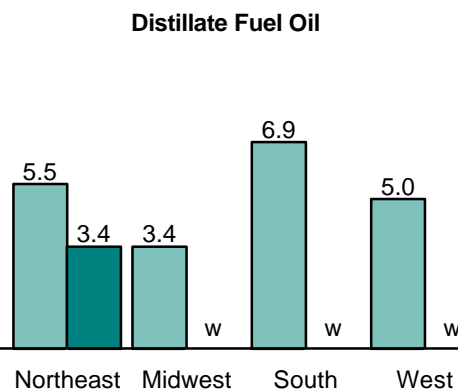
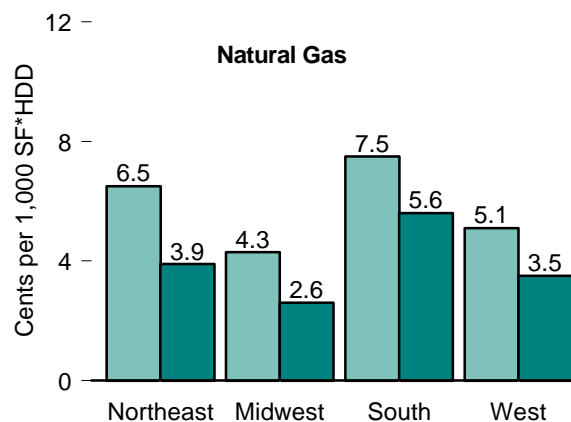
**Figure 2.9 Household Energy Consumption and Expenditure Indicators by Census Region and Vintage of Housing Unit, 1993**

**Consumption of Main Heating Fuel**



**Expenditures for Main Heating Fuel**

■ Homes Built in 1979 or Earlier ■ Homes Built Between 1980 and 1993



¹Includes electricity generated for distribution from geothermal, wood, waste, wind, photovoltaic, and solar thermal energy sources.  
W=Data withheld because fewer than 10 housing units were sampled.

Note: SF\*HDD=square footage times heating degree-days.  
Source: Table 2.9. See Appendix E for Census regions.

**Table 2.9 Household Energy Consumption and Expenditure Indicators by Census Region and Vintage of Housing Unit, 1993**

Source and Indicator (Units)	Census Regions <sup>1</sup>								United States	
	Northeast		Midwest		South		West			
	Built in 1979 or Earlier	Built Between 1980-1993	Built in 1979 or Earlier	Built Between 1980-1993	Built in 1979 or Earlier	Built Between 1980-1993	Built in 1979 or Earlier	Built Between 1980-1993	Built in 1979 or Earlier	Built Between 1980-1993
<b>Natural Gas</b>										
Households Using Natural Gas as Main Space Heating Source (million) .....	8.2	1.3	14.4	2.5	9.7	3.3	9.6	2.5	41.8	9.6
Annual Consumption per Household for Main Space Heating (1,000 cubic feet) .....	83.2	54.9	93.1	70.9	60.9	46.7	43.5	46.8	72.3	54.2
Annual Expenditures per Household for Main Space Heating (dollars) .....	640	440	513	398	378	303	241	251	445	333
Annual Heating Degree-Days (degree-days) .....	5,749	6,058	6,586	6,684	3,277	2,974	3,161	3,888	4,869	4,598
Average Heated Floor Space (square feet) .....	1,718	1,846	1,808	2,287	1,530	1,822	1,508	1,839	1,657	1,952
Consumption per 1,000 Square Feet * HDD (cubic feet) .....	8.4	4.9	7.8	4.6	12.1	8.6	9.1	6.6	9.0	6.0
Expenditures per 1,000 Square Feet * HDD (cents) .....	6.5	3.9	4.3	2.6	7.5	5.6	5.1	3.5	5.5	3.7
<b>Electricity <sup>2</sup></b>										
Households Using Electricity as Main Space Heating Source (million) .....	1.3	0.7	1.7	1.2	7.5	7.1	3.8	1.8	14.3	10.7
Annual Consumption per Household for Main Space Heating (kWh) .....	5,492	6,137	8,215	5,571	4,395	3,638	4,632	3,127	5,001	3,928
Annual Expenditures per Household for Main Space Heating (dollars) .....	527	557	589	376	311	271	279	214	354	291
Annual Heating Degree-Days (degree-days) .....	6,026	6,076	6,445	5,994	2,451	2,434	3,943	3,008	3,633	3,157
Average Heated Floor Space (square feet) .....	1,368	1,536	1,695	1,407	1,390	1,527	1,124	1,294	1,352	1,476
Consumption per 1,000 Square Feet * HDD (kWh) .....	0.67	0.66	0.75	0.66	1.29	0.98	1.05	0.80	1.02	0.84
Expenditures per 1,000 Square Feet * HDD (cents) .....	6.4	6.0	5.4	4.5	9.1	7.3	6.3	5.5	7.2	6.2
<b>Distillate Fuel Oil</b>										
Households Using Oil as Main Space Heating Source (million) .....	6.3	0.7	1.3	W	1.4	W	0.4	W	9.4	0.8
Annual Consumption per Household for Main Space Heating (gallons) .....	653	555	690	W	515	W	535	W	633	532
Annual Expenditures per Household for Main Space Heating (dollars) .....	586	505	592	W	494	W	543	W	571	483
Annual Heating Degree-Days (degree-days) .....	5,926	6,511	7,747	W	3,852	W	5,380	W	5,841	6,322
Average Heated Floor Space (square feet) .....	1,813	2,282	2,246	W	1,846	W	2,009	W	1,885	2,222
Consumption per 1,000 Square Feet * HDD (gallons) .....	0.06	0.04	0.04	W	0.07	W	0.05	W	0.06	0.04
Expenditures per 1,000 Square Feet * HDD (cents) .....	5.5	3.4	3.4	W	6.9	W	5.0	W	5.2	3.4
<b>Liquefied Petroleum Gases (LPG)</b>										
Households Using LPG as Main Space Heating Source (million) .....	W	0.1	1.4	0.3	1.8	0.5	0.2	0.1	3.5	1.1
Annual Consumption per Household for Main Space Heating (gallons) .....	W	608	1,001	707	425	435	867	432	692	541
Annual Expenditures per Household for Main Space Heating (dollars) .....	W	609	762	564	406	417	791	426	581	489
Annual Heating Degree-Days (degree-days) .....	W	7,075	6,939	6,884	2,827	3,033	6,452	4,552	4,824	4,930
Average Heated Floor Space (square feet) .....	W	1,667	2,134	1,938	1,291	1,456	1,599	1,399	1,646	1,624
Consumption per 1,000 Square Feet * HDD (gallons) .....	W	0.05	0.07	0.05	0.12	0.10	0.08	0.07	0.09	0.07
Expenditures per 1,000 Square Feet * HDD (cents) .....	W	5.2	5.1	4.2	11.1	9.4	7.7	6.7	7.3	6.1

<sup>1</sup> See Appendix E for Census regions.

<sup>2</sup> Includes electricity generated for distribution from geothermal, wood, waste, wind, photovoltaic, and solar thermal energy sources.

W=Data withheld because fewer than 10 housing units were sampled.

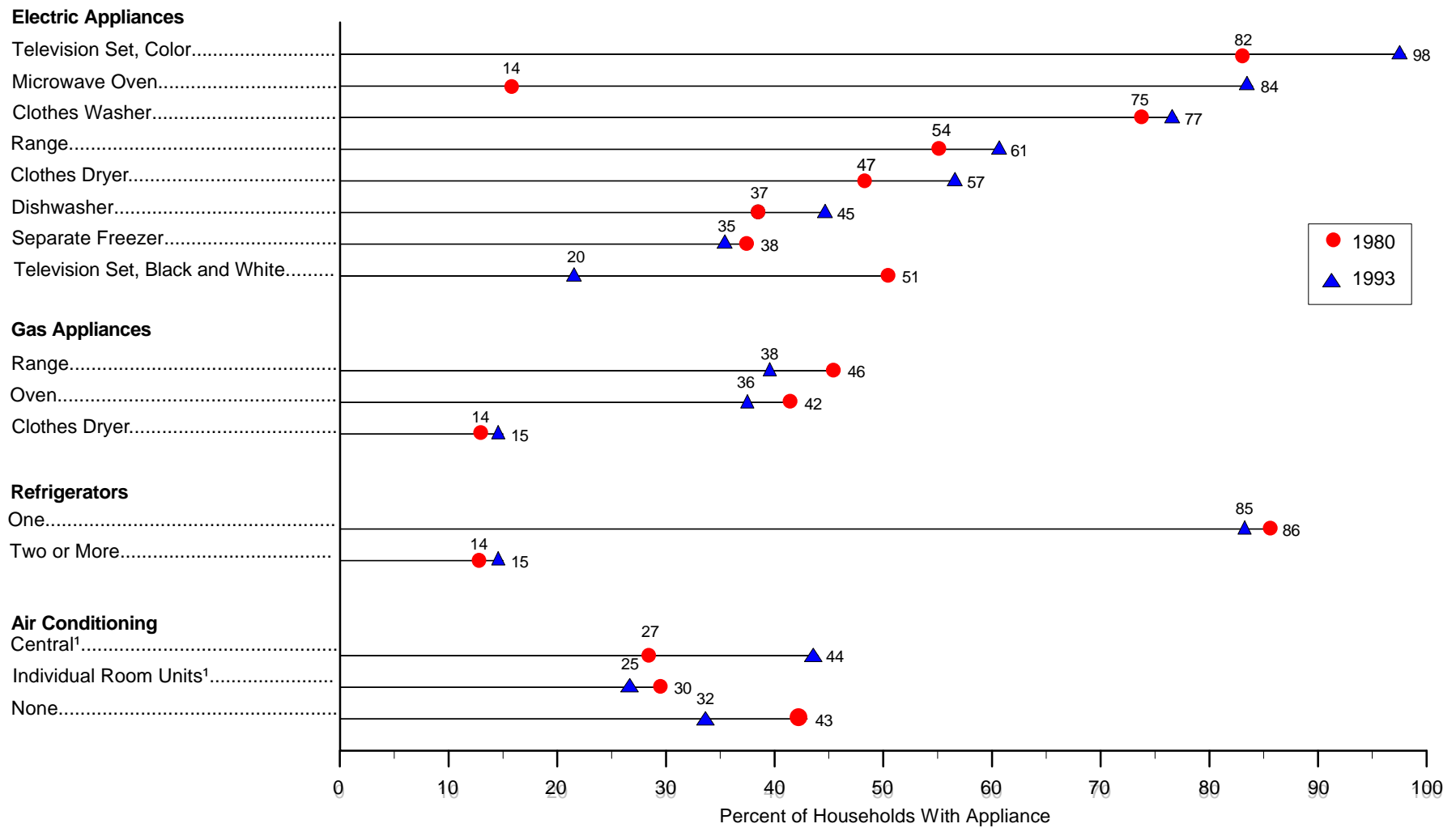
Notes: • HDD = heating degree-days to base 65 °F. • One Btu of electricity = 0.000293 (1 ÷ 3,412)

kWh. • Averages are for households using the fuel as the main space heating fuel. Space heating consumption and expenditures in this table do not show the small amounts of fuel used by households that use the fuel only as a secondary space heating fuel. • Space heating does not include electricity used by the fan that circulates warm air through the ducts. • HDD are for 1993.

Source: Energy Information Administration, Form EIA-457, "Residential Energy Consumption Survey."



**Figure 2.10 Households With Selected Appliances, 1980 and 1993**



<sup>1</sup> Households with both central and individual room units are counted only under "central."

Source: Table 2.10.

**Table 2.10 Households With Selected Appliances, Selected Years, 1978-1993**

Appliance	Percent of Households									Change	
	1978	1979	1980	1981	1982	1984	1987	1990	1993	1980 to 1993	
<b>Total Households</b> .....	100	100	100	100	100	100	100	100	100	100	—
<b>Type of Appliances</b>											
<b>Electric Appliances</b>											
Television Set (Color) .....	NA	NA	82	82	85	88	93	96	98	16	
Television Set (B/W) .....	NA	NA	51	48	47	43	36	31	20	-31	
Clothes Washer .....	75	NA	75	74	72	74	76	76	77	2	
Range (Stove-Top Burner) .....	53	NA	54	54	53	54	57	58	61	7	
Oven, Regular or Microwave .....	54	NA	59	58	59	63	79	88	91	32	
Oven, Microwave .....	8	NA	14	17	21	34	61	79	84	70	
Clothes Dryer .....	45	NA	47	45	45	46	51	53	57	10	
Separate Freezer .....	35	NA	38	38	37	37	34	35	35	-3	
Dishwasher .....	35	NA	37	37	36	38	43	45	45	8	
Dehumidifier .....	NA	NA	9	9	9	9	10	12	9	(s)	
Waterbed Heaters .....	NA	NA	NA	NA	NA	10	14	15	12	NA	
Window or Ceiling Fan .....	NA	NA	NA	NA	28	35	46	51	60	NA	
Whole House Fan .....	NA	NA	NA	NA	8	8	9	10	4	NA	
Evaporative Cooler .....	NA	NA	4	4	4	4	3	4	3	-1	
Personal Computer .....	NA	NA	NA	NA	NA	NA	NA	16	23	NA	
Pump for Well Water .....	NA	NA	NA	NA	NA	NA	NA	15	13	NA	
Swimming-Pool Pump <sup>1</sup> .....	NA	NA	4	4	3	NA	NA	5	5	1	
<b>Gas Appliances <sup>2</sup></b>											
Range (Stove-Top or Burner) .....	48	NA	46	46	47	45	43	42	38	-8	
Oven .....	47	NA	42	40	42	42	41	41	36	-6	
Clothes Dryer .....	14	NA	14	16	15	16	15	16	15	1	
Outdoor Gas Grill .....	NA	NA	9	9	11	13	20	26	29	20	
Outdoor Gas Light .....	2	NA	2	2	2	1	1	1	1	-1	
Swimming Pool Heater <sup>3</sup> .....	NA	NA	NA	NA	NA	1	1	2	1	NA	
<b>Refrigerators <sup>4</sup></b>											
One .....	86	NA	86	87	86	88	86	84	85	-1	
Two or More .....	14	NA	14	13	13	12	14	15	15	1	
<b>Air Conditioning (A/C)</b>											
Central <sup>5</sup> .....	23	24	27	27	28	30	36	39	44	17	
Individual Room Units <sup>5</sup> .....	33	31	30	31	30	30	30	29	25	-5	
None .....	44	45	43	42	42	40	36	32	32	-11	
<b>Portable Kerosene Heaters</b> .....	(s)	NA	(s)	1	3	6	6	5	2	2	

<sup>1</sup> All reported swimming pools were assumed to have an electric pump for filtering and circulating the water, except for 1993, when a filtering system was made explicit.

<sup>2</sup> Includes natural gas or liquefied petroleum gases.

<sup>3</sup> In 1984 and 1987, also includes heaters for jacuzzis and hot tubs.

<sup>4</sup> Fewer than 0.5 percent of the households do not have a refrigerator.

<sup>5</sup> Households with both central and individual room units are counted only under "Central."

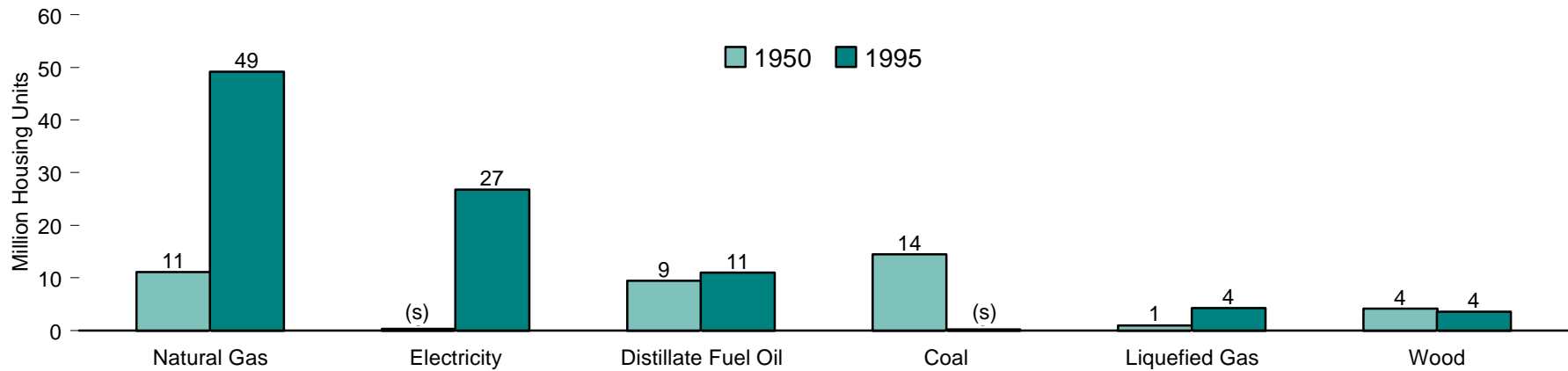
NA=Not available. — = Not applicable. (s)=Less than 0.5 percent.

Note: No data are available for years not shown.

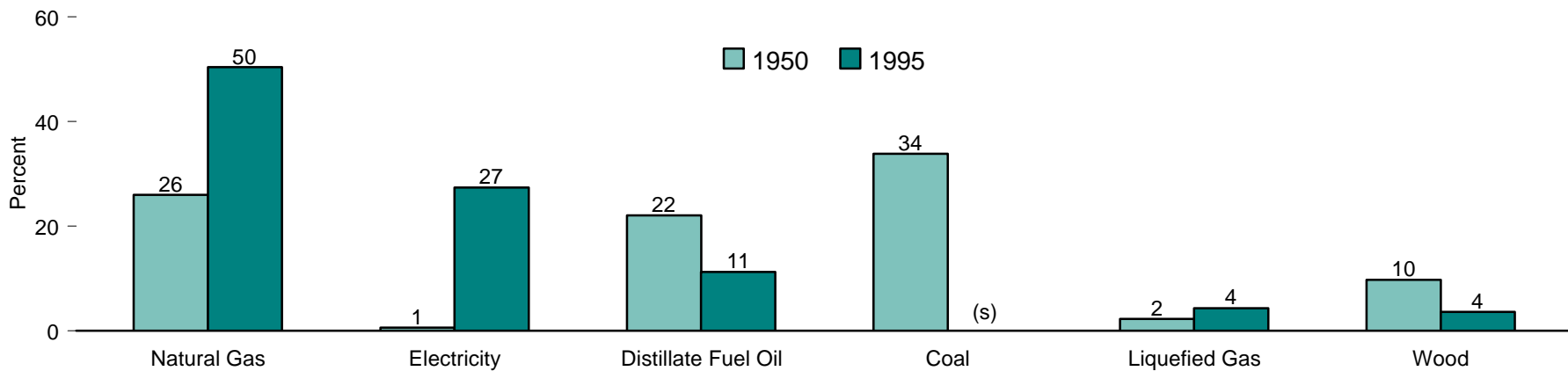
Sources: • 1978 and 1979—Energy Information Administration (EIA), Form EIA-84, "Residential Energy Consumption Survey." • 1980 forward—EIA, Form EIA-457, "Residential Energy Consumption Survey."

**Figure 2.11 Type of Heating in Occupied Housing Units, 1950 and 1995**

**By Fuel Type**



**By Fuel Type, Share of Total**



(s)=Less than 0.5.

Source: Table 2.11.

**Table 2.11 Type of Heating in Occupied Housing Units, Selected Years, 1950-1995**

Year	Coal <sup>1</sup>	Natural Gas	Liquefied Gas	Distillate Fuel Oil	Kerosene	Electricity	Wood	Solar	Other	None <sup>2</sup>	Total
Million											
1950	14.48	11.12	0.98	9.46	( <sup>3</sup> )	0.28	4.17	NA	0.77	1.57	42.83
1960	6.46	22.85	2.69	17.16	( <sup>3</sup> )	0.93	2.24	NA	0.22	0.48	53.02
1970	1.82	35.01	3.81	16.47	( <sup>3</sup> )	4.88	0.79	NA	0.27	0.40	63.45
1973	0.80	38.46	4.42	17.24	( <sup>3</sup> )	7.21	0.60	NA	0.15	0.45	69.34
1974	0.74	39.47	4.14	16.84	( <sup>3</sup> )	8.41	0.66	NA	0.09	0.48	70.83
1975	0.57	40.93	4.15	16.30	( <sup>3</sup> )	9.17	0.85	NA	0.08	0.47	72.52
1976	0.48	41.22	4.24	16.45	( <sup>3</sup> )	10.15	0.91	NA	0.09	0.46	74.01
1977	0.45	41.54	4.18	15.62	0.44	11.15	1.24	NA	0.15	0.51	75.28
1978	0.40	42.52	4.13	15.65	0.42	12.26	1.07	NA	0.12	0.60	77.17
1979	0.36	43.32	4.13	15.30	0.41	13.24	1.14	NA	0.10	0.57	78.57
1980	0.33	44.40	4.17	14.50	0.37	14.21	1.38	NA	0.11	0.61	80.07
1981	0.36	46.08	4.17	14.13	0.37	15.49	1.89	NA	0.10	0.59	83.18
1983 <sup>4</sup>	0.43	46.70	3.87	12.59	0.45	15.68	4.09	NA	0.16	0.68	84.64
1985	0.45	45.33	3.58	12.44	1.06	18.36	6.25	0.05	0.37	0.53	88.43
1987	0.41	45.96	3.66	12.74	1.08	20.61	5.45	0.05	0.28	0.66	90.89
1989	0.34	47.40	3.66	12.47	1.07	23.06	4.59	(s)	0.40	0.66	93.68
1991	0.32	47.02	3.88	11.47	0.99	23.71	4.44	(s)	0.41	0.86	93.15
1993	0.30	47.67	3.92	11.17	1.02	25.11	4.10	(s)	0.50	0.91	94.73
1995	0.21	49.20	4.25	10.98	1.06	26.77	3.53	(s)	0.64	1.04	97.69
Percent											
1950	33.8	26.0	2.3	22.1	( <sup>3</sup> )	0.6	9.7	NA	1.8	3.7	100.0
1960	12.2	43.1	5.1	32.4	( <sup>3</sup> )	1.8	4.2	NA	0.4	0.9	100.0
1970	2.9	55.2	6.0	26.0	( <sup>3</sup> )	7.7	1.3	NA	0.4	0.6	100.0
1973	1.2	55.5	6.4	24.9	( <sup>3</sup> )	10.4	0.9	NA	0.2	0.7	100.0
1974	1.0	55.7	5.8	23.8	( <sup>3</sup> )	11.9	0.9	NA	0.1	0.7	100.0
1975	0.8	56.4	5.7	22.5	( <sup>3</sup> )	12.6	1.2	NA	0.1	0.6	100.0
1976	0.7	55.7	5.7	22.2	( <sup>3</sup> )	13.7	1.2	NA	0.1	0.6	100.0
1977	0.6	55.2	5.6	20.7	0.6	14.8	1.6	NA	0.2	0.7	100.0
1978	0.5	55.1	5.4	20.3	0.5	15.9	1.4	NA	0.2	0.8	100.0
1979	0.5	55.1	5.3	19.5	0.5	16.9	1.4	NA	0.1	0.7	100.0
1980	0.4	55.4	5.2	18.1	0.5	17.7	1.7	NA	0.1	0.8	100.0
1981	0.4	55.4	5.0	17.0	0.4	18.6	2.3	NA	0.1	0.7	100.0
1983 <sup>4</sup>	0.5	55.2	4.6	14.9	0.5	18.5	4.8	NA	0.2	0.8	100.0
1985	0.5	51.3	4.1	14.1	1.2	20.8	7.1	0.1	0.4	0.6	100.0
1987	0.4	50.6	4.0	14.0	1.2	22.7	6.0	0.1	0.3	0.7	100.0
1989	0.4	50.6	3.9	13.3	1.1	24.6	4.9	(s)	0.4	0.7	100.0
1991	0.3	50.5	4.2	12.3	1.1	25.5	4.8	(s)	0.4	0.9	100.0
1993	0.3	50.3	4.1	11.8	1.1	26.5	4.3	(s)	0.5	1.0	100.0
1995	0.2	50.4	4.4	11.2	1.1	27.4	3.6	(s)	0.7	1.1	100.0

<sup>1</sup> Includes coal coke.

<sup>2</sup> Includes nonreporting units in 1950 and 1960, which totaled 997 and 2,000 units, respectively.

<sup>3</sup> Included in distillate fuel oil.

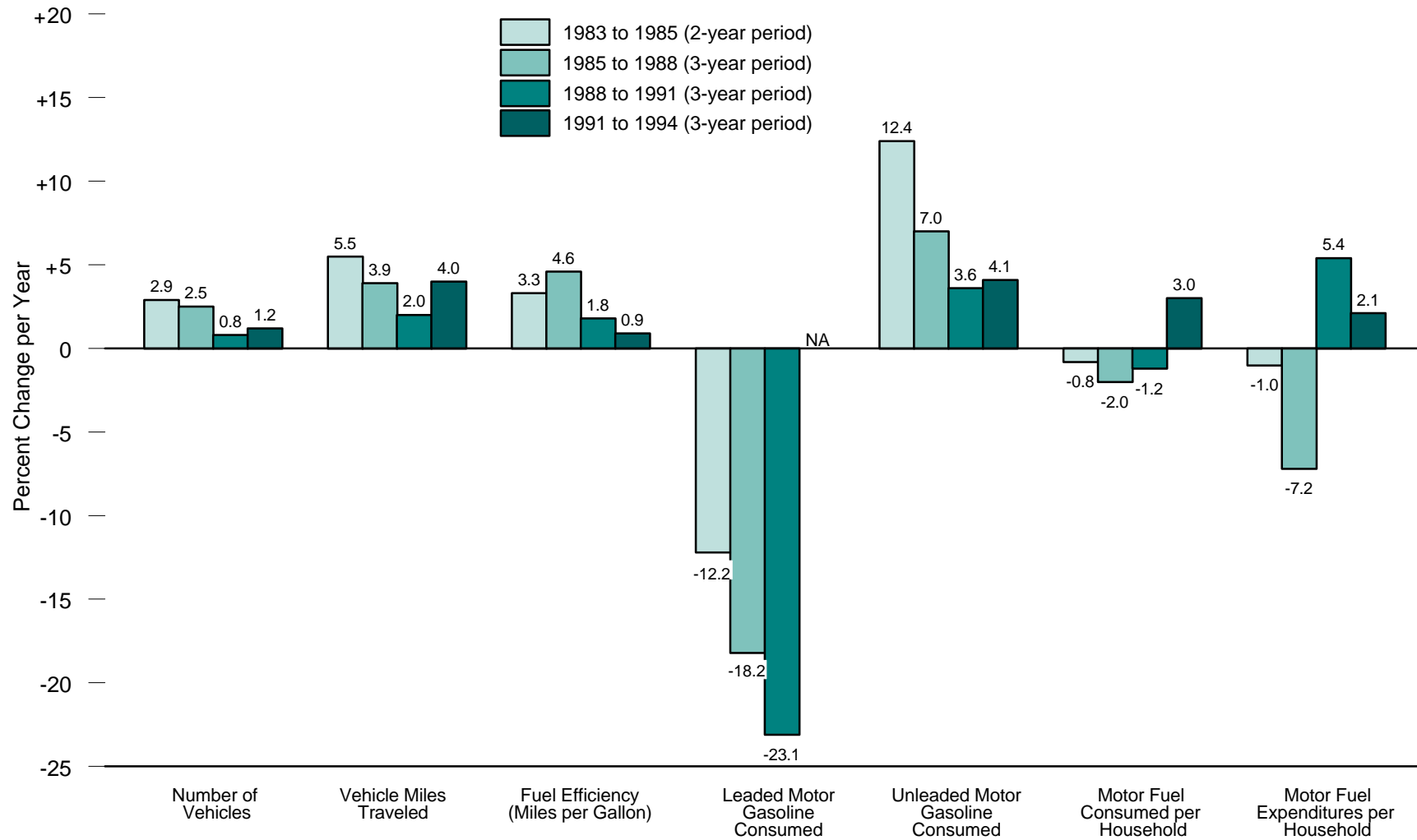
<sup>4</sup> Since 1983, the *American Housing Survey for the United States* has been a biennial survey.

NA=Not available. (s)=Less than 0.05 million or less than 0.05 percent.

Notes: • Includes mobile homes and individual housing units in apartment buildings. Housing units with more than one type of heating system are classified according to the principal type of heating system. • Totals may not equal sum of components due to independent rounding.

Sources: • 1950, 1960, and 1970—Bureau of the Census, *Census of Population and Housing*. • 1973 forward—Bureau of the Census, *American Housing Survey for the United States in 1995*, Table 2-5.

**Figure 2.12 Household Motor Vehicle Data**



Note: The percent changes are of all income categories; they are simple average annual percent changes (computed as the 3-year percent change divided by 3) and will differ slightly from compound average annual percent changes.

NA=Not Available.  
Source: Table 2.12.

**Table 2.12 Household Motor Vehicle Data, 1983, 1985, 1988, 1991, and 1994**

Unit of Measure	Family Income														
	Less than \$25,000					\$25,000 or More					All Income Categories				
	1983	1985	1988	1991	1994	1983	1985	1988	1991	1994	1983	1985	1988	1991	1994
Households with Vehicles (millions) .....	42.9	43.3	38.9	36.5	34.5	30.5	34.5	42.2	48.2	50.3	73.4	77.7	81.3	84.6	84.9
Vehicles (millions) .....	66.7	65.4	58.7	52.7	52.0	63.0	71.9	88.8	98.5	104.8	129.7	137.3	147.5	151.2	156.8
Vehicle Miles Traveled (billions) .....	589	587	550	488	550.4	630	766	960	1,114	1,242.8	1,219	1,353	1,511	1,602	1,793
Motor Fuel Consumed (billion gallons) .....	40.8	38.2	31.4	26.9	28.3	39.8	45.7	51.0	55.9	62.3	80.5	83.9	82.4	82.8	90.6
Motor Gasoline Consumed (billion gallons)															
Leaded .....	19.2	13.5	5.4	1.8	Q	13.2	11.0	5.8	1.6	Q	32.4	24.5	11.1	3.4	Q
Unleaded .....	20.9	24.2	25.7	24.7	26.7	25.3	33.7	44.3	52.9	60.3	46.3	57.8	69.9	77.5	87.0
Motor Fuel Expenditures (billion dollars <sup>1</sup> ) .....	48.1	44.8	30.7	31.7	32.6	47.3	54.3	50.3	66.6	72.1	95.4	99.1	81.1	98.2	104.7
Averages per Household with Vehicles															
Vehicles .....	1.6	1.5	1.5	1.4	1.5	2.1	2.1	2.1	2.0	2.1	1.8	1.8	1.8	1.8	1.8
Vehicle Miles Traveled (thousands) .....	13.7	13.6	14.1	13.4	15.9	20.7	22.2	22.7	23.1	24.7	16.6	17.4	18.6	18.9	21.1
Motor Fuel Consumed (gallons) .....	950	883	807	737	818	1,305	1,326	1,205	1,160	1,238	1,097	1,079	1,014	979	1,067
Motor Fuel Expenditures (dollars <sup>1</sup> ) .....	1,121	1,035	789	869	943	1,552	1,575	1,191	1,382	1,433	1,300	1,274	998	1,161	1,234
Averages per Vehicle															
Vehicle Miles Traveled (thousands) .....	8.8	9.0	9.4	9.3	10.6	10.0	10.7	10.8	11.3	11.9	9.4	9.9	10.3	10.6	11.4
Motor Fuel Consumed (gallons) .....	612	585	536	510	545	631	636	574	568	594	621	611	559	548	578
Motor Fuel Expenditures (dollars <sup>1</sup> ) .....	722	685	524	602	628	751	755	567	676	688	736	722	550	650	668
Fuel Efficiency (miles per gallon) .....	14.4	15.3	17.5	18.1	19.5	15.8	16.8	18.8	19.9	20.0	15.1	16.1	18.3	19.3	19.8
Price of Motor Gasoline (dollars <sup>1</sup> per gallon)															
Leaded .....	1.14	1.11	0.90	1.10	Q	1.14	1.11	0.90	1.10	Q	1.14	1.11	0.90	1.10	Q
Unleaded .....	1.22	1.20	0.99	1.18	1.15	1.22	1.21	1.00	1.19	1.16	1.22	1.21	1.00	1.19	1.16

<sup>1</sup> Nominal dollars.

Q=Data withheld because either the relative standard error was greater than 50 percent or fewer than 10 households were sampled.

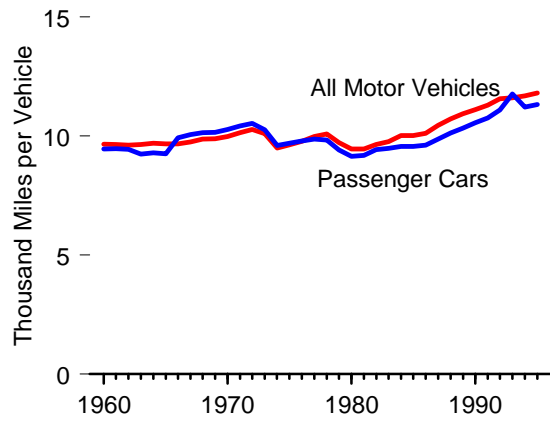
Notes: • Included are passenger cars, minivans, passenger vans, cargo vans, motor homes, pickup trucks, and sport-utility vehicles (i.e., jeeplike vehicles, usually four-wheel drive). Excluded are motorcycles, mopeds, large trucks, and buses. • Motor fuel includes motor gasoline and a small amount of other fuels, such as diesel, gasohol, and propane. These data for 1983 differ from previously published 1983 data in that the basis for estimating the number of vehicle-owning households was changed to conform with that being used for 1985. Purchase diaries, which were fuel purchase logs retained by drivers

in 1983 and 1985, were used as the basis for estimating data for those years. • Totals may not equal sum of components due to independent rounding.

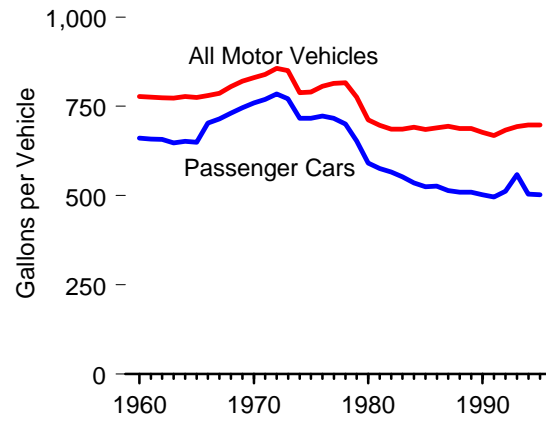
Sources: **Fuel Efficiency:** • 1983 and 1985—Energy Information Administration (EIA), "Residential Transportation Energy Consumption Survey" purchase diaries. • 1988 through 1994—Environmental Protection Agency Certification Files, adjusted for on-road driving. **Price of Motor Gasoline:** • 1983 and 1985—EIA, "Residential Transportation Energy Consumption Survey" purchase diaries. • 1988 through 1994—Bureau of Labor Statistics Gasoline Pump Price Series and Lundberg Inc. price series. **All Other Data:** EIA, Form EIA-876A/C, "Residential Transportation Energy Consumption Survey."

**Figure 2.13 Motor Vehicle Efficiency, 1960-1995**

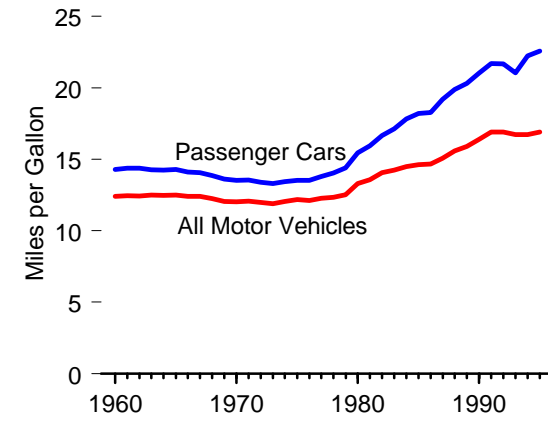
**Mileage**



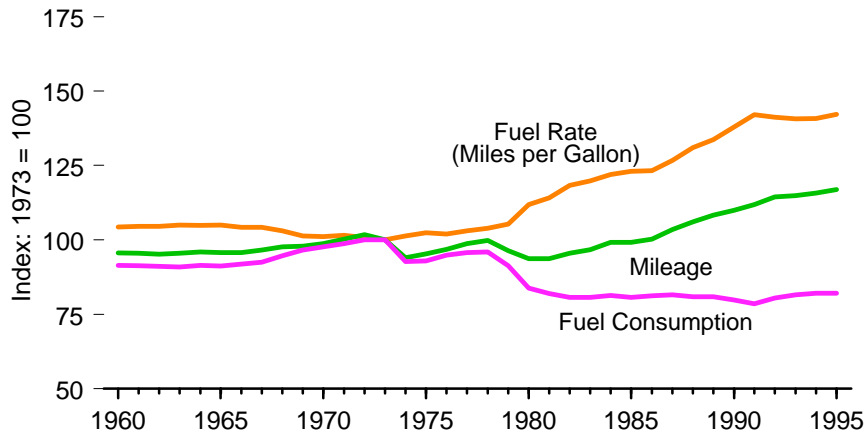
**Fuel Consumption**



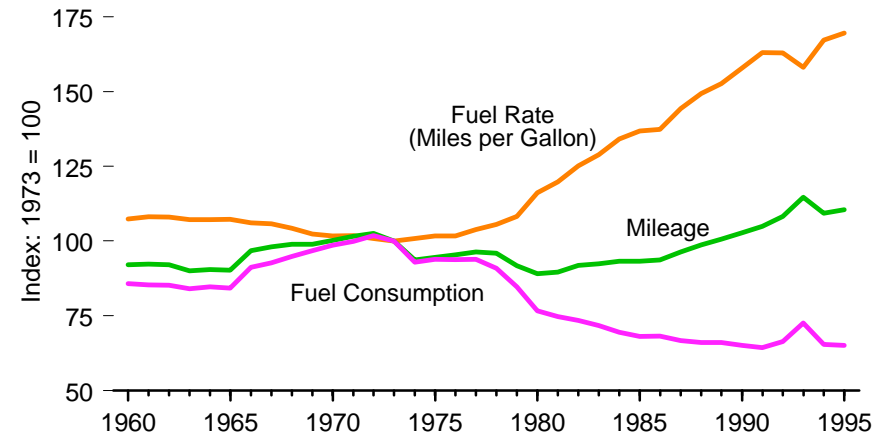
**Fuel Rate**



**All Motor Vehicles Efficiency**



**Passenger Car Efficiency**



Source: Table 2.13.

**Table 2.13 Motor Vehicle Efficiency, 1960-1995**

Year	Passenger Cars <sup>1</sup>						All Motor Vehicles <sup>2</sup>					
	Mileage		Fuel Consumption		Fuel Rate		Mileage		Fuel Consumption		Fuel Rate	
	Miles per Car	Index 1973 = 100.0	Gallons per Car	Index 1973 = 100.0	Miles per Gallon	Index 1973 = 100.0	Miles per Vehicle	Index 1973 = 100.0	Gallons per Vehicle	Index 1973 = 100.0	Miles per Gallon	Index 1973 = 100.0
1960	9,446	92.1	661	85.7	14.28	107.4	9,652	95.6	777	91.4	12.42	104.4
1961	9,465	92.3	658	85.3	14.38	108.1	9,648	95.5	776	91.3	12.44	104.6
1962	9,441	92.1	657	85.2	14.37	108.0	9,618	95.2	774	91.1	12.43	104.5
1963	9,240	90.1	648	84.0	14.26	107.2	9,646	95.5	773	90.9	12.48	105.0
1964	9,286	90.5	652	84.6	14.25	107.1	9,698	96.0	778	91.5	12.47	104.9
1965	9,255	90.2	649	84.2	14.27	107.3	9,674	95.8	775	91.2	12.48	105.0
1966	9,923	96.8	703	91.2	14.11	106.1	9,675	95.8	780	91.8	12.40	104.2
1967	10,060	98.1	715	92.7	14.07	105.8	9,751	96.6	786	92.5	12.40	104.2
1968	10,144	98.9	731	94.8	13.87	104.3	9,864	97.7	805	94.7	12.25	103.0
1969	10,158	99.0	746	96.8	13.62	102.4	9,885	97.9	821	96.6	12.05	101.3
1970	10,272	100.2	760	98.6	13.52	101.7	9,976	98.8	830	97.7	12.02	101.1
1971	10,422	101.6	770	99.9	13.54	101.8	10,133	100.3	839	98.7	12.08	101.6
1972	10,521	102.6	785	101.8	13.40	100.8	10,279	101.8	857	100.1	11.99	100.8
1973	10,256	100.0	771	100.0	13.30	100.0	10,099	100.0	850	100.0	11.89	100.0
1974	9,606	93.7	716	92.9	13.42	100.9	9,493	94.0	788	92.7	12.05	101.3
1975	9,690	94.5	716	93.9	13.52	101.7	9,627	95.3	790	92.9	12.18	102.4
1976	9,785	95.4	723	93.8	13.53	101.7	9,774	96.8	806	94.8	12.12	101.9
1977	9,879	96.3	716	93.9	13.80	103.8	9,978	98.8	814	95.8	12.26	103.1
1978	9,835	95.9	701	90.9	14.04	105.6	10,077	99.8	816	96.0	12.35	103.9
1979	9,403	91.7	653	84.7	14.41	108.3	9,722	96.3	776	91.3	12.52	105.3
1980	9,141	89.1	591	76.7	15.46	116.2	9,458	93.7	712	83.8	13.29	111.8
1981	9,186	89.6	576	74.7	15.94	119.8	9,462	93.7	697	82.0	13.57	114.1
1982	9,428	91.9	566	73.4	16.65	125.2	9,644	95.5	686	80.7	14.07	118.3
1983	9,475	92.4	553	71.7	17.14	128.9	9,761	96.7	686	80.7	14.24	119.8
1984	9,558	93.2	536	69.5	17.83	134.1	10,017	99.2	691	81.3	14.49	121.9
1985	9,560	93.2	525	68.1	18.20	136.8	10,018	99.2	685	80.6	14.62	123.0
1986	9,608	93.7	526	68.2	18.27	137.4	10,117	100.2	690	81.2	14.66	123.3
1987	9,878	96.3	514	66.7	19.20	144.4	10,449	103.5	694	81.6	15.07	126.7
1988	10,121	98.7	509	66.0	19.87	149.4	10,720	106.1	688	80.9	15.58	131.0
1989	10,332	100.7	509	66.0	20.31	152.7	10,936	108.3	688	80.9	15.90	133.7
1990	10,548	102.8	502	65.1	21.02	158.0	11,107	110.0	677	79.8	16.40	137.9
1991	10,757	104.9	496	64.3	21.69	163.1	11,294	111.8	668	78.6	16.90	142.1
1992	11,100	108.2	512	66.4	21.68	163.0	11,558	114.4	683	80.4	16.91	141.2
1993	11,759	114.7	559	72.5	21.04	158.2	11,597	114.8	693	81.5	16.73	140.7
1994	<sup>R</sup> 11,210	<sup>R</sup> 109.3	<sup>R</sup> 504	<sup>R</sup> 65.4	22.24	<sup>R</sup> 167.2	<sup>R</sup> 11,683	<sup>R</sup> 115.7	<sup>R</sup> 698	<sup>R</sup> 82.1	16.74	<sup>R</sup> 140.8
1995 <sup>P</sup>	11,329	110.5	502	65.1	<sup>R</sup> 22.56	169.6	11,801	116.9	698	82.1	<sup>R</sup> 16.91	142.2

<sup>1</sup> From 1960 to 1965, passenger cars category also include motorcycles.

<sup>2</sup> Passenger cars, motorcycles, buses, other 2-axle 4-tire vehicles (including vans, minivans, pickup trucks, and sport-utility vehicles), single-unit trucks with six or more tires, and combination trucks.

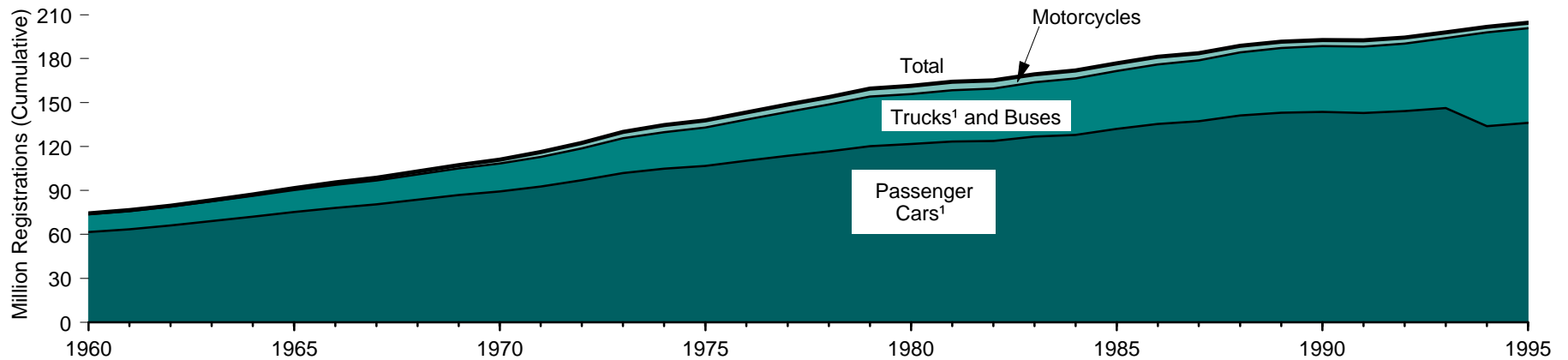
R=Revised data. P=Preliminary data.

Sources: • 1960-1985—Federal Highway Administration, *Highway Statistics Summary to 1985*, Table VM-201A. • 1986 forward—Federal Highway Administration, *Highway Statistics*, annual, Table VM-1M.

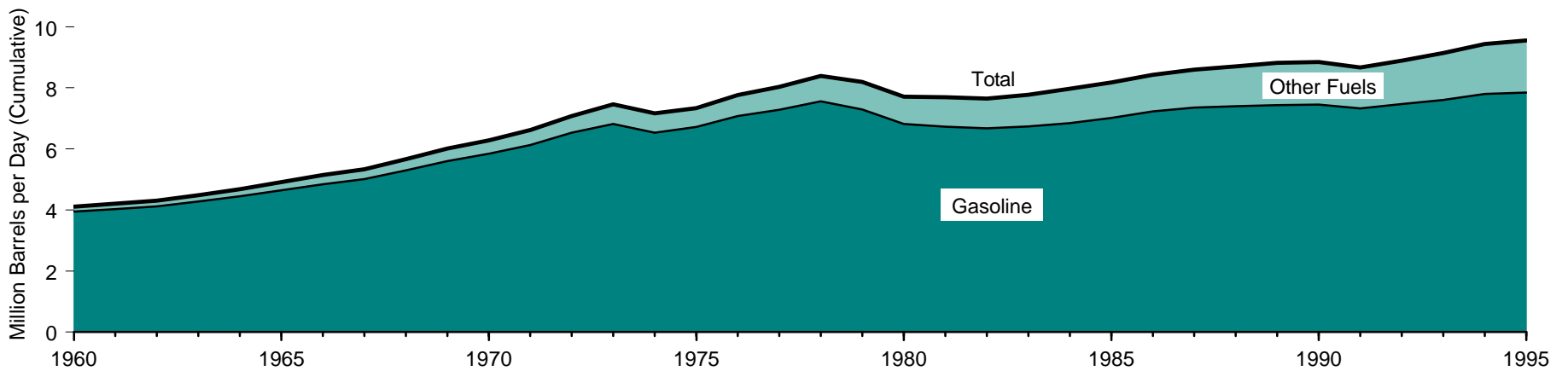


**Figure 2.14 Motor Vehicle Registrations and Motor Fuel Consumption, 1960-1995**

**Motor Vehicle Registrations**



**Motor Fuel Consumption**



<sup>1</sup> Beginning with 1994, personal passenger vans, passenger minivans, and utility-type vehicles are included in "Trucks" instead of "Passenger Cars."

Source: Table 2.14.

**Table 2.14 Motor Vehicle Registrations and Motor Fuel Consumption, 1960-1995**

Year	Motor Vehicle Registrations (millions)					Motor Fuel Consumption <sup>1</sup> (thousand barrels per day)		
	Passenger Cars	Motorcycles	Buses	Trucks	Total	Gasoline <sup>2</sup>	Other Fuels <sup>3</sup>	Total <sup>4</sup>
1960	61.7	0.6	0.3	11.9	74.4	3,953	159	4,112
1961	63.4	0.6	0.3	12.3	76.6	4,034	176	4,210
1962	66.1	0.7	0.3	12.8	79.8	4,120	192	4,312
1963	69.0	0.8	0.3	13.4	83.5	4,274	211	4,485
1964	72.0	1.0	0.3	14.0	87.3	4,454	236	4,690
1965	75.3	1.4	0.3	14.8	91.7	4,644	269	4,913
1966	78.1	1.8	0.3	15.5	95.7	4,846	306	5,152
1967	80.4	2.0	0.3	16.2	98.9	5,014	329	5,343
1968	83.6	2.1	0.4	16.9	103.0	5,300	370	5,670
1969	86.9	2.3	0.4	17.9	107.4	5,604	413	6,017
1970	89.2	2.8	0.4	18.8	111.2	5,845	439	6,284
1971	92.7	3.3	0.4	19.9	116.3	6,125	494	6,619
1972	97.1	3.8	0.4	21.3	122.6	6,529	554	7,083
1973	102.0	4.4	0.4	23.2	130.0	6,819	642	7,460
1974	104.9	5.0	0.4	24.6	134.9	6,531	639	7,170
1975	106.7	5.0	0.5	25.8	137.9	6,719	628	7,347
1976	110.4	5.0	0.5	27.7	143.5	7,075	697	7,772
1977	113.7	5.0	0.5	29.6	148.8	7,287	760	8,046
1978	116.6	5.1	0.5	31.7	153.9	7,555	837	8,392
1979	120.2	5.5	0.5	33.3	159.6	7,291	913	8,204
1980	121.7	5.7	0.5	33.6	161.6	6,820	896	7,716
1981	123.5	5.8	0.5	34.5	164.3	6,726	969	7,695
1982	123.7	5.7	0.6	35.3	165.3	6,679	972	7,651
1983	126.7	5.6	0.6	36.5	169.4	6,731	1,043	7,774
1984	127.9	5.5	0.6	38.0	172.0	6,850	1,127	7,977
1985	132.1	5.4	( <sup>5</sup> )	39.6	177.1	7,020	1,158	8,178
1986	135.4	5.3	( <sup>5</sup> )	40.8	181.5	7,229	1,202	8,431
1987	137.3	4.9	( <sup>5</sup> )	41.7	183.9	7,359	1,242	8,601
1988	141.3	4.6	( <sup>5</sup> )	43.1	189.0	7,405	1,306	8,711
1989	143.1	4.4	( <sup>5</sup> )	44.2	191.7	7,437	1,385	8,822
1990	143.5	4.3	( <sup>5</sup> )	45.1	192.9	7,454	1,396	8,849
1991	143.0	4.2	( <sup>5</sup> )	45.4	192.5	7,323	1,349	8,672
1992	144.2	4.1	( <sup>5</sup> )	46.1	194.4	7,472	1,430	8,902
1993	146.3	4.0	( <sup>5</sup> )	47.7	198.0	7,607	1,534	9,141
1994	<sup>6</sup> 133.9	3.7	( <sup>5</sup> )	<sup>6</sup> 64.1	201.8	7,807	1,639	9,446
1995	136.1	3.7	( <sup>5</sup> )	64.8	204.6	7,844	1,709	9,554

<sup>1</sup> Includes only motor fuel taxed at the prevailing tax rates in each State. Excludes motor fuel exempt from tax payment, subject to tax refund, or taxed at rates other than the prevailing tax rate. Experience has shown that the total motor fuel consumption quantity cited here equals more than 99.0 percent of gross reported motor fuel consumption.

<sup>2</sup> Motor gasoline, aviation gasoline, and gasohol.

<sup>3</sup> Distillate fuel oil (diesel oil), liquefied gases, and kerosene when they are used to operate vehicles on highways. Excludes jet fuel beginning in 1962.

<sup>4</sup> Excludes losses allowed for evaporation, handling, etc.

<sup>5</sup> Included in trucks.

<sup>6</sup> Before 1994, vans and minivans used as personal passenger vehicles, as well as sport-utility vehicles, were included in the passenger-car category. Beginning with 1994, sport-utility vehicles and all vans and minivans (passenger or cargo) are included in the truck category.

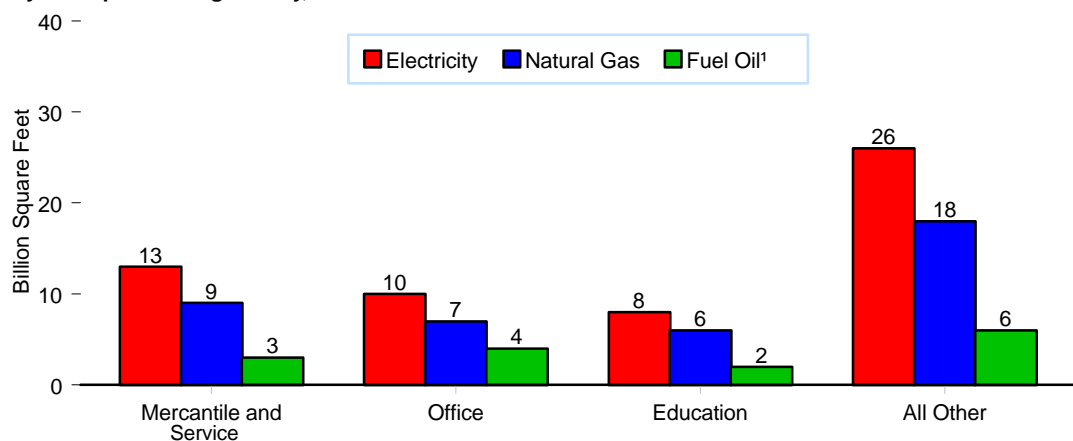
R=Revised data. E=Estimate.

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

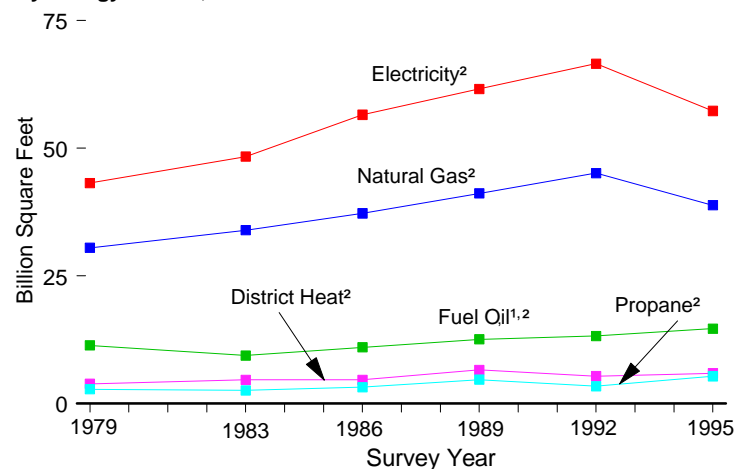
Sources: • 1960-1975—Federal Highway Administration, *Highway Statistics Summary to 1975*, Tables MV-201 and MF-221. • 1976-1986—Federal Highway Administration, *Highway Statistics Annual*, Tables MV-1, MF-21, and MF-25. • 1987 forward—Federal Highway Administration, *Selected Highway Statistics and Charts 1995*.

**Figure 2.15 Commercial Buildings Characteristics by Energy Source**

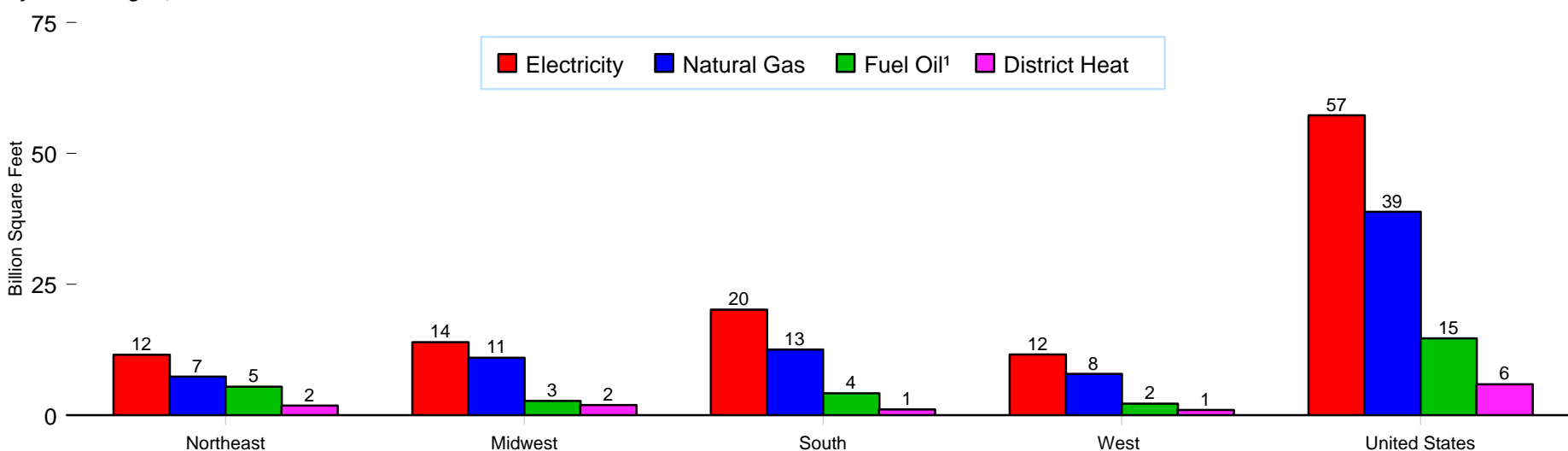
**By Principal Building Activity, 1995**



**By Energy Source, 1979-1995**



**By Census Region, 1995**



<sup>1</sup>Distillate fuel oil, residual fuel oil, and kerosene.

<sup>2</sup>There was a change in sample frame coverage between 1992 and 1995 because commercial buildings at multibuilding facilities and parking garages

were excluded in the 1995 survey.

Source: Table 2.15. See Appendix E for Census Regions.

**Table 2.15 Commercial Buildings Characteristics by Energy Source, Selected Years, 1979-1995**  
(Billion Square Feet)

Energy Source and Year	Square Footage Category			Principal Building Activity				Census Region <sup>1</sup>				All Buildings
	1,001 to 10,000	10,001 to 100,000	Over 100,000	Mercantile and Service	Office	Education	All Other	Northeast	Midwest	South	West	
<b>All Buildings</b>												
1979 .....	9.21	20.89	13.44	9.96	6.99	5.97	20.63	9.53	14.20	13.66	6.16	43.55
1983 .....	9.26	22.35	17.86	10.32	8.31	6.04	24.80	10.25	15.25	16.61	7.36	49.47
1986 .....	13.07	26.34	18.79	12.81	9.55	7.29	28.56	11.83	16.03	19.40	10.94	58.20
1989 .....	13.32	28.32	21.54	12.37	11.80	8.08	30.94	13.57	15.96	22.04	11.62	63.18
1992 .....	14.53	28.51	24.84	12.40	12.32	8.47	34.69	13.40	17.28	24.58	12.62	67.88
1995 <sup>2</sup> .....	13.87	27.26	17.64	12.73	10.48	7.74	27.83	11.88	14.32	20.83	11.74	58.77
<b>Electricity</b>												
1979 .....	8.99	20.76	13.41	9.92	6.98	5.97	20.29	9.46	14.16	13.42	6.11	43.15
1983 .....	8.86	21.79	17.68	10.24	8.27	6.03	23.78	9.98	14.88	16.22	7.24	48.33
1986 .....	12.49	25.52	18.50	12.71	9.50	7.20	27.10	11.43	15.68	18.75	10.65	56.51
1989 .....	12.71	27.58	21.28	12.36	11.80	8.07	29.34	13.33	15.70	21.22	11.32	61.56
1992 .....	14.05	27.89	24.61	12.39	12.32	8.47	33.37	13.24	16.91	23.99	12.42	66.55
1995 <sup>2</sup> .....	13.07	26.88	17.33	12.68	10.48	7.74	26.38	11.53	13.98	20.17	11.60	57.28
<b>Natural Gas</b>												
1979 .....	5.58	14.41	10.50	7.56	4.61	4.17	14.13	6.75	11.81	7.77	4.15	30.48
1983 .....	5.53	14.82	13.58	7.90	5.50	4.45	16.09	6.95	12.79	9.17	5.02	33.94
1986 .....	7.03	16.15	14.09	8.74	5.73	5.52	17.28	6.89	12.42	10.43	7.53	37.26
1989 .....	7.38	17.41	16.36	8.79	7.22	6.64	18.49	8.52	12.81	11.66	8.15	41.14
1992 .....	8.03	19.11	17.96	9.38	7.86	6.85	21.01	8.56	13.84	13.41	9.29	45.10
1995 <sup>2</sup> .....	7.56	18.62	12.66	8.76	6.63	5.88	17.57	7.37	11.01	12.55	7.91	38.84
<b>Fuel Oil <sup>3</sup></b>												
1979 .....	1.92	4.73	4.75	2.09	1.75	2.28	5.28	4.41	2.97	2.97	1.04	11.40
1983 .....	1.21	3.36	4.83	1.50	1.59	1.43	4.89	4.21	1.77	2.84	0.60	9.41
1986 .....	1.71	3.97	5.33	2.42	1.76	1.68	5.14	5.09	2.04	2.52	1.36	11.01
1989 .....	1.52	4.49	6.59	1.62	2.91	2.21	5.87	5.13	3.20	2.84	1.43	12.60
1992 .....	1.75	3.89	7.57	2.11	3.60	1.84	5.67	5.53	2.54	3.58	1.56	13.22
1995 <sup>2</sup> .....	1.70	4.60	8.37	2.57	3.60	2.38	6.12	5.49	2.72	4.22	2.24	14.67
<b>District Heat <sup>4</sup></b>												
1979 .....	Q	1.17	2.64	Q	1.19	0.40	1.98	1.26	1.58	0.65	0.39	3.88
1983 .....	Q	1.39	3.16	Q	1.25	0.45	2.46	1.37	1.93	0.80	0.53	4.64
1986 .....	0.10	1.49	3.04	0.16	1.45	0.83	2.18	1.38	1.80	0.71	0.74	4.63
1989 .....	0.15	1.88	4.55	Q	2.32	1.13	3.02	2.24	1.51	1.58	1.25	6.58
1992 .....	0.13	1.65	3.56	0.15	1.71	0.69	2.79	1.56	1.88	0.98	0.91	5.34
1995 <sup>2</sup> .....	0.22	1.87	3.85	Q	1.59	1.13	2.95	1.84	1.98	1.11	1.01	5.94
<b>Propane</b>												
1979 .....	0.66	1.21	0.93	0.63	0.14	0.47	1.56	0.44	0.73	1.40	0.23	2.80
1983 .....	0.59	0.89	1.07	Q	Q	0.35	1.54	0.47	0.44	1.59	Q	2.56
1986 .....	1.08	1.61	0.52	0.64	Q	0.37	2.10	0.78	0.66	1.35	0.42	3.21
1989 .....	1.04	1.95	1.71	0.91	Q	1.14	2.52	1.07	1.06	1.74	Q	4.69
1992 .....	1.04	1.37	0.99	0.74	0.21	0.47	1.97	1.04	0.58	1.51	0.26	3.39
1995 <sup>2</sup> .....	1.88	2.54	0.92	1.51	0.42	0.88	2.54	1.69	1.09	2.01	0.55	5.34

<sup>1</sup> See Appendix E for Census regions.

<sup>2</sup> Parking garages and commercial buildings on multibuilding manufacturing facilities were excluded in the 1995 survey. Those categories accounted for about 5.6 percent of the 1992 total area for "All Buildings."

<sup>3</sup> Distillate fuel oil, residual fuel oil, and kerosene.

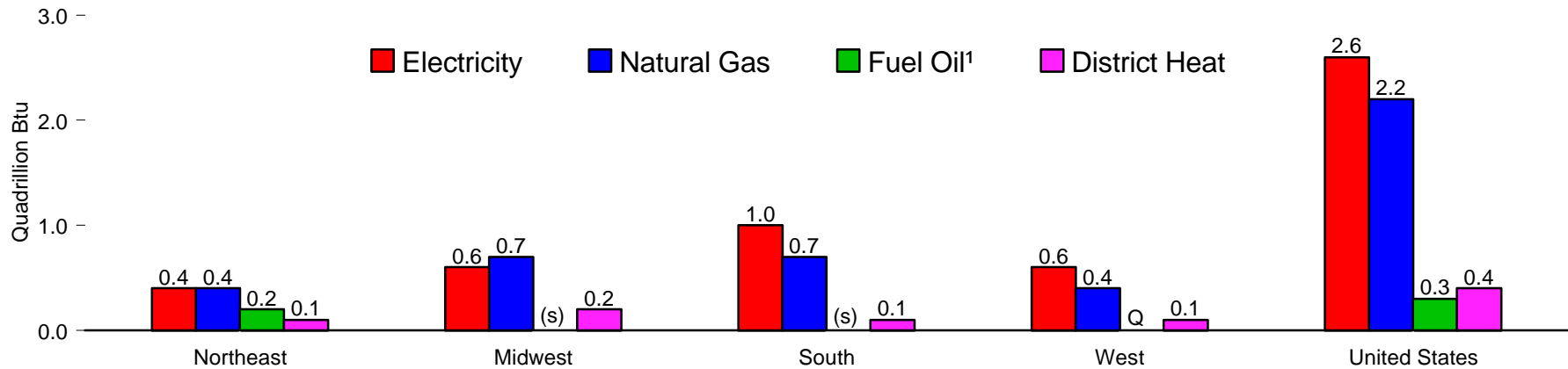
<sup>4</sup> For 1979 and 1983, includes only purchased steam. For 1986, 1989, 1992, and 1995 includes purchased and nonpurchased steam and purchased and nonpurchased hot water.

Q=Data withheld because either the relative standard error was greater than 50 percent or fewer than 20 buildings were sampled.

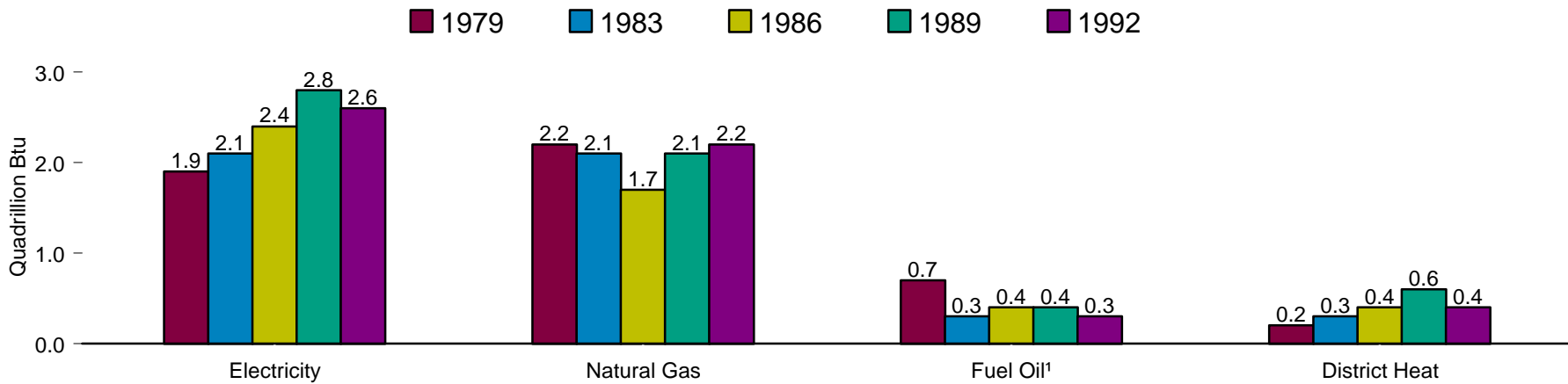
Sources: • 1979—Energy Information Administration (EIA), Form EIA-143, "Nonresidential Buildings Energy Consumption Survey." • 1983—EIA, Form EIA-788, "Nonresidential Buildings Energy Consumption Survey." • 1986—EIA, Form EIA-871, "Nonresidential Buildings Energy Consumption Survey." • 1989, 1992, and 1995—EIA, Form EIA-871A, "Commercial Buildings Energy Consumption Survey."

**Figure 2.16 Commercial Buildings Consumption by Energy Source**

**By Census Region, 1992**



**By Survey Year**



<sup>1</sup> Distillate fuel oil, residual fuel oil, and kerosene.

Q=Data withheld because either the relative standard error was greater than 50 percent or fewer than 20 buildings were sampled.

(s)=Less than 50 trillion Btu.

Source: Table 2.16. See Appendix E for Census regions.

**Table 2.16 Commercial Buildings Consumption by Energy Source, Selected Years, 1979-1992**  
(Trillion Btu)

Energy Source and Year	Square Footage Category			Principal Building Activity				Census Region <sup>1</sup>				All Buildings
	1,001 to 10,000	10,001 to 100,000	Over 100,000	Mercantile and Service	Office	Education	All Other	Northeast	Midwest	South	West	
<b>Major Sources <sup>2</sup></b>												
1979 .....	1,255	2,202	1,508	894	861	511	2,699	1,217	1,826	1,395	526	4,965
1983 .....	1,242	1,935	1,646	812	1,018	480	2,513	858	1,821	1,462	682	4,823
1986 .....	1,273	2,008	1,696	985	1,008	633	2,351	1,037	1,585	1,459	896	4,977
1989 .....	1,259	2,402	2,127	1,048	1,230	704	2,806	1,354	1,659	1,648	1,126	5,788
1992 .....	1,258	2,301	1,932	892	1,247	637	2,714	1,090	1,578	1,825	998	5,490
<b>Electricity</b>												
1979 .....	429	872	608	361	424	163	961	425	593	662	227	1,908
1983 .....	469	903	758	426	509	152	1,041	324	673	801	331	2,129
1986 .....	654	927	809	536	641	179	1,035	430	584	867	510	2,390
1989 .....	572	1,145	1,056	550	781	217	1,225	586	609	975	604	2,773
1992 .....	586	991	1,033	444	704	235	1,226	419	622	1,002	566	2,609
<b>Natural Gas</b>												
1979 .....	646	996	532	422	272	214	1,266	443	1,007	470	255	2,174
1983 .....	684	809	597	327	365	246	1,152	278	978	523	311	2,091
1986 .....	485	715	523	332	258	254	879	244	742	426	311	1,723
1989 .....	568	836	670	417	238	323	1,095	353	831	498	391	2,073
1992 .....	572	1,017	586	381	388	291	1,115	354	747	697	376	2,174
<b>Fuel Oil <sup>3</sup></b>												
1979 .....	177	272	231	103	107	107	364	285	133	237	26	681
1983 .....	85	140	90	43	75	61	135	172	28	104	Q	314
1986 .....	114	206	121	105	39	103	194	270	63	86	23	442
1989 .....	101	170	86	76	43	71	167	237	61	50	Q	357
1992 .....	86	111	75	55	47	62	109	194	26	48	Q	272
<b>District Heat <sup>4</sup></b>												
1979 .....	Q	61	136	Q	58	27	108	64	93	Q	Q	201
1983 .....	Q	83	202	Q	68	21	184	84	141	34	30	289
1986 .....	Q	159	243	12	71	97	243	94	196	81	51	422
1989 .....	19	252	315	Q	167	Q	319	179	159	126	121	585
1992 .....	Q	182	238	Q	109	49	264	123	183	78	51	435
<b>Propane <sup>5</sup></b>												
1979 .....	23	15	5	10	Q	2	29	Q	16	15	10	43
1983 .....	20	12	2	6	Q	2	24	Q	7	21	Q	34
1986 .....	44	18	1	17	Q	3	42	9	19	26	Q	63

<sup>1</sup> See Appendix E for Census regions.

<sup>2</sup> Includes electricity, natural gas, fuel oil, and district heat.

<sup>3</sup> Distillate fuel oil, residual fuel oil, and kerosene.

<sup>4</sup> For 1979 and 1983, includes only purchased steam. For 1986, 1989, and 1992, includes purchased and nonpurchased steam and purchased and nonpurchased hot water.

<sup>5</sup> After 1986, propane data were no longer collected.

Q=Data withheld because either the relative standard error was greater than 50 percent or fewer than 20

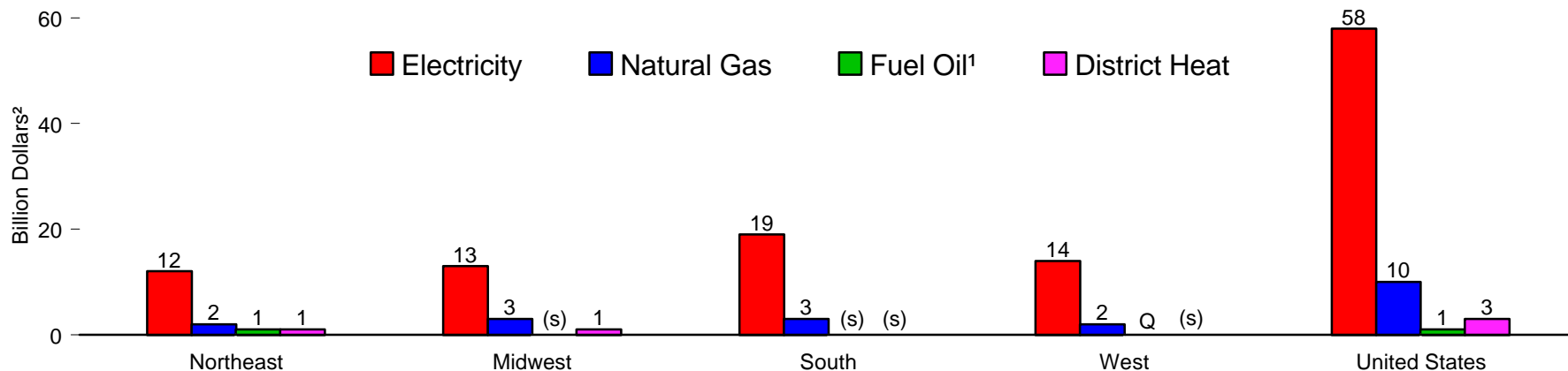
buildings were sampled.

Note: Statistics for individual fuels are for all buildings using each fuel. Statistics for major sources are for the sum of electricity, natural gas, fuel oil, and district heat, across all buildings using any of those fuels.

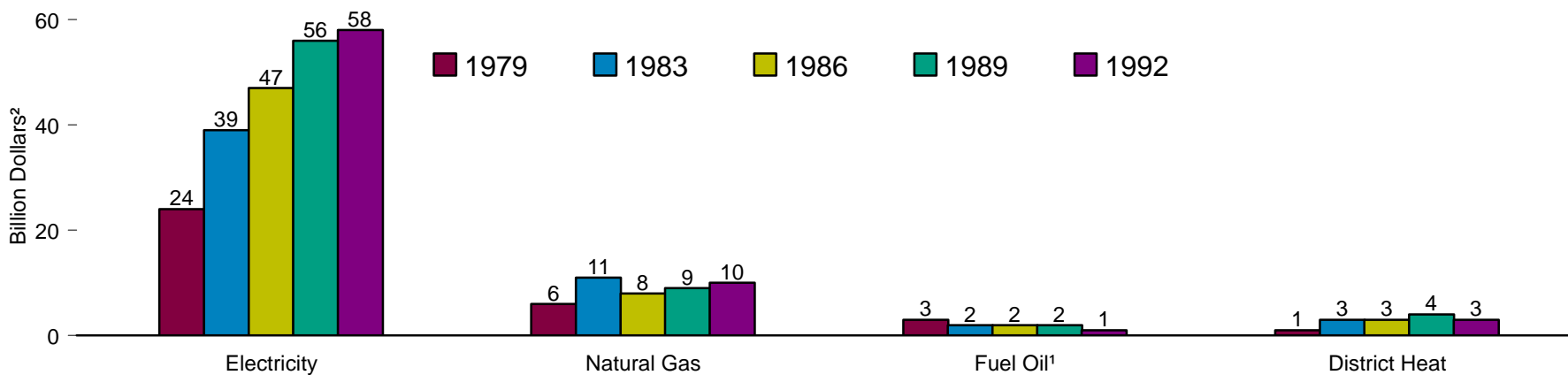
Sources: • 1979—EIA, Form EIA-143, "Nonresidential Buildings Energy Consumption Survey." • 1983—EIA, Form EIA-788, "Nonresidential Buildings Energy Consumption Survey." • 1986—EIA, Form EIA-871, "Nonresidential Buildings Energy Consumption Survey." • 1989 and 1992—EIA, Form EIA-871A-F, "Commercial Buildings Energy Consumption Survey."

**Figure 2.17 Commercial Buildings Expenditures by Energy Source**

**By Census Region, 1992**



**By Survey Year**



<sup>1</sup> Distillate fuel oil, residual fuel oil, and kerosene.

<sup>2</sup> Nominal dollars.

(s)=Less than 500 million dollars. Q=Data withheld because either the relative standard

error was greater than 50 percent or fewer than 20 buildings were sampled.

Note: See Appendix E for Census regions.

Source: Table 2.17.

**Table 2.17 Commercial Buildings Expenditures by Energy Source, Selected Years, 1979-1992**

(Million Dollars<sup>1</sup>)

Energy Source and Year	Square Footage Category			Principal Building Activity				Census Region <sup>2</sup>				All Buildings
	1,001 to 10,000	10,001 to 100,000	Over 100,000	Mercantile and Service	Office	Education	All Other	Northeast	Midwest	South	West	
<b>Major Sources <sup>3</sup></b>												
1979 .....	8,587	15,120	9,889	6,384	7,438	3,051	16,723	9,405	10,661	10,106	3,424	33,596
1983 .....	13,891	22,978	18,582	9,958	12,814	4,786	27,892	12,399	18,009	17,868	7,174	55,451
1986 .....	17,411	23,512	19,296	13,091	14,763	5,762	26,604	14,269	15,718	17,725	12,508	60,219
1989 .....	17,472	28,943	24,411	13,527	18,323	6,589	32,386	17,505	16,468	21,759	15,093	70,826
1992 .....	18,554	28,473	24,794	12,907	18,102	7,389	33,423	16,226	16,957	22,843	15,795	71,821
<b>Electricity</b>												
1979 .....	5,958	10,994	6,799	4,655	5,862	1,936	11,298	6,493	7,009	7,756	2,493	23,751
1983 .....	9,338	16,779	13,162	7,602	9,651	2,925	19,101	8,406	11,594	14,176	5,103	39,279
1986 .....	14,137	18,046	15,003	10,781	12,884	3,606	19,915	10,886	10,869	14,856	10,575	47,186
1989 .....	13,824	22,770	19,349	11,116	15,757	4,391	24,679	13,188	11,697	18,409	12,649	55,943
1992 .....	14,872	22,183	20,565	10,583	15,511	5,526	25,999	12,250	12,745	19,097	13,527	57,619
<b>Natural Gas</b>												
1979 .....	1,804	2,654	1,356	1,231	728	551	3,304	1,320	2,547	1,255	692	5,814
1983 .....	3,886	4,485	3,071	1,904	1,999	1,317	6,223	1,874	5,172	2,675	1,721	11,443
1986 .....	2,522	3,543	2,289	1,706	1,178	1,189	4,282	1,472	3,400	1,958	1,524	8,355
1989 .....	2,924	3,760	2,520	1,931	1,128	1,309	4,836	1,807	3,381	2,293	1,724	9,204
1992 .....	3,058	4,625	2,218	1,899	1,618	1,271	5,114	2,014	3,011	2,998	1,878	9,901
<b>Fuel Oil <sup>4</sup></b>												
1979 .....	798	1,117	850	457	443	396	1,469	1,149	569	932	116	2,765
1983 .....	630	947	525	319	501	387	896	1,141	198	688	75	2,102
1986 .....	616	970	473	516	194	448	901	1,272	278	394	115	2,059
1989 .....	582	862	378	430	232	331	829	1,225	310	241	Q	1,822
1992 .....	516	561	323	318	245	277	560	989	132	257	Q	1,400
<b>District Heat <sup>5</sup></b>												
1979 .....	Q	355	885	Q	405	169	652	444	535	163	124	1,267
1983 .....	Q	767	1,823	Q	664	157	1,673	977	1,045	329	275	2,627
1986 .....	Q	953	1,530	88	507	519	1,506	639	1,170	516	294	2,620
1989 .....	141	1,551	2,165	Q	1,207	Q	2,042	1,286	1,081	816	Q	3,857
1992 .....	Q	1,688	1,689	Q	728	315	1,751	973	1,069	492	368	2,901
<b>Propane <sup>6</sup></b>												
1979 .....	123	80	22	52	Q	10	153	Q	76	81	47	225
1983 .....	190	109	14	56	Q	12	222	Q	62	201	Q	313
1986 .....	370	163	10	140	Q	20	368	93	131	221	Q	543

<sup>1</sup> Nominal dollars.

<sup>2</sup> See Appendix E for Census regions.

<sup>3</sup> Includes electricity, natural gas, fuel oil, and district heat.

<sup>4</sup> Distillate fuel oil, residual fuel oil, and kerosene.

<sup>5</sup> For 1979 and 1983, includes only purchased steam. For 1986, 1989, and 1992, includes purchased and nonpurchased steam and purchased and nonpurchased hot water.

<sup>6</sup> After 1986, propane data were no longer collected.

Q=Data withheld because either the relative standard error was greater than 50 percent or fewer than 20

buildings were sampled.

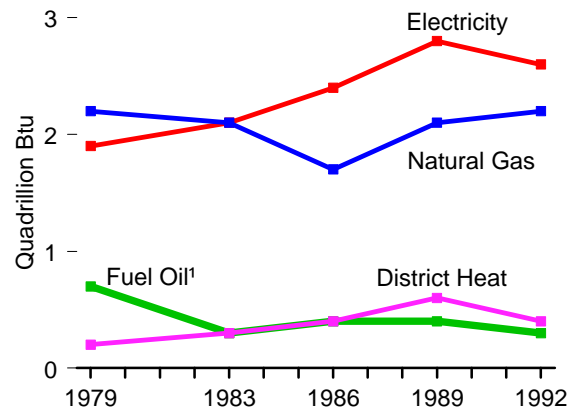
Note: Statistics for individual fuels are for all buildings using each fuel. Statistics for major sources are for the sum of electricity, natural gas, fuel oil, and district heat across all buildings using any of those fuels.

Sources: • 1979—EIA, Form EIA-143, "Nonresidential Buildings Energy Consumption Survey." • 1983—EIA, Form EIA-788, "Nonresidential Buildings Energy Consumption Survey." • 1986—EIA, Form EIA-871, "Nonresidential Buildings Energy Consumption Survey." • 1989 and 1992—EIA, Form EIA-871A-F, "Commercial Buildings Energy Consumption Survey."

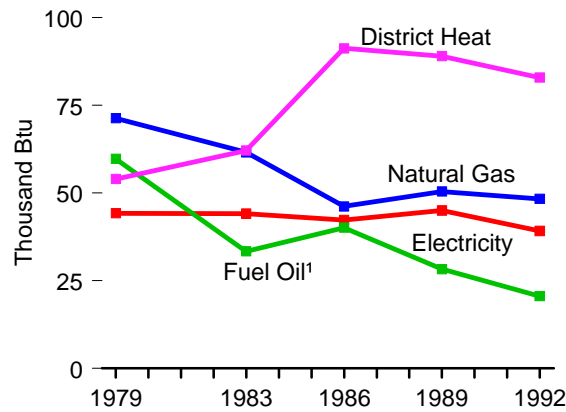


**Figure 2.18 Commercial Buildings Energy Consumption and Expenditure Indicators, Selected Years, 1979-1992**

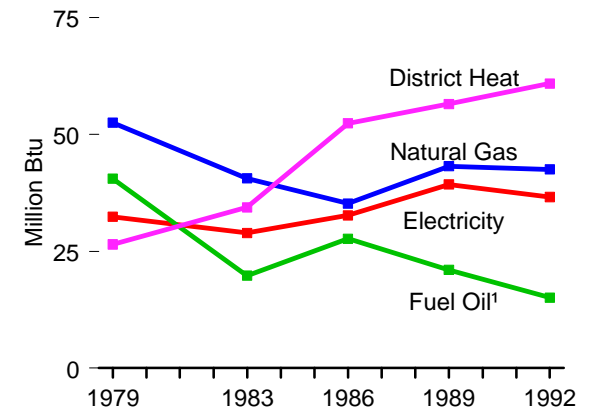
**Consumption**



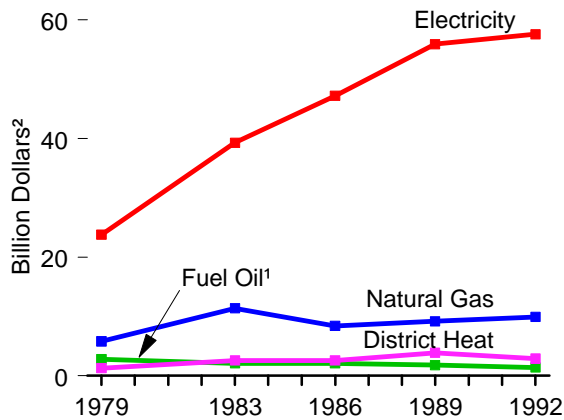
**Consumption per Square Foot**



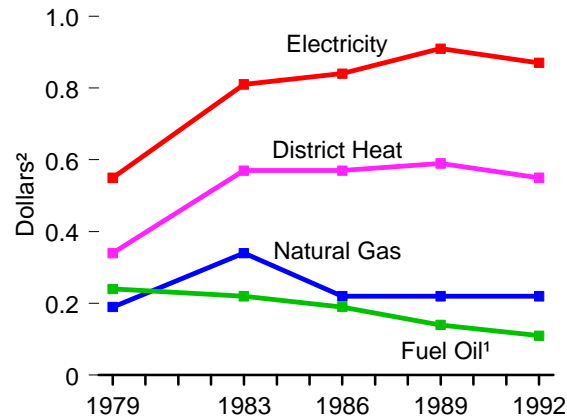
**Consumption per Employee**



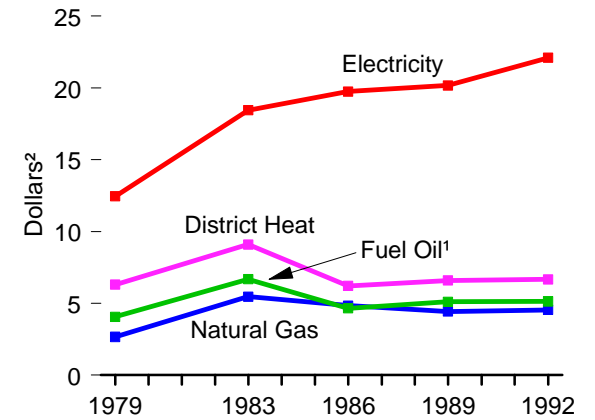
**Expenditures**



**Expenditures per Square Foot**



**Expenditures per Million Btu**



<sup>1</sup> Distillate fuel oil, residual fuel oil, and kerosene.

<sup>2</sup> Nominal dollars.

Notes: • No data are available for 1980-1982, 1984-1985, 1987-1988, and 1990-1991. • Because vertical scales differ, graphs should not be compared.

Source: Table 2.18.

**Table 2.18 Commercial Buildings Energy Consumption and Expenditure Indicators, Selected Years, 1979-1992**

Energy Source and Year	Building Characteristics			Energy Consumption				Energy Expenditures			
	Number of Buildings (thousand)	Total Square Feet (million)	Square Feet per Building (thousand)	Total (trillion Btu)	Per Building (million Btu)	Per Square Foot (thousand Btu)	Per Employee (million Btu)	Total (million dollars <sup>1</sup> )	Per Building (thousand dollars <sup>1</sup> )	Per Square Foot (dollars <sup>1</sup> )	Per Million Btu (dollars <sup>1</sup> )
<b>Major Sources <sup>2</sup></b>											
1979 .....	3,073	43,546	14.2	5,008	1,630	115.0	85.0	33,821	11.0	0.78	6.75
1983 .....	3,185	49,471	15.5	4,856	1,525	98.2	65.7	55,764	17.5	1.13	11.48
1986 .....	4,154	58,199	14.0	5,040	1,213	86.6	68.6	60,762	14.6	1.04	12.06
1989 .....	4,528	63,184	14.0	5,788	1,278	91.6	81.9	70,826	15.6	1.12	12.24
1992 .....	4,806	67,876	14.1	5,490	1,142	80.9	77.1	71,821	14.9	1.06	13.08
<b>Electricity</b>											
1979 .....	3,001	43,153	14.4	1,908	636	44.2	32.4	23,751	7.9	0.55	12.45
1983 .....	3,052	48,327	15.8	2,129	697	44.1	28.9	39,279	12.9	0.81	18.45
1986 .....	3,965	56,508	14.3	2,390	603	42.3	32.7	47,186	11.9	0.84	19.74
1989 .....	4,294	61,563	14.3	2,773	646	45.0	39.3	55,943	13.0	0.91	20.17
1992 .....	4,611	66,525	14.4	2,609	566	39.2	36.6	57,619	12.5	0.87	22.09
<b>Natural Gas</b>											
1979 .....	1,864	30,477	16.4	2,174	1,167	71.3	52.5	5,814	3.1	0.19	2.67
1983 .....	1,904	33,935	17.8	2,091	1,098	61.6	40.6	11,443	6.0	0.34	5.47
1986 .....	2,214	37,263	16.8	1,723	778	46.2	35.2	8,355	3.8	0.22	4.85
1989 .....	2,420	41,143	17.0	2,073	857	50.4	43.2	9,204	3.8	0.22	4.44
1992 .....	2,657	44,994	16.9	2,174	818	48.3	42.5	9,901	3.7	0.22	4.55
<b>Fuel Oil <sup>3</sup></b>											
1979 .....	641	11,397	17.8	681	1,063	59.7	40.5	2,765	4.3	0.24	4.06
1983 .....	441	9,409	21.3	314	714	33.4	19.8	2,102	4.8	0.22	6.68
1986 .....	534	11,005	20.6	442	827	40.1	27.7	2,059	3.9	0.19	4.66
1989 .....	581	12,600	21.7	357	614	28.3	21.0	1,822	3.1	0.14	5.11
1992 .....	560	13,215	23.6	272	487	20.6	15.1	1,400	2.5	0.11	5.14
<b>District Heat <sup>4</sup></b>											
1979 .....	47	3,722	79.0	201	4,267	54.0	26.5	1,267	26.9	0.34	6.30
1983 .....	64	4,643	72.9	289	4,530	62.1	34.4	2,627	41.2	0.57	9.10
1986 .....	77	4,625	59.7	422	5,446	91.2	52.4	2,620	33.8	0.57	6.21
1989 .....	98	6,578	67.0	585	5,964	89.0	56.5	3,857	39.3	0.59	6.59
1992 .....	95	5,245	55.4	435	4,596	82.9	60.9	2,901	30.7	0.55	6.67
<b>Propane</b>											
1979 .....	214	2,797	13.1	43	202	15.5	12.9	225	1.1	0.08	5.19
1983 .....	191	2,562	13.4	34	176	13.1	8.5	313	1.6	0.12	9.29
1986 .....	344	3,213	9.3	63	184	19.7	17.6	543	1.6	0.17	8.59
1989 .....	348	4,695	13.5	NA	NA	NA	NA	NA	NA	NA	NA
1992 .....	337	3,393	10.1	NA	NA	NA	NA	NA	NA	NA	NA

<sup>1</sup> Nominal dollars.

<sup>2</sup> For 1979, 1983 and 1986, includes electricity, natural gas, fuel oil, district heat, and propane. For 1989 and 1992, includes electricity, natural gas, fuel oil, and district heat. Propane consumption statistics were not collected in 1989 or 1992.

<sup>3</sup> Distillate fuel oil, residual fuel oil, and kerosene.

<sup>4</sup> For 1979 and 1983, includes only purchased steam. For 1986, 1989, and 1992, includes purchased and nonpurchased steam and purchased and nonpurchased hot water.

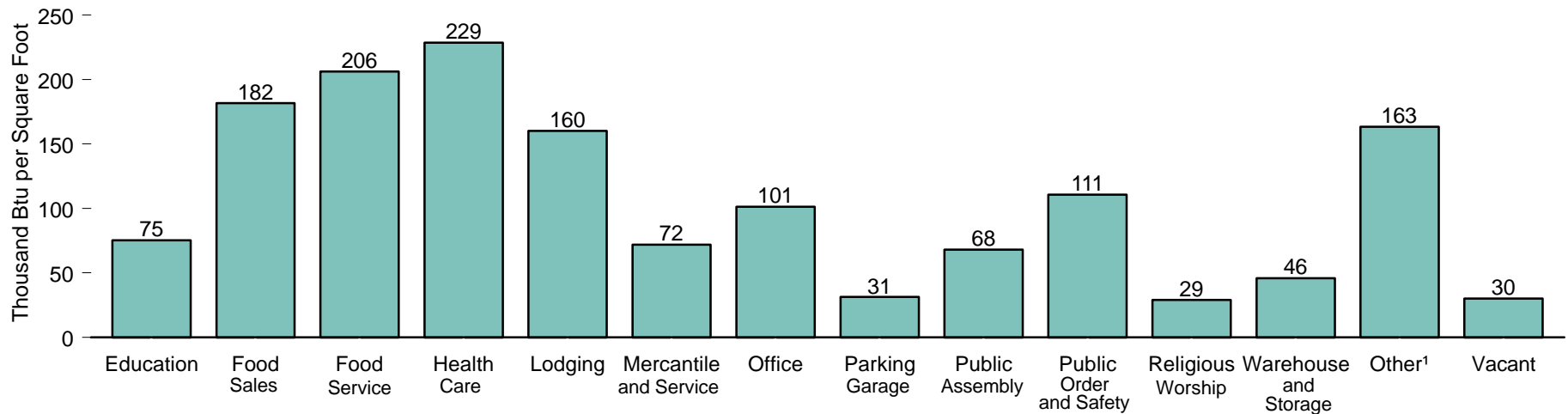
NA=Not available.

Note: Statistics for individual fuels are for all buildings using each fuel. Statistics for major sources are for all buildings, even buildings using no major fuel.

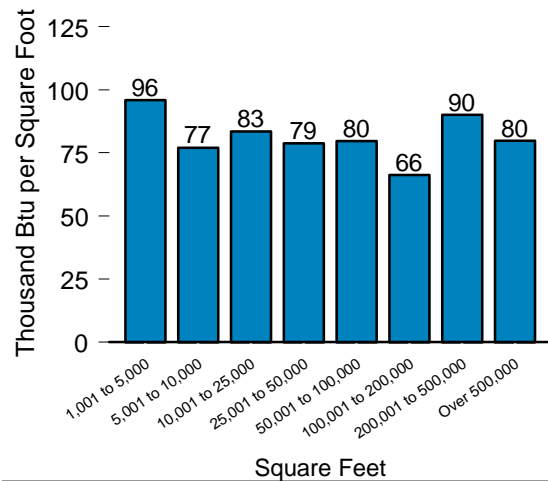
Sources: • 1979—EIA, Form EIA-143, "Nonresidential Buildings Energy Consumption Survey." • 1983—EIA, Form EIA-788, "Nonresidential Buildings Energy Consumption Survey." • 1986—EIA, Form EIA-871, "Nonresidential Buildings Energy Consumption Survey." • 1989 and 1992—EIA, Form EIA-871A-F, "Commercial Buildings Energy Consumption Survey."

**Figure 2.19 Commercial Buildings Energy Intensities by Building Characteristic, 1992**

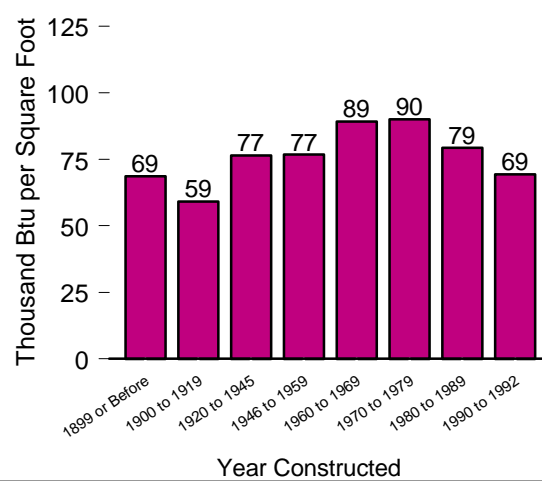
**By Principal Building Activity**



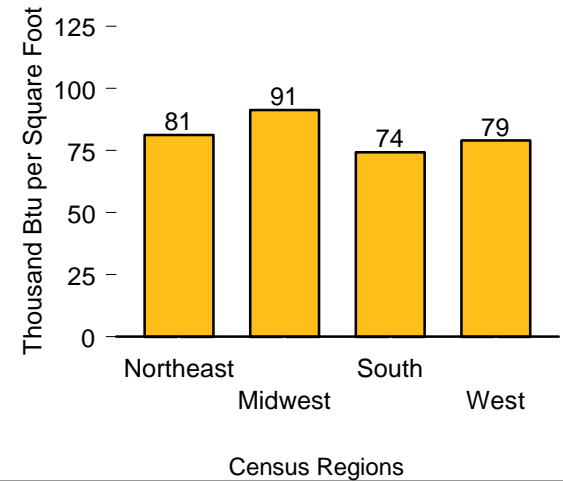
**By Building Floorspace**



**By Year Constructed**



**By Census Region**



<sup>1</sup> Includes buildings that do not fit into any of the other named categories.  
 Notes: • See Appendix E for Census regions. • Because vertical scales differ, graphs

should not be compared.  
 Source: Table 2.19.

**Table 2.19 Commercial Buildings Energy Intensities by Building Characteristic, 1992**

(Thousand Btu per Square Foot)

Building Characteristic	Space Heating	Cooling	Ventilation	Water Heating	Lighting	Cooking	Refrigeration	Office Equipment	Other <sup>1</sup>	All End Uses
<b>All Buildings</b> .....	<b>28.2</b>	<b>6.8</b>	<b>2.5</b>	<b>12.6</b>	<b>17.1</b>	<b>3.3</b>	<b>2.0</b>	<b>3.0</b>	<b>5.3</b>	<b>80.9</b>
<b>Building Floorspace (square feet)</b>										
1,001 to 5,000 .....	34.3	8.3	2.8	14.0	17.1	8.0	5.6	2.7	3.2	95.9
5,001 to 10,000 .....	27.7	8.2	2.0	13.6	13.4	5.1	2.0	2.4	2.7	77.1
10,001 to 25,000 .....	36.0	6.2	1.6	15.4	13.4	2.5	2.2	2.7	3.4	83.4
25,001 to 50,000 .....	26.8	6.7	2.1	13.5	14.4	2.3	1.7	2.4	9.1	78.8
50,001 to 100,000 .....	31.5	6.5	2.5	10.0	17.6	1.5	1.7	2.8	5.5	79.7
100,001 to 200,000 .....	21.8	5.7	2.5	8.9	17.3	1.3	1.0	3.0	4.5	66.2
200,001 to 500,000 .....	25.8	6.8	3.4	15.1	24.3	3.6	0.9	4.3	5.8	90.1
Over 500,000 .....	21.0	6.8	3.2	10.4	21.3	3.8	1.1	4.4	7.9	79.8
<b>Principal Building Activity</b>										
Education .....	40.2	6.2	1.3	7.2	15.5	0.9	0.8	0.5	2.7	75.2
Food Sales .....	21.3	12.8	4.5	11.9	27.9	6.6	84.1	0.9	11.5	181.5
Food Service .....	28.7	35.3	6.2	24.8	18.5	77.8	11.3	0.3	3.1	206.1
Health Care .....	50.1	18.3	6.5	72.4	29.7	16.8	3.3	8.5	23.0	228.5
Lodging .....	51.2	20.8	3.4	41.6	22.0	4.4	1.6	1.0	14.1	160.1
Mercantile and Service .....	24.6	3.4	2.1	14.8	18.7	1.5	1.2	2.2	3.5	71.9
Office .....	33.2	11.4	6.1	11.0	18.9	1.4	0.3	11.1	7.8	101.2
Parking Garage .....	7.1	Q	0.5	3.1	18.0	Q	0.0	0.0	0.4	31.3
Public Assembly .....	21.9	4.5	1.4	8.8	25.3	2.2	0.7	0.4	2.7	68.0
Public Order and Safety .....	44.3	4.6	1.0	31.2	24.3	2.1	0.0	0.3	2.8	110.6
Religious Worship .....	17.4	1.9	0.8	3.2	3.8	0.7	0.3	0.1	0.9	29.0
Warehouse and Storage .....	18.2	1.9	0.2	5.6	13.9	Q	1.1	1.1	3.7	45.9
Other <sup>2</sup> .....	71.2	8.1	5.9	23.0	32.3	0.5	0.1	2.4	19.7	163.2
Vacant .....	14.4	1.4	0.3	2.7	5.7	Q	0.1	0.1	Q	29.9
<b>Year Constructed</b>										
1899 or Before .....	33.9	6.0	0.9	11.6	7.1	4.2	1.1	2.1	1.6	68.6
1900 to 1919 .....	30.7	3.7	0.9	9.0	8.3	2.5	0.6	1.4	2.0	59.1
1920 to 1945 .....	37.2	6.9	1.5	11.9	9.5	3.2	1.4	1.6	3.3	76.5
1946 to 1959 .....	28.5	5.3	2.0	12.0	15.4	2.8	1.5	2.3	7.1	76.8
1960 to 1969 .....	29.5	6.1	2.8	16.1	21.6	3.2	2.0	3.2	4.7	89.2
1970 to 1979 .....	29.2	8.2	2.8	12.5	20.7	4.2	2.3	3.1	7.1	90.0
1980 to 1989 .....	20.5	8.1	3.2	12.6	18.8	3.3	3.0	4.4	5.5	79.3
1990 to 1992 .....	20.3	6.8	3.6	7.9	17.9	2.1	1.1	4.9	4.7	69.3
<b>Census Region <sup>3</sup></b>										
Northeast .....	34.7	4.5	1.3	13.6	14.7	3.8	1.7	2.7	4.3	81.3
Midwest .....	38.3	5.3	2.2	14.3	17.4	4.0	2.0	2.9	5.0	91.3
South .....	21.3	8.4	2.7	11.2	17.1	2.5	1.7	3.0	6.2	74.3
West .....	20.9	8.2	3.5	12.2	19.5	3.4	2.7	3.6	5.1	79.1

<sup>1</sup> Examples of "other" include medical, electronic, and testing equipment; conveyors, wrappers, hoists, and compactors; washers, disposals, dryers, and cleaning equipment; escalators, elevators, dumb waiters, and window washers; shop tools and electronic testing equipment; sign motors, time clocks, vending machines, phone equipment, and sprinkler controls; scoreboards, fire alarms, intercoms, television sets, radios, projectors, and door operators.

<sup>2</sup> Includes buildings that do not fit into any of the other named categories.

<sup>3</sup> See Appendix E for Census regions.

Q=Data withheld because either the relative standard error was greater than 50 percent or fewer than 20 buildings were sampled.

Source: Energy Information Administration, Form EIA-871A/F, "Commercial Buildings Consumption Survey."

## 3. Financial Indicators

### Fossil Fuel Prices

From the 1959 level of \$1.25 per million Btu, real prices<sup>1</sup> of fossil fuels<sup>2</sup> trended downward to a low of \$1.03 in 1968 (3.1).<sup>\*</sup> Thereafter, prices began to escalate, sometimes abruptly. In 1974, the composite price of fossil fuels jumped from the 1973 level of \$1.12 to \$1.76, surpassing the 1959 level for the first time and registering the largest year-to-year increase (56 percent) of the 1959-to-1996 period. The peak of \$4.16 was reached in 1981. Thereafter, the price declined through 1988, plunging 36 percent in 1986 alone. Although prices recovered somewhat in 1989 and 1990, they then declined to a 22-year low of \$1.37 in 1995 before rebounding 23 percent to \$1.69 in 1996.

Crude oil was the most expensive of the fossil fuels over the entire period, with the exception of anthracite in 1975 through 1977. At its peak in 1981, the real price of crude oil reached \$8.31 per million Btu, more than triple the price of natural gas and more than quadruple the price of nonanthracitic coal.

### Energy Expenditures (1994)

The average price paid by consumers for energy rose slightly in 1994 to \$8.31 per million Btu (3.3). Energy consumption also rose, and total nominal expenditures for energy increased by 2.6 percent to \$505 billion in 1994 (3.4). About 26 percent of the total (\$130 billion) was accounted for by expenditures on motor gasoline and about 45 percent (\$229 billion) was due to expenditures on petroleum products in general. End-use consumers spent \$27 billion on coal and \$78 billion on natural gas in 1994. Spending on purchased electricity totaled \$201 billion.

<sup>1</sup>Real (inflation-adjusted) prices are expressed in chained (1992) dollars.

<sup>2</sup>Crude oil, natural gas, and coal.

*\*Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications. Percentage and numbers in text are calculated using data in the tables.*

### Energy Industry Financial Performance

In 1995, the 24 major energy companies included in the Financial Reporting System (FRS)<sup>3</sup> accounted for 52 percent of U.S. crude oil and natural gas liquids production, 44 percent of dry natural gas production, and 16 percent of coal production (3.8). They also accounted for 68 percent of refinery capacity. The FRS companies continued to play a significant role in the U.S. economy. In 1995, their sales equaled 11 percent of the \$4.5 trillion in sales of the Fortune 500 largest U.S. industrial corporations.<sup>4</sup>

Driven mainly by record income gains from nonenergy lines of business, especially chemical operations, the overall income and profitability of the FRS companies rose for the third year in a row in 1995 (3.8). Consolidated net income soared 28 percent to \$21 billion. Nonenergy income more than doubled, from \$6.2 billion in 1994 to \$12.6 billion in 1995, while foreign petroleum and natural gas operations reversed the previous year's decline and posted a gain of 41 percent, to \$8.3 billion (3.9). These improvements more than offset income declines from domestic petroleum and natural gas operations, as a warm winter in the Northeast reduced demand for natural gas and heating oil. Refining operations were hurt further by the added production costs associated with the introduction of reformulated gasoline in 1995. The financial performance of domestic refining/marketing operations was the third worst in at least 20 years, with 1995 income from these operations falling 72 percent from the 1994 level.

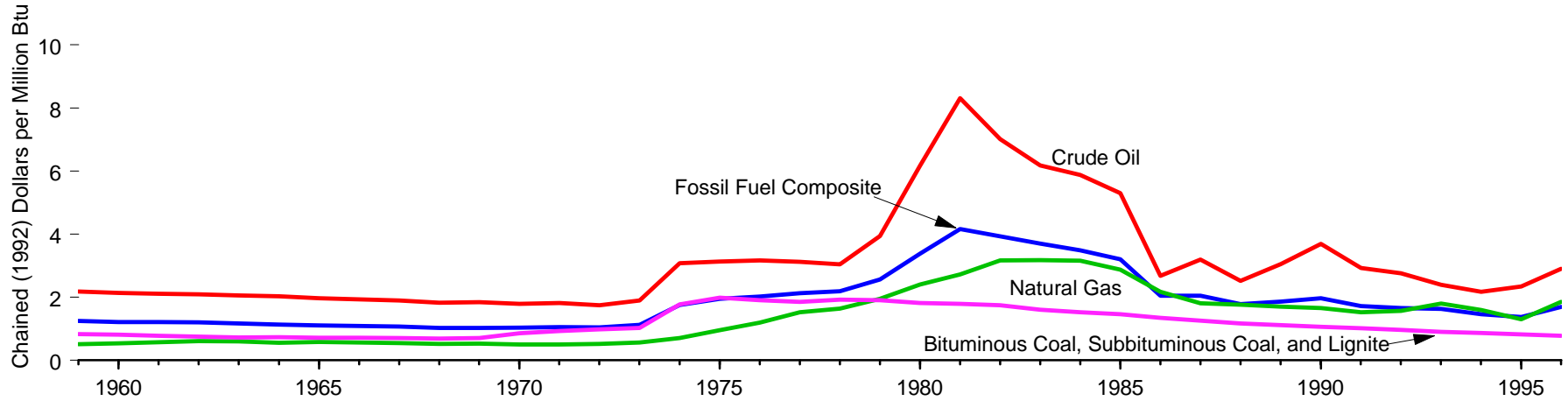
FRS companies' additions to investment in place totaled \$48 billion in 1995, up from \$39 billion in 1994 (3.11). Petroleum and natural gas accounted for \$32 billion of the 1995 total. Like nonenergy income, additions to investment in nonenergy businesses more than doubled, to \$13.4 billion.

<sup>3</sup>The FRS collects financial data from the major energy-producing companies. See Table 3.13 at end of section for a list of the U.S. energy companies reporting to the FRS.

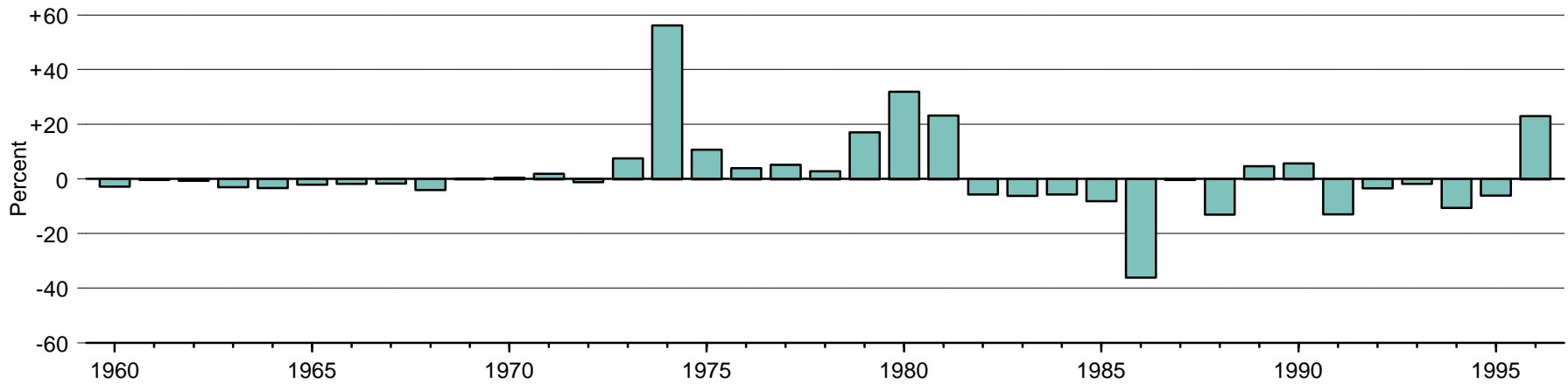
<sup>4</sup>Energy Information Administration, *Performance Profiles of Major Energy Producers 1995*, DOE/EIA-0206(95) (Washington DC, January 1997), p. 3.

**Figure 3.1 Fossil Fuel Production Prices**

Prices, 1959-1996



Fossil Fuel Composite Price, Change from Previous Year, 1960-1996



Note: Prices are in chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

Source: Table 3.1.

**Table 3.1 Fossil Fuel Production Prices, 1949-1996**  
(Dollars per Million Btu)

Year	Crude Oil <sup>1</sup>		Natural Gas <sup>2</sup>		Bituminous Coal, Subbituminous Coal, and Lignite <sup>3</sup>		Anthracite <sup>4</sup>		Fossil Fuel Composite <sup>5</sup>		
	Nominal	Real <sup>6</sup>	Nominal	Real <sup>6</sup>	Nominal	Real <sup>6</sup>	Nominal	Real <sup>6</sup>	Nominal	Real <sup>6</sup>	Percent Change <sup>7</sup>
1949	0.44	( <sup>8</sup> )	0.05	( <sup>8</sup> )	0.20	( <sup>8</sup> )	0.36	( <sup>8</sup> )	0.26	( <sup>8</sup> )	—
1950	0.43	( <sup>8</sup> )	0.06	( <sup>8</sup> )	0.19	( <sup>8</sup> )	0.38	( <sup>8</sup> )	0.26	( <sup>8</sup> )	( <sup>8</sup> )
1951	0.44	( <sup>8</sup> )	0.06	( <sup>8</sup> )	0.20	( <sup>8</sup> )	0.41	( <sup>8</sup> )	0.26	( <sup>8</sup> )	( <sup>8</sup> )
1952	0.44	( <sup>8</sup> )	0.07	( <sup>8</sup> )	0.20	( <sup>8</sup> )	0.39	( <sup>8</sup> )	0.26	( <sup>8</sup> )	( <sup>8</sup> )
1953	0.46	( <sup>8</sup> )	0.08	( <sup>8</sup> )	0.20	( <sup>8</sup> )	0.41	( <sup>8</sup> )	0.27	( <sup>8</sup> )	( <sup>8</sup> )
1954	0.48	( <sup>8</sup> )	0.09	( <sup>8</sup> )	0.18	( <sup>8</sup> )	0.36	( <sup>8</sup> )	0.28	( <sup>8</sup> )	( <sup>8</sup> )
1955	0.48	( <sup>8</sup> )	0.09	( <sup>8</sup> )	0.18	( <sup>8</sup> )	0.33	( <sup>8</sup> )	0.27	( <sup>8</sup> )	( <sup>8</sup> )
1956	0.48	( <sup>8</sup> )	0.10	( <sup>8</sup> )	0.19	( <sup>8</sup> )	0.35	( <sup>8</sup> )	0.28	( <sup>8</sup> )	( <sup>8</sup> )
1957	0.53	( <sup>8</sup> )	0.10	( <sup>8</sup> )	0.20	( <sup>8</sup> )	0.38	( <sup>8</sup> )	0.30	( <sup>8</sup> )	( <sup>8</sup> )
1958	0.52	( <sup>8</sup> )	0.11	( <sup>8</sup> )	0.19	( <sup>8</sup> )	0.38	( <sup>8</sup> )	0.29	( <sup>8</sup> )	( <sup>8</sup> )
1959	0.50	2.18	0.12	0.51	0.19	0.83	0.36	1.57	0.29	1.25	NA
1960	0.50	2.13	0.13	0.54	0.19	0.81	0.34	1.45	0.28	1.22	-2.7
1961	0.50	2.11	0.14	0.57	0.18	0.78	0.35	1.47	0.29	1.21	-0.2
1962	0.50	2.09	0.14	0.61	0.18	0.75	0.34	1.41	0.29	1.20	-0.6
1963	0.50	2.06	0.14	0.60	0.18	0.73	0.37	1.51	0.28	1.17	-3.0
1964	0.50	2.03	0.14	0.56	0.18	0.73	0.38	1.55	0.28	1.13	-3.3
1965	0.49	1.97	0.14	0.58	0.18	0.72	0.36	1.45	0.28	1.11	-2.0
1966	0.50	1.93	0.14	0.56	0.18	0.72	0.35	1.35	0.28	1.09	-1.7
1967	0.50	1.90	0.14	0.55	0.19	0.71	0.36	1.36	0.28	1.07	-1.6
1968	0.51	1.83	0.14	0.52	0.19	0.69	0.39	1.42	0.28	1.03	-4.0
1969	0.53	1.84	0.15	0.53	0.20	0.71	0.44	1.52	0.30	1.03	0.2
1970	0.55	1.79	0.15	0.50	0.26	0.86	0.49	1.60	0.32	1.04	0.5
1971	0.58	1.81	0.16	0.51	0.30	0.94	0.53	1.65	0.34	1.06	1.9
1972	0.58	1.74	0.17	0.52	0.33	0.98	0.55	1.65	0.35	1.04	-1.0
1973	0.67	1.90	0.20	0.57	0.36	1.03	0.62	1.74	0.40	1.12	7.6
1974	1.18	3.08	0.27	0.71	0.68	1.77	1.02	2.66	0.68	1.76	56.2
1975	1.32	3.13	0.40	0.95	0.84	1.99	1.50	3.54	0.82	1.94	10.8
1976	1.41	3.17	0.53	1.19	0.85	1.91	1.54	3.45	0.90	2.02	4.0
1977	1.48	3.12	0.72	1.52	0.88	1.85	1.54	3.24	1.01	2.13	5.2
1978	1.55	3.04	0.84	1.64	0.98	1.92	1.53	2.99	1.12	2.19	2.9
1979	2.18	3.94	1.08	1.96	1.05	1.90	1.77	3.20	1.42	2.56	17.1
1980	3.72	6.16	1.45	2.40	1.09	1.81	1.86	3.08	2.04	3.38	32.0
1981	5.48	8.31	1.80	2.72	1.18	1.79	1.90	2.88	2.74	4.16	23.2
1982	4.92	7.01	2.22	3.17	1.22	1.74	2.14	3.05	2.76	3.93	-5.6
1983	4.52	6.18	2.32	3.18	1.17	1.60	2.30	3.15	2.70	3.70	-6.1
1984	4.46	5.88	2.40	3.16	1.16	1.53	2.09	2.75	2.65	3.49	-5.7
1985	4.15	5.30	2.26	2.88	1.15	1.46	2.04	2.60	2.51	3.20	-8.1
1986	2.16	2.68	1.75	2.17	1.08	1.34	1.91	2.37	1.65	2.05	-36.0
1987	2.66	3.20	1.50	1.81	1.05	1.26	1.89	2.27	1.70	2.05	-0.2
1988	2.17	2.52	1.52	1.77	1.01	1.17	1.90	2.20	1.53	1.78	-13.0
1989	2.73	3.05	1.53	1.70	1.00	1.12	1.84	2.05	1.67	1.86	4.7
1990	3.45	3.69	1.55	1.65	1.00	1.06	1.74	1.86	1.84	1.97	5.7
1991	2.85	2.93	1.48	1.52	0.99	1.02	1.61	1.66	1.67	1.72	-12.8
1992	2.76	2.76	1.57	1.57	0.97	0.97	1.52	1.52	1.66	1.66	-3.4
1993	2.46	2.40	1.84	1.80	0.93	0.90	<sup>R</sup> 1.46	<sup>R</sup> 1.42	1.67	1.63	-1.7
1994	2.27	<sup>R</sup> 2.17	<sup>R</sup> 1.67	<sup>R</sup> 1.60	0.91	<sup>R</sup> 0.86	1.60	<sup>R</sup> 1.52	<sup>R</sup> 1.53	<sup>R</sup> 1.46	<sup>R</sup> -10.5
1995	2.52	<sup>R</sup> 2.34	<sup>R</sup> 1.40	<sup>R</sup> 1.30	<sup>R</sup> 0.88	<sup>R</sup> 0.82	<sup>R</sup> 1.76	<sup>R</sup> 1.64	<sup>R</sup> 1.47	<sup>R</sup> 1.37	<sup>R</sup> -6.0
1996 <sup>P</sup>	3.18	2.90	2.03	1.85	0.86	0.78	1.80	1.64	1.85	1.69	23.1

<sup>1</sup> Domestic first purchase prices.

<sup>2</sup> Wellhead prices.

<sup>3</sup> Prices are based on the value of coal produced at free-on-board (f.o.b.) mines.

<sup>4</sup> Through 1978, prices are f.o.b. preparation plants; for 1979 forward, prices are f.o.b. mines.

<sup>5</sup> Derived by multiplying the price per Btu of each fossil fuel by the total Btu content of the production of each fossil fuel and dividing this accumulated value of total fossil fuel production by the accumulated Btu content of total fossil fuel production.

<sup>6</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>7</sup> Based on real values.

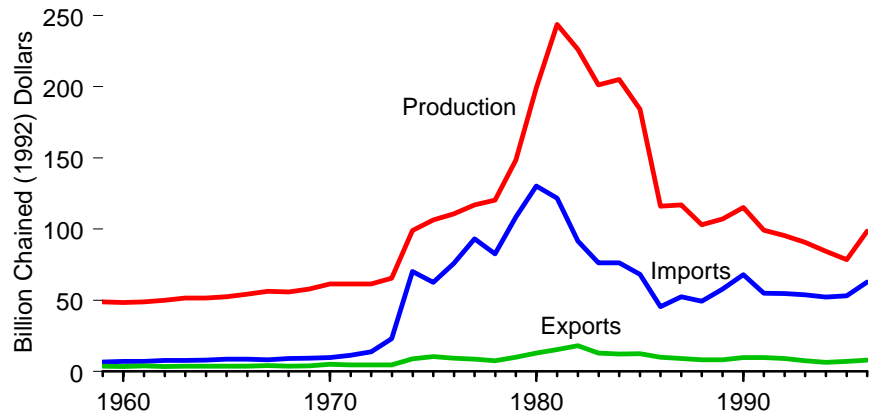
<sup>8</sup> For 1949-1958, the gross domestic product implicit price deflators, which are used to convert nominal values to real (inflation-adjusted) values, were not available in time to use in this report.

R=Revised data. P=Preliminary data. — = Not applicable. NA=Not available.

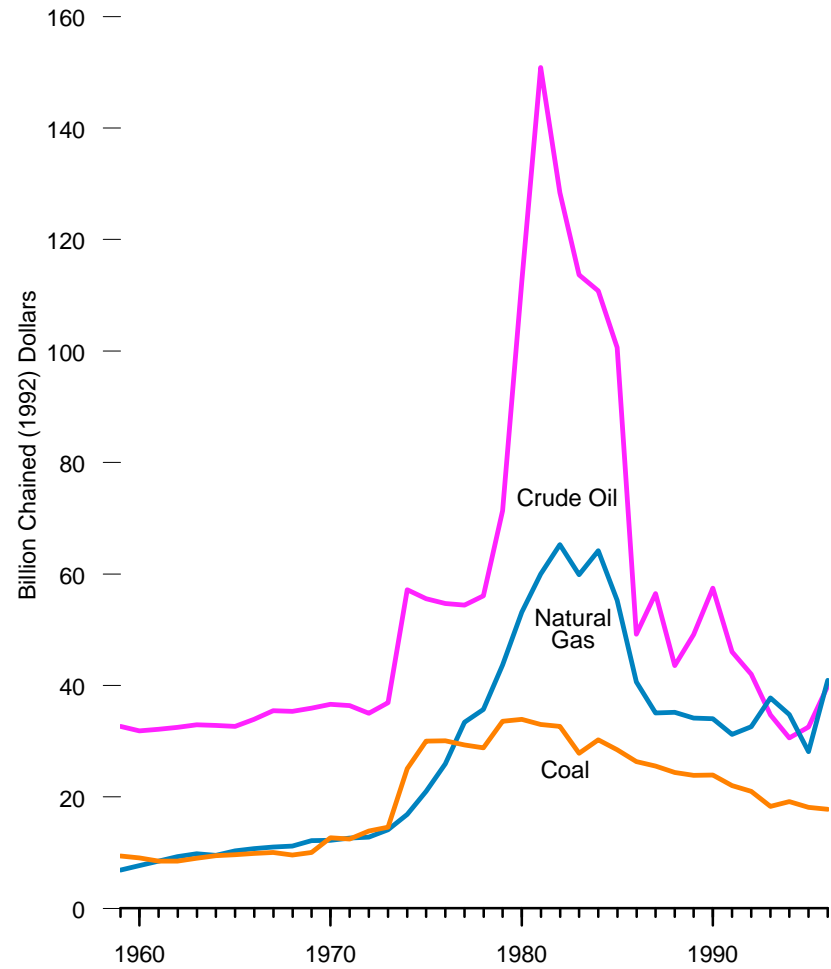
Sources: Tables 5.16, 6.8, and 7.8 and Appendices A and D.

**Figure 3.2 Value of Fossil Fuel Production**

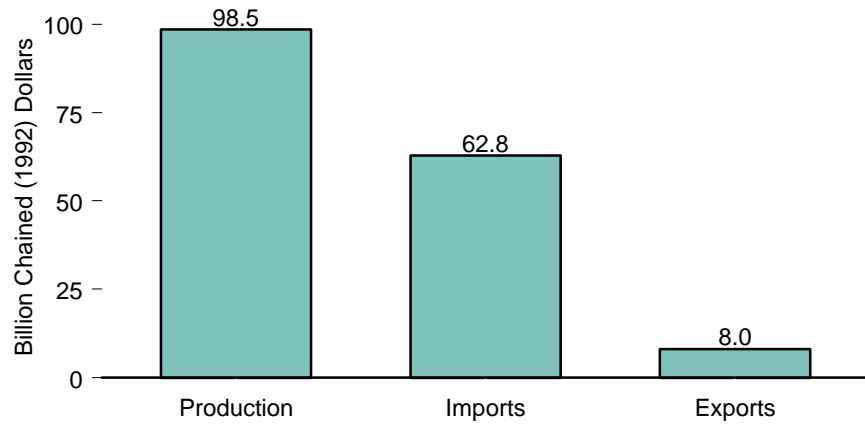
**Overview, 1959-1996**



**Production by Fuel, 1959-1996**



**Overview, 1996**



Notes: • Prices are in chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D. • Because vertical scales differ, graphs should not be compared.

Sources: Tables 3.2, 3.5, and 3.6.



**Table 3.2 Value of Fossil Fuel Production, 1949-1996**  
(Billion Dollars)

Year	Crude Oil <sup>1</sup>		Natural Gas (Marketed Production)		Coal						Total	
					Bituminous Coal, Subbituminous Coal, and Lignite		Anthracite		Total			
	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>
1949	4.68	( <sup>3</sup> )	0.33	( <sup>3</sup> )	2.14	( <sup>3</sup> )	0.38	( <sup>3</sup> )	2.52	( <sup>3</sup> )	7.53	( <sup>3</sup> )
1950	4.95	( <sup>3</sup> )	0.44	( <sup>3</sup> )	2.50	( <sup>3</sup> )	0.41	( <sup>3</sup> )	2.91	( <sup>3</sup> )	8.30	( <sup>3</sup> )
1951	5.69	( <sup>3</sup> )	0.52	( <sup>3</sup> )	2.63	( <sup>3</sup> )	0.42	( <sup>3</sup> )	3.05	( <sup>3</sup> )	9.26	( <sup>3</sup> )
1952	5.79	( <sup>3</sup> )	0.64	( <sup>3</sup> )	2.29	( <sup>3</sup> )	0.39	( <sup>3</sup> )	2.68	( <sup>3</sup> )	9.11	( <sup>3</sup> )
1953	6.32	( <sup>3</sup> )	0.76	( <sup>3</sup> )	2.25	( <sup>3</sup> )	0.31	( <sup>3</sup> )	2.56	( <sup>3</sup> )	9.64	( <sup>3</sup> )
1954	6.44	( <sup>3</sup> )	0.87	( <sup>3</sup> )	1.77	( <sup>3</sup> )	0.25	( <sup>3</sup> )	2.02	( <sup>3</sup> )	9.33	( <sup>3</sup> )
1955	6.88	( <sup>3</sup> )	0.94	( <sup>3</sup> )	2.09	( <sup>3</sup> )	0.21	( <sup>3</sup> )	2.30	( <sup>3</sup> )	10.12	( <sup>3</sup> )
1956	7.30	( <sup>3</sup> )	1.11	( <sup>3</sup> )	2.41	( <sup>3</sup> )	0.24	( <sup>3</sup> )	2.65	( <sup>3</sup> )	11.06	( <sup>3</sup> )
1957	8.09	( <sup>3</sup> )	1.17	( <sup>3</sup> )	2.50	( <sup>3</sup> )	0.23	( <sup>3</sup> )	2.73	( <sup>3</sup> )	11.99	( <sup>3</sup> )
1958	7.37	( <sup>3</sup> )	1.32	( <sup>3</sup> )	1.99	( <sup>3</sup> )	0.19	( <sup>3</sup> )	2.18	( <sup>3</sup> )	10.87	( <sup>3</sup> )
1959	7.47	32.62	1.57	6.86	1.97	8.60	0.18	0.79	2.15	9.39	11.19	48.87
1960	7.42	31.85	1.79	7.68	1.95	8.37	0.15	0.64	2.10	9.01	11.31	48.54
1961	7.58	32.12	1.99	8.43	1.85	7.84	0.14	0.59	1.99	8.43	11.56	48.98
1962	7.76	32.47	2.22	9.29	1.89	7.91	0.13	0.54	2.02	8.45	12.00	50.21
1963	7.96	32.89	2.36	9.75	2.01	8.31	0.16	0.66	2.17	8.97	12.49	51.61
1964	8.03	32.78	2.33	9.51	2.17	8.86	0.15	0.61	2.32	9.47	12.68	51.76
1965	8.15	32.60	2.57	10.28	2.27	9.08	0.13	0.52	2.40	9.60	13.12	52.48
1966	8.72	33.93	2.75	10.70	2.42	9.42	0.10	0.39	2.52	9.81	13.99	54.44
1967	9.39	35.43	2.91	10.98	2.55	9.62	0.10	0.38	2.65	10.00	14.95	56.41
1968	9.79	35.34	3.09	11.16	2.55	9.21	0.10	0.36	2.65	9.57	15.53	56.07
1969	10.42	35.93	3.52	12.14	2.80	9.66	0.10	0.34	2.90	10.00	16.84	58.07
1970	11.19	36.57	3.73	12.19	3.77	12.32	0.11	0.36	3.88	12.68	18.80	61.44
1971	11.71	36.37	4.05	12.58	3.90	12.11	0.11	0.34	4.01	12.45	19.77	61.40
1972	11.71	34.96	4.28	12.78	4.56	13.61	0.09	0.27	4.65	13.88	20.64	61.62
1973	13.07	36.92	4.98	14.07	5.05	14.27	0.09	0.25	5.14	14.52	23.19	65.51
1974	22.00	57.14	6.48	16.83	9.50	24.68	0.15	0.39	9.65	25.07	38.13	99.04
1975	23.45	55.57	8.85	20.97	12.47	29.55	0.20	0.47	12.67	30.02	44.97	106.56
1976	24.37	54.64	11.57	25.94	13.19	29.57	0.21	0.47	13.40	30.04	49.34	110.62
1977	25.79	54.41	15.82	33.38	13.70	28.90	0.20	0.42	13.90	29.32	55.51	117.11
1978	28.60	56.08	18.18	35.65	14.49	28.41	0.18	0.35	14.67	28.76	61.45	120.49
1979	39.45	71.34	24.16	43.69	18.36	33.20	0.20	0.36	18.56	33.56	82.17	148.59
1980	67.93	112.47	32.09	53.13	20.20	33.44	0.26	0.43	20.46	33.87	120.48	199.47
1981	99.40	150.83	39.51	59.95	21.51	32.64	0.24	0.36	21.75	33.00	160.66	243.78
1982	90.03	128.43	45.71	65.21	22.62	32.27	0.23	0.33	22.85	32.60	158.59	226.24
1983	83.05	113.61	43.73	59.82	20.11	27.51	0.21	0.29	20.32	27.80	147.10	201.23
1984	84.10	110.80	48.69	64.15	22.75	29.97	0.20	0.26	22.95	30.23	155.74	205.18
1985	78.88	100.61	43.35	55.29	22.06	28.14	0.22	0.28	22.28	28.42	144.51	184.32
1986	39.63	49.17	32.71	40.58	21.00	26.05	0.19	0.24	21.19	26.29	93.53	116.04
1987	46.93	56.47	29.11	35.03	21.05	25.33	0.16	0.19	21.21	25.52	97.25	117.02
1988	37.48	43.53	30.28	35.17	20.83	24.19	0.16	0.19	20.99	24.38	88.75	103.08
1989	44.07	49.13	30.58	34.09	21.27	23.71	0.14	0.16	21.41	23.87	96.06	107.09
1990	53.77	57.45	31.80	33.97	22.27	23.79	0.14	0.15	22.41	23.94	107.98	115.36
1991	44.77	46.01	30.39	31.23	21.29	21.88	0.13	0.13	21.42	22.01	96.58	99.25
1992	41.97	41.97	32.56	32.56	20.86	20.86	0.12	0.12	20.98	20.98	95.51	95.51
1993	35.61	34.71	38.72	37.74	18.62	18.15	0.14	0.14	18.76	18.29	93.09	90.74
1994	32.07	<sup>R</sup> 30.57	<sup>R</sup> 36.46	<sup>R</sup> 34.76	19.91	<sup>R</sup> 18.98	0.17	0.16	20.08	<sup>R</sup> 19.14	<sup>R</sup> 88.61	<sup>R</sup> 84.47
1995	<sup>R</sup> 35.00	<sup>R</sup> 32.53	<sup>R</sup> 30.24	<sup>R</sup> 28.10	<sup>R</sup> 19.27	<sup>R</sup> 17.91	<sup>R</sup> 0.19	<sup>R</sup> 0.18	<sup>R</sup> 19.46	<sup>R</sup> 18.09	<sup>R</sup> 84.70	<sup>R</sup> 78.72
1996 <sup>P</sup>	43.72	39.85	44.88	40.91	19.31	17.60	0.17	0.15	19.48	17.75	108.08	98.51

<sup>1</sup> Includes lease condensate.

<sup>2</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>3</sup> For 1949-1958, the gross domestic product implicit price deflators, which are used to convert nominal

values to real (inflation-adjusted) values, were not available in time to use in this report.

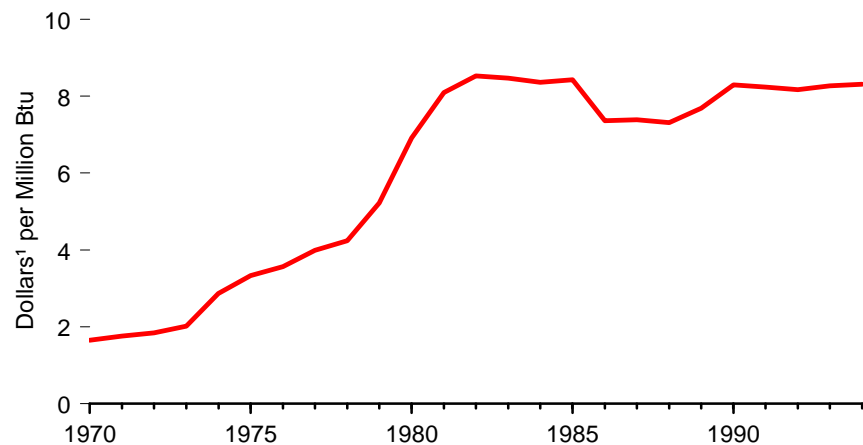
R=Revised data. P=Preliminary data.

Note: Value is based on fuel prices taken as closely as possible to the point of production.

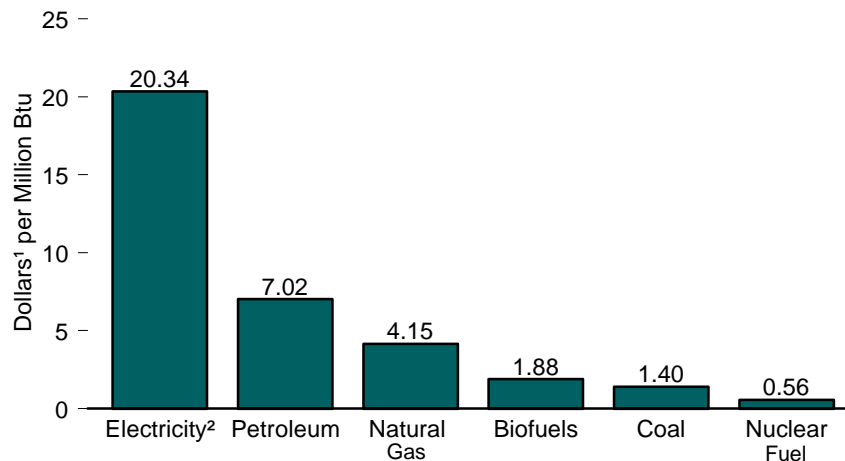
Sources: Tables 5.1, 5.16, 6.2, 6.8, 7.2, and 7.8 and Appendix D.

**Figure 3.3 Consumer Price Estimates for Energy**

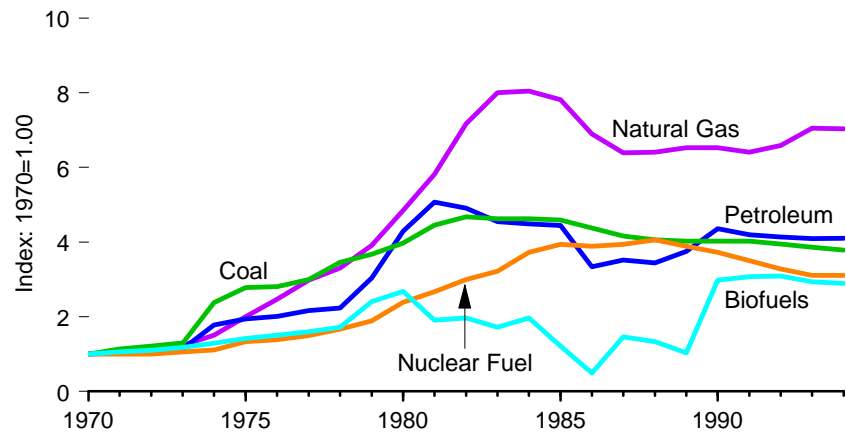
**Total Energy, 1970-1994**



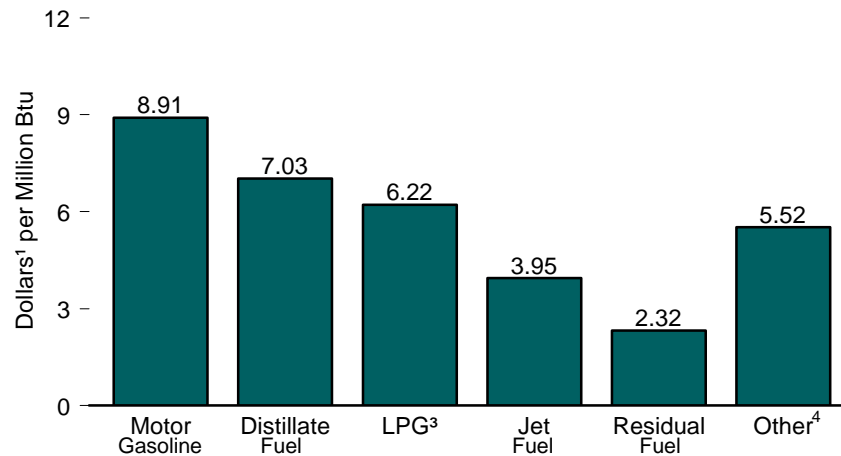
**By Energy Type, 1994**



**Prices, Indexed, 1970-1994**



**By Petroleum Product, 1994**



<sup>1</sup> Nominal dollars.

<sup>2</sup> Electricity purchased by end users.

<sup>3</sup> Liquefied petroleum gases.

<sup>4</sup> Asphalt, road oil, aviation gasoline and aviation gasoline blending components, crude oil, kerosene, lubricants, motor gasoline blending components, pentanes plus, petrochemical waxes, and miscellaneous petroleum products.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 3.3

**Table 3.3 Consumer Price Estimates for Energy, 1970-1994**  
(Nominal Dollars per Million Btu)

Year	Primary Energy <sup>1</sup>												Electric Utility Fuel	Electricity Purchased by End-Users	Total Energy <sup>4</sup>
	Coal	Natural Gas	Petroleum							Nuclear Fuel	Biofuels	Total <sup>4</sup>			
			Distillate Fuel	Jet Fuel	LPG <sup>2</sup>	Motor Gasoline	Residual Fuel	Other <sup>3</sup>	Total						
1970	0.37	0.59	1.16	0.73	1.46	2.85	0.42	1.32	1.71	0.18	0.65	1.08	0.32	4.99	1.65
1971	0.42	0.63	1.22	0.77	1.49	2.90	0.58	1.39	1.78	0.18	0.69	1.14	0.38	5.30	1.76
1972	0.45	0.68	1.22	0.79	1.52	2.88	0.62	1.42	1.77	0.18	0.72	1.17	0.41	5.54	1.84
1973	0.48	0.73	1.46	0.92	2.02	3.10	0.75	1.49	1.96	0.19	0.77	1.29	0.46	5.86	2.02
1974	0.88	0.89	2.44	1.58	2.81	4.32	1.82	2.44	3.04	0.20	0.84	1.94	0.86	7.42	2.87
1975	1.03	1.18	2.60	2.05	2.97	4.65	1.93	2.79	3.33	0.24	0.92	2.19	0.96	8.61	3.33
1976	1.04	1.46	2.77	2.25	3.21	4.84	1.90	2.95	3.45	0.25	0.98	2.34	1.02	9.13	3.57
1977	1.11	1.76	3.11	2.59	3.65	5.13	2.14	3.15	3.71	0.27	1.04	2.58	1.16	10.11	3.99
1978	1.28	1.95	3.26	2.87	3.60	5.24	2.08	3.32	3.82	0.30	1.12	2.72	1.25	10.92	4.24
1979	1.36	2.31	4.69	3.90	4.50	7.11	2.83	4.47	5.20	0.34	1.56	3.47	1.48	11.78	5.22
1980	1.47	2.86	6.70	6.36	5.64	9.84	3.88	6.64	7.35	0.43	1.74	4.58	1.75	13.95	6.91
1981	1.65	3.43	8.03	7.57	6.18	10.94	4.91	8.67	8.68	0.48	1.24	5.27	2.00	16.14	8.09
1982	1.73	4.23	7.78	7.23	6.66	10.39	4.65	7.87	8.40	0.54	1.28	5.34	2.01	18.16	8.53
1983	1.71	4.72	7.32	6.53	7.17	9.12	4.50	7.64	7.78	0.58	1.12	5.13	1.98	18.62	8.47
1984	1.71	4.75	7.36	6.25	6.93	8.89	4.75	7.75	7.68	0.67	1.28	5.05	1.97	18.50	8.36
1985	1.70	4.61	7.18	5.91	6.33	9.01	4.30	7.59	7.61	0.71	0.79	4.92	1.85	19.05	8.43
1986	1.62	4.07	5.66	3.92	6.21	6.79	2.37	5.82	5.72	0.70	0.32	3.96	1.55	19.06	7.36
1987	1.54	3.77	5.94	4.03	5.85	7.22	2.86	5.54	6.01	0.71	0.95	3.98	1.51	18.74	7.38
1988	1.50	3.78	5.80	3.80	5.65	7.32	2.35	5.27	5.89	0.73	0.87	3.88	1.45	18.68	7.31
1989	1.49	3.85	6.45	4.39	5.35	8.01	2.72	5.55	6.42	0.70	0.67	4.12	1.48	18.98	7.69
1990	1.49	3.85	7.70	5.68	6.51	9.12	3.16	5.87	7.46	0.67	<sup>5</sup> 1.94	<sup>5</sup> 4.49	1.46	19.33	<sup>5</sup> 8.29
1991	1.49	3.78	7.28	4.83	6.54	8.93	2.62	5.78	7.18	0.63	2.00	4.32	1.37	19.85	8.24
1992	1.46	3.89	7.11	4.52	5.95	8.96	2.27	5.67	7.07	0.59	2.01	4.29	1.34	20.06	8.17
1993	1.43	4.16	7.10	4.29	5.97	8.82	2.25	5.54	7.00	0.56	1.91	4.31	1.35	20.38	8.27
1994	1.40	4.15	7.03	3.95	6.22	8.91	2.32	5.52	7.02	0.56	1.88	4.32	1.30	20.34	8.31

<sup>1</sup> Primary energy is all energy including that consumed to produce electricity but excluding the electricity produced.

<sup>2</sup> Liquefied petroleum gases.

<sup>3</sup> "Other" is asphalt and road oil, aviation gasoline, kerosene, lubricants, petrochemical feedstocks, petroleum coke, special naphthas, waxes, and miscellaneous petroleum products.

<sup>4</sup> The "Primary Energy Total" and "Total Energy" prices include consumption-weighted average prices for coal coke imports and coal coke exports that are not shown in the other columns. In 1994, coal coke imports

averaged 3.31 dollars per million Btu and coal coke exports averaged 2.46 dollars per million Btu.

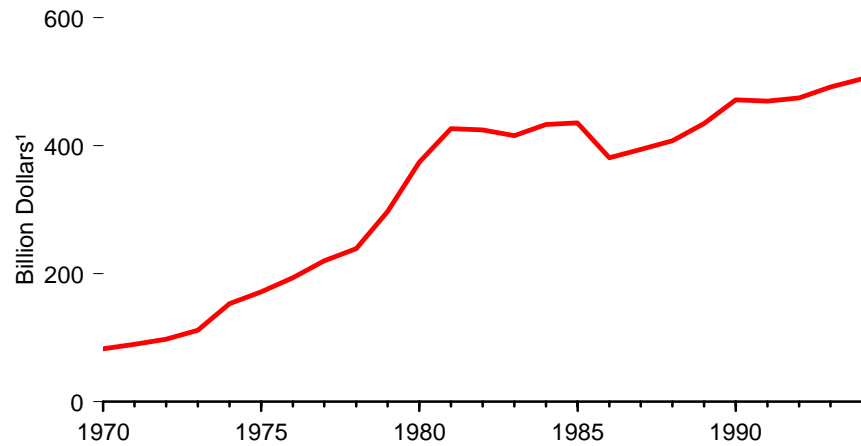
<sup>5</sup> There is a discontinuity in this time series between 1989 and 1990 due to expanded coverage of non-electric utility use of biofuels beginning in 1990.

Note: There are no direct fuel costs for hydroelectric, geothermal, wind, photovoltaic, or solar thermal energy.

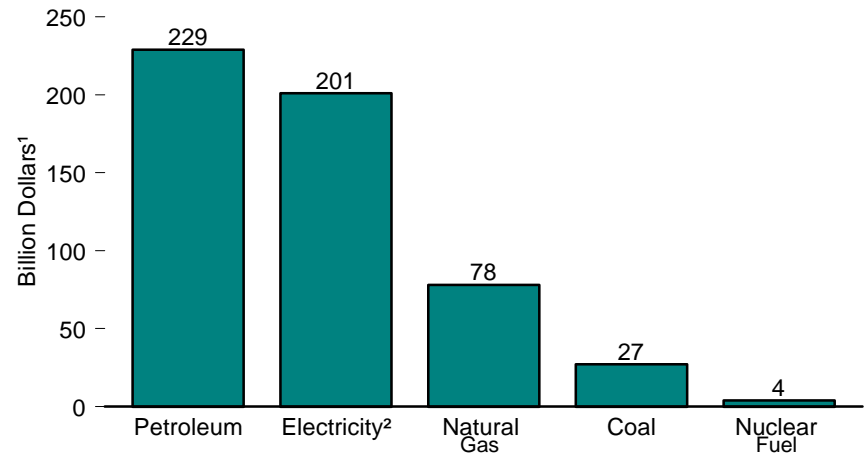
Sources: Energy Information Administration, *State Energy Price and Expenditure Report 1994* (June 1997), Table 7. This publication includes State-level data by end-use sector as well as type of energy and is available via internet at <http://www.eia.doe.gov/fueloverview.html#state>.

**Figure 3.4 Consumer Expenditure Estimates for Energy**

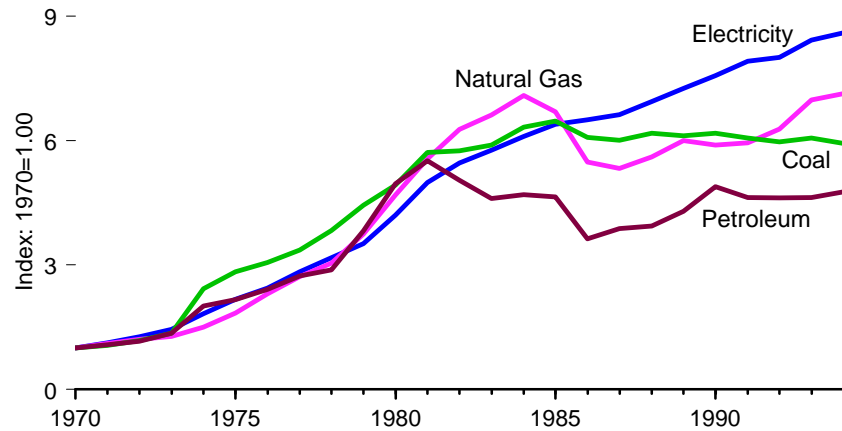
**Total Energy, 1970-1994**



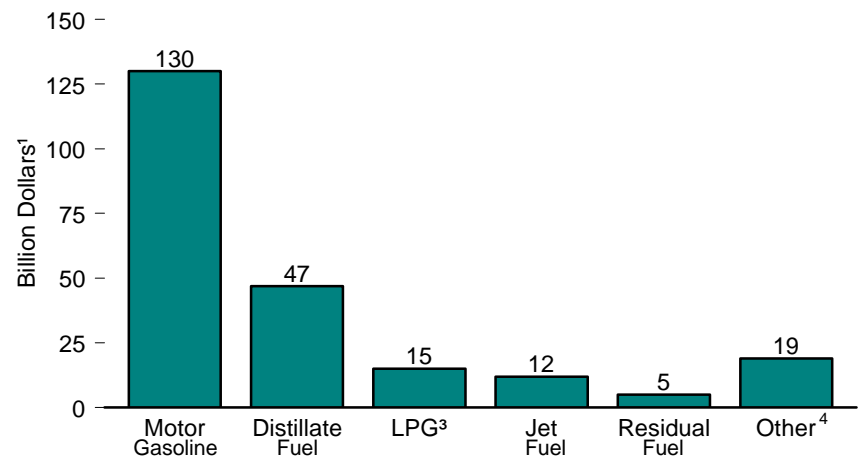
**By Energy Type, 1994**



**Expenditures by Energy Type, Indexed, 1970-1994**



**By Petroleum Product, 1994**



<sup>1</sup> Nominal dollars.

<sup>2</sup> Electricity purchased by end users.

<sup>3</sup> Liquefied petroleum gases.

<sup>4</sup> Asphalt, road oil, aviation gasoline and aviation gasoline blending components, crude oil, kerosene, lubricants, motor gasoline blending components, pentanes plus, petrochemical waxes, and miscellaneous petroleum products.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 3.4

**Table 3.4 Consumer Expenditure Estimates for Energy, 1970-1994**  
(Million Nominal Dollars)

Year	Primary Energy <sup>1</sup>													Electric Utility Fuel	Electricity Purchased by End-Users	Total Energy
	Coal	Net Imports of Coal Coke <sup>2</sup>	Natural Gas	Petroleum							Nuclear Fuel	Biofuels	Total			
				Distillate Fuel	Jet Fuel	LPG <sup>3</sup>	Motor Gasoline	Residual Fuel	Other <sup>4</sup>	Total						
1970	4,594	-75	10,891	6,253	1,441	2,446	31,596	2,046	4,305	48,088	44	2	63,544	-4,316	23,351	82,579
1971	4,883	-40	12,065	6,890	1,582	2,531	33,478	2,933	4,615	52,030	73	2	69,013	-5,441	26,208	89,781
1972	5,412	-26	13,198	7,552	1,682	2,889	35,346	3,458	4,941	55,866	104	2	74,556	-6,473	29,718	97,801
1973	6,251	7	13,933	9,524	2,001	3,933	39,667	4,667	5,513	65,304	177	3	85,675	-7,817	33,780	111,638
1974	11,145	150	16,380	15,217	3,208	5,273	54,194	10,547	8,504	96,943	259	2	124,880	-14,391	42,589	153,078
1975	13,047	82	20,061	15,680	4,193	5,231	59,446	10,374	8,935	103,858	448	2	137,499	-16,396	50,680	171,782
1976	14,079	44	25,097	18,402	4,567	5,993	64,977	11,648	10,421	116,008	520	3	155,751	-18,923	56,971	193,799
1977	15,448	67	29,602	22,004	5,517	6,824	70,591	14,381	12,377	131,694	743	5	177,560	-23,392	66,225	220,393
1978	17,595	362	33,185	23,587	6,205	6,621	74,513	13,747	13,881	138,554	915	4	190,615	-25,746	74,164	239,033
1979	20,421	259	40,785	32,854	8,603	9,383	95,916	17,656	19,353	183,766	941	8	246,180	-31,031	82,050	297,199
1980	22,648	-78	51,061	40,797	13,923	10,926	124,408	21,573	26,781	238,408	1,189	8	313,237	-37,435	98,098	373,900
1981	26,231	-31	60,544	48,200	15,607	11,900	138,138	22,668	28,571	265,084	1,436	5	353,268	-43,275	116,453	426,446
1982	26,426	-52	68,292	44,087	14,974	12,925	130,305	17,632	22,447	242,372	1,684	4	338,726	-41,311	127,394	424,809
1983	27,051	-44	72,000	41,846	13,979	14,083	115,816	14,099	21,691	221,514	1,859	4	322,384	-41,336	134,746	415,794
1984	29,049	-22	77,169	44,580	15,097	14,143	114,438	14,410	22,892	225,560	2,384	12	334,151	-43,378	142,438	433,211
1985	29,719	-34	72,938	43,759	14,747	13,108	118,044	11,493	22,199	223,350	2,930	11	328,914	-42,558	149,242	435,597
1986	27,905	-40	59,702	34,995	10,505	12,283	91,526	7,486	17,720	174,515	3,125	4	265,210	-35,793	151,806	381,224
1987	27,585	7	58,019	37,587	11,448	12,412	99,809	8,062	17,419	186,737	3,486	15	275,848	-36,692	154,692	393,848
1988	28,370	116	61,089	38,593	11,318	12,301	103,211	7,259	16,816	189,498	4,111	15	283,199	-37,435	162,070	407,833
1989	28,106	137	65,383	43,246	13,434	11,772	112,585	8,354	17,198	206,588	3,992	14	304,219	-38,895	169,340	434,664
1990	28,381	22	64,102	49,430	17,784	13,187	126,472	8,707	19,413	234,993	4,142	<sup>5</sup> 1,645	<sup>5</sup> 333,286	-38,441	176,742	<sup>5</sup> 471,586
1991	27,866	42	64,697	45,181	14,609	14,372	123,051	6,786	18,376	222,375	4,172	1,809	320,962	-36,500	184,822	469,283
1992	27,417	99	68,401	45,110	13,559	13,628	125,158	5,575	18,866	221,897	3,878	1,828	323,519	-35,763	186,957	474,713
1993	27,857	56	75,941	45,885	13,002	13,432	126,397	5,439	18,463	222,618	3,658	1,737	331,866	-36,651	196,586	491,801
1994	27,251	92	77,753	47,235	12,474	15,286	129,900	5,289	18,856	229,040	3,858	1,750	339,744	-35,951	200,894	504,688

<sup>1</sup> Primary energy is all energy including that consumed to produce electricity but excluding the electricity produced.

<sup>2</sup> Values derive from U.S. Department of Commerce, Bureau of the Census, "Monthly Report IM-145" and "Monthly Report IM-545," and may differ slightly from those shown on Table 3.7, which derive from Bureau of the Census, *U.S. International Trade in Goods and Services*. FT600 series.

<sup>3</sup> Liquefied petroleum gases.

<sup>4</sup> "Other" is asphalt and road oil, aviation gasoline, kerosene, lubricants, petrochemical feedstocks, petroleum coke, special naphthas, waxes, and miscellaneous petroleum products.

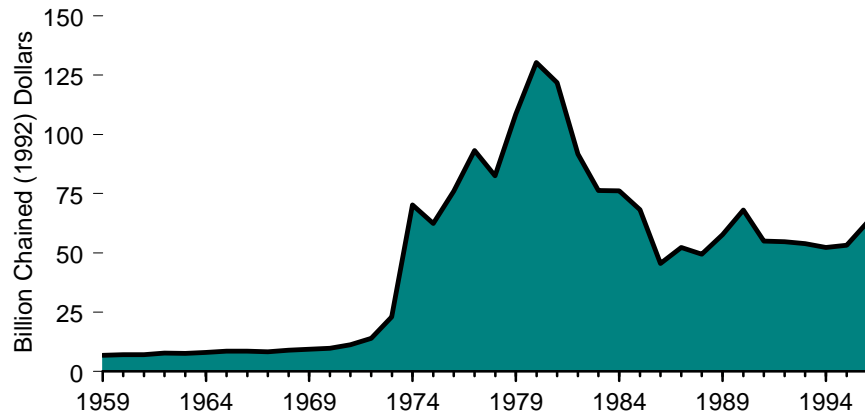
<sup>5</sup> There is a discontinuity in this time series between 1989 and 1990 due to expanded coverage of non-electric utility use of biofuels beginning in 1990.

Note: There are no direct fuel costs for hydroelectric, geothermal, wind, photovoltaic, or solar thermal energy. Totals may not equal the sum of components due to independent rounding.

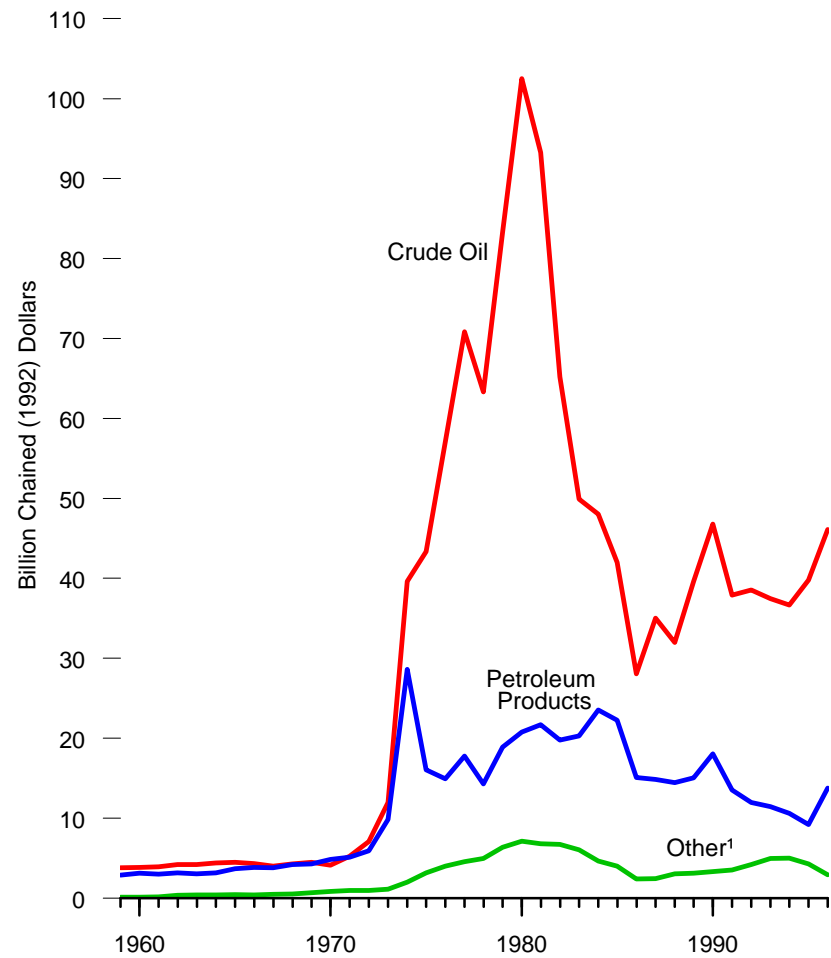
Sources: Energy Information Administration, *State Energy Price and Expenditure Report 1994* (June 1997), Table 7. This publication includes State-level data by end-use sector as well as type of energy and is available via internet at <http://www.eia.doe.gov/fueloverview.html#state>.

**Figure 3.5 Value of Fossil Fuel Imports**

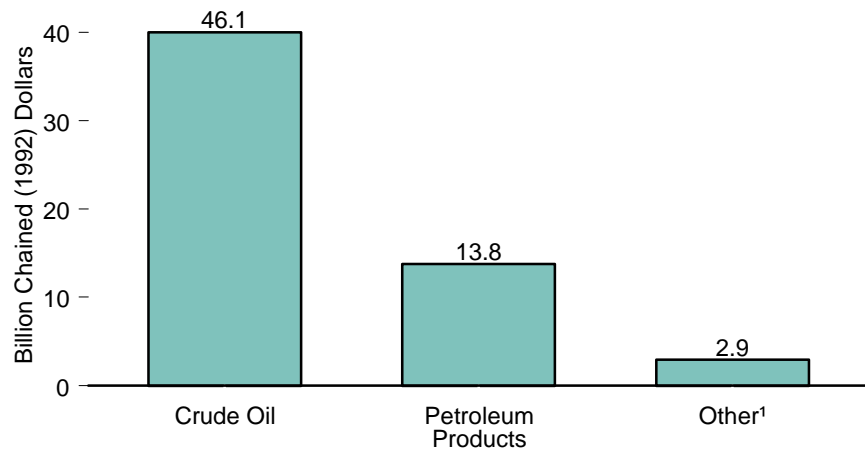
**Total, 1959-1996**



**By Fuel, 1959-1996**



**By Fuel, 1996**



<sup>1</sup> "Other" is natural gas, coal, and coal coke.

Notes: • Prices are in chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D. • Because vertical scales differ, graphs should not be compared.

Source: Table 3.5.

**Table 3.5 Value of Fossil Fuel Imports, 1949-1996**  
(Billion Dollars)

Year	Coal		Coal Coke		Natural Gas		Crude Oil <sup>1</sup>		Petroleum Products		Total	
	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>
1949	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	0.00	( <sup>3</sup> )	0.30	( <sup>3</sup> )	0.14	( <sup>3</sup> )	0.45	( <sup>3</sup> )
1950	(s)	( <sup>3</sup> )	0.01	( <sup>3</sup> )	0.00	( <sup>3</sup> )	0.37	( <sup>3</sup> )	0.21	( <sup>3</sup> )	0.59	( <sup>3</sup> )
1951	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	0.00	( <sup>3</sup> )	0.37	( <sup>3</sup> )	0.23	( <sup>3</sup> )	0.61	( <sup>3</sup> )
1952	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	0.42	( <sup>3</sup> )	0.25	( <sup>3</sup> )	0.68	( <sup>3</sup> )
1953	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	0.51	( <sup>3</sup> )	0.25	( <sup>3</sup> )	0.77	( <sup>3</sup> )
1954	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	0.54	( <sup>3</sup> )	0.28	( <sup>3</sup> )	0.83	( <sup>3</sup> )
1955	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	0.65	( <sup>3</sup> )	0.44	( <sup>3</sup> )	1.10	( <sup>3</sup> )
1956	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	0.84	( <sup>3</sup> )	0.45	( <sup>3</sup> )	1.29	( <sup>3</sup> )
1957	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	0.98	( <sup>3</sup> )	0.57	( <sup>3</sup> )	1.56	( <sup>3</sup> )
1958	(s)	( <sup>3</sup> )	(s)	( <sup>3</sup> )	0.02	( <sup>3</sup> )	0.94	( <sup>3</sup> )	0.68	( <sup>3</sup> )	1.65	( <sup>3</sup> )
1959	(s)	0.01	(s)	0.01	0.03	0.11	0.87	3.81	0.66	2.89	1.57	6.84
1960	(s)	0.01	(s)	0.01	0.03	0.12	0.90	3.84	0.73	3.14	1.66	7.12
1961	(s)	0.01	(s)	0.01	0.04	0.19	0.93	3.95	0.71	3.01	1.69	7.17
1962	(s)	0.01	(s)	0.01	0.09	0.36	1.01	4.23	0.75	3.15	1.86	7.76
1963	(s)	0.01	(s)	0.01	0.10	0.41	1.03	4.24	0.74	3.05	1.87	7.71
1964	(s)	0.01	(s)	0.01	0.10	0.41	1.08	4.41	0.78	3.20	1.97	8.03
1965	(s)	0.01	(s)	0.01	0.11	0.42	1.12	4.48	0.92	3.69	2.15	8.61
1966	(s)	0.01	(s)	0.01	0.11	0.41	1.12	4.34	0.99	3.84	2.21	8.61
1967	(s)	0.01	(s)	0.01	0.13	0.49	1.06	4.02	1.02	3.83	2.21	8.35
1968	(s)	0.01	(s)	0.01	0.15	0.53	1.18	4.27	1.16	4.20	2.50	9.02
1969	(s)	(s)	(s)	0.01	0.20	0.67	1.30	4.48	1.24	4.27	2.74	9.44
1970	(s)	(s)	(s)	0.01	0.26	0.84	1.26	4.12	1.48	4.84	3.00	9.82
1971	(s)	0.01	0.01	0.02	0.31	0.97	1.69	5.24	1.66	5.14	3.66	11.37
1972	(s)	(s)	(s)	0.01	0.31	0.94	2.37	7.07	1.99	5.94	4.68	13.97
1973	(s)	(s)	0.04	0.11	0.36	1.02	4.24	11.98	3.50	9.88	8.14	23.00
1974	0.06	0.15	0.19	0.50	0.53	1.38	15.25	39.62	11.01	28.61	27.05	70.25
1975	0.02	0.05	0.16	0.37	1.15	2.73	18.29	43.34	6.77	16.04	26.39	62.53
1976	0.02	0.04	0.11	0.25	1.66	3.72	25.46	57.08	6.65	14.91	33.90	76.00
1977	0.04	0.08	0.13	0.28	2.00	4.22	33.59	70.87	8.42	17.76	44.18	93.20
1978	0.07	0.15	0.41	0.80	2.06	4.04	32.30	63.33	7.30	14.32	42.15	82.64
1979	0.05	0.09	0.34	0.61	3.13	5.65	46.06	83.29	10.45	18.90	60.03	108.55
1980	0.03	0.05	0.05	0.09	4.21	6.98	61.90	102.48	12.54	20.76	78.74	130.36
1981	0.03	0.05	0.04	0.07	4.41	6.70	61.46	93.26	14.30	21.70	80.24	121.76
1982	0.02	0.03	0.01	0.01	4.69	6.70	45.72	65.23	13.86	19.78	64.31	91.74
1983	0.04	0.06	(s)	(s)	4.39	6.00	36.49	49.92	14.84	20.30	55.77	76.29
1984	0.05	0.06	0.05	0.06	3.44	4.53	36.44	48.02	17.87	23.54	57.84	76.21
1985	0.07	0.09	0.04	0.05	3.05	3.89	32.90	41.97	17.47	22.28	53.53	68.28
1986	0.08	0.10	0.03	0.03	1.82	2.26	22.61	28.05	12.18	15.11	36.72	45.55
1987	0.06	0.07	0.05	0.07	1.93	2.32	29.13	35.05	12.37	14.88	43.54	52.39
1988	0.06	0.07	0.19	0.22	2.38	2.76	27.55	31.99	12.43	14.44	42.62	49.50
1989	0.10	0.11	0.22	0.24	2.51	2.79	35.53	39.61	13.50	15.05	51.85	57.80
1990	0.09	0.10	0.07	0.08	2.97	3.18	43.78	46.78	16.90	18.06	63.83	68.19
1991	0.11	0.12	0.09	0.10	3.24	3.33	36.90	37.93	13.17	13.54	53.51	55.00
1992	0.13	0.13	0.14	0.14	3.96	3.96	38.55	38.55	11.98	11.98	54.77	54.77
1993	0.22	0.21	0.12	0.11	R <sup>4</sup> 7.77	R <sup>4</sup> 6.65	38.47	37.49	11.74	11.44	R <sup>5</sup> 53.31	R <sup>5</sup> 53.91
1994	0.23	0.22	0.13	0.13	R <sup>4</sup> 9.00	R <sup>4</sup> 6.67	38.48	R <sup>3</sup> 36.68	11.14	R <sup>10</sup> 6.62	R <sup>5</sup> 54.89	R <sup>5</sup> 52.32
1995	0.25	0.23	0.16	0.15	R <sup>4</sup> 2.23	R <sup>3</sup> 9.93	R <sup>4</sup> 2.81	R <sup>3</sup> 39.79	R <sup>9</sup> 9.95	R <sup>9</sup> 2.25	R <sup>5</sup> 7.39	R <sup>5</sup> 3.34
1996 <sup>P</sup>	0.24	0.22	0.11	0.10	2.87	2.61	50.58	46.11	15.12	13.78	68.92	62.83

<sup>1</sup> Includes imports into the Strategic Petroleum Reserve, which began in 1977.

<sup>2</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>3</sup> For 1949-1958, the gross domestic product implicit price deflators, which are used to convert nominal values to real (inflation-adjusted) values, were not available in time to use in this report.

R=Revised data. P=Preliminary data. (s)=Less than \$5 million.

Notes: • Includes value of imports into Puerto Rico from foreign countries; excludes receipts into the 50 States and the District of Columbia from the Virgin Islands and Puerto Rico. • Totals may not equal sum of components due to independent rounding.

Sources: **Natural Gas:** • 1949-1962—Bureau of the Census, *U.S. Imports of Merchandise for Consumption*, FT110. • 1963—Bureau of the Census, *U.S. Imports of Merchandise for Consumption*,

FT125. • 1964-1971—Bureau of the Census, *U.S. Imports for Consumption and General Imports*, FT246.

• 1972 and 1973—Federal Power Commission, *Pipeline Imports and Exports of Natural Gas - Imports and Exports of LNG*. • 1974-1977—Federal Power Commission, *United States Imports and Exports of Natural Gas*, annual. • 1978-1981—Energy Information Administration (EIA), *U.S. Imports and Exports of Natural Gas*, annual. • 1982-1995—EIA, *Natural Gas Monthly*. • 1996—EIA estimates. **All Other Data:**

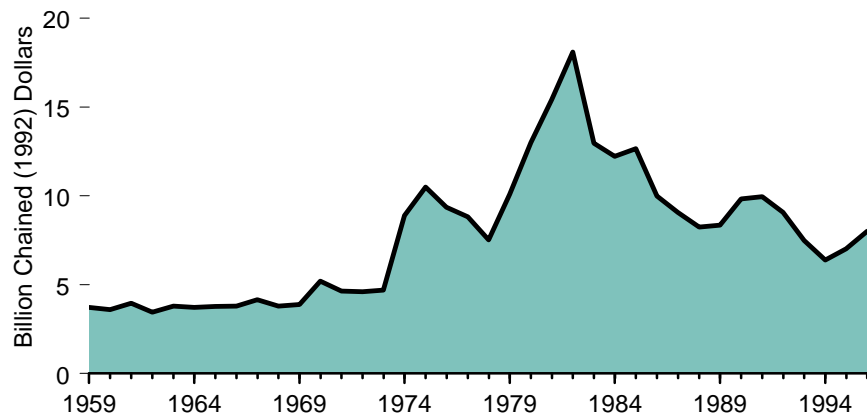
• 1949-1962—Bureau of the Census, *U.S. Imports of Merchandise for Consumption*, FT110.

• 1963—Bureau of the Census, *U.S. Imports of Merchandise for Consumption*, FT125.

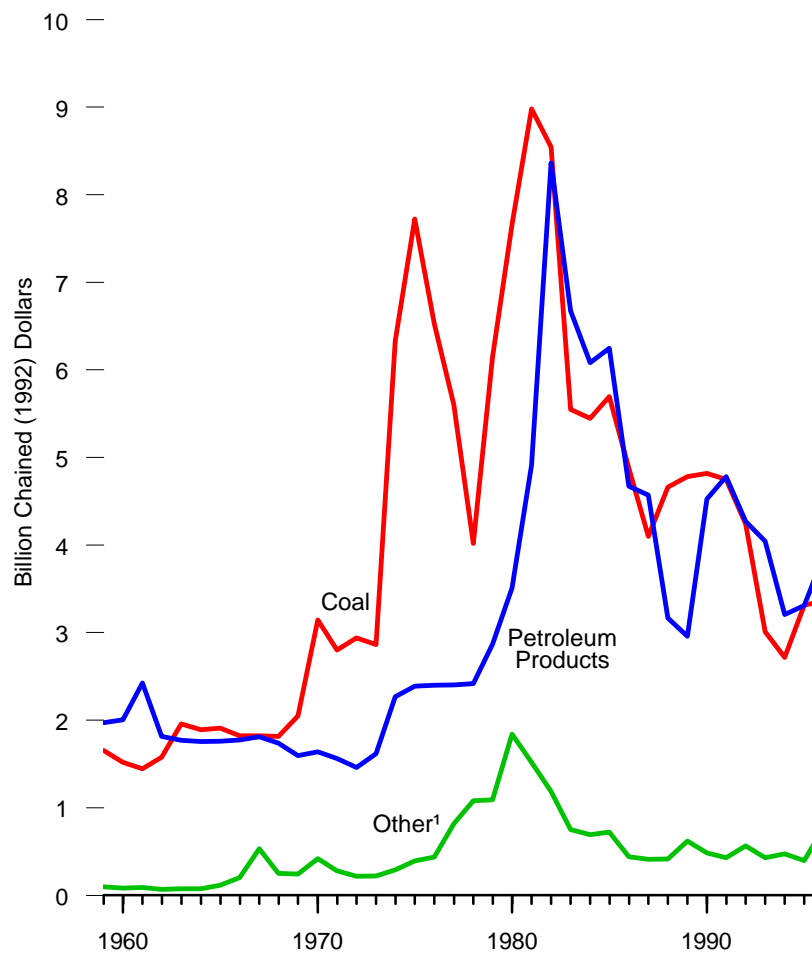
• 1964-1988—Bureau of the Census, *U.S. Imports for Consumption*, FT135. • 1989-1993—Bureau of the Census, *Advanced Report on U.S. Merchandise Trade*, FT900 Adv. (94-12). • 1994—Bureau of the Census, *U.S. International Trade in Goods and Services*, FT900 Adv. (95-12). • 1995 and 1996—Bureau of the Census, *Foreign Trade Division*, FT900 (CB-97-26) December 1996.

**Figure 3.6 Value of Fossil Fuel Exports**

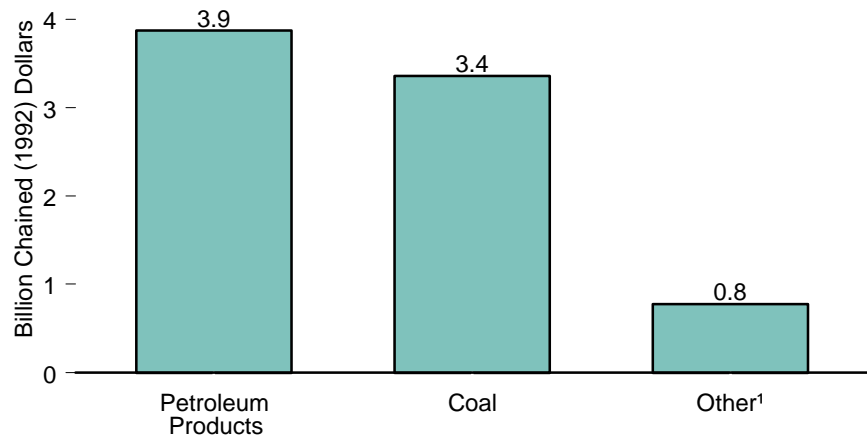
**Total, 1959-1996**



**By Fuel, 1959-1996**



**By Fuel, 1996**



<sup>1</sup> "Other" is natural gas, crude oil, and coal coke.

Notes: • Prices are in chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D. • Because vertical scales differ,

graphs should not be compared.

Source: Table 3.6.



**Table 3.6 Value of Fossil Fuel Exports, 1949-1996**  
(Billion Dollars)

Year	Coal		Coal Coke		Natural Gas		Crude Oil		Petroleum Products		Total	
	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>
1949	0.30	( <sup>2</sup> )	0.01	( <sup>2</sup> )	(s)	( <sup>2</sup> )	0.10	( <sup>2</sup> )	0.46	( <sup>2</sup> )	0.87	( <sup>2</sup> )
1950	0.27	( <sup>2</sup> )	0.01	( <sup>2</sup> )	(s)	( <sup>2</sup> )	0.10	( <sup>2</sup> )	0.39	( <sup>2</sup> )	0.78	( <sup>2</sup> )
1951	0.59	( <sup>2</sup> )	0.02	( <sup>2</sup> )	(s)	( <sup>2</sup> )	0.08	( <sup>2</sup> )	0.70	( <sup>2</sup> )	1.39	( <sup>2</sup> )
1952	0.49	( <sup>2</sup> )	0.01	( <sup>2</sup> )	(s)	( <sup>2</sup> )	0.08	( <sup>2</sup> )	0.74	( <sup>2</sup> )	1.33	( <sup>2</sup> )
1953	0.34	( <sup>2</sup> )	0.01	( <sup>2</sup> )	(s)	( <sup>2</sup> )	0.06	( <sup>2</sup> )	0.63	( <sup>2</sup> )	1.04	( <sup>2</sup> )
1954	0.30	( <sup>2</sup> )	0.01	( <sup>2</sup> )	(s)	( <sup>2</sup> )	0.05	( <sup>2</sup> )	0.61	( <sup>2</sup> )	0.97	( <sup>2</sup> )
1955	0.48	( <sup>2</sup> )	0.01	( <sup>2</sup> )	0.01	( <sup>2</sup> )	0.04	( <sup>2</sup> )	0.60	( <sup>2</sup> )	1.14	( <sup>2</sup> )
1956	0.73	( <sup>2</sup> )	0.01	( <sup>2</sup> )	0.01	( <sup>2</sup> )	0.09	( <sup>2</sup> )	0.67	( <sup>2</sup> )	1.51	( <sup>2</sup> )
1957	0.83	( <sup>2</sup> )	0.01	( <sup>2</sup> )	0.01	( <sup>2</sup> )	0.17	( <sup>2</sup> )	0.81	( <sup>2</sup> )	1.84	( <sup>2</sup> )
1958	0.53	( <sup>2</sup> )	0.01	( <sup>2</sup> )	0.01	( <sup>2</sup> )	0.01	( <sup>2</sup> )	0.51	( <sup>2</sup> )	1.07	( <sup>2</sup> )
1959	0.38	1.65	0.01	0.04	0.01	0.03	0.01	0.03	0.45	1.97	0.85	3.72
1960	0.35	1.52	0.01	0.03	(s)	0.02	0.01	0.03	0.47	2.00	0.84	3.60
1961	0.34	1.45	0.01	0.03	(s)	0.02	0.01	0.04	0.57	2.43	0.93	3.96
1962	0.38	1.58	0.01	0.03	(s)	0.02	0.01	0.02	0.43	1.81	0.83	3.46
1963	0.47	1.96	0.01	0.03	(s)	0.02	(s)	0.02	0.43	1.77	0.92	3.80
1964	0.46	1.89	0.01	0.04	(s)	0.02	(s)	0.02	0.43	1.75	0.91	3.72
1965	0.48	1.91	0.02	0.07	0.01	0.03	(s)	0.02	0.44	1.76	0.95	3.78
1966	0.47	1.82	0.02	0.09	0.02	0.07	0.01	0.04	0.46	1.77	0.97	3.79
1967	0.48	1.82	0.02	0.06	0.03	0.12	0.09	0.35	0.48	1.81	1.10	4.16
1968	0.50	1.81	0.02	0.07	0.04	0.14	0.01	0.04	0.48	1.74	1.05	3.80
1969	0.59	2.05	0.04	0.13	0.03	0.09	0.01	0.02	0.46	1.59	1.13	3.88
1970	0.96	3.14	0.08	0.26	0.03	0.10	0.02	0.06	0.50	1.64	1.59	5.20
1971	0.90	2.80	0.04	0.14	0.04	0.12	0.01	0.02	0.50	1.56	1.49	4.64
1972	0.98	2.94	0.03	0.09	0.04	0.12	(s)	0.01	0.49	1.46	1.55	4.61
1973	1.01	2.86	0.03	0.09	0.04	0.12	(s)	0.01	0.57	1.62	1.66	4.70
1974	2.44	6.33	0.04	0.11	0.05	0.14	0.01	0.04	0.87	2.27	3.42	8.89
1975	3.26	7.72	0.07	0.18	0.09	0.22	(s)	(s)	1.01	2.39	4.43	10.50
1976	2.91	6.53	0.07	0.15	0.10	0.23	0.03	0.06	1.07	2.40	4.17	9.36
1977	2.66	5.60	0.07	0.15	0.11	0.23	0.21	0.44	1.14	2.40	4.18	8.82
1978	2.05	4.02	0.05	0.10	0.11	0.22	0.39	0.76	1.23	2.42	3.83	7.51
1979	3.40	6.14	0.08	0.15	0.13	0.23	0.39	0.71	1.58	2.86	5.58	10.10
1980	4.63	7.66	0.13	0.22	0.23	0.38	0.75	1.24	2.12	3.51	7.86	13.01
1981	5.92	8.98	0.07	0.11	0.35	0.53	0.58	0.88	3.24	4.91	10.16	15.41
1982	5.99	8.55	0.06	0.09	0.30	0.43	0.47	0.67	5.86	8.36	12.68	18.09
1983	4.06	5.55	0.05	0.06	0.28	0.38	0.22	0.31	4.88	6.67	9.48	12.97
1984	4.13	5.44	0.07	0.09	0.27	0.35	0.19	0.24	4.62	6.08	9.27	12.22
1985	4.47	5.70	0.08	0.10	0.26	0.34	0.23	0.29	4.90	6.24	9.93	12.66
1986	3.93	4.88	0.07	0.08	0.17	0.21	0.12	0.15	3.77	4.67	8.05	9.99
1987	3.40	4.10	0.05	0.06	0.17	0.20	0.13	0.15	3.80	4.57	7.54	9.07
1988	4.01	4.66	0.08	0.09	0.20	0.23	0.08	0.09	2.72	3.16	7.09	8.24
1989	4.29	4.78	0.08	0.09	0.27	0.30	0.21	0.23	2.65	2.96	7.49	8.35
1990	4.51	4.82	0.05	0.05	0.27	0.28	0.14	0.15	4.23	4.52	9.20	9.82
1991	4.62	4.75	0.05	0.05	0.33	0.34	0.03	0.03	4.65	4.78	9.69	9.96
1992	4.24	4.24	0.04	0.04	0.49	0.49	0.03	0.03	4.27	4.27	9.07	9.07
1993	3.09	3.01	0.06	0.06	0.36	0.35	0.02	0.02	4.15	4.04	7.68	7.48
1994	2.85	<sup>R</sup> 2.72	0.04	0.04	0.40	0.39	0.05	0.05	3.36	3.20	<sup>R</sup> 6.71	6.39
1995	3.57	<sup>R</sup> 3.31	0.05	0.05	<sup>R</sup> 0.37	<sup>R</sup> 0.34	<sup>R</sup> 0.01	<sup>R</sup> 0.01	3.56	3.31	7.55	<sup>R</sup> 7.02
1996 <sup>P</sup>	3.69	3.36	0.06	0.06	0.33	0.30	0.46	0.42	4.25	3.87	8.79	8.01

<sup>1</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>2</sup> For 1949-1958, the gross domestic product implicit price deflators, which are used to convert nominal values to real (inflation-adjusted) values, were not available in time to use in this report.

R=Revised data. P=Preliminary data. (s)=Less than \$5 million.

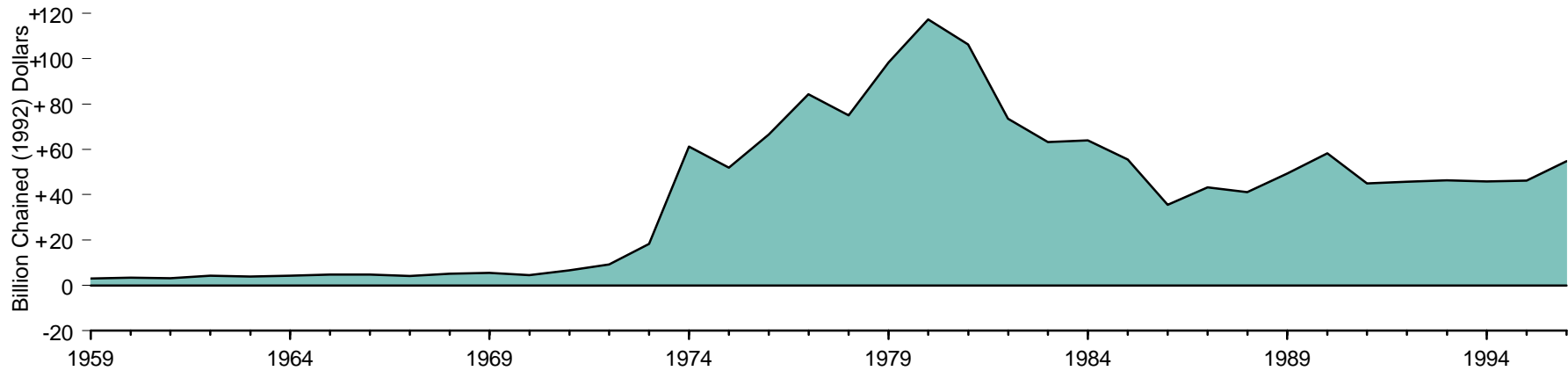
Notes: • Includes value of exports from Puerto Rico to foreign countries; excludes shipments from the 50 States and the District of Columbia to the Virgin Islands and Puerto Rico. • Totals may not equal sum of components due to independent rounding.

Sources: **Natural Gas:** • 1949-1971—Bureau of the Census, *U.S. Exports*, FT410. • 1972 and

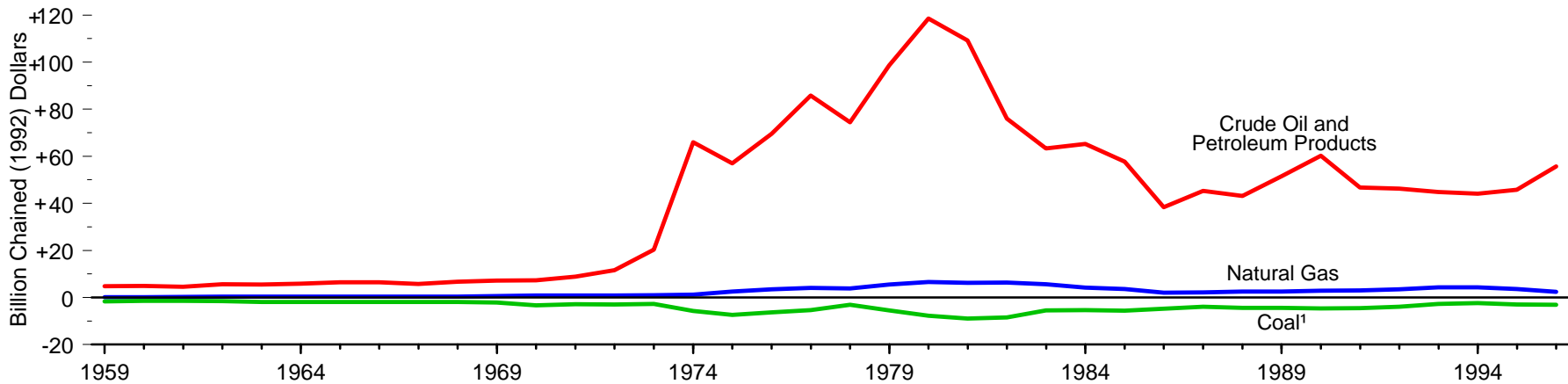
1973—Federal Power Commission, *Pipeline Imports and Exports of Natural Gas - Imports and Exports of LNG*. • 1974-1977—Federal Power Commission, *United States Imports and Exports of Natural Gas*, annual. • 1978-1981—Energy Information Administration (EIA), *U.S. Imports and Exports of Natural Gas*, annual. • 1982-1994—EIA, *Natural Gas Monthly*. • 1995—EIA estimates. **All Other Data:** • 1949-1988—Bureau of the Census, *U.S. Exports*, FT410. • 1989-1993—Bureau of the Census, *Advanced Report on U.S. Merchandise Trade*, FT900 Adv. (94-12). • 1994—Bureau of the Census, *U.S. International Trade in Goods and Services*, FT900 Adv. (95-12). • 1995 and 1996—Bureau of the Census, *Foreign Trade Division*, FT900 (CB-97-26) December 1996

**Figure 3.7 Value of Fossil Fuel Net Imports, 1959-1996**

**Value of Fossil Fuel Net Imports**



**Value of Fossil Fuel Net Imports by Fuel**



<sup>1</sup> Includes small amounts of coal coke.

Notes: • Negative net imports are net exports.

• Prices are in chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

Source: Table 3.7.

**Table 3.7 Value of Fossil Fuel Net Imports, 1949-1996**  
(Billion Dollars)

Year	Coal		Coal Coke		Natural Gas		Crude Oil		Petroleum Products		Total	
	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>
1949	-0.29	( <sup>2</sup> )	(s)	( <sup>2</sup> )	(s)	( <sup>2</sup> )	0.21	( <sup>2</sup> )	-0.32	( <sup>2</sup> )	-0.42	( <sup>2</sup> )
1950	-0.27	( <sup>2</sup> )	(s)	( <sup>2</sup> )	(s)	( <sup>2</sup> )	0.27	( <sup>2</sup> )	-0.18	( <sup>2</sup> )	-0.18	( <sup>2</sup> )
1951	-0.58	( <sup>2</sup> )	-0.02	( <sup>2</sup> )	(s)	( <sup>2</sup> )	0.29	( <sup>2</sup> )	-0.47	( <sup>2</sup> )	-0.78	( <sup>2</sup> )
1952	-0.49	( <sup>2</sup> )	-0.01	( <sup>2</sup> )	(s)	( <sup>2</sup> )	0.34	( <sup>2</sup> )	-0.49	( <sup>2</sup> )	-0.65	( <sup>2</sup> )
1953	-0.33	( <sup>2</sup> )	-0.01	( <sup>2</sup> )	(s)	( <sup>2</sup> )	0.45	( <sup>2</sup> )	-0.38	( <sup>2</sup> )	-0.27	( <sup>2</sup> )
1954	-0.30	( <sup>2</sup> )	(s)	( <sup>2</sup> )	(s)	( <sup>2</sup> )	0.50	( <sup>2</sup> )	-0.32	( <sup>2</sup> )	-0.14	( <sup>2</sup> )
1955	-0.48	( <sup>2</sup> )	-0.01	( <sup>2</sup> )	-0.01	( <sup>2</sup> )	0.62	( <sup>2</sup> )	-0.16	( <sup>2</sup> )	-0.04	( <sup>2</sup> )
1956	-0.73	( <sup>2</sup> )	-0.01	( <sup>2</sup> )	-0.01	( <sup>2</sup> )	0.75	( <sup>2</sup> )	-0.22	( <sup>2</sup> )	-0.22	( <sup>2</sup> )
1957	-0.83	( <sup>2</sup> )	-0.01	( <sup>2</sup> )	-0.01	( <sup>2</sup> )	0.81	( <sup>2</sup> )	-0.24	( <sup>2</sup> )	-0.28	( <sup>2</sup> )
1958	-0.52	( <sup>2</sup> )	-0.01	( <sup>2</sup> )	0.01	( <sup>2</sup> )	0.92	( <sup>2</sup> )	0.17	( <sup>2</sup> )	0.58	( <sup>2</sup> )
1959	-0.38	-1.64	-0.01	-0.03	0.02	0.09	0.87	3.78	0.21	0.92	0.71	3.12
1960	-0.35	-1.51	-0.01	-0.02	0.02	0.11	0.89	3.81	0.26	1.14	0.82	3.51
1961	-0.34	-1.44	-0.01	-0.03	0.04	0.17	0.92	3.92	0.14	0.58	0.76	3.21
1962	-0.38	-1.57	-0.01	-0.02	0.08	0.34	1.01	4.21	0.32	1.34	1.03	4.30
1963	-0.47	-1.95	-0.01	-0.03	0.09	0.39	1.02	4.22	0.31	1.28	0.95	3.91
1964	-0.46	-1.88	-0.01	-0.04	0.10	0.39	1.08	4.39	0.35	1.44	1.06	4.31
1965	-0.48	-1.90	-0.01	-0.06	0.10	0.39	1.11	4.46	0.48	1.94	1.21	4.83
1966	-0.47	-1.81	-0.02	-0.08	0.09	0.34	1.11	4.30	0.53	2.07	1.24	4.81
1967	-0.48	-1.81	-0.01	-0.06	0.10	0.37	0.97	3.67	0.54	2.03	1.11	4.19
1968	-0.50	-1.81	-0.02	-0.06	0.11	0.39	1.17	4.23	0.68	2.47	1.45	5.22
1969	-0.59	-2.04	-0.04	-0.12	0.17	0.58	1.29	4.46	0.78	2.68	1.61	5.55
1970	-0.96	-3.14	-0.08	-0.25	0.23	0.74	1.24	4.06	0.98	3.21	1.41	4.62
1971	-0.90	-2.79	-0.04	-0.12	0.27	0.85	1.68	5.22	1.15	3.58	2.17	6.74
1972	-0.98	-2.94	-0.03	-0.08	0.28	0.82	2.37	7.07	1.50	4.48	3.13	9.35
1973	-1.01	-2.86	0.01	0.02	0.32	0.91	4.24	11.97	2.93	8.26	6.48	18.30
1974	-2.38	-6.18	0.15	0.39	0.48	1.24	15.24	39.58	10.14	26.34	23.63	61.37
1975	-3.24	-7.67	0.08	0.19	1.06	2.51	18.29	43.34	5.76	13.65	21.96	52.03
1976	-2.89	-6.49	0.04	0.10	1.56	3.50	25.43	57.02	5.58	12.51	29.72	66.64
1977	-2.62	-5.52	0.06	0.12	1.89	3.99	33.38	70.43	7.28	15.36	40.00	84.38
1978	-1.98	-3.87	0.36	0.70	1.95	3.82	31.91	62.57	6.07	11.90	38.31	75.12
1979	-3.35	-6.05	0.26	0.47	3.00	5.42	45.66	82.58	8.87	16.03	54.44	98.45
1980	-4.60	-7.61	-0.08	-0.13	3.98	6.60	61.15	101.24	10.42	17.25	70.88	117.35
1981	-5.89	-8.93	-0.03	-0.05	4.06	6.16	60.88	92.38	11.06	16.78	70.09	106.35
1982	-5.97	-8.51	-0.05	-0.07	4.39	6.27	45.25	64.56	8.00	11.41	51.63	73.65
1983	-4.01	-5.49	-0.04	-0.06	4.11	5.62	36.27	49.61	9.96	13.63	46.28	63.32
1984	-4.09	-5.38	-0.02	-0.03	3.17	4.18	36.26	47.77	13.25	17.46	48.57	63.99
1985	-4.39	-5.61	-0.03	-0.04	2.79	3.55	32.68	41.68	12.57	16.03	43.60	55.62
1986	-3.85	-4.78	-0.04	-0.05	1.65	2.05	22.49	27.90	8.42	10.44	28.67	35.57
1987	-3.35	-4.03	0.01	0.01	1.76	2.12	29.00	34.90	8.57	10.31	36.00	43.32
1988	-3.95	-4.59	0.12	0.14	2.18	2.53	27.47	31.90	9.71	11.28	35.53	41.26
1989	-4.19	-4.67	0.14	0.15	2.24	2.49	35.32	39.38	10.85	12.09	44.35	49.45
1990	-4.42	-4.72	0.02	0.02	2.71	2.89	43.65	46.63	12.67	13.54	54.63	58.36
1991	-4.51	-4.63	0.04	0.04	2.90	2.98	36.87	37.89	8.52	8.75	43.82	45.04
1992	-4.11	-4.11	0.10	0.10	3.47	3.47	38.52	38.52	7.72	7.72	45.70	45.70
1993	-2.87	-2.79	0.06	0.05	<sup>R</sup> 4.41	<sup>R</sup> 4.30	38.45	37.48	7.59	7.40	<sup>R</sup> 47.64	<sup>R</sup> 46.43
1994	-2.62	-2.50	0.09	0.09	<sup>R</sup> 4.50	<sup>R</sup> 4.29	38.43	<sup>R</sup> 36.64	7.78	<sup>R</sup> 7.42	<sup>R</sup> 48.18	<sup>R</sup> 45.93
1995	-3.32	-3.09	0.11	0.10	<sup>R</sup> 3.86	<sup>R</sup> 3.59	<sup>R</sup> 42.81	<sup>R</sup> 39.78	<sup>R</sup> 6.39	<sup>R</sup> 5.94	<sup>R</sup> 49.84	<sup>R</sup> 46.32
1996 <sup>P</sup>	-3.45	-3.14	0.05	0.05	2.54	2.32	50.12	45.69	10.87	9.91	60.13	54.82

<sup>1</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>2</sup> For 1949-1958, the gross domestic product implicit price deflators, which are used to convert nominal values to real (inflation-adjusted) values, were not available in time to use in this report.

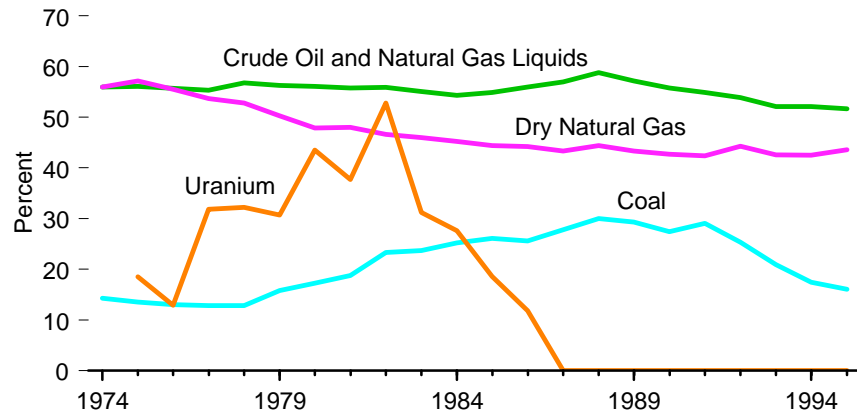
R=Revised data. P=Preliminary data. (s)=Less than \$5 million.

Notes: • Net imports = imports minus exports. • Totals may not equal sum of components due to independent rounding. Data on this table may not equal data on Table 3.5 minus data on Table 3.6 due to independent rounding.

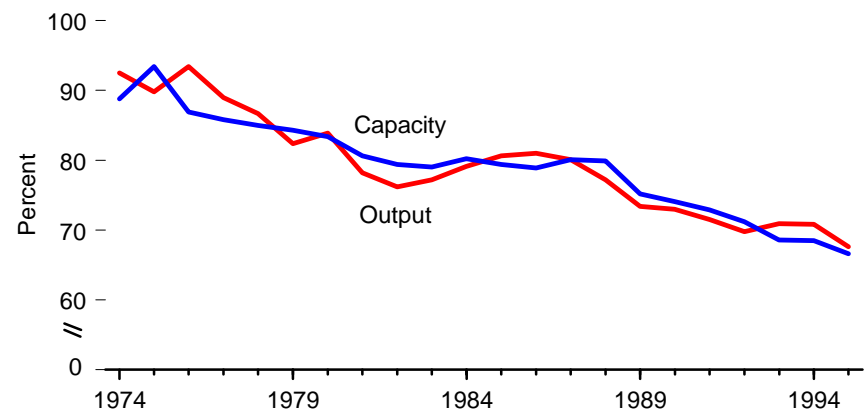
Sources: Tables 3.5 and 3.6.

**Figure 3.8 FRS Companies' Operations, Selected Statistics, 1974-1995**

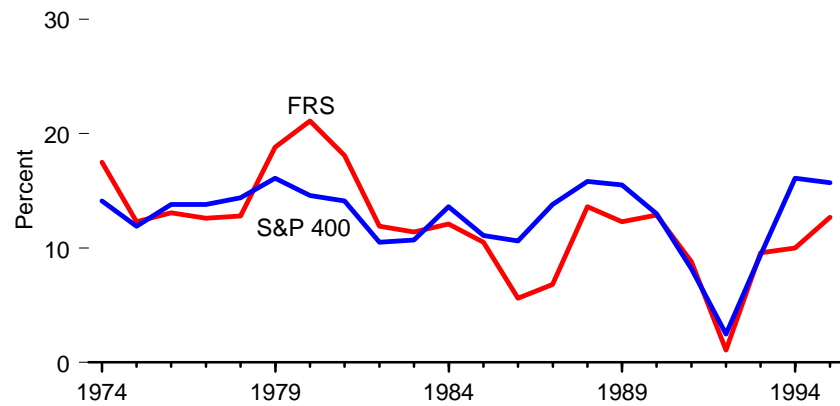
**FRS Shares of U.S. Total Production**



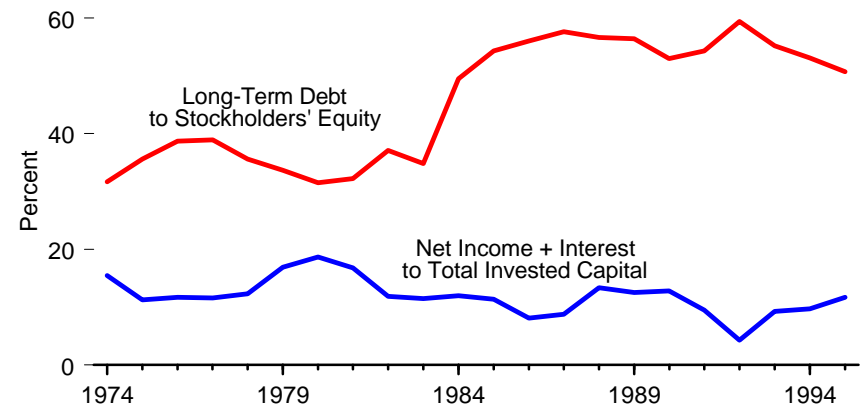
**FRS Shares of U.S. Refining Capacity and Output**



**FRS Companies' Net Income to Stockholders' Equity**



**FRS Companies' Indicators**



Notes: • FRS is the Financial Reporting System. See Table 3.13.  
 • Because vertical scales differ, graphs should not be compared.

Source: Table 3.8.

**Table 3.8 FRS Companies' Operations, Selected Statistics, 1974-1995**

Year	Production				Refining		Financial Indicators				
	Crude Oil and Natural Gas Liquids	Dry Natural Gas	Coal <sup>1</sup>	Uranium	Capacity <sup>2,3</sup>	Output <sup>3</sup>	Net Income	Net Income to Stockholders' Equity	Net Income to Stockholders' Equity for S & P 400 <sup>4</sup>	Net Income Plus Interest to Total Invested Capital	Long-Term Debt to Stockholders' Equity
	Million Barrels	Trillion Cubic Feet	Million Short Tons	Million Pounds U <sub>3</sub> O <sub>8</sub>	Million Barrels per Day		Billion Dollars <sup>5</sup>	Percent			
1974	2,136.7	11.6	87.4	NA	13.3	11.8	13.6	17.5	14.1	15.5	31.7
1975	2,049.9	11.0	88.1	4.3	13.4	R12.0	10.3	12.3	11.9	11.3	35.6
1976	1,983.4	10.6	89.0	3.3	14.2	R12.6	12.0	13.1	13.8	11.7	38.7
1977	1,991.2	10.3	89.1	R 9.5	14.6	R13.5	12.7	12.6	13.8	11.6	38.9
1978	2,131.4	10.1	85.5	R11.9	14.8	R13.5	13.9	12.8	14.4	12.3	35.6
1979	2,081.7	9.9	123.3	R11.5	14.4	R13.2	23.5	18.8	16.1	16.9	33.7
1980	2,087.5	9.3	142.3	19.0	15.1	12.2	31.0	21.1	14.6	18.7	31.5
1981	2,072.4	9.2	154.8	14.5	14.6	R11.2	30.0	18.1	14.1	16.8	32.2
1982	2,079.1	8.3	195.2	R14.2	13.6	10.6	21.8	11.9	10.5	11.9	37.1
1983	2,059.3	7.4	185.2	6.6	13.0	R10.3	21.9	11.4	10.7	11.5	34.8
1984	2,088.8	7.9	226.0	4.1	12.8	R10.9	21.3	12.1	13.6	12.0	49.5
1985	2,120.5	7.3	230.4	2.1	12.6	R10.8	17.4	10.5	11.1	11.4	54.3
1986	2,089.6	7.1	227.6	1.6	12.5	R11.4	9.2	5.6	10.6	8.1	56.0
1987	2,069.5	7.2	255.3	R 0.0	12.5	11.7	11.3	6.8	13.8	8.8	57.6
1988	2,102.1	7.6	285.3	R 0.0	12.3	12.0	22.3	13.6	15.8	13.4	56.6
1989	1,911.1	7.5	286.9	R 0.0	11.5	11.4	19.8	12.3	15.5	12.5	56.4
1990	1,814.0	7.6	282.0	R 0.0	11.4	11.3	21.6	12.9	13.0	12.8	53.0
1991	1,818.1	7.5	289.6	R 0.0	11.2	11.1	14.7	8.8	8.2	9.5	54.3
1992	1,750.2	7.9	251.9	0.0	11.0	11.0	1.8	1.1	2.5	4.3	59.4
1993	1,632.5	7.7	197.3	0.0	10.7	10.8	15.5	9.6	9.4	9.3	55.2
1994	1,593.8	8.0	179.7	0.0	10.6	10.8	16.5	10.0	R16.1	9.7	53.1
1995	1,570.6	8.1	165.4	0.0	10.4	10.7	21.1	12.7	15.7	11.7	50.7
Percent of U.S. Total											
1974	56.0	R56.0	R14.3	NA	R92.5	R88.8					
1975	56.1	R57.2	R13.5	R18.5	R89.8	R93.4					
1976	R55.7	R55.5	R13.0	R12.9	R93.4	R86.9					
1977	55.3	R53.7	R12.8	R31.8	R89.0	R85.8					
1978	56.8	R52.8	R12.8	R32.2	R86.7	R85.0					
1979	56.3	50.3	R15.8	R30.7	R82.4	R84.3					
1980	56.1	R47.9	R17.2	43.5	R83.9	R83.4					
1981	R55.8	R48.0	R18.8	37.7	R78.2	R80.6					
1982	R55.9	46.6	R23.3	R52.8	R76.2	R79.4					
1983	R55.1	R46.0	R23.7	R31.2	R77.2	R79.0					
1984	R54.3	R45.2	R25.2	R27.6	R79.1	R80.2					
1985	R54.9	R44.4	R26.1	18.6	R80.6	R79.4					
1986	R56.0	R44.2	R25.6	R11.8	R81.0	R78.9					
1987	R57.0	R43.3	R27.8	R 0.0	R80.1	R80.1					
1988	R58.8	R44.4	R30.0	R 0.0	R77.2	R79.9					
1989	R57.2	R43.3	R29.3	R 0.0	R73.4	R75.2					
1990	R55.8	R42.7	R27.4	R 0.0	R73.0	R74.1					
1991	R54.9	42.4	R29.1	R 0.0	R71.5	R72.9					
1992	R53.9	R44.3	25.3	0.0	R69.8	R71.2					
1993	R52.1	R42.6	R20.9	0.0	R70.9	R68.6					
1994	R52.1	R42.5	R17.4	0.0	R70.8	R68.5					
1995	51.7	43.6	16.0	0.0	67.6	66.6					

<sup>1</sup> Bituminous coal, subbituminous coal, and lignite.

<sup>2</sup> Operable capacity as of January 1 of the following year.

<sup>3</sup> Includes Puerto Rico and the Virgin Islands.

<sup>4</sup> Standard and Poors' 400.

<sup>5</sup> Nominal dollars.

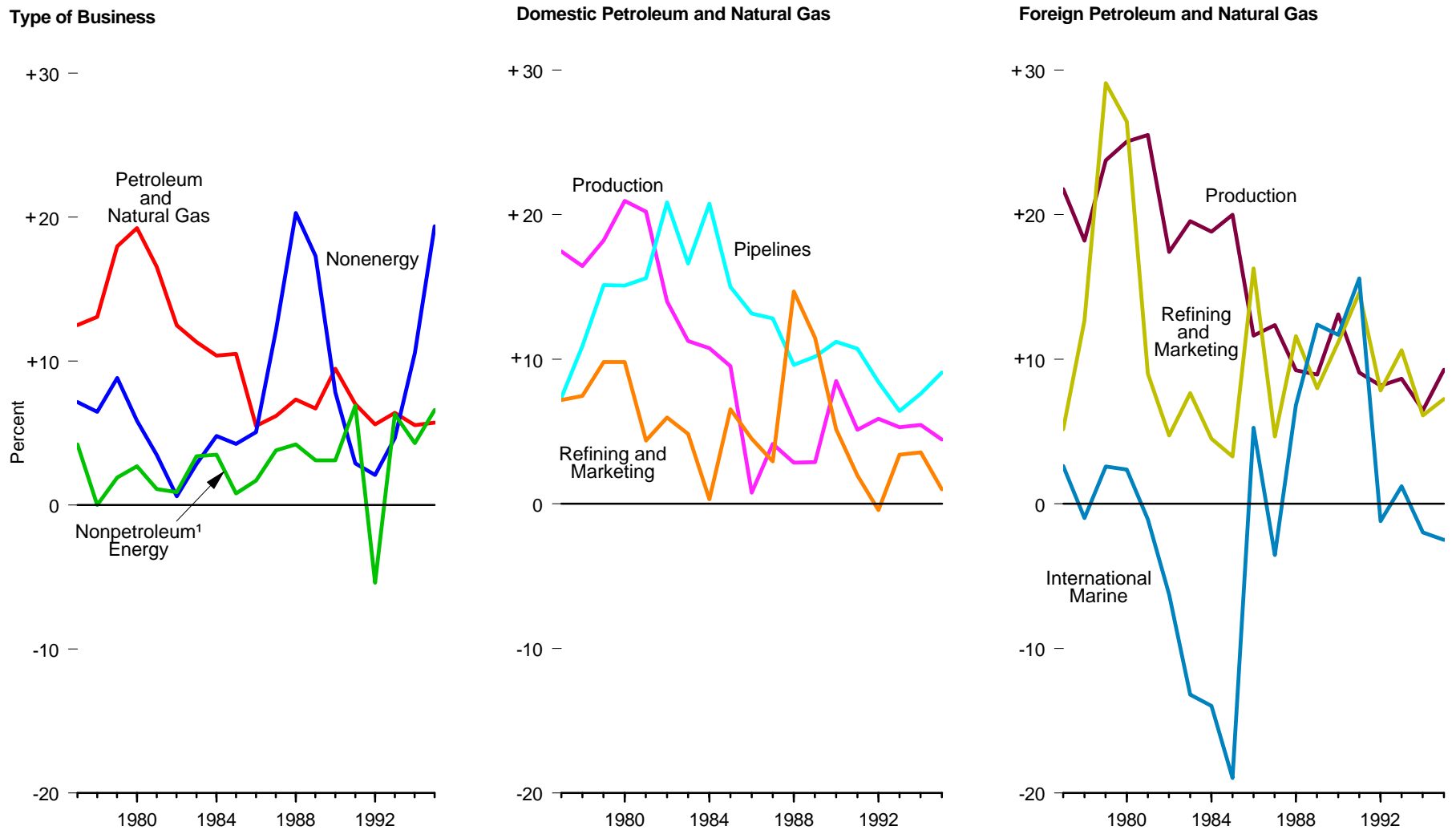
R=Revised data.

Notes: • FRS is the Financial Reporting System. See Table 3.14. • FRS Crude Oil and NGL and

Natural Gas (Dry Marketed) production are on a net ownership interest basis (see Glossary).

Sources: **FRS Company Statistics:** • 1974-1976—Energy Information Administration (EIA), Form EIA-28, "Financial Reporting System" database, October 1996. • 1977-1994—EIA, *Performance Profiles of Major Energy Producers*, annual report. • 1995—EIA, *Performance Profiles of Major Energy Producers, annual report*. • 1995—EIA, *Performance Profiles of Major Energy Producers 1995* (January 1997), Tables 1, 12, 21, 25, B16, and B40. **U.S. Production Data for Calculation of Shares:** EIA, *Annual Energy Review 1995*, Tables 5.1, 5.8, 5.9, 6.1, 7.2, and 9.3.

**Figure 3.9 FRS Companies' Return on Investment, 1977-1995**



<sup>1</sup> Coal, nuclear, and other energy.

Notes: • FRS is the Financial Reporting System. See Table 3.13. • Return on

investment = net income as a percent of net investment in place.

Sources: Tables 3.9 and 3.10.

**Table 3.9 FRS Companies' Net Income, 1974-1995**

(Billion Dollars<sup>1</sup>)

Year	Type of Business					Domestic Petroleum and Natural Gas				Foreign Petroleum and Natural Gas			
	Petroleum and Natural Gas	Coal	Nuclear and Other Energy	Non-energy	Total <sup>2</sup>	Production	Refining and Marketing	Rate Regulated Pipelines	Total <sup>2</sup>	Production	Refining and Marketing	International Marine	Total <sup>2</sup>
1974	NA	NA	NA	NA	13.6	NA	NA	NA	NA	NA	NA	NA	NA
1975	NA	NA	NA	NA	10.3	NA	NA	NA	NA	NA	NA	NA	NA
1976	NA	NA	NA	NA	12.0	NA	NA	NA	NA	NA	NA	NA	NA
1977	13.0	0.2	(s)	1.7	12.7	6.4	1.5	0.8	8.6	3.6	0.7	0.1	4.4
1978	14.7	0.1	-0.1	1.8	13.9	6.7	1.6	1.2	9.5	3.5	1.8	-0.1	5.2
1979	23.0	0.3	-0.1	2.8	23.5	9.4	2.3	1.7	13.4	5.2	4.3	0.1	9.7
1980	29.1	0.3	(s)	2.3	31.0	13.8	2.5	1.7	17.9	6.9	4.3	0.1	11.2
1981	29.5	0.4	-0.3	1.6	30.0	16.8	1.3	1.8	19.9	8.0	1.6	-0.1	9.6
1982	25.0	0.4	-0.3	0.4	21.8	14.1	1.9	2.3	18.3	6.1	0.8	-0.3	6.7
1983	24.0	0.5	(s)	1.8	21.9	12.2	1.6	2.0	15.9	7.2	1.3	-0.5	8.2
1984	23.6	0.6	-0.1	2.9	21.3	13.3	0.1	2.5	15.8	7.5	0.7	-0.4	7.8
1985	24.8	0.4	-0.3	2.5	17.4	12.1	2.3	2.3	16.7	8.0	0.5	-0.4	8.1
1986	12.9	0.2	(s)	2.8	9.2	0.9	1.6	2.6	5.2	4.7	2.9	0.1	7.7
1987	14.8	0.4	(s)	7.1	11.3	4.7	1.1	2.6	8.4	5.4	1.0	-0.1	6.4
1988	17.5	0.6	-0.1	10.8	22.3	3.2	5.4	2.0	10.6	4.3	2.4	0.1	6.9
1989	16.2	0.4	-0.1	8.7	19.8	3.1	4.5	1.9	9.5	4.7	1.8	0.2	6.7
1990	23.4	0.3	0.1	4.3	21.6	8.7	2.2	2.1	12.9	7.4	2.8	0.2	10.5
1991	17.7	0.6	0.1	1.6	14.7	5.1	0.9	2.0	7.9	5.4	4.1	0.3	9.8
1992	14.4	-0.5	0.1	1.2	1.8	5.6	-0.2	2.1	7.5	4.7	2.2	(s)	6.9
1993	16.5	0.4	0.1	2.7	15.5	4.8	1.7	1.6	8.1	5.2	3.2	(s)	8.4
1994	14.4	0.2	0.2	6.2	16.5	4.8	1.8	1.8	8.5	4.0	2.0	(s)	5.9
1995	14.7	0.3	0.2	12.6	21.1	3.7	0.5	2.2	6.4	5.9	2.4	(s)	8.3

<sup>1</sup> Nominal dollars.

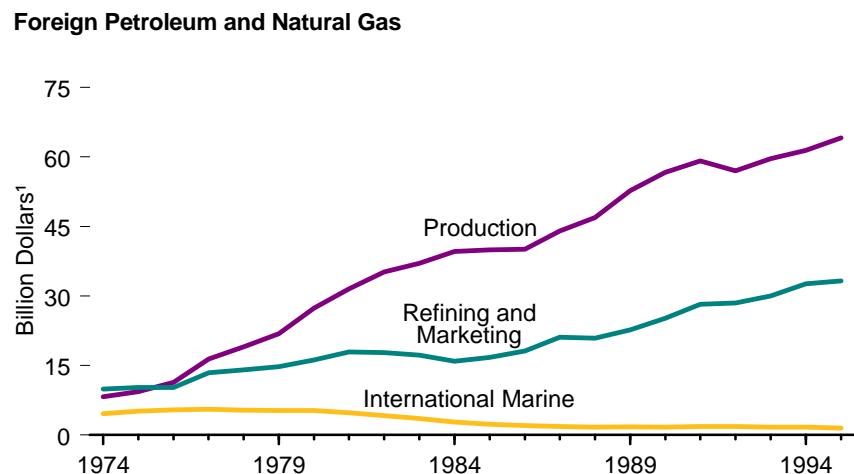
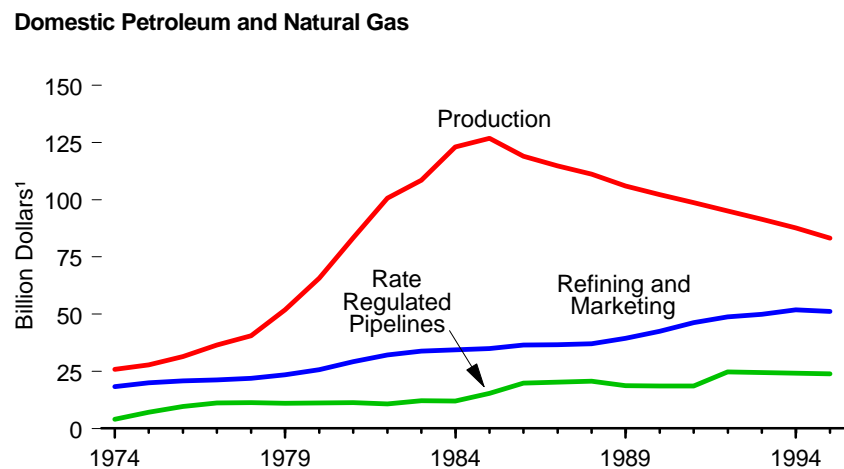
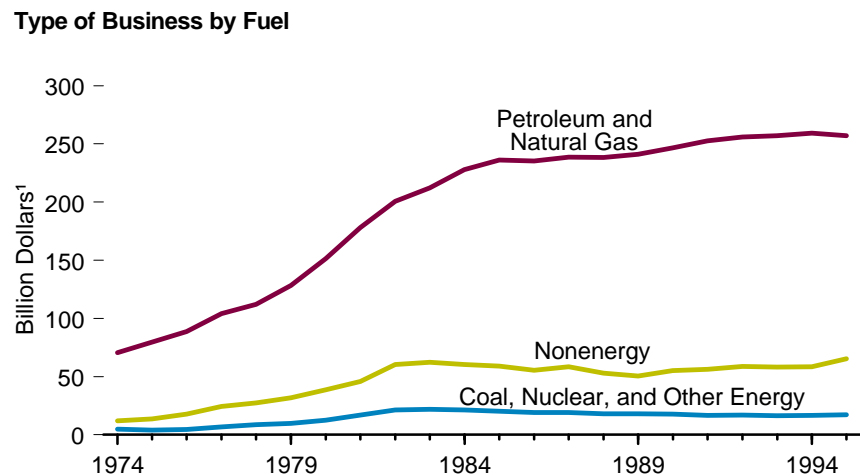
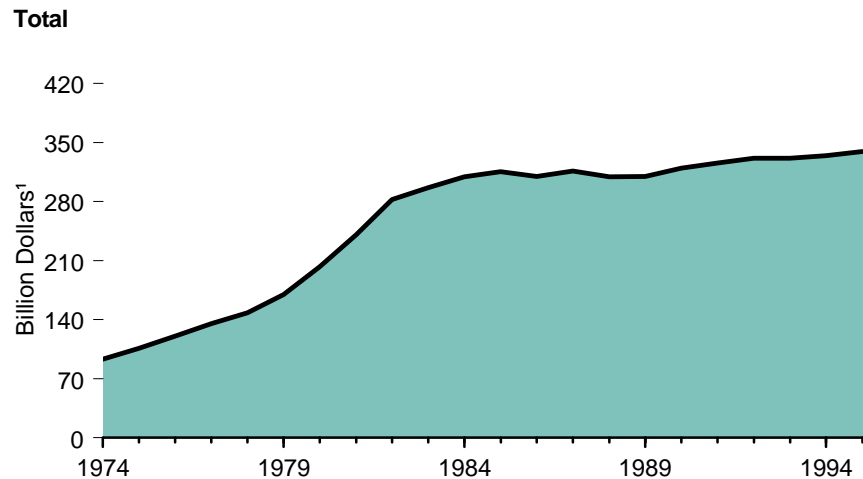
<sup>2</sup> Total is sum of components shown, plus eliminations and nontraceables, which are defined in the glossary.

NA=Not available. (s)=Less than \$50 million in absolute value.

Note: FRS is the Financial Reporting System (see Table 3.13).

Sources: • 1974–1976—Energy Information Administration (EIA), Form EIA-28, "Financial Reporting System" database, October 1996. • 1977–1994—EIA, *Performance Profiles of Major Energy Producers*, annual report. • 1995—EIA, *Performance Profiles of Major Energy Producers, 1995* (January 1997), Table 2.

**Figure 3.10 FRS Companies' Net Investment in Place, 1974-1995**



<sup>1</sup> Nominal dollars.

Notes: • FRS is the Financial Reporting System. See Table 3.13. • Because vertical

scales differ, graphs should not be compared.

Source: Table 3.10.



**Table 3.10 FRS Companies' Net Investment in Place, 1974-1995**  
(Billion Dollars<sup>1</sup>)

Year	Type of Business						Domestic Petroleum and Natural Gas				Foreign Petroleum and Natural Gas			
	Petroleum and Natural Gas	Coal	Nuclear and Other Energy	Non-energy	Non-traceables	Total	Production	Refining and Marketing	Rate Regulated Pipelines	Total	Production	Refining and Marketing	International Marine	Total
1974	70.6	1.2	1.0	11.9	2.6	93.3	25.9	18.3	4.0	47.7	8.3	9.9	4.6	22.9
1975	<sup>R</sup> 79.7	1.6	<sup>R</sup> 1.1	13.7	<sup>R</sup> 1.1	<sup>R</sup> 106.0	27.8	20.0	7.0	54.8	9.4	10.3	5.2	24.9
1976	<sup>R</sup> 88.8	2.0	<sup>R</sup> 1.4	17.6	<sup>R</sup> 1.2	<sup>R</sup> 120.2	31.4	20.7	9.5	61.7	11.4	10.3	5.4	27.1
1977	104.2	2.8	1.9	24.3	1.9	135.2	36.4	21.1	11.2	68.7	16.4	13.5	5.6	35.5
1978	112.2	3.3	3.1	27.3	2.1	148.1	40.5	22.0	11.2	73.7	19.0	14.1	5.4	38.5
1979	128.3	4.1	3.3	31.9	2.4	169.9	51.8	23.5	11.0	86.3	21.9	14.8	5.3	42.0
1980	151.4	5.0	4.0	38.7	3.4	202.6	65.8	25.7	11.1	102.5	27.4	16.2	5.3	48.9
1981	178.0	7.2	4.5	45.9	5.2	240.8	<sup>R</sup> 83.3	29.2	11.2	123.6	31.5	17.9	4.9	54.3
1982	200.7	9.3	5.3	60.3	6.9	282.5	100.7	32.1	10.8	143.6	35.2	17.8	4.2	57.2
1983	212.2	9.4	5.1	62.2	7.4	296.3	108.4	33.8	12.1	154.4	37.1	17.2	3.6	57.9
1984	227.8	9.2	4.7	60.3	7.4	309.4	123.1	34.3	12.0	169.4	39.6	15.9	2.8	58.4
1985	236.2	9.1	3.7	58.9	7.5	315.4	126.8	34.9	15.4	177.1	40.0	16.8	2.3	59.0
1986	235.4	8.4	3.3	55.4	7.4	309.9	118.9	36.5	19.8	175.1	40.1	18.1	2.0	60.3
1987	238.7	8.6	3.3	58.5	7.3	316.4	114.7	36.6	20.2	171.6	44.0	21.2	1.9	67.1
1988	238.4	8.7	3.4	53.1	6.0	309.6	111.1	37.1	20.6	168.8	46.9	20.9	1.7	69.6
1989	241.3	8.7	3.1	50.5	6.2	309.9	106.0	39.4	18.7	164.1	52.7	22.7	1.8	77.2
1990	246.7	8.2	3.0	55.1	6.5	319.6	102.1	42.5	18.5	163.1	56.7	25.2	1.7	83.6
1991	252.6	6.7	2.9	<sup>R</sup> 56.4	7.0	325.6	98.6	46.2	18.5	163.4	59.2	28.2	1.8	89.2
1992	256.0	5.2	2.8	58.7	8.7	331.5	95.1	48.8	24.7	168.6	57.0	28.5	1.8	87.4
1993	257.1	4.9	3.0	58.0	8.6	331.5	91.4	49.8	24.4	165.6	59.7	30.1	1.7	91.5
1994	259.4	4.1	3.1	58.5	9.5	334.6	87.6	51.8	24.1	163.6	61.5	32.6	1.7	95.8
1995	257.0	4.5	2.8	65.3	9.9	339.5	83.2	51.0	23.9	158.1	64.1	33.3	1.5	98.9

<sup>1</sup> Nominal dollars.

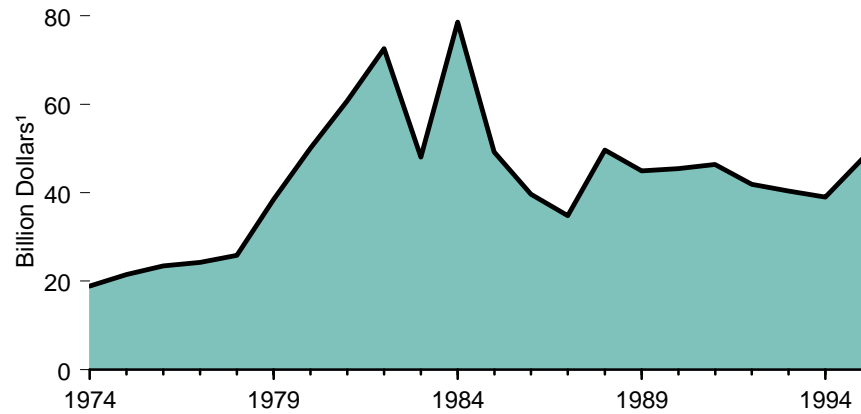
R=Revised data.

Notes: • FRS is the Financial Reporting System. See Table 3.14. • Net investment in place is net property, plant, and equipment, plus investments and advances. • Totals may not equal sum of components due to independent rounding.

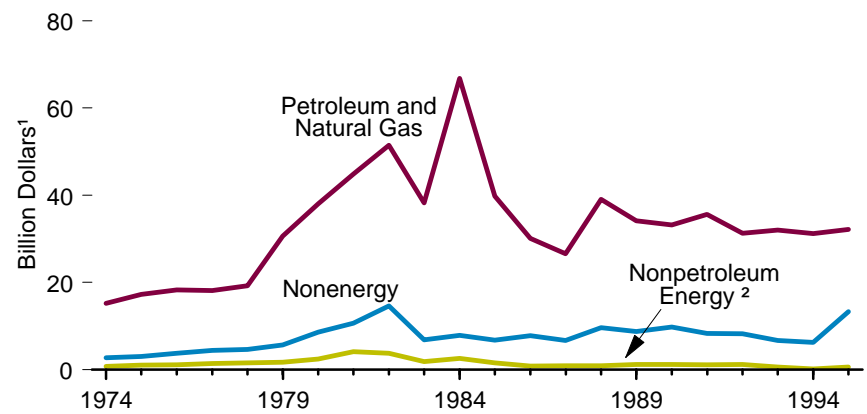
Sources: • 1974–1976—Energy Information Administration (EIA), Form EIA-28, "Financial Reporting System" database, October 1996. • 1977–1994—EIA, *Performance Profiles of Major Energy Producers*, annual report. • 1995—EIA, *Performance Profiles of Major Energy Producers, 1995* (January 1997), Table B11.

**Figure 3.11 FRS Companies' Additions to Investment in Place, 1974-1995**

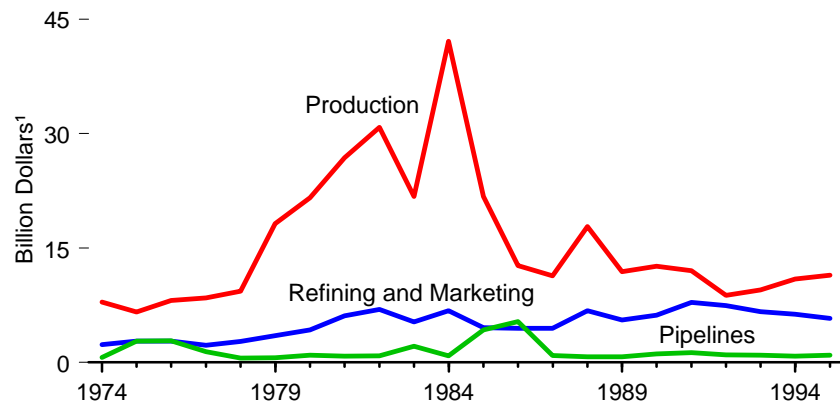
**Type of Business, Total**



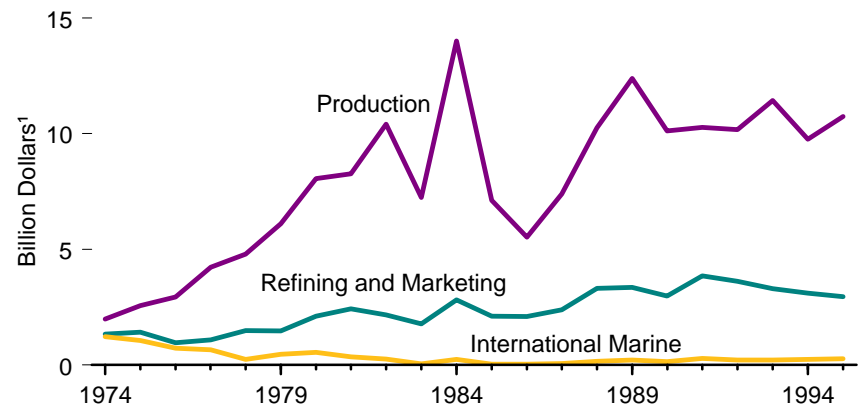
**Type of Business by Fuel**



**Domestic Petroleum and Natural Gas**



**Foreign Petroleum and Natural Gas**



<sup>1</sup> Nominal dollars.

<sup>2</sup> Coal, nuclear, and other energy.

Notes: • FRS is the Financial Reporting System. See Table 3.13. • Because vertical

scales differ, graphs should not be compared.

Source: Table 3.11.

**Table 3.11 FRS Companies' Additions to Investment in Place, 1974-1995**  
(Billion Dollars<sup>1</sup>)

Year	Type of Business					Domestic Petroleum and Natural Gas				Foreign Petroleum and Natural Gas			
	Petroleum and Natural Gas	Coal	Nuclear and Other Energy	Non-energy	Total <sup>2</sup>	Production	Refining and Marketing	Rate Regulated Pipelines	Total	Production	Refining and Marketing	International Marine	Total
1974	15.2	0.2	0.5	2.8	18.9	7.9	2.3	0.7	11.0	2.0	1.3	1.2	4.3
1975	<sup>R</sup> 17.2	0.5	<sup>R</sup> 0.5	<sup>R</sup> 3.0	<sup>R</sup> 21.5	6.6	2.8	2.8	12.2	2.6	1.4	1.1	<sup>R</sup> 5.0
1976	<sup>R</sup> 18.3	0.5	<sup>R</sup> 0.6	<sup>R</sup> 3.7	<sup>R</sup> 23.4	8.1	2.8	2.8	13.8	2.9	1.0	0.7	<sup>R</sup> 4.5
1977	18.1	0.9	0.6	4.5	24.3	8.5	2.2	1.4	12.1	4.2	1.1	0.7	6.0
1978	19.2	<sup>R</sup> 0.7	0.9	<sup>R</sup> 4.7	<sup>R</sup> 25.9	9.3	2.8	0.6	12.7	4.8	1.5	0.2	6.5
1979	30.7	0.8	0.9	5.7	38.5	18.2	3.5	0.6	22.5	6.1	1.5	0.5	8.2
1980	38.0	1.3	1.2	8.6	50.1	21.6	4.2	1.0	26.9	8.1	2.1	0.5	11.1
1981	44.9	2.9	1.2	10.7	60.8	26.8	6.1	0.8	33.8	8.3	2.4	0.4	11.1
1982	51.5	2.1	1.7	14.6	72.6	30.8	6.9	0.9	38.6	10.4	2.2	0.3	12.8
1983	38.2	1.1	0.8	6.9	48.0	21.8	5.3	2.1	29.2	7.2	1.8	0.1	9.1
1984	66.8	1.6	1.0	7.9	78.7	42.1	6.8	0.9	49.7	14.0	2.8	0.2	17.1
1985	39.8	1.5	0.1	6.8	49.2	21.8	4.5	4.3	30.6	7.1	2.1	(s)	9.3
1986	30.2	0.7	0.2	7.8	39.7	12.7	4.5	5.3	22.5	5.5	2.1	(s)	7.7
1987	26.6	0.6	0.3	6.7	34.8	11.3	4.5	0.9	16.7	7.4	2.4	0.1	9.9
1988	39.1	0.6	0.4	9.7	49.7	17.8	6.8	0.7	25.3	10.3	3.3	0.2	13.7
1989	34.2	1.0	0.2	8.8	45.0	11.9	5.5	0.7	18.2	12.4	3.4	0.2	16.0
1990	33.2	0.9	0.2	9.8	45.5	12.6	6.2	1.1	20.0	10.1	3.0	0.2	13.2
1991	35.6	1.0	0.2	8.3	46.4	12.0	7.9	1.3	21.2	10.3	3.9	0.3	14.4
1992	31.3	0.9	0.2	8.3	42.0	8.8	7.4	1.0	17.3	10.2	3.6	0.2	14.0
1993	32.1	0.2	0.4	6.7	40.4	9.5	6.7	1.0	17.1	11.4	3.3	0.2	15.0
1994	31.2	(s)	0.3	6.3	39.1	10.9	6.3	0.8	18.1	9.8	3.1	0.3	13.1
1995	32.2	0.3	0.4	13.4	47.7	11.4	5.8	1.0	18.2	10.7	3.0	0.3	14.0

<sup>1</sup> Nominal dollars.

<sup>2</sup> Total is sum of components shown, plus nontraceables, which are defined in the glossary. Totals may not equal sum of components due to independent rounding.

R=Revised data. (s)=Less than \$50 million.

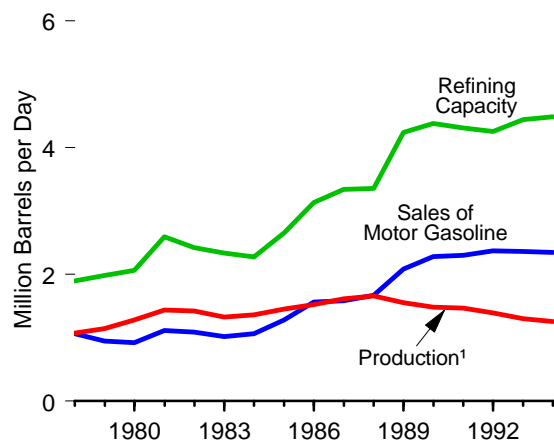
Notes: • FRS is the Financial Reporting System (see Table 3.14). • Additions to investment in place is

property, plant, and equipment, plus investments and advances.

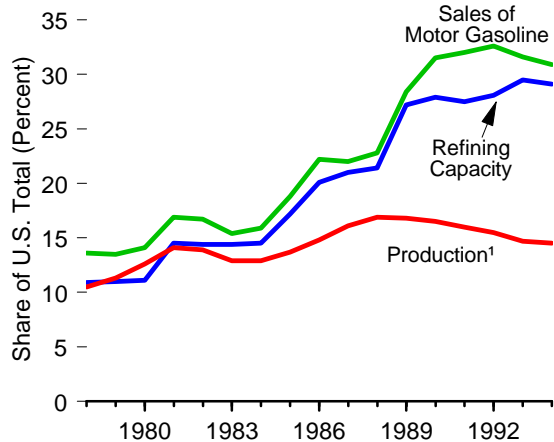
Sources: • 1974-1976—Energy Information Administration (EIA), Form EIA-28, "Financial Reporting System" database, October 1996. • 1977-1994—EIA, *Performance Profiles of Major Energy Producers*, annual report. • 1995—EIA, *Performance Profiles of Major Energy Producers, 1995* (January 1997), Table B11.

**Figure 3.12 U.S. Energy Activities by Foreign-Affiliated U.S. Companies, 1978-1994**

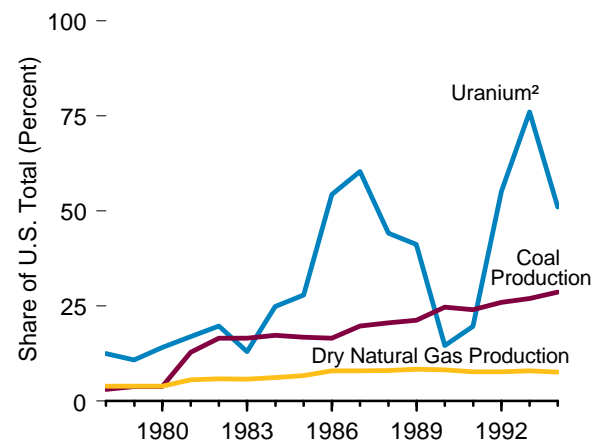
**Petroleum Activities**



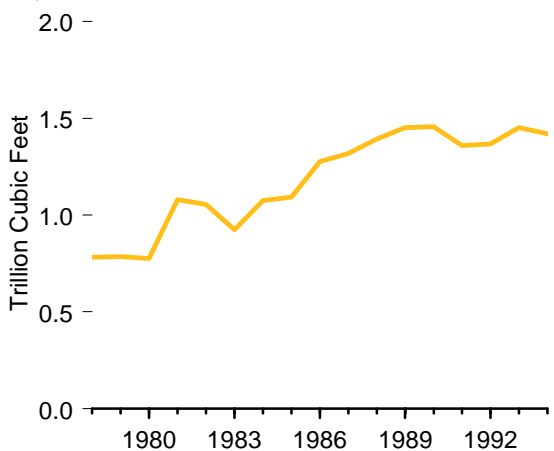
**Petroleum Activities**



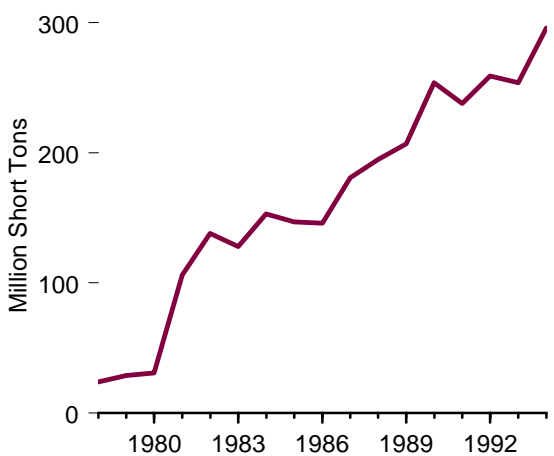
**Natural Gas, Coal, and Uranium Activities**



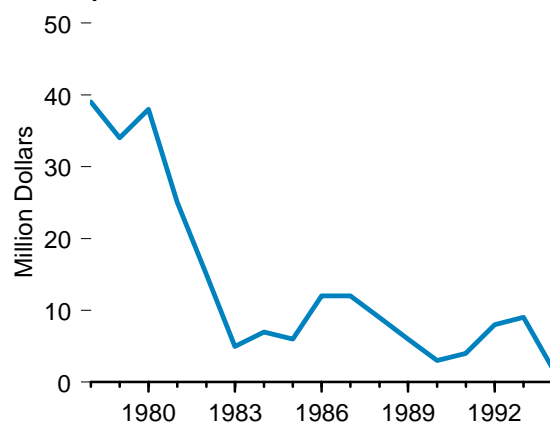
**Dry Natural Gas Production**



**Coal Production**



**Expenditures for Exploration and Development of Uranium**



<sup>1</sup> Crude oil and natural gas liquids.

<sup>2</sup> Expenditures for exploration and development of uranium.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 3.12.

**Table 3.12 U.S. Energy Activities by Foreign-Affiliated U.S. Companies, 1978-1994**

Year	Production			Refining Capacity	Sales of Motor Gasoline	Expenditures for Exploration and Development of Uranium
	Crude Oil and Natural Gas Liquids	Dry Natural Gas	Coal			
	Thousand Barrels per Day	Billion Cubic Feet	Million Short Tons	Thousand Barrels per Day		Million Dollars
1978	1,076	783	24	1,895	1,066	39
1979	1,145	786	29	1,984	948	34
1980	1,280	776	31	2,066	926	38
1981	1,438	1,080	106	2,595	1,114	25
1982	1,421	1,055	138	2,423	1,092	15
1983	1,325	924	128	2,337	1,022	5
1984	1,365	1,075	153	2,276	1,066	7
1985	1,455	1,093	147	2,656	1,285	6
1986	1,523	1,276	146	3,133	1,565	12
1987	1,614	1,318	181	3,342	1,586	12
1988	1,659	1,392	195	3,356	1,673	9
1989	1,553	1,452	207	4,243	2,084	6
1990	1,481	1,457	254	4,379	2,282	3
1991	1,469	1,360	238	4,312	2,299	4
1992	1,392	1,368	259	4,256	2,369	8
1993	1,299	1,451	254	4,440	2,362	9
1994	1,257	1,419	296	4,486	2,346	2
Share of U.S. Total (Percent)						
1978	10.5	3.9	3.1	10.9	13.6	12.5
1979	11.3	4.0	3.8	11.0	13.5	10.8
1980	12.6	4.0	3.8	11.1	14.1	14.1
1981	14.1	5.6	12.9	14.5	16.9	17.0
1982	13.9	5.9	16.6	14.4	16.7	19.8
1983	12.9	5.8	16.5	14.4	15.4	13.0
1984	12.9	6.2	17.3	14.5	15.9	24.9
1985	13.7	6.7	16.8	17.2	18.8	27.9
1986	14.8	8.0	16.5	20.1	22.2	54.3
1987	16.1	8.0	19.8	21.0	22.0	60.4
1988	16.9	8.1	20.6	21.4	22.8	44.2
1989	16.8	8.4	21.2	27.2	28.4	41.2
1990	16.5	8.2	24.7	27.9	31.5	14.6
1991	16.0	7.7	24.0	27.5	32.0	19.7
1992	15.5	7.7	26.0	28.1	32.6	55.2
1993	14.7	8.0	27.0	29.5	31.6	76.0
1994	14.5	7.6	28.7	29.1	30.9	51.0

Sources: • 1978-1992—Energy Information Administration (EIA), *Profile of Foreign Direct Investment in U.S. Energy*, annual report. • 1993—EIA, *Profile of Foreign Direct Investment in U.S. Energy 1993*

(May 1995), Tables 7, 9, 10, 11, and 12. • 1994—EIA, *Performance Profiles of Major Energy Producers 1995* (January 1997), Tables 36, 38, 39, 40, and 41.

**Table 3.13 Companies Reporting to the Financial Reporting System, 1974-1995**

Company	1974-1981	1982	1983-84	1985-86	1987	1988	1989-90	1991	1992-93	1994-95
Amerada Hess Corporation	X	X	X	X	X	X	X	X	X	X
American Petrofina Inc. <sup>1</sup>	X	X	X	X	X	X	X	X	X	X
Amoco Corporation <sup>2</sup>	X	X	X	X	X	X	X	X	X	X
Anadarko Petroleum, Inc.									X	X
Ashland Oil, Inc.	X	X	X	X	X	X	X	X	X	X
Atlantic Richfield Co. (ARCO)	X	X	X	X	X	X	X	X	X	X
BP America, Inc. <sup>3</sup>					X	X	X	X	X	X
Burlington Northern Inc. <sup>4</sup>	X	X	X	X	X					
Burlington Resources Inc. <sup>4</sup>						X	X	X	X	X
Chevron Corporation <sup>5,6</sup>	X	X	X	X	X	X	X	X	X	X
Cities Service <sup>7</sup>	X	X								
Coastal Corporation	X	X	X	X	X	X	X	X	X	X
Conoco <sup>8</sup>	X									
E.I. du Pont de Nemours and Co. <sup>8</sup>		X	X	X	X	X	X	X	X	X
Enron Corporation									X	X
Exxon Corporation	X	X	X	X	X	X	X	X	X	X
Fina, Inc. <sup>1</sup>								X	X	X
Getty Oil <sup>9</sup>	X	X	X							
Gulf Oil <sup>6</sup>	X	X	X							
Kerr-McGee Corporation	X	X	X	X	X	X	X	X	X	X
Marathon <sup>10</sup>	X									
Mobil Corporation <sup>11</sup>	X	X	X	X	X	X	X	X	X	X
Nerco, Inc. <sup>12</sup>									X	X
Occidental Petroleum Corporation <sup>7</sup>	X	X	X	X	X	X	X	X	X	X
Oryx Energy Company <sup>13</sup>						X	X	X	X	X
Phillips Petroleum Company	X	X	X	X	X	X	X	X	X	X
Shell Oil Company	X	X	X	X	X	X	X	X	X	X
Standard Oil Co. (Ohio) (Sohio) <sup>3</sup>	X	X	X	X						
Sun Company, Inc. <sup>13</sup>	X	X	X	X	X	X	X	X	X	X
Superior Oil <sup>11</sup>	X	X	X							
Tenneco Inc. <sup>14</sup>	X	X	X	X	X	X				
Texaco Inc. <sup>9</sup>	X	X	X	X	X	X			X	X
Total Petroleum (North America) Ltd. <sup>15</sup>							X	X		
Union Pacific Corporation	X	X	X	X	X	X	X	X	X	X
Unocal Corporation	X	X	X	X	X	X	X	X	X	X
USX Corporation <sup>10</sup>		X	X	X	X	X	X	X	X	X

<sup>1</sup> American Petrofina, Inc. changed its name to Fina, Inc. effective April 17, 1991.

<sup>2</sup> Formerly Standard Oil Company (Indiana).

<sup>3</sup> In 1987, British Petroleum acquired all shares in Standard Oil Company (Ohio) that it did not already control and renamed its U.S. affiliate British Petroleum America.

<sup>4</sup> Burlington Resources was added to the Financial Reporting System (FRS) and Burlington Northern was dropped for 1988. Data for Burlington Resources cover the full year 1988 even though that company was not created until May of that year.

<sup>5</sup> Formerly Standard Oil Company of California.

<sup>6</sup> Chevron acquired Gulf Oil in 1984 but separate data for Gulf continued to be available for the full 1984 year.

<sup>7</sup> Occidental acquired Cities Service in 1982. Separate financial reports were available for 1982, so each company continued to be treated separately until 1983.

<sup>8</sup> DuPont acquired Conoco in 1981. Separate data for Conoco were available for 1981. DuPont was included in the FRS system in 1982.

<sup>9</sup> Texaco acquired Getty in 1984; however, Getty was treated as a separate FRS company for that year.

<sup>10</sup> U.S. Steel (now USX) acquired Marathon in 1982.

<sup>11</sup> Mobil acquired Superior in 1984 but both companies were treated separately for that year.

<sup>12</sup> RTZ America acquired the common stock of Nerco, Inc., on February 17, 1994. In September 1993, Nerco, Inc., sold Nerco Oil & Gas, Inc., its subsidiary. Nerco's 1993 submission includes operations of Nerco Oil & Gas, Inc., through September 28, 1993.

<sup>13</sup> Sun Company spun off Sun Exploration and Development Company (later renamed Oryx Energy Company) during 1988. Both companies were included in the FRS system for 1988; therefore, some degree of duplication exists for that year.

<sup>14</sup> Tenneco sold its worldwide oil and gas assets and its refining and marketing assets in 1988. Other FRS companies purchased approximately 70 percent of Tenneco's assets.

<sup>15</sup> Effective June 1, 1991, Total's exploration, production, and marketing operations in Canada were spun off to Total Oil & Gas, a new public entity.

Note: "X" indicates that the company was included in the FRS system for the year indicated.

Source: Energy Information Administration, Form EIA-28, "Financial Reporting System."

## 4. Energy Resources

### Crude Oil and Natural Gas Resources

The U.S. Department of the Interior's latest mean estimates of United States petroleum resources are 142.0 billion barrels of crude oil, 1,246 trillion cubic feet of natural gas, and 24.5 billion barrels of natural gas liquids. They include undiscovered conventionally reservoired deposits, expected ultimate recovery appreciation (reserve growth), and unconventionally reservoired deposits (continuous-type accumulations), and exclude proved reserves.<sup>1</sup> For the undiscovered conventionally reservoired deposits alone, the estimates are 75.9 billion barrels of crude oil, 526.7 trillion cubic feet of natural gas, and 7.2 billion barrels of natural gas liquids (4.1).

### Crude Oil and Natural Gas Proved Reserves

The combined oil-equivalent proved reserves of crude oil, natural gas, and natural gas liquids increased every year from 1949 until 1968 (4.10), when, for the first time, production exceeded net additions to proved reserves. Except for the addition of Alaska's North Slope reserves in 1970, proved reserves trended downward through 1994 before rebounding slightly. At the end of 1995, proved reserves were 24 billion barrels of crude oil (including lease condensate) and 174 trillion cubic feet of natural gas (4.2). Through 1995, crude oil cumulative production of 175 billion barrels from 40,165 fields equaled about 88 percent of estimated ultimate recovery, while natural gas cumulative production of 897 trillion cubic feet from 35,836 fields equaled about 84 percent of ultimate recovery.

### Coal Reserves

The Energy Information Administration has estimated that the demonstrated reserve base of coal contained 494 billion short tons at the beginning of 1996 (4.11). Although recoverability rates differ from site to site, about 55 percent of the demonstrated reserve base is estimated to be recoverable.

<sup>1</sup>See Note 1 at the end of the section.

*\*Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications. Percentages and numbers in text are calculated by using data in the tables.*

### Uranium Resources

At the end of 1996, uranium reserves with forward costs (those yet to be incurred in production) of no more than \$30 per pound totaled 285 million pounds of uranium oxide ( $U_3O_8$ ), 40 percent of which was in Wyoming (4.13). Estimated additional resources and speculative resources in the \$30-or-less-per-pound category in 1996 totaled 2.2 billion pounds and 1.3 billion pounds, respectively.

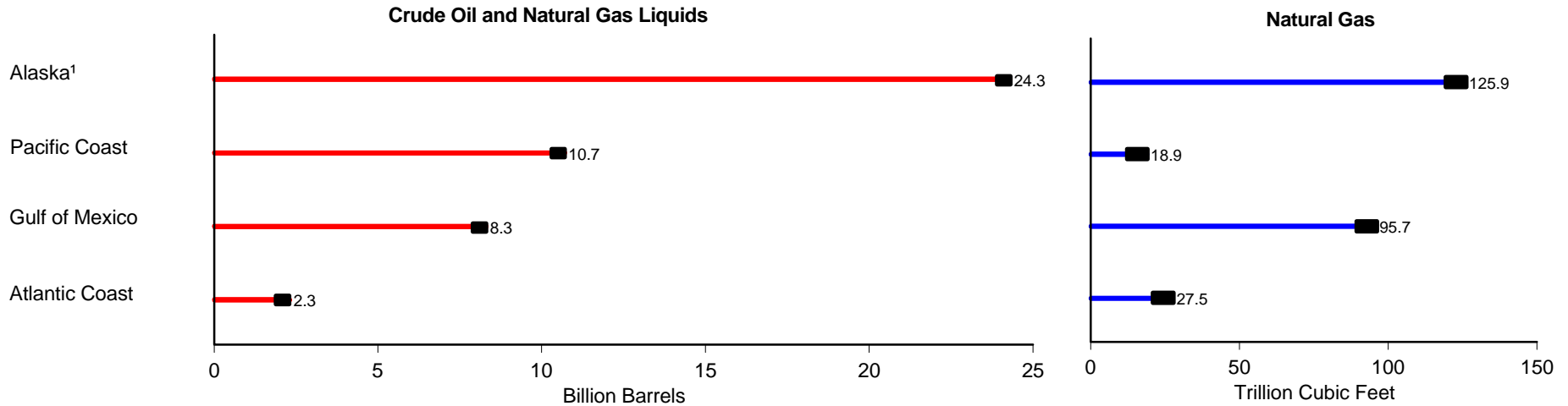
#### Exploring for Energy Resources

Exploration for oil and gas is shaped by market conditions and technological developments. Market forces significantly decreased the number of rotary rigs in operation and the number of exploratory wells from highs in 1981 of 3,970 rigs and 17.5 thousand exploratory wells (4.3 and 4.5) to 779 rigs and 3.9 thousand exploratory wells in 1996. The use of new technologies, such as three-dimensional seismic surveying, multidisciplinary teams supported by a common and comprehensive computerized database, and horizontal drilling, has increased the efficiency of energy industry operations. During the 1990's, the percentage of successful wells drilled, particularly exploratory wells, generally increased (4.4). In 1996, 45 percent of oil and gas exploratory wells were successful, compared with 25 percent in 1990 (4.5). The percentage of successful oil and gas development wells rose from 82 percent in 1990 to 83 percent in 1996 (4.6).

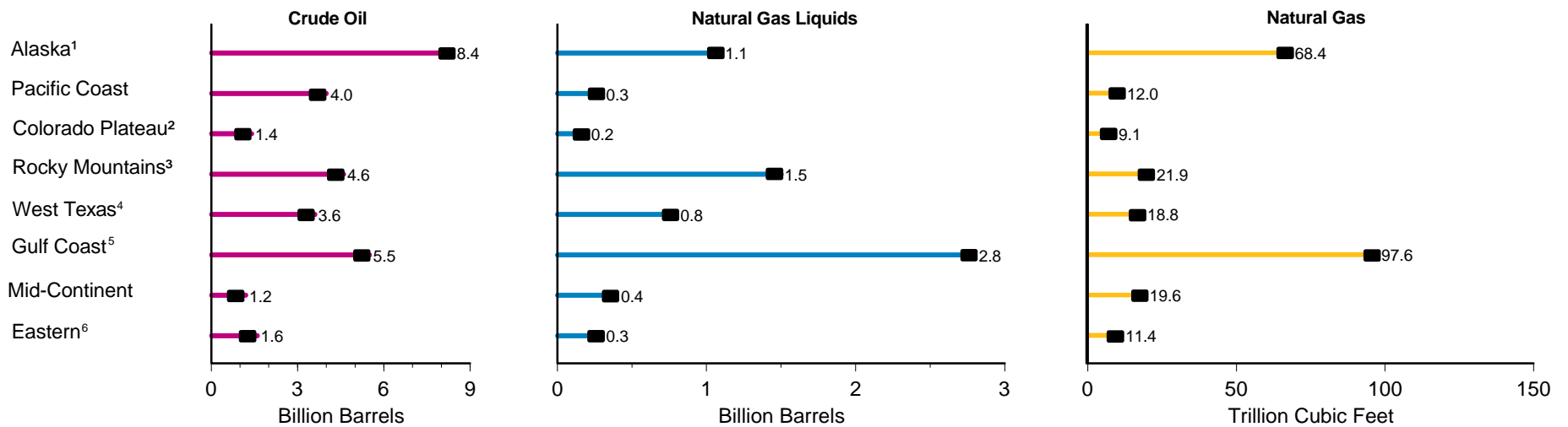
Exploration for uranium also reflects changes in energy markets. The number of exploratory and development holes drilled peaked in 1978 at 104 thousand (4.12). As uranium market conditions deteriorated after 1978, the number plunged to fewer than 4 thousand per year in the mid-1980's. In 1995, the number of holes drilled totaled 2.3 thousand. However, amid other signs of a turnaround in the uranium industry, the number of holes drilled in 1996 more than doubled to 4.7 thousand.

**Figure 4.1 Undiscovered Conventionally Reservoired Recoverable Resource Estimates for Petroleum,  
January 1, 1994**

**Federal Offshore, Mean Estimates, by Region**



**Onshore and State Waters, Mean Estimates, by Region**



<sup>1</sup> Includes Arctic National Wildlife Refuge.

<sup>2</sup> And Basin and Range.

<sup>3</sup> And Northern Great Plains.

<sup>4</sup> And Eastern New Mexico.

<sup>5</sup> Includes all of Florida.

<sup>6</sup> Includes Michigan Basin, Illinois Basin, Black Warrior Basin, Cincinnati Arch, Appalachian Basin, Blue Ridge Thrust Belt, Piedmont, and Atlantic Coastal Plain.  
Note: Because vertical and horizontal scales differ, graphs should not be compared.  
Source: Table 4.1



**Table 4.1 Undiscovered Conventionally Reservoired Recoverable Resource Estimates for Petroleum, January 1, 1994**

Region	Crude Oil (billion barrels)			Natural Gas Liquids (billion barrels)			Natural Gas <sup>1</sup> (trillion cubic feet)		
	Estimated Range <sup>2</sup>		Mean <sup>3</sup>	Estimated Range <sup>2</sup>		Mean <sup>3</sup>	Estimated Range <sup>2</sup>		Mean <sup>3</sup>
	Low	High		Low	High		Low	High	
January 1, 1994									
<b>Onshore and State Waters</b> .....	<b>23.5</b>	<b>39.6</b>	<b>30.3</b>	<b>5.82</b>	<b>8.87</b>	<b>7.2</b>	<b>207.1</b>	<b>329.1</b>	<b>258.7</b>
Alaska <sup>4</sup> .....	3.2	16.8	8.4	0.4	2.1	1.1	27.9	129.2	68.4
Pacific Coast .....	2.6	5.9	4.0	0.2	0.4	0.3	7.7	17.7	12.0
Colorado Plateau and Basin and Range .....	0.7	2.5	1.4	0.1	0.4	0.2	5.5	15.3	9.1
Rocky Mountains and Northern Great Plains .....	3.1	6.8	4.6	0.8	2.2	1.5	15.2	31.1	21.9
West Texas and Eastern New Mexico .....	2.2	5.3	3.6	0.5	1.0	0.8	12.9	25.8	18.8
Gulf Coast <sup>5</sup> .....	2.7	8.9	5.5	1.9	3.9	2.8	70.9	130.2	97.6
Mid-Continent .....	0.8	1.8	1.2	0.3	0.5	0.4	13.6	27.5	19.6
Eastern <sup>6</sup> .....	0.9	2.5	1.6	0.2	0.4	0.3	7.9	15.8	11.4
<b>Federal Offshore</b> .....	<b>37.1</b>	<b>55.3</b>	<b>45.6</b>	( <sup>7</sup> )	( <sup>7</sup> )	( <sup>7</sup> )	<b>186.3</b>	<b>369.2</b>	<b>268.0</b>
Alaska <sup>4,8</sup> .....	16.9	33.6	24.3	( <sup>7</sup> )	( <sup>7</sup> )	( <sup>7</sup> )	58.0	229.5	125.9
Pacific Coast .....	9.0	12.6	10.7	( <sup>7</sup> )	( <sup>7</sup> )	( <sup>7</sup> )	15.2	23.2	18.9
Gulf of Mexico .....	6.0	11.1	8.3	( <sup>7</sup> )	( <sup>7</sup> )	( <sup>7</sup> )	82.3	110.3	95.7
Atlantic Coast .....	1.3	3.7	2.3	( <sup>7</sup> )	( <sup>7</sup> )	( <sup>7</sup> )	15.9	43.4	27.5
<b>United States Total</b> .....	<b>NA</b>	<b>NA</b>	<b>75.9</b>	<b>NA</b>	<b>NA</b>	<b>7.2</b>	<b>NA</b>	<b>NA</b>	<b>526.7</b>

<sup>1</sup> See Note 1 at end of section.

<sup>2</sup> The low value of the range is the quantity associated with a 95 percent probability a 19 in 20 chance that there is at least this amount. The high value is the quantity with a 5 percent probability 1 in 20 chance that there is at least this amount. Totals for the low and high values are not obtained by arithmetic summation; they are derived by statistical methods.

<sup>3</sup> The arithmetic average of all possible outcomes.

<sup>4</sup> Includes Arctic National Wildlife Refuge.

<sup>5</sup> Includes all of Florida.

<sup>6</sup> Includes the Michigan Basin, Illinois Basin, Black Warrior Basin, Cincinnati Arch, Appalachian Basin, Blue Ridge Thrust Belt, and Piedmont, and for 1994 the Atlantic Coastal Plain.

<sup>7</sup> Included in crude oil.

<sup>8</sup> Includes quantities considered recoverable only if technology permits their exploitation beneath Arctic ice — a condition not yet met.

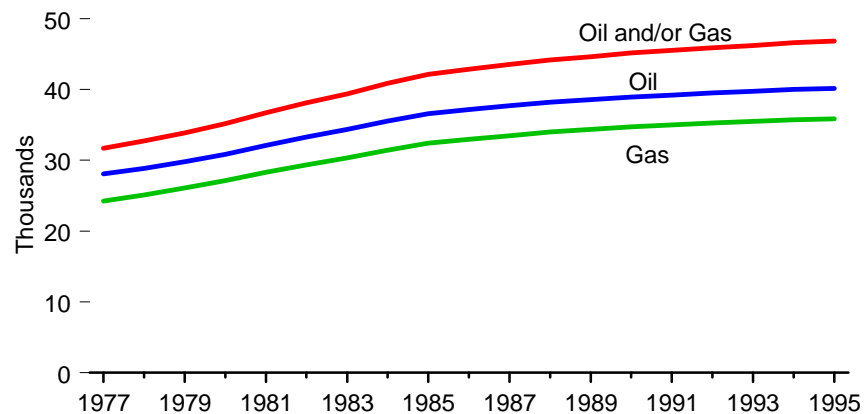
NA=Not available.

Note: The estimates are risked for the probability that economically recoverable hydrocarbons exist in the area. When applied to the mean volume, the methodology adjusts the figure to reflect the probability that the area may be nonproductive.

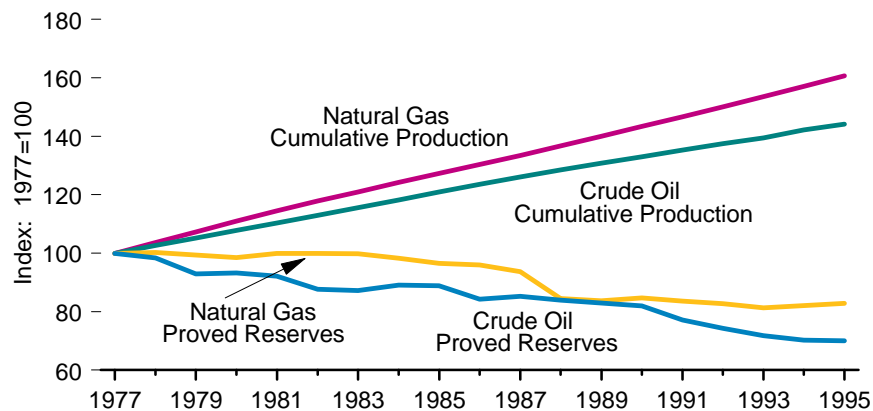
Source: U.S. Geological Survey, 1995 *National Assessment of Oil and Gas Resources*, Circular 1118 and Minerals Management Service, *An Assessment of the Undiscovered Hydrocarbon Potential of the Nation's Outer Continental Shelf*, OCS Report MMS 96-0034.

**Figure 4.2 Crude Oil and Natural Gas Field Counts, Cumulative Production, Proved Reserves, and Ultimate Recovery, End of Year, 1977-1995**

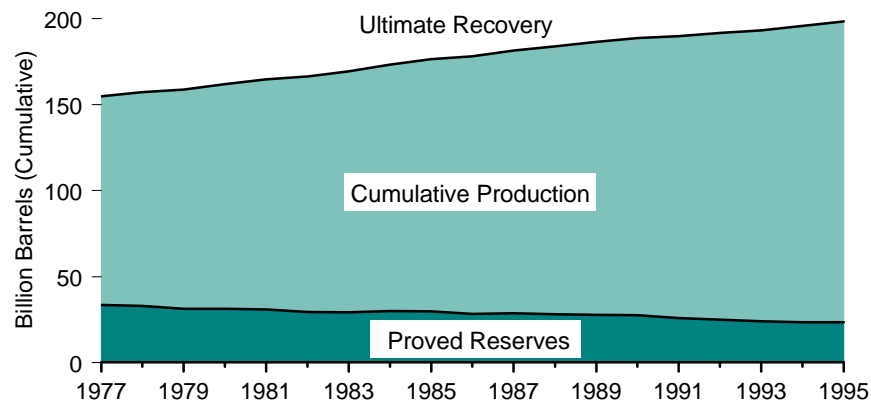
**Cumulative Number of Fields**



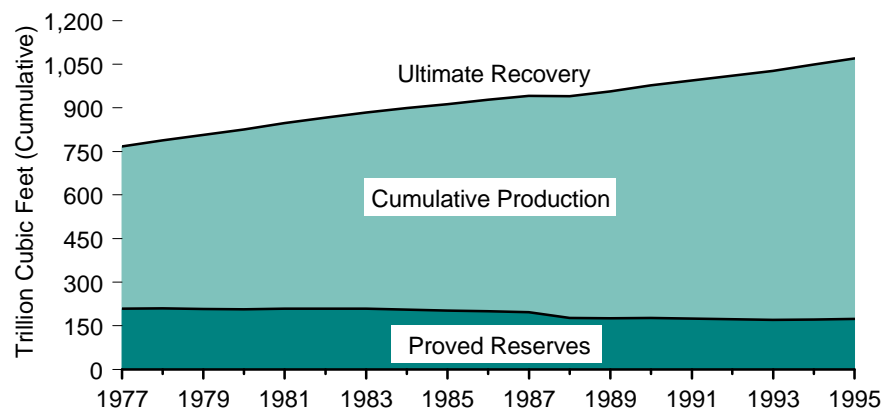
**Cumulative Production and Proved Reserves, Indexed to 1977**



**Crude Oil**



**Natural Gas**



Notes: • Crude oil includes lease condensate • Natural gas is wet, after lease separation.

Source: Table 4.2.

**Table 4.2 Crude Oil and Natural Gas Field Counts, Cumulative Production, Proved Reserves, and Ultimate Recovery, End of Year 1977-1995**

Year	Cumulative Number of Fields with Oil and/or Gas	Cumulative Number of Fields with Oil	Crude Oil <sup>1</sup> (billion barrels)			Cumulative Number of Fields with Gas	Natural Gas <sup>2</sup> (trillion cubic feet)		
			Cumulative Production	Proved Reserves	Ultimate Recovery		Cumulative Production	Proved Reserves	Ultimate Recovery
1977	31,725	28,057	121.4	33.6	155.0	24,266	558.3	209.5	767.8
1978	32,755	28,877	124.6	33.1	157.6	25,126	578.4	210.1	788.5
1979	33,898	29,810	127.7	31.2	158.9	26,094	599.1	208.3	807.4
1980	35,196	30,860	130.8	31.3	162.2	27,129	619.4	206.3	825.6
1981	36,727	32,124	133.9	31.0	165.0	28,331	639.4	209.4	848.9
1982	38,110	33,289	137.1	29.5	166.6	29,374	658.1	209.3	867.4
1983	39,403	34,345	140.3	29.3	169.6	30,349	675.1	209.0	884.1
1984	40,865	35,558	143.5	30.0	173.5	31,449	693.5	206.0	899.5
1985	42,114	36,590	146.8	29.9	176.7	32,419	710.9	202.2	913.1
1986	42,869	37,195	150.0	28.3	178.3	32,963	727.8	201.1	928.9
1987	43,535	37,703	153.0	28.7	181.7	33,469	745.4	196.4	941.8
1988	44,197	38,215	156.0	28.2	184.2	33,996	763.4	177.0	940.4
1989	44,655	38,555	158.8	27.9	186.7	34,367	781.7	175.4	957.1
1990	45,157	38,933	161.5	27.6	189.0	34,757	800.4	177.6	978.0
1991	45,539	39,233	164.2	25.9	190.1	35,022	819.1	175.3	994.4
1992	45,898	39,508	166.8	25.0	191.8	35,283	838.0	173.3	1,011.3
1993	46,220	39,737	169.3	24.1	193.4	35,490	<sup>R</sup> 857.2	170.5	<sup>R</sup> 1,027.7
1994	46,597	40,001	172.5	23.6	196.2	35,724	<sup>R</sup> 877.1	171.9	<sup>R</sup> 1,049.1
1995	46,872	40,165	174.9	23.5	198.5	35,836	896.9	173.5	1,070.4

<sup>1</sup> Includes lease condensate.

<sup>2</sup> Wet, after lease separation.

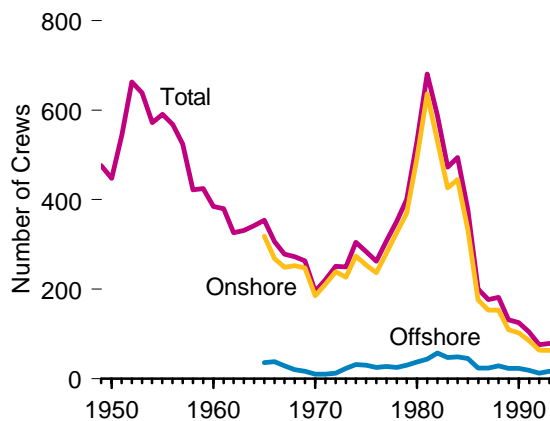
R=Revised data.

Sources: **1992:** Energy Information Administration (EIA), Office of Oil and Gas, Oil and Gas Integrated Field File (OGIFF), (July 1995). **1977-1991 and 1993-1995:** • Crude Oil Cumulative Production—EIA,

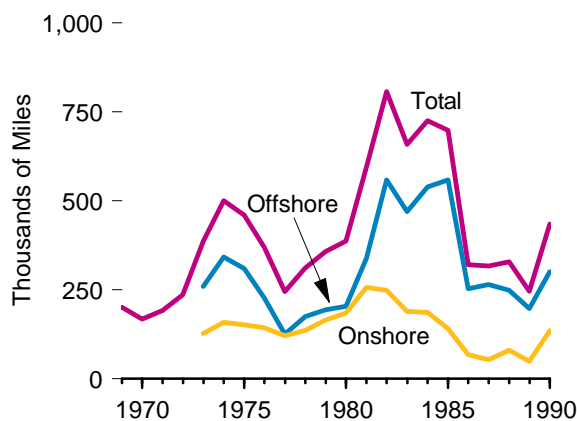
*Petroleum Supply Annual 1995, Volume 1* (May 1996). • Natural Gas Cumulative Production—EIA, *Natural Gas Annual 1995* (November 1996). • Proved Reserves—EIA, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves Annual Report 1995* (November 1996). • Field Counts—EIA, *Oil and Gas Field Code Master List Updates 1996* (January 1997) and OGIFF.

**Figure 4.3 Oil and Gas Drilling Activity Measurements**

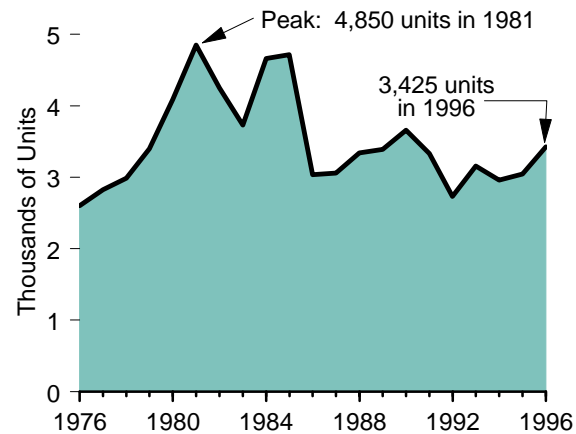
**Crews Engaged in Seismic Exploration, 1949-1993**



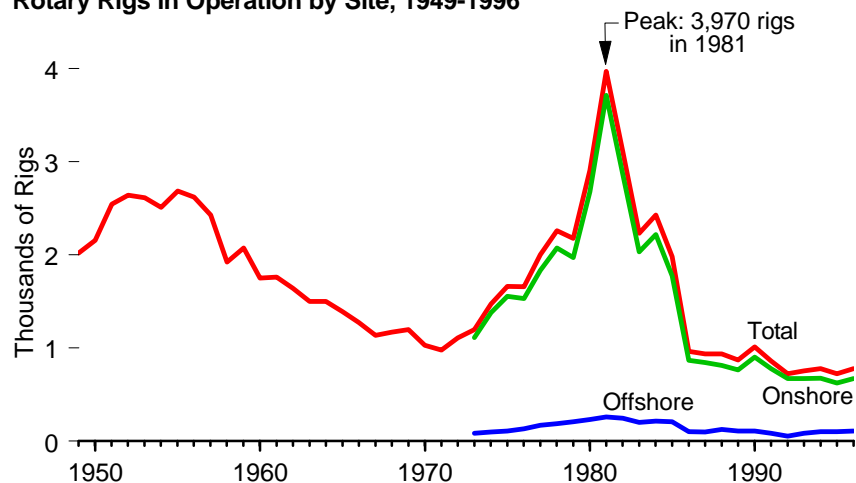
**Line Miles of Seismic Surveys, 1969-1990**



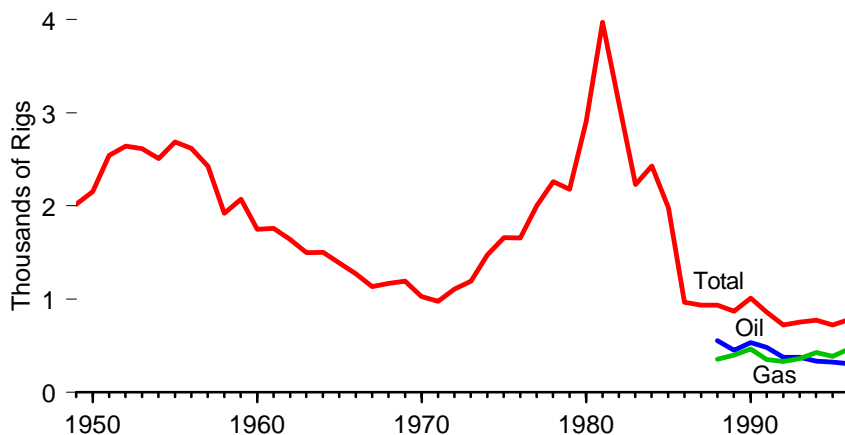
**Active Well Servicing Units, 1976-1996**



**Rotary Rigs in Operation by Site, 1949-1996**



**Rotary Rigs in Operation by Type, 1949-1996**



Source: Table 4.3.

**Table 4.3 Oil and Gas Drilling Activity Measurements, 1949-1996**

Year	Crews Engaged in Seismic Exploration			Line Miles of Seismic Surveys (thousand)			Rotary Rigs in Operation <sup>1</sup>					Active Well Servicing Units
	Offshore	Onshore	Total	Offshore	Onshore	Total	By Site		By Type		Total <sup>2</sup>	
							Offshore	Onshore	Oil	Gas		
1949	NA	NA	476	NA	NA	NA	NA	NA	NA	NA	2,017	NA
1950	NA	NA	448	NA	NA	NA	NA	NA	NA	NA	2,154	NA
1951	NA	NA	545	NA	NA	NA	NA	NA	NA	NA	2,543	NA
1952	NA	NA	663	NA	NA	NA	NA	NA	NA	NA	2,641	NA
1953	NA	NA	639	NA	NA	NA	NA	NA	NA	NA	2,613	NA
1954	NA	NA	572	NA	NA	NA	NA	NA	NA	NA	2,508	NA
1955	NA	NA	591	NA	NA	NA	NA	NA	NA	NA	2,686	NA
1956	NA	NA	568	NA	NA	NA	NA	NA	NA	NA	2,620	NA
1957	NA	NA	524	NA	NA	NA	NA	NA	NA	NA	2,426	NA
1958	NA	NA	422	NA	NA	NA	NA	NA	NA	NA	1,922	NA
1959	NA	NA	425	NA	NA	NA	NA	NA	NA	NA	2,071	NA
1960	NA	NA	385	NA	NA	NA	NA	NA	NA	NA	1,748	NA
1961	NA	NA	380	NA	NA	NA	NA	NA	NA	NA	1,761	NA
1962	NA	NA	326	NA	NA	NA	NA	NA	NA	NA	1,641	NA
1963	NA	NA	331	NA	NA	NA	NA	NA	NA	NA	1,499	NA
1964	NA	NA	342	NA	NA	NA	NA	NA	NA	NA	1,501	NA
1965	36	318	354	NA	NA	NA	NA	NA	NA	NA	1,388	NA
1966	38	268	306	NA	NA	NA	NA	NA	NA	NA	1,272	NA
1967	29	249	278	NA	NA	NA	NA	NA	NA	NA	1,135	NA
1968	20	252	272	NA	NA	NA	NA	NA	NA	NA	1,169	NA
1969	16	247	263	NA	NA	199.9	NA	NA	NA	NA	1,194	NA
1970	10	185	195	NA	NA	167.3	NA	NA	NA	NA	1,028	NA
1971	10	211	221	NA	NA	191.7	NA	NA	NA	NA	976	NA
1972	12	239	251	NA	NA	235.7	NA	NA	NA	NA	1,107	NA
1973	23	227	250	258.9	127.2	386.1	84	1,110	NA	NA	1,194	NA
1974	31	274	305	341.8	158.6	500.4	94	1,378	NA	NA	1,472	NA
1975	30	254	284	309.3	150.7	460.0	106	1,554	NA	NA	1,660	NA
1976	25	237	262	226.3	142.9	369.2	129	1,529	NA	NA	1,658	2,601
1977	27	281	308	124.7	120.1	244.7	167	1,834	NA	NA	2,001	2,828
1978	25	327	352	174.6	135.9	310.5	185	2,074	NA	NA	2,259	2,988
1979	30	370	400	193.2	163.9	357.1	207	1,970	NA	NA	2,177	3,399
1980	37	493	530	202.7	184.1	386.8	231	2,678	NA	NA	2,909	4,089
1981	44	637	681	338.2	256.2	594.4	256	3,714	NA	NA	3,970	4,850
1982	57	531	588	558.5	248.5	806.9	243	2,862	NA	NA	3,105	4,248
1983	47	426	473	469.2	188.5	657.7	199	2,033	NA	NA	2,232	3,732
1984	49	445	494	538.5	185.9	724.4	213	2,215	NA	NA	2,428	4,663
1985	45	333	378	557.7	140.0	697.7	206	1,774	NA	NA	1,980	4,716
1986	24	176	200	252.6	67.6	320.2	99	865	NA	NA	964	3,036
1987	24	153	177	263.7	52.7	316.5	95	841	NA	NA	936	3,060
1988	29	153	182	248.6	79.5	328.1	123	813	554	354	936	3,341
1989	23	109	132	197.4	48.0	245.5	105	764	453	401	869	3,391
1990	23	102	125	300.2	134.2	434.5	108	902	532	464	1,010	3,658
1991	19	85	104	NA	NA	NA	81	779	482	351	860	3,331
1992	12	64	76	NA	NA	NA	52	669	373	331	721	2,732
1993	16	63	79	NA	NA	NA	82	672	373	364	754	3,158
1994	NA	NA	NA	NA	NA	NA	102	673	335	427	775	2,961
1995	NA	NA	NA	NA	NA	NA	101	622	323	385	723	3,043
1996	NA	NA	NA	NA	NA	NA	108	671	306	464	779	3,425

<sup>1</sup> Data are not for the exact calendar year but for the 52 or 53 consecutive whole weeks that most nearly coincide with the calendar year.

<sup>2</sup> Sum of oil, gas, and miscellaneous other rigs, which is not shown.

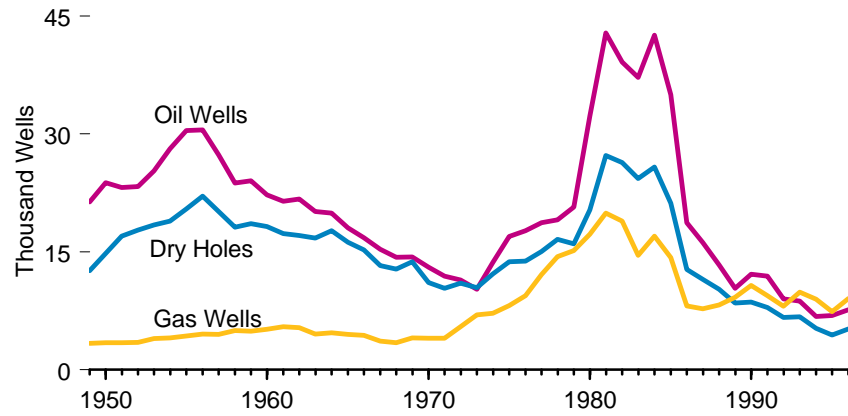
NA=Not available.

Notes: • Geographic coverage is the 50 States and the District of Columbia. • Totals may not equal sum of components due to independent rounding.

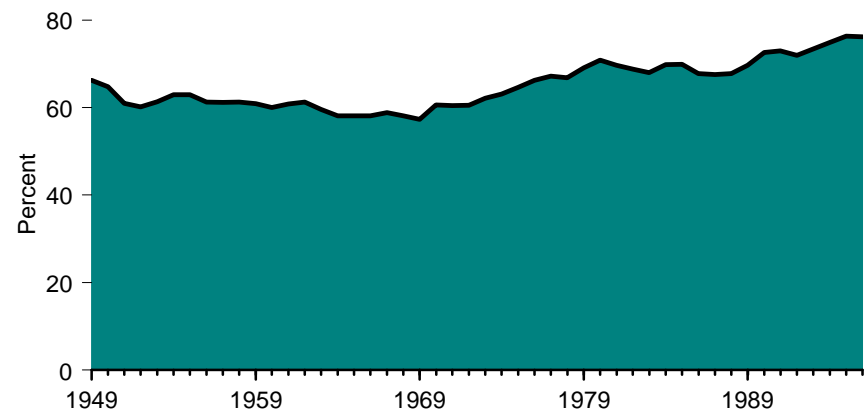
Sources: **Crews Engaged in Seismic Exploration and Line Miles of Seismic Surveys:** Society of Exploration Geophysicists, Tulsa, Oklahoma, *SEG News Release*, and *Geophysics: The Leading Edge of Exploration*, monthly. **Rotary Rigs in Operation:** Baker Hughes, Inc., Houston, Texas, *Rotary Rigs Running—By State*. **Active Well Servicing Units:** Association of Energy Service Companies, Dallas, Texas, *Field Reports*.

**Figure 4.4 Oil and Gas Exploratory and Development Wells, 1949-1996**

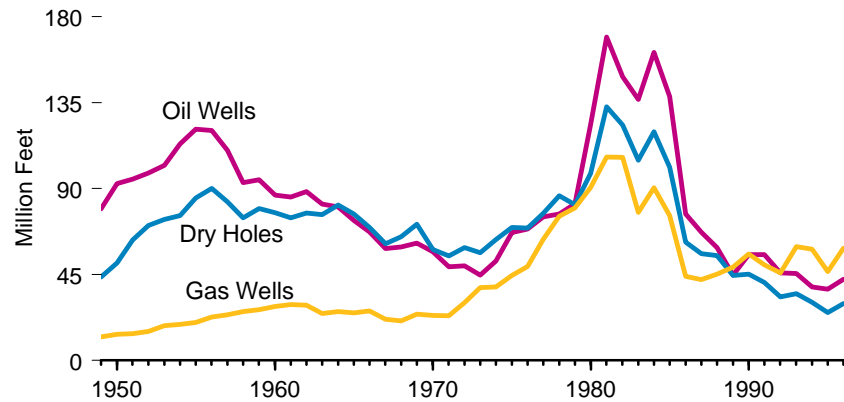
**Wells Drilled**



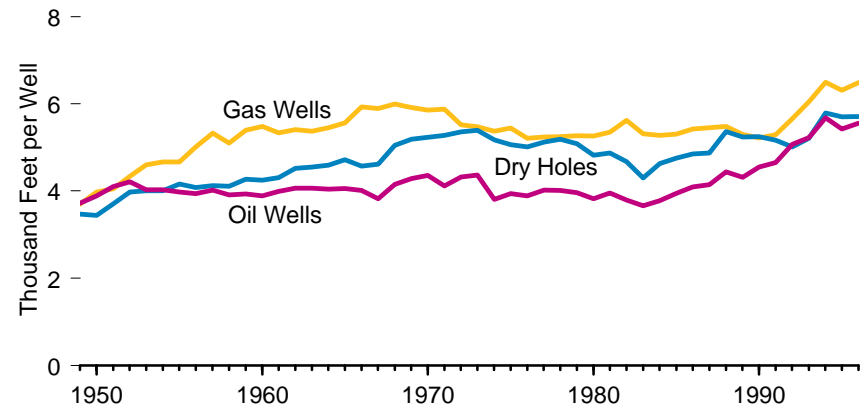
**Successful Wells**



**Footage Drilled**



**Average Depth**



Source: Table 4.4.

**Table 4.4 Oil and Gas Exploratory and Development Wells, 1949-1996**

Year	Wells Drilled (thousands)				Successful Wells (percent)	Footage Drilled (million feet)				Average Depth (feet per well)			
	Oil	Gas	Dry Holes	Total		Oil	Gas	Dry Holes	Total	Oil	Gas	Dry Holes	Total
1949	21.35	3.36	12.60	37.31	66.2	79.4	12.4	43.8	135.6	3,720	3,698	3,473	3,635
1950	23.81	3.44	14.80	42.05	64.8	92.7	13.7	51.0	157.4	3,893	3,979	3,445	3,742
1951	23.18	3.44	17.03	43.64	61.0	95.1	13.9	63.1	172.1	4,103	4,056	3,706	3,944
1952	23.29	3.51	17.76	44.56	60.1	98.1	15.3	70.7	184.1	4,214	4,342	3,983	4,132
1953	25.32	3.97	18.45	47.74	61.4	102.1	18.2	73.9	194.2	4,033	4,599	4,004	4,069
1954	28.14	4.04	18.93	51.11	63.0	113.4	18.9	75.8	208.0	4,028	4,670	4,004	4,070
1955	30.43	4.27	20.45	55.15	62.9	121.1	19.9	85.1	226.2	3,981	4,672	4,161	4,101
1956	30.53	4.53	22.11	57.17	61.3	120.4	22.7	90.2	233.3	3,942	5,018	4,079	4,080
1957	27.36	4.48	20.16	52.00	61.2	110.0	23.8	83.2	217.0	4,021	5,326	4,126	4,174
1958	23.77	5.01	18.16	46.94	61.3	93.1	25.6	74.6	193.3	3,916	5,106	4,110	4,118
1959	24.04	4.93	18.59	47.56	60.9	94.6	26.6	79.5	200.7	3,935	5,396	4,275	4,220
1960	22.26	5.15	18.21	45.62	60.1	86.6	28.2	77.4	192.2	3,889	5,486	4,248	4,213
1961	21.44	5.49	17.33	44.25	60.8	85.6	29.3	74.7	189.6	3,994	5,339	4,311	4,285
1962	21.73	5.35	17.08	44.16	61.3	88.4	28.9	77.3	194.6	4,070	5,408	4,524	4,408
1963	20.14	4.57	16.76	41.47	59.6	81.8	24.5	76.3	182.6	4,063	5,368	4,552	4,405
1964	19.91	4.69	17.69	42.29	58.2	80.5	25.6	81.4	187.4	4,042	5,453	4,598	4,431
1965	18.07	4.48	16.23	38.77	58.2	73.3	24.9	76.6	174.9	4,059	5,562	4,723	4,510
1966	16.78	4.38	15.23	36.38	58.1	67.3	25.9	69.6	162.9	4,013	5,928	4,573	4,478
1967	15.33	3.66	13.25	32.23	58.9	58.6	21.6	61.1	141.4	3,825	5,898	4,616	4,385
1968	14.33	3.46	12.81	30.60	58.1	59.5	20.7	64.7	145.0	4,153	5,994	5,053	4,738
1969	14.37	4.08	13.74	32.19	57.3	61.6	24.2	71.4	157.1	4,286	5,918	5,195	4,881
1970	13.04	4.03	11.10	28.17	60.6	56.8	23.6	58.1	138.6	4,357	5,859	5,236	4,918
1971	11.90	3.98	10.38	26.27	60.5	49.1	23.4	54.8	127.3	4,121	5,880	5,276	4,845
1972	11.44	5.48	11.01	27.93	60.6	49.5	30.3	59.1	138.8	4,327	5,517	5,362	4,969
1973	10.25	6.98	10.47	27.69	62.2	44.8	38.2	56.5	139.4	4,366	5,478	5,394	5,035
1974	13.66	7.17	12.21	33.04	63.1	52.1	38.5	63.2	153.8	3,811	5,369	5,180	4,655
1975	16.98	8.17	13.74	38.89	64.7	66.9	44.5	69.6	181.0	3,942	5,445	5,069	4,656
1976	17.70	9.44	13.81	40.94	66.3	68.8	49.2	69.3	187.3	3,889	5,213	5,017	4,575
1977	18.70	12.12	15.04	45.86	67.2	75.2	63.5	77.0	215.7	4,021	5,240	5,121	4,704
1978	19.07	14.41	16.59	50.06	66.9	76.6	75.6	86.2	238.4	4,019	5,247	5,194	4,762
1979	20.70	15.17	16.04	51.91	69.1	82.1	79.9	81.7	243.7	3,967	5,266	5,092	4,694
1980	32.28	17.22	20.34	69.84	70.9	123.6	90.7	98.1	312.3	3,829	5,264	4,821	4,472
1981	42.84	19.91	27.28	90.03	69.7	169.4	106.5	132.9	408.8	3,955	5,350	4,871	4,541
1982	39.14	18.94	26.38	84.47	68.8	148.6	106.5	123.3	378.4	3,797	5,621	4,674	4,480
1983	37.20	14.56	24.34	76.09	68.0	136.6	77.6	104.9	319.1	3,665	5,315	4,305	4,185
1984	42.59	17.01	25.80	85.39	69.8	161.3	90.3	119.8	371.5	3,781	5,279	4,635	4,338
1985	35.02	14.25	21.21	70.48	69.9	138.3	75.9	101.2	315.4	3,948	5,309	4,759	4,433
1986	18.70	8.14	12.77	39.60	67.8	76.6	44.1	61.9	182.7	4,096	5,426	4,852	4,613
1987	16.19	7.76	11.48	35.42	67.6	67.1	42.3	55.9	165.3	4,147	5,452	4,869	4,667
1988	13.32	8.24	10.24	31.80	67.8	59.1	45.2	55.0	159.3	4,437	5,487	5,367	5,008
1989	10.34	9.23	8.49	28.06	69.7	44.6	48.9	44.5	138.0	4,316	5,300	5,245	4,920
1990	12.15	10.71	8.61	31.47	72.6	55.3	<sup>R</sup> 55.9	45.2	156.4	<sup>R</sup> 5,217	<sup>R</sup> 5,217	<sup>R</sup> 5,247	4,969
1991	11.91	9.45	7.91	29.27	73.0	<sup>R</sup> 55.4	<sup>R</sup> 50.1	40.9	146.4	<sup>R</sup> 4,653	<sup>R</sup> 5,295	<sup>R</sup> 5,171	5,000
1992 <sup>E</sup>	9.02	8.09	6.65	<sup>R</sup> 23.77	72.0	<sup>R</sup> 45.7	<sup>R</sup> 45.8	33.4	124.9	<sup>R</sup> 5,070	<sup>R</sup> 5,658	<sup>R</sup> 5,015	<sup>R</sup> 5,255
1993 <sup>E</sup>	8.73	9.86	6.73	25.32	73.4	45.6	<sup>R</sup> 59.7	<sup>R</sup> 35.1	140.3	<sup>R</sup> 5,224	<sup>R</sup> 6,048	<sup>R</sup> 5,213	5,542
1994 <sup>E</sup>	<sup>R</sup> 6.78	8.98	<sup>R</sup> 5.27	<sup>R</sup> 21.03	74.9	<sup>R</sup> 38.5	<sup>R</sup> 58.3	<sup>R</sup> 30.5	<sup>R</sup> 127.4	<sup>R</sup> 5,681	<sup>R</sup> 6,497	<sup>R</sup> 5,789	<sup>R</sup> 6,056
1995 <sup>E</sup>	<sup>R</sup> 6.88	<sup>R</sup> 7.37	<sup>R</sup> 4.41	<sup>R</sup> 18.66	<sup>R</sup> 76.4	<sup>R</sup> 37.3	<sup>R</sup> 46.5	<sup>R</sup> 25.1	<sup>R</sup> 109.0	<sup>R</sup> 5,424	<sup>R</sup> 6,317	<sup>R</sup> 5,703	<sup>R</sup> 5,843
1996 <sup>E</sup>	7.65	9.06	5.21	21.91	76.2	42.5	58.8	29.8	131.0	5,555	6,488	5,715	5,979

R=Revised data. E=Estimate. See Note 2 at end of section.

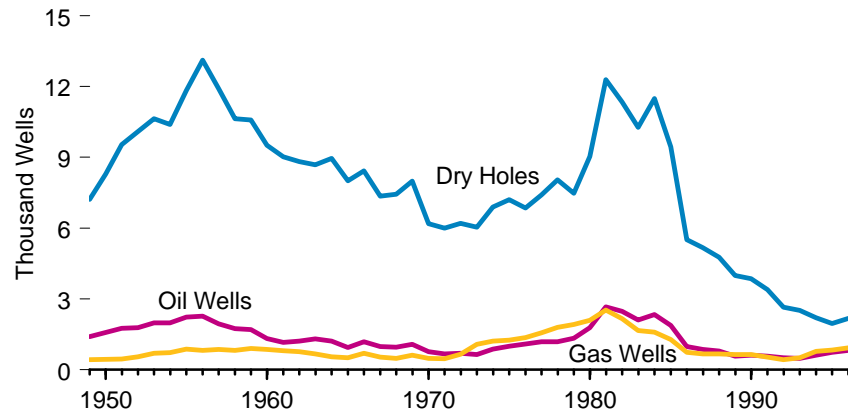
Notes: • Service wells, stratigraphic tests, and core tests are excluded. • For 1949-1959, data represent wells completed in a given year. For 1960-1969, data are for well completion reports received by the American Petroleum Institute during the reporting year. For 1970 forward, the data represent wells completed in a given year. See Note 2 at end of section. • Totals may not equal sum of components due to independent rounding. Average depth may not equal average of components due to independent

rounding.

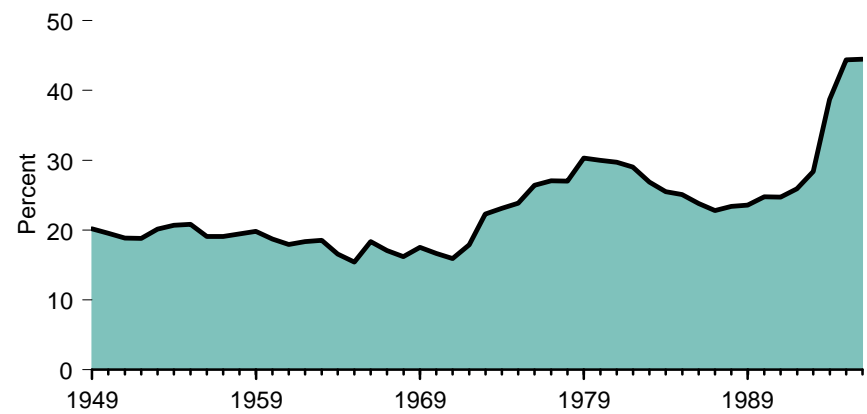
Sources: • 1949-1965—Gulf Publishing Company, *World Oil*, "Forecast-Review" issue. • 1966-1969—American Petroleum Institute, *Quarterly Review of Drilling Statistics for the United States*, annual summaries and monthly reports. • 1970 forward—Energy Information Administration computations based on well reports submitted to the American Petroleum Institute (1970-1994) and to the Petroleum Information Corporation (1995 forward).

**Figure 4.5 Oil and Gas Exploratory Wells, 1949-1996**

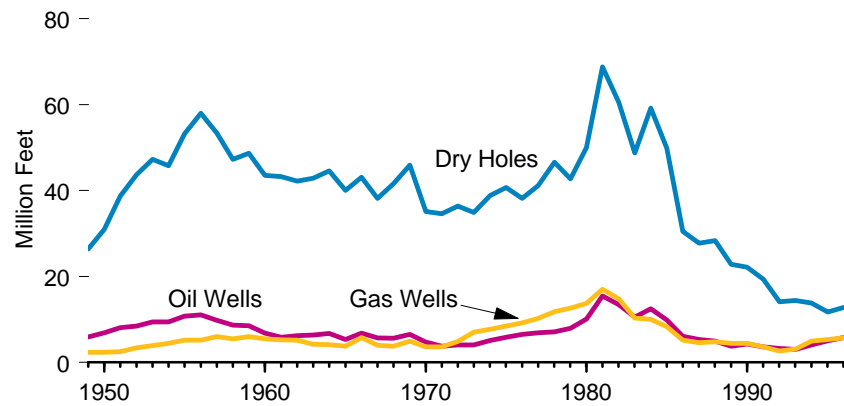
**Wells Drilled**



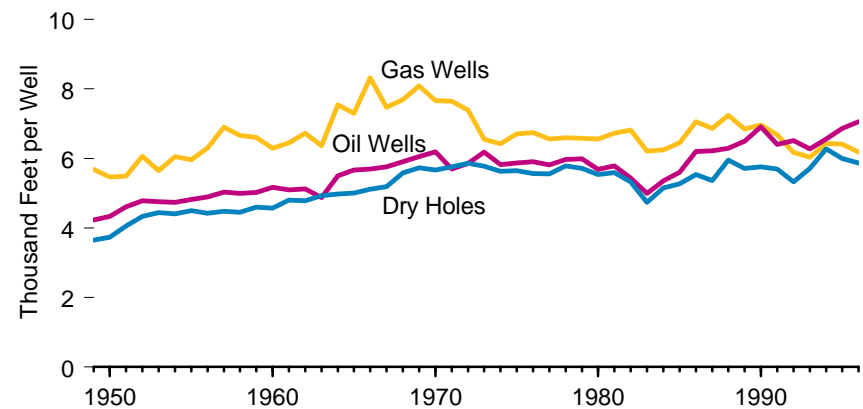
**Successful Wells**



**Footage Drilled**



**Average Depth**



Source: Table 4.5.



**Table 4.5 Oil and Gas Exploratory Wells, 1949-1996**

Year	Wells Drilled (thousands)				Successful Wells (percent)	Footage Drilled (million feet)				Average Depth (feet per well)			
	Oil	Gas	Dry Holes	Total		Oil	Gas	Dry Holes	Total	Oil	Gas	Dry Holes	Total
1949	1.41	0.42	7.23	9.06	20.2	6.0	2.4	26.4	34.8	4,232	5,682	3,658	3,842
1950	1.58	0.43	8.29	10.31	19.5	6.9	2.4	31.0	40.2	4,335	5,466	3,733	3,898
1951	1.76	0.45	9.54	11.76	18.9	8.1	2.5	38.7	49.3	4,609	5,497	4,059	4,197
1952	1.78	0.56	10.09	12.43	18.8	8.5	3.4	43.7	55.6	4,781	6,071	4,334	4,476
1953	1.98	0.70	10.63	13.31	20.1	9.4	4.0	47.3	60.7	4,761	5,654	4,447	4,557
1954	1.99	0.73	10.39	13.10	20.7	9.4	4.4	45.8	59.6	4,740	6,059	4,408	4,550
1955	2.24	0.87	11.83	14.94	20.8	10.8	5.2	53.2	69.2	4,819	5,964	4,498	4,632
1956	2.27	0.82	13.12	16.21	19.1	11.1	5.2	58.0	74.3	4,901	6,301	4,425	4,587
1957	1.95	0.87	11.90	14.71	19.1	9.8	6.0	53.4	69.2	5,036	6,898	4,488	4,702
1958	1.75	0.82	10.63	13.20	19.4	8.7	5.5	47.3	61.5	4,993	6,657	4,449	4,658
1959	1.70	0.91	10.58	13.19	19.8	8.5	6.0	48.7	63.3	5,021	6,613	4,602	4,795
1960	1.32	0.87	9.52	11.70	18.7	6.8	5.5	43.5	55.8	5,170	6,298	4,575	4,770
1961	1.16	0.81	9.02	10.99	17.9	5.9	5.2	43.3	54.4	5,099	6,457	4,799	4,953
1962	1.21	0.77	8.82	10.80	18.4	6.2	5.2	42.2	53.6	5,124	6,728	4,790	4,966
1963	1.31	0.66	8.69	10.66	18.5	6.4	4.2	42.8	53.5	4,878	6,370	4,933	5,016
1964	1.22	0.56	8.95	10.73	16.6	6.7	4.2	44.6	55.5	5,509	7,547	4,980	5,174
1965	0.95	0.52	8.01	9.47	15.4	5.4	3.8	40.1	49.2	5,672	7,295	5,007	5,198
1966	1.20	0.70	8.42	10.31	18.4	6.8	5.8	43.1	55.7	5,700	8,321	5,117	5,402
1967	0.99	0.53	7.36	8.88	17.1	5.7	4.0	38.2	47.8	5,758	7,478	5,188	5,388
1968	0.95	0.49	7.44	8.88	16.2	5.6	3.7	41.6	51.0	5,914	7,697	5,589	5,739
1969	1.08	0.62	8.00	9.70	17.5	6.6	5.0	45.9	57.5	6,054	8,092	5,739	5,924
1970	0.76	0.48	6.19	7.43	16.7	4.7	3.7	35.1	43.5	6,198	7,669	5,671	5,854
1971	0.66	0.47	6.00	7.13	15.9	3.8	3.6	34.6	42.0	5,702	7,654	5,765	5,885
1972	0.69	0.66	6.20	7.55	17.9	4.0	4.9	36.4	45.3	5,858	7,393	5,863	5,996
1973	0.65	1.08	6.04	7.77	22.3	4.0	7.1	34.9	46.0	6,187	6,556	5,785	5,926
1974	0.87	1.21	6.89	8.97	23.1	5.1	7.7	38.9	51.7	5,826	6,425	5,637	5,761
1975	0.99	1.26	7.21	9.46	23.8	5.8	8.5	40.8	55.1	5,875	6,714	5,655	5,819
1976	1.10	1.36	6.85	9.32	26.4	6.5	9.2	38.2	53.9	5,903	6,748	5,575	5,785
1977	1.18	1.56	7.40	10.15	27.1	6.9	10.2	41.1	58.3	5,821	6,562	5,557	5,743
1978	1.19	1.79	8.05	11.04	27.0	7.1	11.8	46.6	65.6	5,974	6,604	5,787	5,940
1979	1.34	1.92	7.48	10.73	30.3	8.0	12.6	42.7	63.4	5,985	6,579	5,715	5,903
1980	1.78	2.09	9.04	12.91	30.0	10.1	13.7	50.1	73.9	5,684	6,558	5,540	5,725
1981	2.67	2.53	12.30	17.50	29.7	15.4	17.0	68.8	101.3	5,789	6,724	5,598	5,790
1982	2.47	2.17	11.35	15.98	29.0	13.5	14.8	60.5	88.8	5,446	6,819	5,334	5,553
1983	2.11	1.66	10.27	14.04	26.9	10.6	10.3	48.8	69.6	4,995	6,211	4,744	4,955
1984	2.34	1.60	11.48	15.42	25.5	12.5	10.0	59.2	81.7	5,354	6,253	5,151	5,296
1985	1.88	1.28	9.45	12.61	25.1	9.9	8.3	49.9	68.7	5,604	6,456	5,273	5,443
1986	0.99	0.73	5.51	7.23	23.8	6.1	5.2	30.5	41.8	6,205	7,064	5,538	5,783
1987	0.86	0.67	5.18	6.71	22.8	5.3	4.6	27.8	37.8	6,224	6,862	5,366	5,626
1988	0.79	0.66	4.77	6.22	23.4	5.0	4.8	28.4	38.2	6,297	7,245	5,952	6,134
1989	0.58	0.65	4.00	5.24	23.6	3.8	4.5	22.9	31.1	6,500	6,852	5,718	5,946
1990	0.63	0.64	3.86	5.12	24.8	4.3	4.5	22.2	31.0	<sup>R</sup> 6,909	<sup>R</sup> 6,967	<sup>R</sup> 5,760	<sup>R</sup> 6,052
1991	0.57	0.54	3.39	4.51	24.7	3.7	3.6	19.3	26.6	<sup>R</sup> 6,401	<sup>R</sup> 6,681	<sup>R</sup> 5,695	<sup>R</sup> 5,903
1992 <sup>E</sup>	0.51	0.42	2.66	3.59	25.9	3.3	2.6	14.2	<sup>R</sup> 20.1	<sup>R</sup> 6,514	<sup>R</sup> 6,174	<sup>R</sup> 5,335	<sup>R</sup> 5,601
1993 <sup>E</sup>	<sup>R</sup> 0.49	<sup>R</sup> 0.51	2.51	<sup>R</sup> 3.51	<sup>R</sup> 28.4	3.0	<sup>R</sup> 3.1	14.4	20.5	<sup>R</sup> 6,282	<sup>R</sup> 6,033	<sup>R</sup> 5,718	<sup>R</sup> 5,842
1994 <sup>E</sup>	<sup>R</sup> 0.61	<sup>R</sup> 0.78	2.20	<sup>R</sup> 3.59	<sup>R</sup> 38.7	4.0	<sup>R</sup> 5.0	<sup>R</sup> 13.8	<sup>R</sup> 22.8	<sup>R</sup> 6,563	<sup>R</sup> 6,432	<sup>R</sup> 6,274	<sup>R</sup> 6,358
1995 <sup>E</sup>	<sup>R</sup> 0.73	<sup>R</sup> 0.83	<sup>R</sup> 1.96	<sup>R</sup> 3.53	<sup>R</sup> 44.4	<sup>R</sup> 5.0	<sup>R</sup> 5.3	<sup>R</sup> 11.8	<sup>R</sup> 22.2	<sup>R</sup> 6,870	<sup>R</sup> 6,415	<sup>R</sup> 6,006	<sup>R</sup> 6,282
1996 <sup>E</sup>	0.82	0.93	2.18	3.93	44.5	5.8	5.8	12.8	24.3	7,063	6,186	5,869	6,192

R=Revised data. E=Estimate. See Note 2 at end of section.

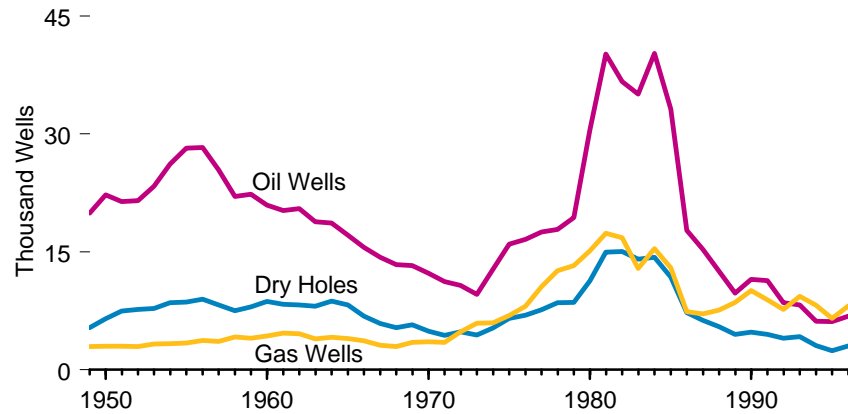
Notes: • For 1949-1959, data represent wells completed in a given year. For 1960-1969, data are for well completion reports received by the American Petroleum Institute during the reporting year. For 1970 forward, the data represent wells completed in a given year. See Note 2 at end of section. • Totals may not equal sum of components due to independent rounding. Average depth may not equal average of components due to independent rounding.

Sources: • 1949-1960—American Association of Petroleum Geologists, *Statistics on Exploratory Drilling*

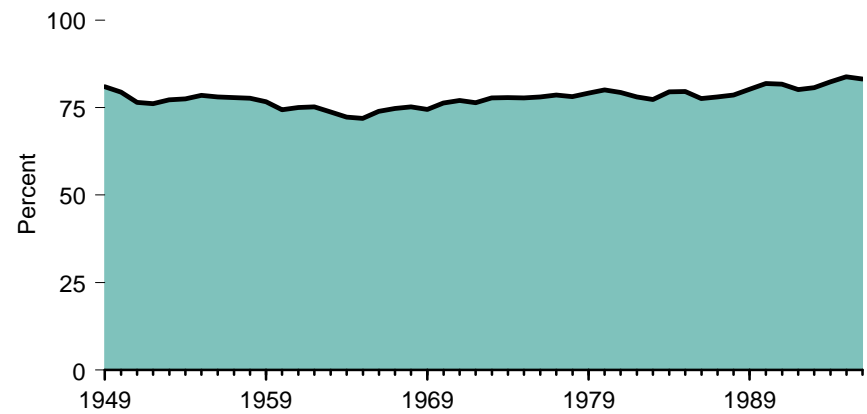
*in the United States, 1940 through 1960* (1962), pp. 4-19. • 1961-1965—*Bulletin of the American Association of Petroleum Geologists*, "North American Developments" issue. • 1966-1969—American Petroleum Institute, *Quarterly Review of Drilling Statistics for the United States*, annual summaries and monthly reports. • 1970 forward—Energy Information Administration computations based on well reports submitted to the American Petroleum Institute (1970-1994) and to the Petroleum Information Corporation (1995 forward).

**Figure 4.6 Oil and Gas Development Wells, 1949-1996**

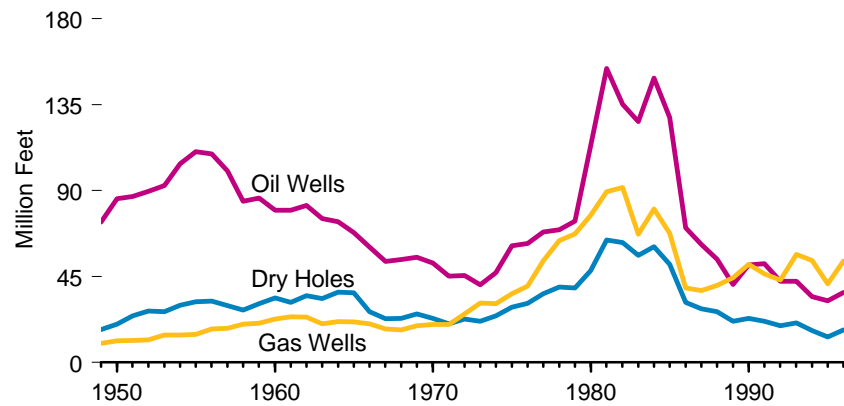
**Wells Drilled**



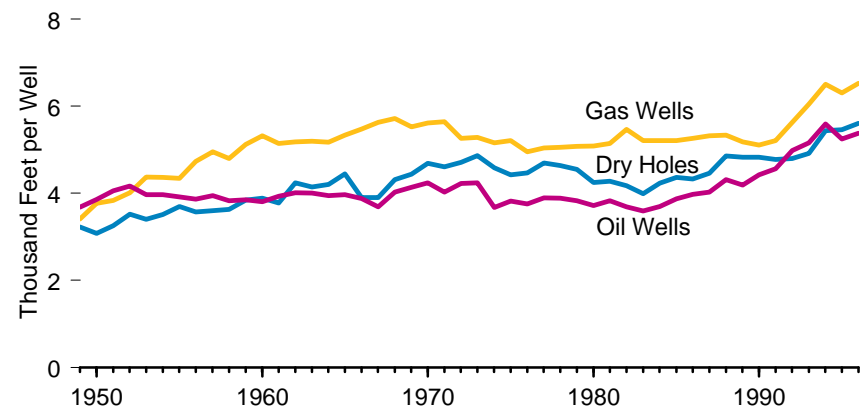
**Successful Wells**



**Footage Drilled**



**Average Depth**



Source: Table 4.6.

**Table 4.6 Oil and Gas Development Wells, 1949-1996**

Year	Wells Drilled (thousands)				Successful Wells (percent)	Footage Drilled (million feet)				Average Depth (feet per well)			
	Oil	Gas	Dry Holes	Total		Oil	Gas	Dry Holes	Total	Oil	Gas	Dry Holes	Total
1949	19.95	2.94	5.37	28.25	81.0	73.5	10.0	17.3	100.8	3,684	3,412	3,225	3,568
1950	22.23	3.01	6.51	31.74	79.5	85.8	11.3	20.0	117.2	3,861	3,766	3,077	3,691
1951	21.42	2.98	7.49	31.89	76.5	87.0	11.5	24.4	122.8	4,061	3,837	3,255	3,851
1952	21.51	2.96	7.67	32.14	76.1	89.7	11.9	27.0	128.5	4,167	4,015	3,520	3,999
1953	23.34	3.27	7.82	34.43	77.3	92.7	14.3	26.6	133.6	3,972	4,373	3,401	3,880
1954	26.16	3.31	8.54	38.01	77.5	104.0	14.5	30.0	148.4	3,974	4,365	3,512	3,905
1955	28.20	3.39	8.62	40.21	78.6	110.4	14.7	31.9	157.0	3,915	4,339	3,699	3,904
1956	28.26	3.71	8.99	40.96	78.0	109.2	17.6	32.1	158.9	3,865	4,734	3,574	3,880
1957	25.42	3.61	8.25	37.28	77.9	100.2	17.9	29.7	147.9	3,944	4,950	3,605	3,966
1958	22.03	4.18	7.53	33.74	77.7	84.4	20.1	27.3	131.8	3,831	4,801	3,631	3,907
1959	22.34	4.02	8.01	34.37	76.7	86.1	20.6	30.8	137.4	3,852	5,120	3,844	3,999
1960	20.94	4.28	8.70	33.92	74.4	79.7	22.8	33.8	136.3	3,809	5,321	3,889	4,020
1961	20.28	4.67	8.31	33.26	75.0	79.7	24.0	31.4	135.2	3,931	5,145	3,782	4,064
1962	20.52	4.58	8.26	33.36	75.2	82.2	23.8	35.0	141.0	4,008	5,186	4,239	4,227
1963	18.82	3.91	8.08	30.80	73.8	75.4	20.3	33.5	129.2	4,006	5,198	4,143	4,193
1964	18.69	4.14	8.74	31.57	72.3	73.7	21.4	36.8	131.9	3,947	5,171	4,207	4,179
1965	17.12	3.97	8.22	29.31	71.9	68.0	21.2	36.5	125.7	3,970	5,337	4,446	4,288
1966	15.58	3.68	6.81	26.07	73.9	60.5	20.1	26.6	107.2	3,884	5,474	3,900	4,112
1967	14.34	3.13	5.89	23.36	74.8	53.0	17.6	23.0	93.5	3,692	5,629	3,901	4,004
1968	13.38	2.97	5.37	21.72	75.3	53.9	17.0	23.2	94.0	4,027	5,716	4,311	4,328
1969	13.28	3.47	5.74	22.49	74.5	55.0	19.2	25.4	99.6	4,142	5,531	4,437	4,431
1970	12.28	3.55	4.91	20.74	76.3	52.1	20.0	23.0	95.0	4,243	5,615	4,686	4,583
1971	11.24	3.51	4.39	19.14	77.1	45.3	19.8	20.2	85.3	4,028	5,641	4,608	4,457
1972	10.75	4.83	4.81	20.38	76.4	45.4	25.4	22.7	93.5	4,228	5,261	4,716	4,588
1973	9.60	5.90	4.43	19.92	77.8	40.7	31.1	21.5	93.4	4,242	5,281	4,861	4,687
1974	12.79	5.97	5.31	24.07	77.9	47.0	30.8	24.4	102.1	3,674	5,156	4,587	4,243
1975	15.99	6.91	6.53	29.42	77.8	61.1	36.0	28.9	126.0	3,822	5,213	4,423	4,282
1976	16.60	8.08	6.95	31.62	78.0	62.3	40.0	31.1	133.4	3,756	4,954	4,468	4,218
1977	17.52	10.56	7.63	35.71	78.6	68.3	53.3	35.9	157.4	3,899	5,044	4,699	4,409
1978	17.87	12.61	8.54	39.02	78.1	69.5	63.8	39.6	172.8	3,889	5,056	4,634	4,429
1979	19.37	13.25	8.56	41.18	79.2	74.1	67.3	38.9	180.3	3,828	5,076	4,549	4,379
1980	30.50	15.13	11.30	56.93	80.1	113.5	76.9	48.0	238.4	3,721	5,085	4,246	4,188
1981	40.18	17.37	14.99	72.54	79.3	154.0	89.5	64.1	307.5	3,833	5,149	4,275	4,240
1982	36.67	16.78	15.04	68.48	78.0	135.2	91.7	62.8	289.7	3,686	5,466	4,176	4,230
1983	35.09	12.90	14.07	62.05	77.3	126.1	67.2	56.1	249.5	3,594	5,213	3,992	4,020
1984	40.25	15.41	14.32	69.98	79.5	148.8	80.3	60.6	289.8	3,698	5,211	4,235	4,141
1985	33.14	12.97	11.76	57.88	79.7	128.3	67.6	51.3	246.6	<sup>R</sup> 3,873	5,213	4,364	4,262
1986	17.71	7.40	7.26	32.37	77.6	70.5	39.0	31.4	140.9	3,979	5,264	4,331	4,351
1987	15.33	7.08	6.30	28.71	78.1	61.8	37.7	28.1	127.6	4,030	5,318	4,460	4,442
1988	12.53	7.58	5.48	25.58	78.6	54.1	40.4	26.6	121.1	4,319	5,333	4,857	4,734
1989	9.76	8.57	4.49	22.82	80.3	40.8	44.4	21.7	106.9	4,186	5,181	4,824	4,685
1990	11.52	10.06	4.76	26.34	81.9	51.0	51.4	23.0	125.4	<sup>R</sup> 4,426	<sup>R</sup> 5,106	<sup>R</sup> 4,832	4,759
1991	11.34	8.91	4.52	24.77	81.7	51.7	<sup>R</sup> 46.4	21.6	119.8	<sup>R</sup> 4,565	<sup>R</sup> 5,211	<sup>R</sup> 4,778	<sup>R</sup> 4,836
1992 <sup>E</sup>	8.52	7.67	<sup>R</sup> 4.00	20.18	80.2	42.5	<sup>R</sup> 43.2	19.2	<sup>R</sup> 104.8	<sup>R</sup> 4,984	<sup>R</sup> 5,629	<sup>R</sup> 4,802	<sup>R</sup> 5,193
1993 <sup>E</sup>	<sup>R</sup> 8.24	<sup>R</sup> 9.35	4.21	<sup>R</sup> 21.81	80.7	42.6	<sup>R</sup> 56.6	<sup>R</sup> 20.7	<sup>R</sup> 119.8	<sup>R</sup> 5,162	<sup>R</sup> 6,049	<sup>R</sup> 4,912	<sup>R</sup> 5,494
1994 <sup>E</sup>	<sup>R</sup> 6.17	<sup>R</sup> 8.20	<sup>R</sup> 3.07	<sup>R</sup> 17.44	<sup>R</sup> 82.4	34.5	53.3	16.7	<sup>R</sup> 104.5	<sup>R</sup> 5,593	<sup>R</sup> 6,503	<sup>R</sup> 5,441	<sup>R</sup> 5,994
1995 <sup>E</sup>	<sup>R</sup> 6.14	<sup>R</sup> 6.54	<sup>R</sup> 2.45	<sup>R</sup> 15.13	<sup>R</sup> 83.8	32.3	<sup>R</sup> 41.2	<sup>R</sup> 13.4	<sup>R</sup> 86.8	<sup>R</sup> 5,251	<sup>R</sup> 6,304	<sup>R</sup> 5,461	<sup>R</sup> 5,740
1996 <sup>E</sup>	6.83	8.13	3.03	17.98	83.2	36.7	53.0	17.0	106.7	5,374	6,523	5,604	5,932

R=Revised data. E=Estimate. See Note 2 at end of section.

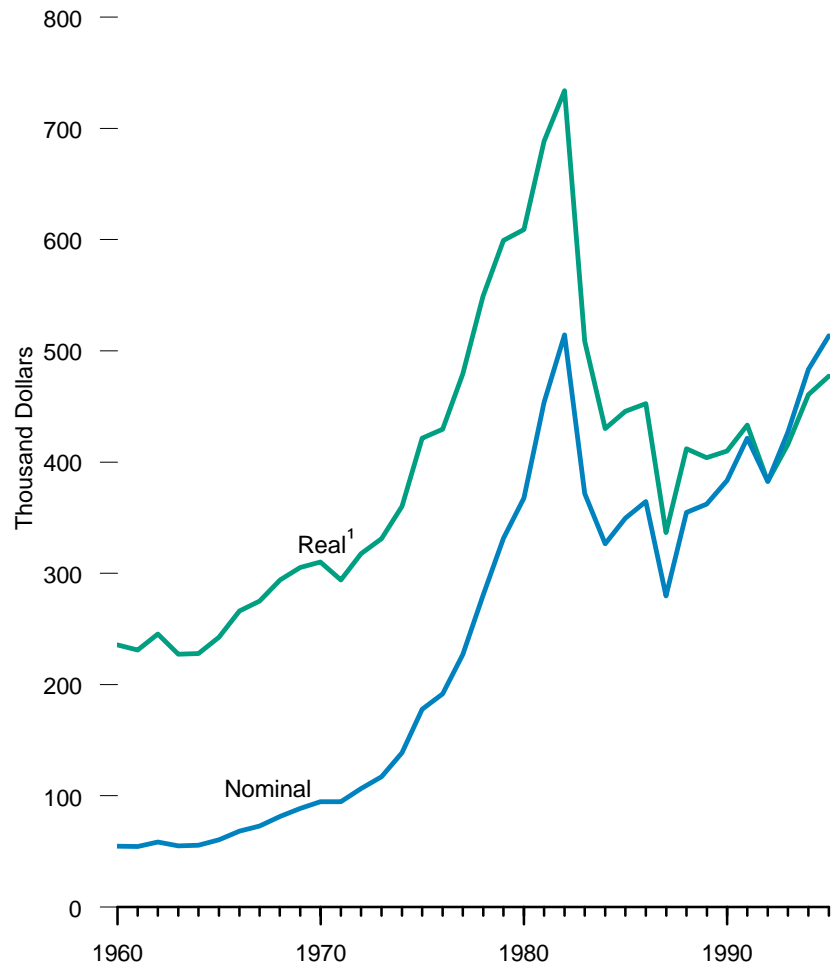
Notes: • Service wells, stratigraphic tests, and core tests are excluded. • For 1949-1959, data represent wells completed in a given year. For 1960-1969, data are for well completion reports received by the American Petroleum Institute during the reporting year. For 1970 forward, the data represent wells completed in a given year. See Note 2 at end of section. • Totals may not equal sum of components due to independent rounding. Average depth may not equal average of components due to independent

rounding.

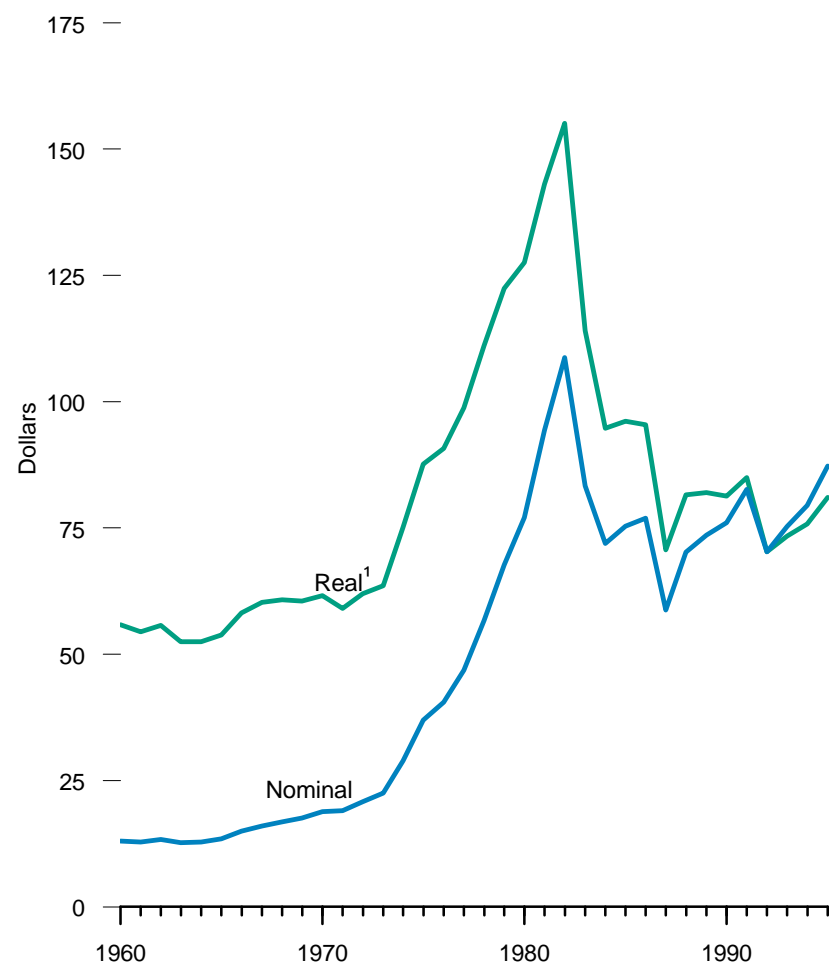
Sources: • 1949-1965—Gulf Publishing Company, *World Oil*, "Forecast-Review" issue. • 1966-1969—American Petroleum Institute, *Quarterly Review of Drilling Statistics for the United States*, annual summaries and monthly reports. • 1970 forward—Energy Information Administration computations based on well reports submitted to the American Petroleum Institute (1970-1994) and to the Petroleum Information Corporation (1995 forward).

**Figure 4.7 Costs of Wells Drilled, 1960-1995**

**Costs per Well, All Wells**



**Costs per Foot, All Wells**



<sup>1</sup>In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

Source: Table 4.7.

**Table 4.7 Costs of Oil and Gas Wells Drilled, 1960-1995**

Year	Costs per Well (thousand dollars)					Costs per Foot (dollars)				
	Oil (nominal)	Gas (nominal)	Dry Holes (nominal)	All		Oil (nominal)	Gas (nominal)	Dry Holes (nominal)	All	
				(nominal)	(real) <sup>1</sup>				(nominal)	(real) <sup>1</sup>
1960	52.2	102.7	44.0	54.9	235.8	13.22	18.57	10.56	13.01	55.84
1961	51.3	94.7	45.2	54.5	231.0	13.11	17.65	10.56	12.85	54.45
1962	54.2	97.1	50.8	58.6	245.3	13.41	18.10	11.20	13.31	55.69
1963	51.8	92.4	48.2	55.0	227.4	13.20	17.19	10.58	12.69	52.44
1964	50.6	104.8	48.5	55.8	227.8	13.12	18.57	10.64	12.86	52.49
1965	56.6	101.9	53.1	60.6	242.6	13.94	18.35	11.21	13.44	53.76
1966	62.2	133.8	56.9	68.4	266.1	15.04	21.75	12.34	14.95	58.17
1967	66.6	141.0	61.5	72.9	275.1	16.61	23.05	12.87	15.97	60.26
1968	79.1	148.5	66.2	81.5	294.1	18.63	24.05	12.88	16.83	60.76
1969	86.5	154.3	70.2	88.6	305.4	19.28	25.58	13.23	17.56	60.55
1970	86.7	160.7	80.9	94.9	310.1	19.29	26.75	15.21	18.84	61.57
1971	78.4	166.6	86.8	94.7	294.1	18.41	27.70	16.02	19.03	59.10
1972	93.5	157.8	94.9	106.4	317.7	20.77	27.78	17.28	20.76	61.97
1973	103.8	155.3	105.8	117.2	330.9	22.54	27.46	19.22	22.50	63.56
1974	110.2	189.2	141.7	138.7	360.3	27.82	34.11	26.76	28.93	75.14
1975	138.6	262.0	177.2	177.8	421.3	34.17	46.23	33.86	36.99	87.65
1976	151.1	270.4	190.3	191.6	429.6	37.35	49.78	36.94	40.46	90.72
1977	170.0	313.5	230.2	227.2	479.3	41.16	57.57	43.49	46.81	98.76
1978	208.0	374.2	281.7	280.0	548.9	49.72	68.37	52.55	56.63	111.04
1979	243.1	443.1	339.6	331.4	599.2	58.29	80.66	64.60	67.70	122.42
1980	272.1	536.4	376.5	367.7	608.7	66.36	95.16	73.70	77.02	127.52
1981	336.3	698.6	464.0	453.7	688.5	80.40	122.17	90.03	94.30	143.10
1982	347.4	864.3	515.4	514.4	733.8	86.34	146.20	104.09	108.73	155.11
1983	283.8	608.1	366.5	371.7	508.5	72.65	108.37	79.10	83.34	114.01
1984	262.1	489.8	329.2	326.5	430.1	66.32	88.80	67.18	71.90	94.73
1985	270.4	508.7	372.3	349.4	445.7	66.78	93.09	73.69	75.35	96.11
1986	284.9	522.9	389.2	364.6	452.3	68.35	93.02	76.53	76.88	95.38
1987	246.0	380.4	259.1	279.6	336.5	58.35	69.55	51.05	58.71	70.65
1988	279.4	460.3	366.4	354.7	412.0	62.28	84.65	66.96	70.23	81.57
1989	282.3	457.8	355.4	362.2	403.8	64.92	86.86	67.61	73.55	82.00
1990	321.8	471.3	367.5	383.6	409.8	69.17	90.73	67.49	76.07	81.27
1991	346.9	506.6	441.2	421.5	433.1	73.75	93.10	83.05	82.64	84.93
1992	362.3	426.1	357.6	382.6	382.6	69.50	72.83	67.82	70.27	70.27
1993	356.6	521.2	387.7	426.8	416.0	67.52	83.15	72.56	75.30	73.39
1994	409.5	535.1	491.5	483.2	<sup>R</sup> 460.7	70.57	81.90	86.60	79.49	<sup>R</sup> 75.78
1995	415.8	629.7	481.2	513.4	477.2	78.09	95.97	84.60	87.22	81.06

<sup>1</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

R=Revised data.

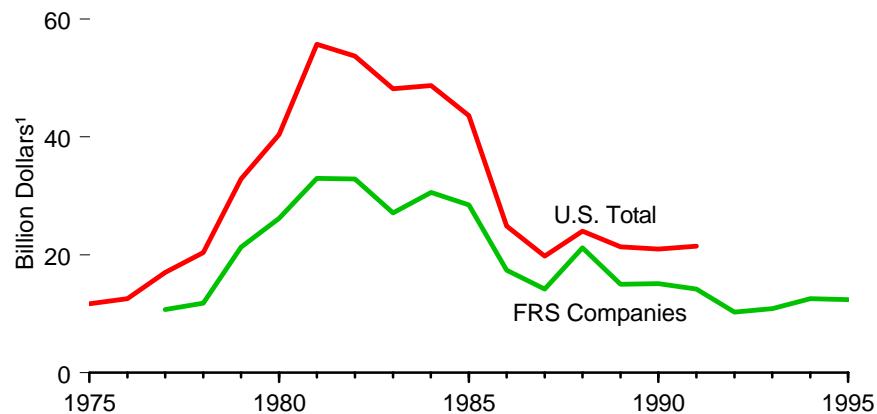
Notes: • The information reported for 1965 and prior years is not strictly comparable to that in the more recent surveys. • Average cost is the arithmetic mean and includes all costs for drilling and equipping

wells and for surface-producing facilities. Wells drilled include exploratory and development wells; excludes service wells, stratigraphic tests, and core tests.

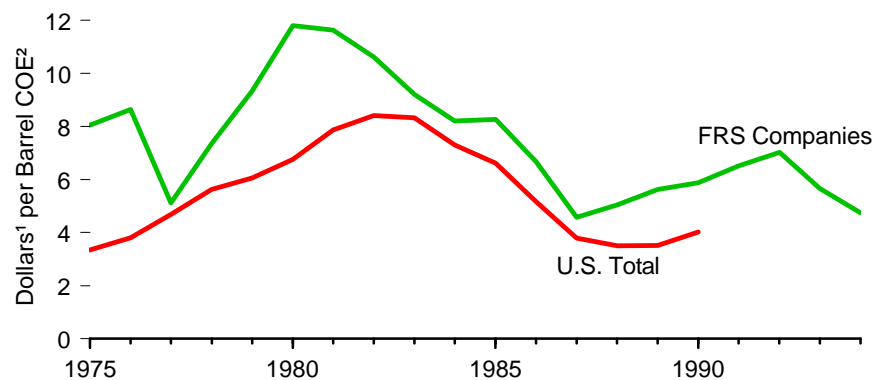
Source: American Petroleum Institute, Independent Petroleum Association of America, Mid-Continent Oil and Gas Association, *1995 Joint Association Survey on Drilling Costs*.

**Figure 4.8 U.S. Exploration and Development Expenditures, Gross Additions to Proved Reserves, and Production of Liquid and Gaseous Hydrocarbons by FRS Companies and U.S. Industry**

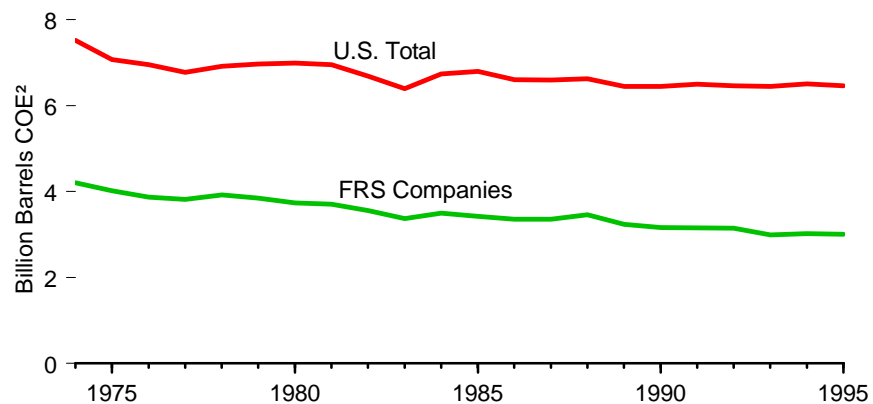
**Exploration and Development Expenditures, 1975-1995**



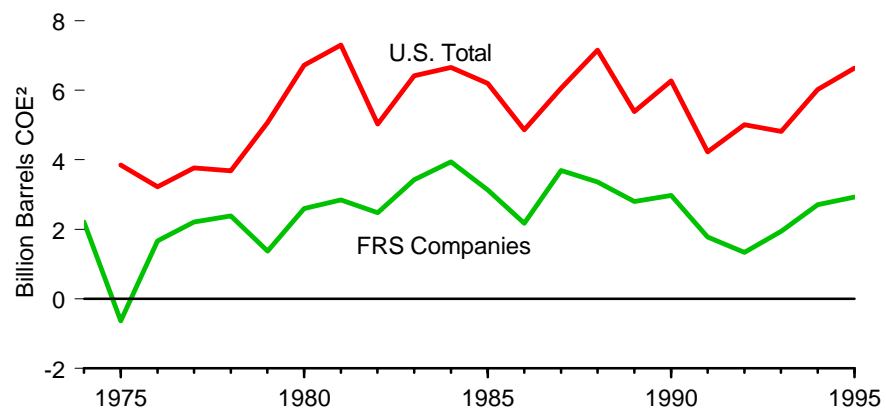
**Expenditures per Barrel of Reserve Additions, 1975-1994 (3-year weighted average)**



**Production, 1974-1995**



**Gross Additions to Proved Reserves, 1974-1995**



<sup>1</sup> Nominal dollars.

<sup>2</sup> COE=crude oil equivalent.

Note: FRS is the Financial Reporting System. See Table 3.13.

Source: Table 4.8.

**Table 4.8 U.S. Exploration and Development Expenditures, Gross Additions to Proved Reserves, and Production of Liquid and Gaseous Hydrocarbons by FRS Companies and U.S. Industry, 1974-1995**

Year	Exploration and Development Expenditures (billion dollars <sup>3</sup> )		Gross Additions to Proved Reserves <sup>1</sup> of Liquid and Gaseous Hydrocarbons <sup>2</sup> (million barrels COE <sup>4</sup> )		Expenditures per Barrel of Reserve Additions, Three-Year Weighted Average (dollars <sup>3</sup> per barrel COE <sup>4</sup> )		Production of Liquid and Gaseous Hydrocarbons <sup>2</sup> (million barrels COE <sup>4</sup> )	
	FRS Companies <sup>5</sup>	U.S. Total	FRS Companies <sup>6,7</sup>	U.S. Total <sup>7</sup>	FRS Companies <sup>5,6</sup>	U.S. Total	FRS Companies <sup>6</sup>	U.S. Total
1974	NA	NA	R2,205	NA	NA	NA	R4,205	R7,519
1975	NA	11.7	R-634	3,846	8.05	3.34	R4,017	7,071
1976	NA	12.6	1,663	3,224	8.64	3.81	R3,873	6,958
1977	10.7	17.0	2,210	3,765	5.12	4.68	R3,820	6,777
1978	11.8	20.4	2,383	3,679	7.34	5.62	R3,926	6,918
1979	21.3	32.9	1,378	5,071	9.34	6.06	R3,844	6,970
1980	26.2	40.4	2,590	6,723	11.80	6.76	R3,736	6,995
1981	33.0	55.7	2,848	7,304	11.63	7.86	R3,703	6,954
1982	32.9	53.7	2,482	5,030	10.62	8.41	R3,559	6,682
1983	27.1	48.2	3,427	6,412	9.20	8.32	3,370	6,399
1984	30.6	48.7	3,941	6,653	8.21	7.30	3,503	6,736
1985	28.5	43.6	3,129	6,190	8.27	6.61	3,427	6,798
1986	17.4	24.9	2,178	4,866	6.67	5.16	3,361	6,602
1987	14.2	19.8	3,698	6,059	4.58	3.79	3,354	6,596
1988	21.2	24.0	3,359	7,156	5.05	3.50	3,460	6,627
1989	15.0	21.4	2,798	5,385	5.62	3.52	3,243	6,446
1990	15.1	21.0	2,979	6,271	5.87	4.02	3,163	6,453
1991	14.2	21.5	1,772	4,227	6.52	NA	3,155	6,497
1992	10.3	NA	1,332	5,006	7.02	NA	3,152	6,459
1993	10.9	NA	1,945	4,814	5.66	NA	2,994	6,446
1994	12.6	NA	2,703	6,021	R4.74	NA	3,018	R6,506
1995	12.4	NA	2,929	6,641	NA	NA	3,004	6,459

<sup>1</sup> Gross additions to proved reserves equal annual change in proved reserves plus annual production.

<sup>2</sup> Liquid and gaseous hydrocarbons include crude oil, natural gas liquids, and natural gas.

<sup>3</sup> Nominal dollars.

<sup>4</sup> Crude oil equivalent: converted to Btu on the basis of annual average conversion factors. See Appendix A.

<sup>5</sup> FRS data for 1982 and 1984 are adjusted to exclude purchases of proved reserves associated with mergers among the FRS companies.

<sup>6</sup> Based on net ownership interest (see Glossary).

<sup>7</sup> Downward revisions of Alaska North Slope natural gas reserves are excluded.

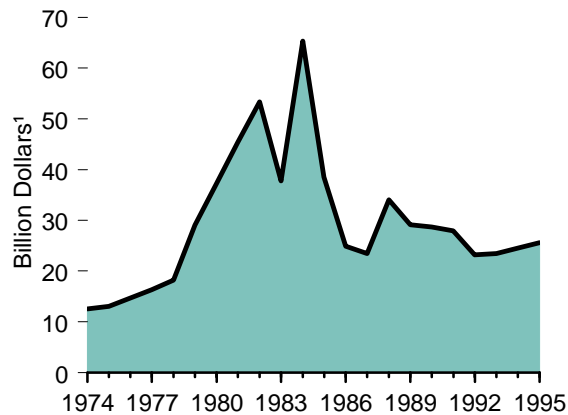
R=Revised data. NA=Not available.

Notes: • FRS is the Financial Reporting System. See Table 3.13. • Data in this table are for U.S. domestic operations only.

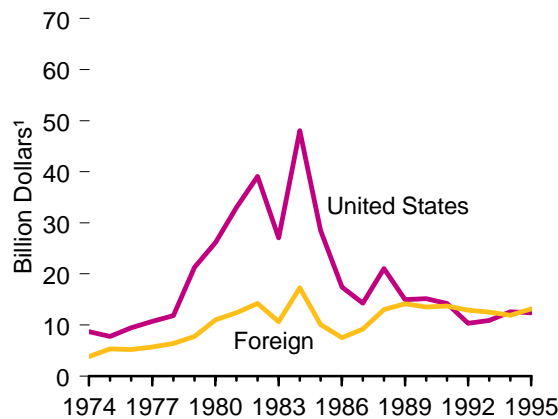
Sources: **FRS Companies:** • 1974-1976—Energy Information Administration (EIA), Form EIA-28, "Financial Reporting System" database, October 1996. • 1977-1994—EIA, *Performance Profiles of Major Energy Producers*, annual report. • 1995—EIA, *Performance Profiles of Major Energy Producers 1995* (January 1997), Tables 13, 17, and B21. **U.S. Total, Exploration and Development Expenditures:** • 1975-1982—Bureau of the Census, *Annual Survey of Oil and Gas*. • 1983-1991—American Petroleum Institute, *Survey on Oil and Gas Expenditures 1992*. **U.S. Total, Gross Additions to Proved Reserves of Liquid and Gaseous Hydrocarbons:** • 1975-1979—American Gas Association, American Petroleum Institute, and Canadian Petroleum Association (published jointly), *Reserves of Crude Oil, Natural Gas Liquids, and Natural Gas in the United States and Canada as of December 31, 1979*, Volume 34, June 1980. • 1980 forward—EIA, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1995 Annual Report* (November 1996). **U.S. Total, Production of Liquid and Gaseous Hydrocarbons:** • 1974-1994—Tables 5.1 and 6.1. • 1995—EIA, *Monthly Energy Review* (February 1997).

**Figure 4.9 FRS Companies' Expenditures for Oil and Gas Exploration and Development by Region**

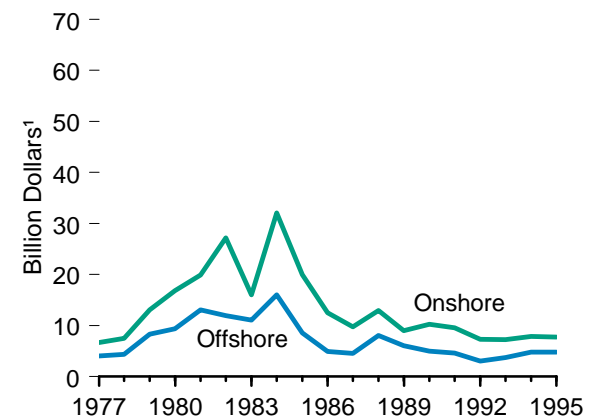
**Total, 1974-1995**



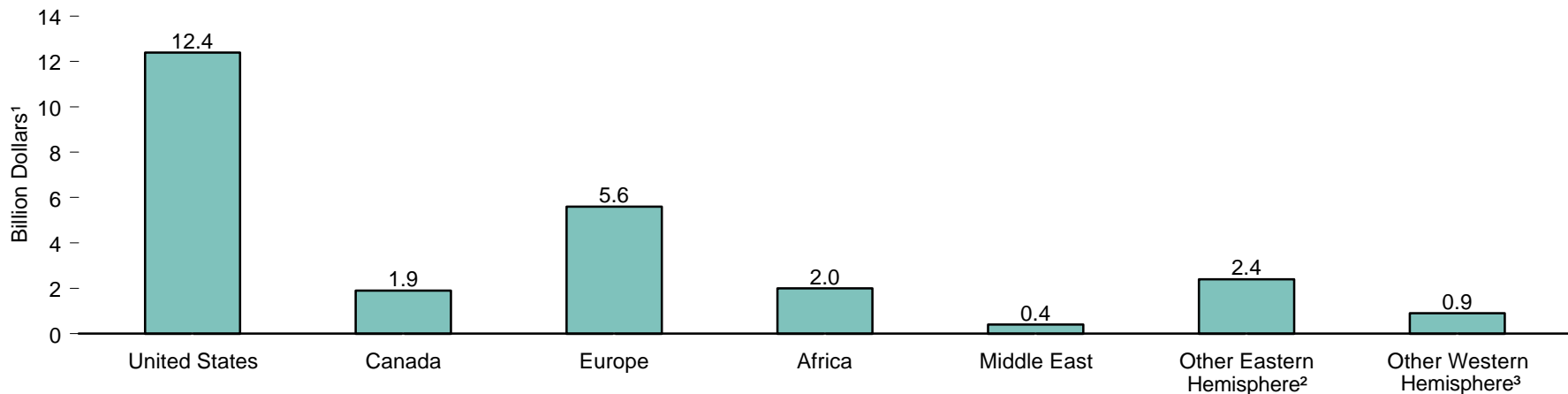
**U.S. and Foreign, 1974-1995**



**U.S. Onshore and Offshore, 1977-1995**



**By Region, 1995**



<sup>1</sup> Nominal dollars.

<sup>2</sup> This region includes areas eastward of the Greenwich prime meridian to 180° longitude and not included in other specific domestic or foreign classifications.

<sup>3</sup> This region includes areas westward of the Greenwich prime meridian to 180°

longitude and not included in other specific domestic or foreign classifications.

Notes: • FRS is the Financial Reporting System. See Table 3.13. • Because vertical scales differ, graphs should not be compared.

Source: Table 4.9.



**Table 4.9 FRS Companies' Expenditures for Oil and Gas Exploration and Development by Region, 1974-1995**  
(Billion Dollars<sup>1</sup>)

Year	United States			Foreign							Total
	Onshore	Offshore	Total	Canada	Europe	Africa	Middle East	Other Eastern Hemisphere <sup>2</sup>	Other Western Hemisphere <sup>3</sup>	Total	
1974	NA	NA	8.7	NA	NA	NA	NA	NA	NA	3.8	12.5
1975	NA	NA	7.8	NA	NA	NA	NA	NA	NA	5.3	13.1
1976	NA	NA	9.5	NA	NA	NA	NA	NA	NA	5.2	14.7
1977	6.7	4.0	10.7	1.5	2.5	0.7	0.2	0.3	0.4	5.6	16.3
1978	7.5	4.3	11.8	1.6	2.6	0.8	0.3	0.4	0.6	6.4	18.2
1979	13.0	8.3	21.3	2.3	3.0	0.8	0.2	0.5	0.8	7.8	29.1
1980	16.8	9.4	26.2	3.1	4.3	1.4	0.2	0.8	1.0	11.0	37.2
1981	19.9	13.0	33.0	1.8	5.0	2.1	0.3	1.9	1.3	12.4	45.4
1982	27.2	11.9	39.1	1.9	6.3	2.1	0.4	2.4	1.1	14.2	53.3
1983	16.0	11.1	27.1	1.6	4.3	1.7	0.5	2.0	0.6	10.7	37.7
1984	32.1	16.0	48.1	5.4	5.5	3.4	0.5	2.0	0.5	17.3	65.3
1985	20.0	8.5	28.5	1.9	3.7	1.6	0.9	1.3	0.7	10.1	38.6
1986	12.5	4.9	17.4	1.1	3.2	1.1	0.3	1.2	0.6	7.5	24.9
1987	9.7	4.5	14.3	1.9	3.0	0.8	0.4	2.8	0.5	9.2	23.5
1988	12.9	8.1	21.0	5.4	4.3	0.8	0.4	1.4	0.7	13.0	34.1
1989	9.0	6.0	15.0	6.3	3.5	1.0	0.4	2.3	0.6	14.1	29.1
1990	10.2	4.9	15.1	1.8	6.6	1.4	0.6	2.4	0.7	13.6	28.7
1991	9.6	4.6	14.2	1.7	6.8	1.5	0.5	2.4	0.7	13.7	27.9
1992	7.3	3.0	10.3	1.1	6.8	1.4	0.6	2.4	0.6	12.9	23.2
1993	7.2	3.7	10.9	1.6	5.7	1.5	0.7	2.5	0.6	12.5	23.5
1994	7.8	4.8	12.6	1.8	4.7	1.4	0.4	2.8	0.7	11.9	24.5
1995	7.7	4.7	12.4	1.9	5.6	2.0	0.4	2.4	0.9	13.2	25.6

<sup>1</sup> Nominal dollars.

<sup>2</sup> This region includes areas eastward of the Greenwich prime meridian to 180° longitude and not included in other specified domestic or foreign classifications.

<sup>3</sup> This region includes areas westward of the Greenwich prime meridian to 180° longitude not included in other domestic or foreign classifications.

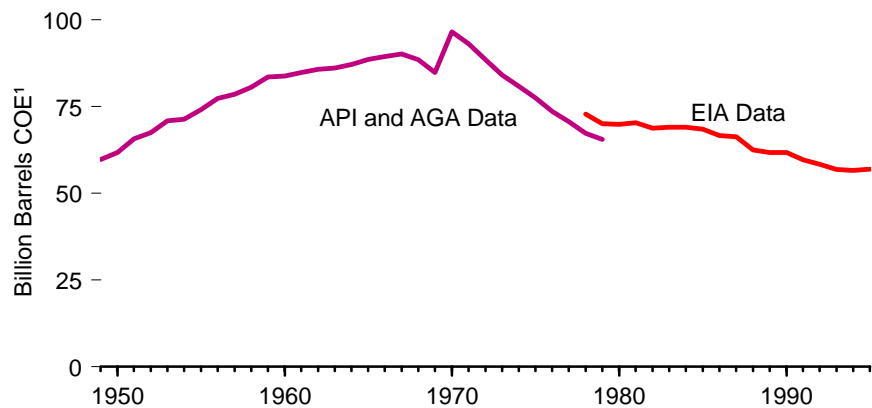
NA=Not available.

Note: • FRS is the Financial Reporting System. See Table 3.14. • Totals may not equal sum of components due to independent rounding.

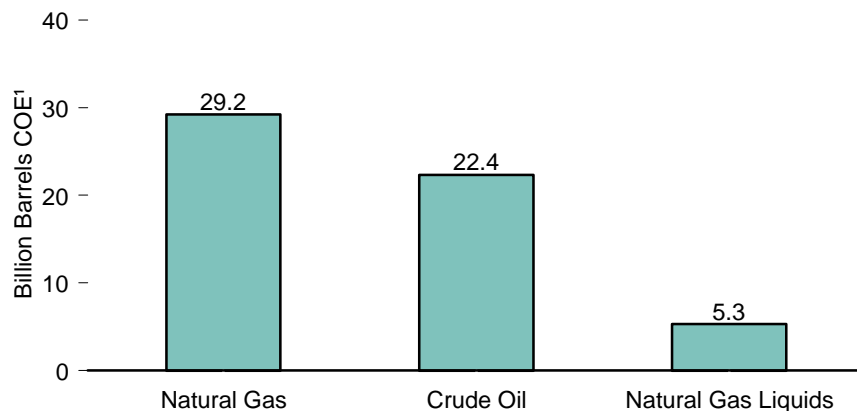
Sources: • 1974–1976—Energy Information Administration (EIA), Office of Energy Markets and End Use, Financial Reporting System Database, October 1996. • 1977–1994—EIA, *Performance Profiles of Major Energy Producers*, annual report. • 1995—EIA, *Performance Profiles of Major Energy Producers*, (January 1997), Tables B32 and B34.

**Figure 4.10 Liquid and Gaseous Hydrocarbon Proved Reserves, End of Year**

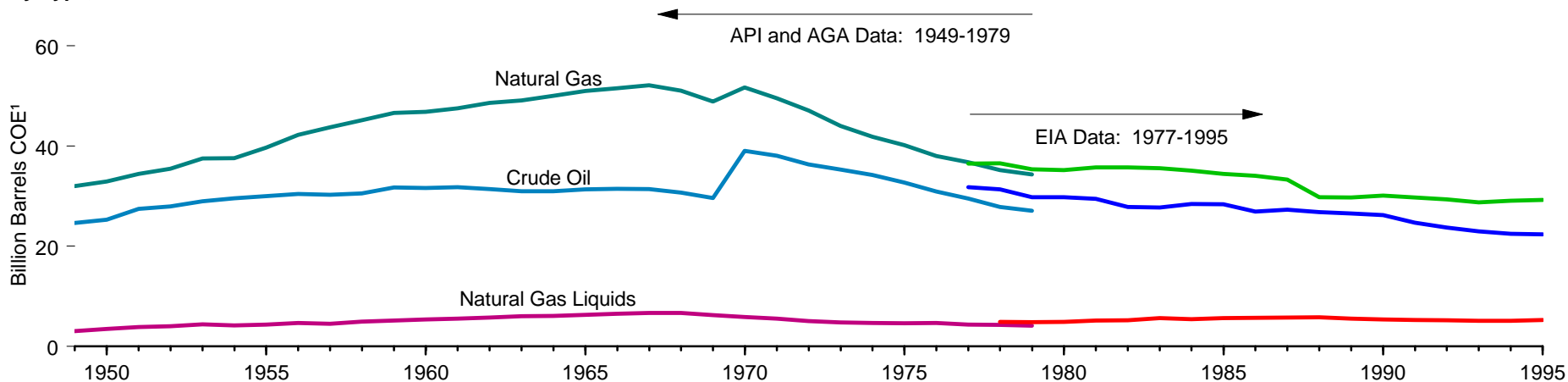
**Total, 1949-1995**



**By Type, 1995**



**By Type, 1949-1995**



<sup>1</sup> COE=crude oil equivalent.

Notes: • API=American Petroleum Institute. AGA=American Gas Association.  
EIA=Energy Information Administration. • Because vertical scales differ, graphs

should not be compared.

Source: Table 4.10.

**Table 4.10 Liquid and Gaseous Hydrocarbon Proved Reserves, End of Year 1949-1995**

Year	Crude Oil	Natural Gas		Natural Gas Liquids		Total
	Billion Barrels	Trillion Cubic Feet <sup>1</sup>	Billion Barrels COE <sup>2</sup>	Billion Barrels	Billion Barrels COE <sup>2</sup>	Billion Barrels COE <sup>2</sup>
American Petroleum Institute and American Gas Association Data						
1949	24.6	179.4	32.0	3.7	3.1	59.7
1950	25.3	184.6	32.9	4.3	3.5	61.7
1951	27.5	192.8	34.4	4.7	3.9	65.7
1952	28.0	198.6	35.4	5.0	4.1	67.5
1953	28.9	210.3	37.5	5.4	4.4	70.9
1954	29.6	210.6	37.6	5.2	4.2	71.3
1955	30.0	222.5	39.7	5.4	4.4	74.1
1956	30.4	236.5	42.2	5.9	4.7	77.3
1957	30.3	245.2	43.8	5.7	4.5	78.6
1958	30.5	252.8	45.1	6.2	5.0	80.6
1959	31.7	261.2	46.6	6.5	5.2	83.5
1960	31.6	262.3	46.8	6.8	5.4	83.8
1961	31.8	266.3	47.5	7.0	5.6	84.8
1962	31.4	272.3	48.6	7.3	5.8	85.7
1963	31.0	276.2	49.1	7.7	6.0	86.1
1964	31.0	281.3	50.0	7.7	6.1	87.1
1965	31.4	286.5	51.0	8.0	6.3	88.6
1966	31.5	289.3	51.5	8.3	6.5	89.5
1967	31.4	292.9	52.1	8.6	6.7	90.2
1968	30.7	287.3	51.1	8.6	6.7	88.5
1969	29.6	275.1	48.9	8.1	6.3	84.8
1970	39.0	290.7	51.7	7.7	5.9	96.6
1971	38.1	278.8	49.6	7.3	5.5	93.2
1972	36.3	266.1	47.1	6.8	5.1	88.5
1973	35.3	250.0	44.0	6.5	4.8	84.1
1974	34.2	237.1	41.9	6.4	4.7	80.8
1975	32.7	228.2	40.2	6.3	4.6	77.5
1976	30.9	216.0	38.0	6.4	4.7	73.6
1977	29.5	208.9	36.8	6.0	4.4	70.6
1978	27.8	200.3	35.2	5.9	4.3	67.3
1979	27.1	194.9	34.3	5.7	4.1	65.5
Energy Information Administration Data						
1977	31.8	207.4	36.5	NA	NA	NA
1978	31.4	208.0	36.5	6.8	4.9	72.8
1979	29.8	201.0	35.4	6.6	4.8	70.0
1980	29.8	199.0	35.2	6.7	4.9	69.9
1981	29.4	201.7	35.7	7.1	5.2	70.3
1982	27.9	201.5	35.7	7.2	5.2	68.8
1983	27.7	200.2	35.6	7.9	5.7	69.0
1984	28.4	197.5	35.1	7.6	5.5	69.0
1985	28.4	193.4	34.4	7.9	5.6	68.5
1986	26.9	191.6	34.0	8.2	5.7	66.6
1987	27.3	187.2	33.3	8.1	5.8	66.3
1988	26.8	168.0	29.8	8.2	5.8	62.5
1989	26.5	167.1	29.7	7.8	5.5	61.7
1990	26.3	169.3	30.1	7.6	5.4	61.7
1991	24.7	167.1	29.7	7.5	5.3	59.6
1992	23.7	165.0	29.3	7.5	5.2	58.3
1993	23.0	162.4	28.8	7.2	5.1	56.8
1994	22.5	163.8	29.0	7.2	5.1	56.6
1995	22.4	165.1	29.2	7.4	5.3	56.9

<sup>1</sup> The American Gas Association estimates of natural gas proved reserves include volumes of gas held in underground storage. In 1979, this volume amounted to 4.9 trillion cubic feet. Energy Information Administration (EIA) data do not include gas in underground storage.

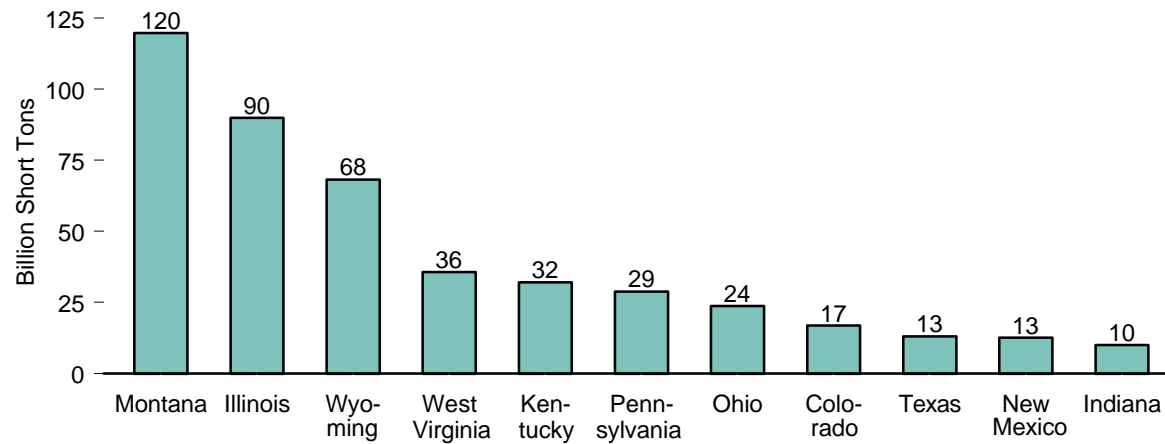
<sup>2</sup> Crude oil equivalent. Natural gas and natural gas liquids are converted to Btu on the basis of annual average conversion factors. See Appendix A.

NA=Not available.

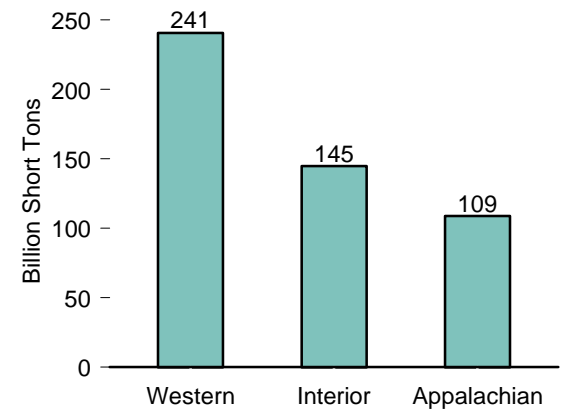
Sources: **API/AGA Data:** American Gas Association, American Petroleum Institute, and Canadian Petroleum Association (published jointly). *Reserves of Crude Oil, Natural Gas Liquids and Natural Gas in the United States and Canada as of December 31, 1979*. Volume 34, June 1980. **EIA Data:** • 1977-1984—EIA, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1988 Annual Report* (October 1989), Table 1. • 1985-forward—EIA, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, Annual Report 1995* (November 1996), Table 1.

**Figure 4.11 Coal Demonstrated Reserve Base, January 1, 1996**

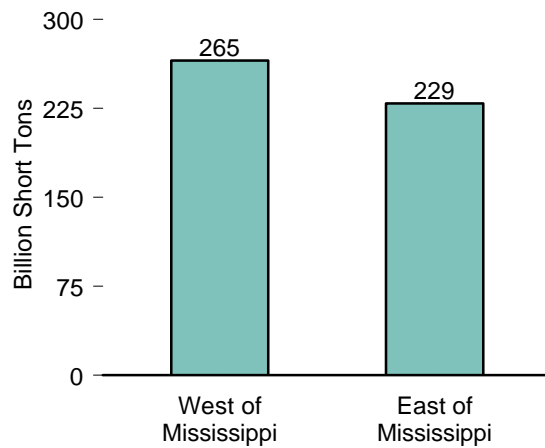
**By Key States**



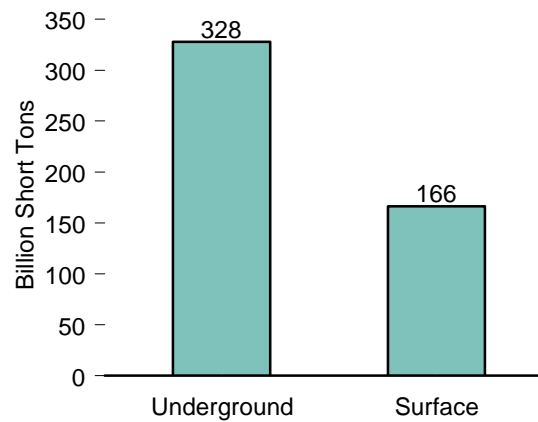
**By Region**



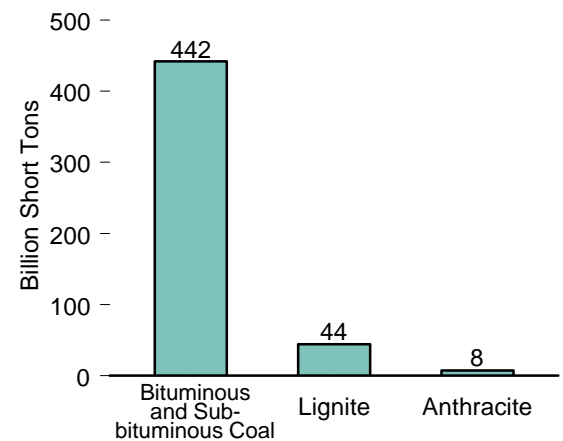
**West and East of Mississippi**



**By Mining Method**



**By Rank**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 4.11.

**Table 4.11 Coal Demonstrated Reserve Base, January 1, 1996**  
(Billion Short Tons)

Region and State	Anthracite	Bituminous Coal <sup>1</sup>		Lignite	Total		
	Underground and Surface <sup>2</sup>	Underground	Surface	Surface <sup>3</sup>	Underground	Surface	Total
<b>Appalachian</b> .....	<b>7.3</b>	<b>75.9</b>	<b>24.6</b>	<b>1.1</b>	<b>79.8</b>	<b>29.0</b>	<b>108.9</b>
Alabama .....	0.0	1.3	2.2	1.1	1.3	3.3	4.6
Kentucky, Eastern .....	0.0	2.4	9.9	0.0	2.4	9.9	12.3
Ohio .....	0.0	17.8	5.9	0.0	17.8	5.9	23.7
Pennsylvania .....	7.2	20.5	1.1	0.0	24.3	4.4	28.8
Virginia .....	0.1	1.5	0.7	0.0	1.6	0.7	2.3
West Virginia .....	0.0	31.2	4.5	0.0	31.2	4.5	35.7
Other <sup>4</sup> .....	0.0	1.2	0.4	0.0	1.2	0.4	1.6
<b>Interior</b> .....	<b>0.1</b>	<b>103.6</b>	<b>27.4</b>	<b>13.5</b>	<b>103.7</b>	<b>40.9</b>	<b>144.6</b>
Illinois .....	0.0	73.7	16.2	0.0	73.7	16.2	89.9
Indiana .....	0.0	8.9	1.1	0.0	8.9	1.1	10.0
Iowa .....	0.0	1.7	0.5	0.0	1.7	0.5	2.2
Kentucky, Western .....	0.0	16.3	3.7	0.0	16.3	3.7	20.0
Missouri .....	0.0	1.5	4.5	0.0	1.5	4.5	6.0
Oklahoma .....	0.0	1.2	0.3	0.0	1.2	0.3	1.6
Texas .....	0.0	0.0	0.0	13.0	0.0	13.0	13.0
Other <sup>5</sup> .....	0.1	0.3	1.1	0.5	0.4	1.6	2.0
<b>Western</b> .....	<b>0.0</b>	<b>144.2</b>	<b>66.6</b>	<b>29.8</b>	<b>144.2</b>	<b>96.4</b>	<b>240.6</b>
Alaska .....	0.0	5.4	0.7	0.0	5.4	0.7	6.1
Colorado .....	0.0	12.0	0.6	4.2	12.0	4.8	16.8
Montana .....	0.0	71.0	33.0	15.8	71.0	48.8	119.7
New Mexico .....	0.0	6.2	6.3	0.0	6.2	6.3	12.5
North Dakota .....	0.0	0.0	0.0	9.4	0.0	9.4	9.4
Utah .....	0.0	5.6	0.3	0.0	5.6	0.3	5.9
Washington .....	0.0	1.3	0.1	0.0	1.3	0.1	1.4
Wyoming .....	0.0	42.5	25.6	0.0	42.5	25.6	68.2
Other <sup>6</sup> .....	0.0	0.1	0.1	0.4	0.1	0.4	0.6
<b>U.S. Total</b> .....	<b>7.5</b>	<b>323.7</b>	<b>118.6</b>	<b>44.3</b>	<b>327.8</b>	<b>166.3</b>	<b>494.1</b>
States East of the Mississippi River .....	7.3	174.9	45.6	1.1	178.9	50.0	229.0
States West of the Mississippi River .....	0.1	148.8	73.0	43.3	148.8	116.3	265.1

<sup>1</sup> Includes subbituminous coal.

<sup>2</sup> Includes 3,388.2 million short tons of surface-minable resources, of which 3,372.7 million tons are in Pennsylvania and 15.5 million tons are in Arkansas.

<sup>3</sup> Lignite resources are not mined underground in the United States.

<sup>4</sup> Georgia, Maryland, North Carolina, and Tennessee.

<sup>5</sup> Arkansas, Kansas, Louisiana, and Michigan.

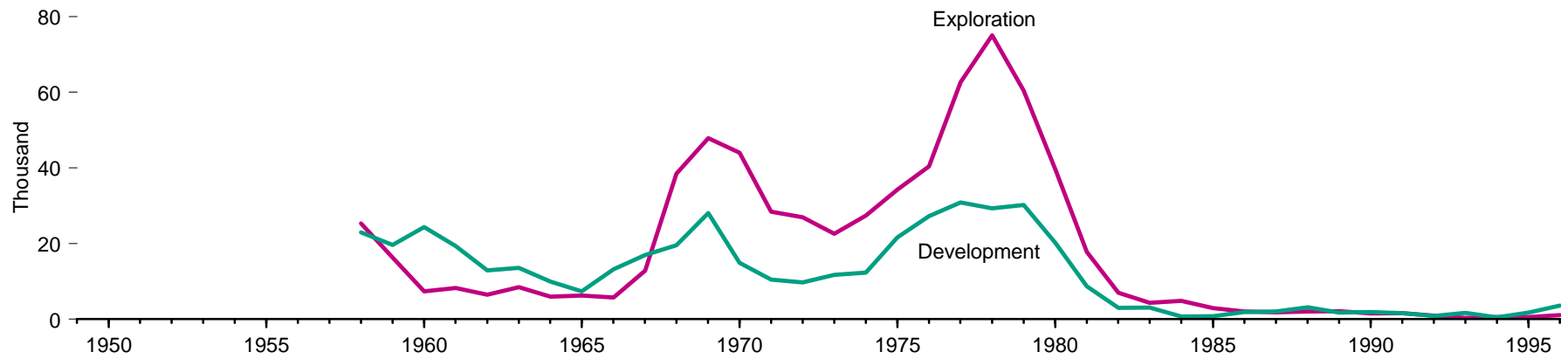
<sup>6</sup> Arizona, Idaho, Oregon, and South Dakota.

Notes: • Data represent known measured and indicated coal resources meeting minimum seam and depth criteria, in the ground as of January 1, 1996. These coal resources are not totally recoverable. Net recoverability ranges from less than 40 percent to more than 90 percent. Fifty-five percent of the demonstrated reserve base of coal in the United States is estimated to be recoverable. • Totals may not equal sum of components due to independent rounding.

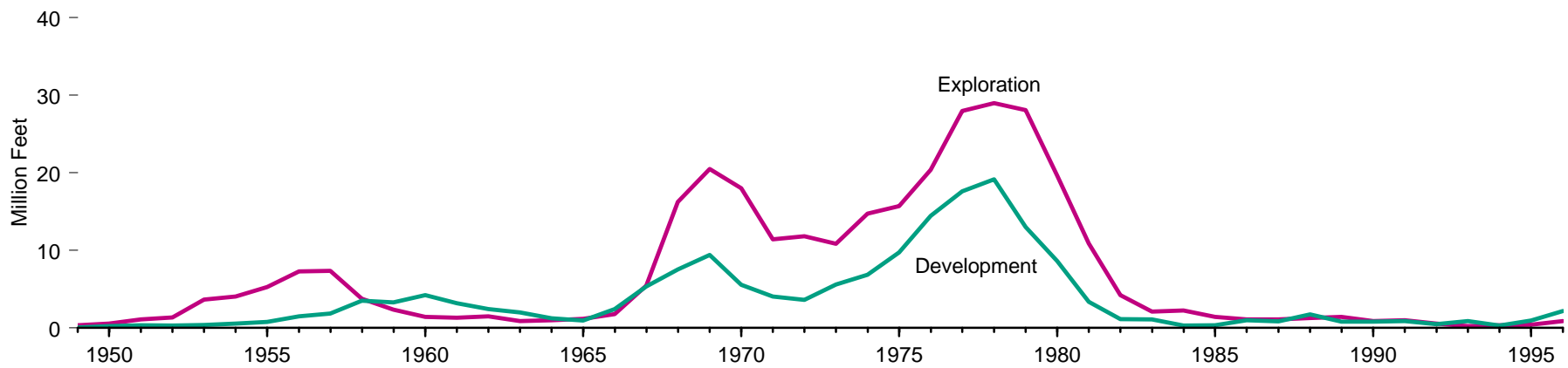
Source: Energy Information Administration, *U.S. Coal Reserves: A Review and Update* (August 1996), Tables 13 and 14, adjusted using 1995 coal production data and depletion factors on file.

**Figure 4.12 Uranium Exploration and Development Drilling, 1949-1996**

**Holes Drilled**



**Footage Drilled**



Source: Table 4.12.

**Table 4.12 Uranium Exploration and Development Drilling, 1949-1996**

Year	Exploration <sup>1</sup>		Development <sup>2</sup>		Total	
	Holes Drilled (thousands)	Footage Drilled (million feet)	Holes Drilled (thousands)	Footage Drilled (million feet)	Holes Drilled (thousands)	Footage Drilled (million feet)
1949	NA	0.36	NA	0.05	NA	0.41
1950	NA	0.57	NA	0.21	NA	0.78
1951	NA	1.08	NA	0.35	NA	1.43
1952	NA	1.36	NA	0.30	NA	1.66
1953	NA	3.65	NA	0.37	NA	4.02
1954	NA	4.06	NA	0.55	NA	4.61
1955	NA	5.27	NA	0.76	NA	6.03
1956	NA	7.29	NA	1.50	NA	8.79
1957	NA	7.35	NA	1.85	NA	9.20
1958	25.32	3.76	22.93	3.49	48.25	7.25
1959	16.25	2.37	19.59	3.28	35.84	5.65
1960	7.34	1.40	24.40	4.21	31.73	5.61
1961	8.26	1.32	19.31	3.19	27.57	4.51
1962	6.44	1.48	12.87	2.43	19.31	3.91
1963	8.47	0.88	13.53	1.98	22.01	2.86
1964	5.97	0.97	9.91	1.25	15.88	2.21
1965	6.23	1.16	7.33	0.95	13.56	2.11
1966	5.75	1.80	13.18	2.40	18.93	4.20
1967	12.79	5.44	16.95	5.33	29.74	10.76
1968	38.47	16.23	19.53	7.53	58.00	23.75
1969	47.85	20.47	28.01	9.39	75.86	29.86
1970	43.98	17.98	14.87	5.55	58.85	23.53
1971	28.42	11.40	10.44	4.05	38.86	15.45
1972	26.91	11.82	9.71	3.61	36.62	15.42
1973	22.56	10.83	11.70	5.59	34.26	16.42
1974	27.40	14.72	12.30	6.84	39.70	21.56
1975	34.29	15.69	21.60	9.73	55.89	25.42
1976	40.41	20.36	27.23	14.44	67.64	34.80
1977	62.60	27.96	30.86	17.62	93.45	45.58
1978	75.07	28.95	29.29	19.15	104.35	48.10
1979	60.46	28.07	30.19	13.01	90.65	41.08
1980	39.61	19.60	20.19	8.59	59.80	28.19
1981	17.75	10.87	8.67	3.35	26.42	14.22
1982	6.97	4.23	3.00	1.13	9.97	5.36
1983	4.29	2.09	3.01	1.08	7.30	3.17
1984	4.80	2.26	0.72	0.29	5.52	2.55
1985	2.88	1.42	0.77	0.34	3.65	1.76
1986	1.99	1.10	1.85	0.97	3.83	2.07
1987	1.82	1.11	1.99	0.86	3.81	R1.97
1988	2.03	1.28	3.18	1.73	5.21	3.01
1989	2.09	1.43	1.75	0.80	3.84	R2.23
1990	1.51	0.87	1.91	0.81	3.42	1.68
1991	1.62	0.97	1.57	0.87	3.20	1.84
1992	0.94	0.56	0.83	0.50	1.77	1.06
1993	0.36	0.22	1.67	0.89	2.02	1.11
1994	0.52	0.34	0.48	0.32	1.00	0.66
1995	0.58	0.40	1.73	0.95	2.31	1.35
1996	1.12	0.88	3.58	2.16	4.70	3.05

<sup>1</sup> Includes surface drilling in search of new ore deposits or extensions of known deposits and drilling at the location of a discovery up to the time the company decides sufficient ore reserves are present to justify commercial exploitation.

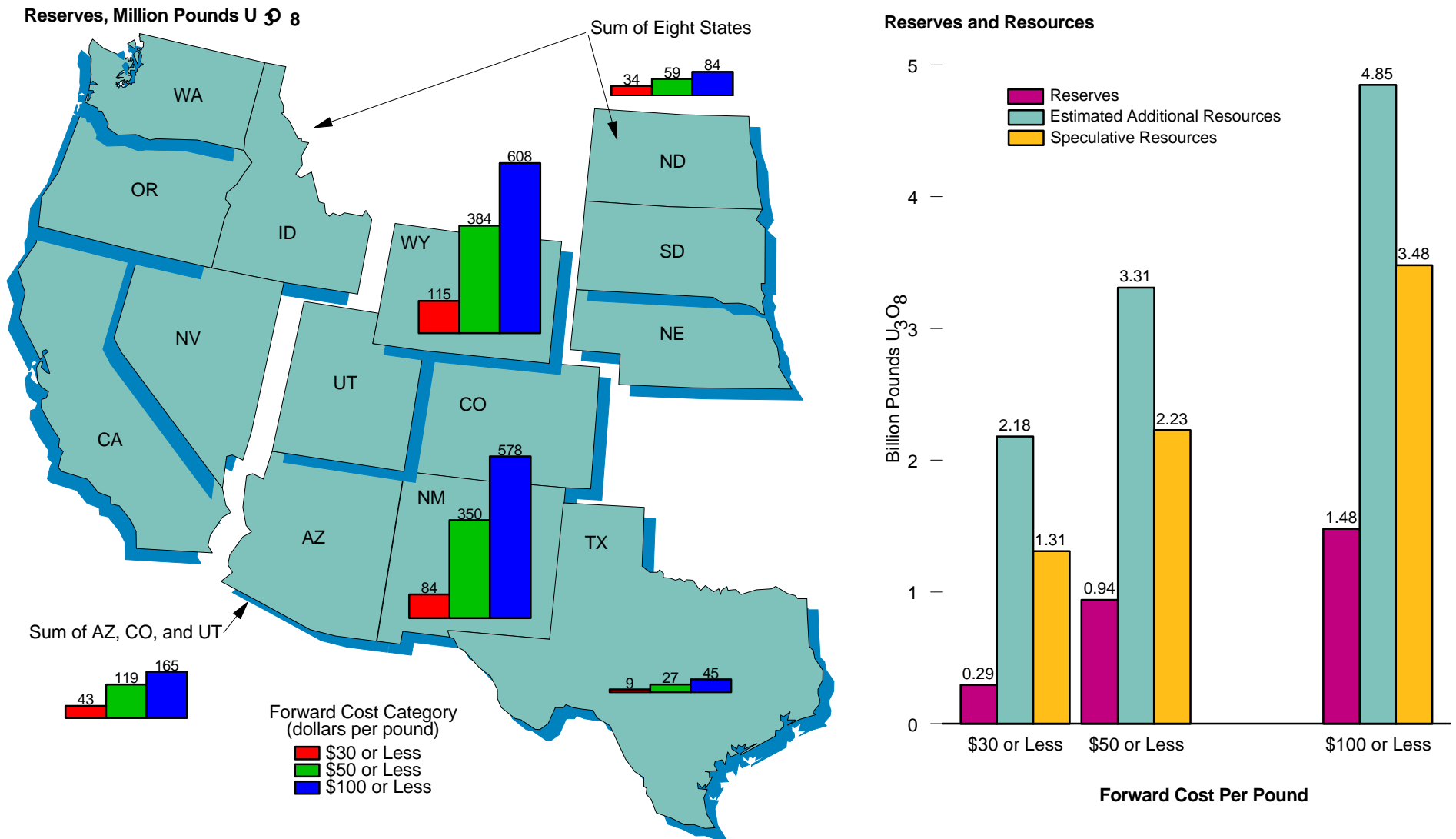
<sup>2</sup> Includes all surface drilling on an ore deposit to determine more precisely size, grade, and configuration subsequent to the time that commercial exploitation is deemed feasible.

R=Revised data. NA=Not available.

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

Sources: • 1949-1981—U.S. Department of Energy, Grand Junction Office, *Statistical Data of the Uranium Industry*, January 1, 1983, Report No. GJO-100 (1983), Table VIII-5. • 1982-1984—Energy Information Administration (EIA), *Uranium Industry Annual 1993* (September 1994), Table 3. • 1985—EIA, *Uranium Industry Annual 1994* (July 1995), Table 4. • 1986—EIA, *Uranium Industry Annual 1995* (May 1996), Table 1. • 1987 forward—EIA, *Uranium Industry Annual 1996* (April 1997), Table 1.

**Figure 4.13 Uranium Reserves and Resources, December 31, 1996**



Note: States shaded by group correspond to categories listed under "Reserves" on Table 4.13.

Source: Table 4.13.



**Table 4.13 Uranium Reserves and Resources, December 31, 1996**

(Million Pounds U<sub>3</sub>O<sub>8</sub>)

Resource Category and State	Forward Cost Category (dollars per pound) <sup>1</sup>		
	\$30 or Less	\$50 or Less	\$100 or Less
<b>Reserves</b> <sup>2</sup> .....	<b>285</b>	<b>939</b>	<b>1,480</b>
New Mexico .....	84	350	578
Wyoming .....	115	384	608
Texas .....	9	27	45
Arizona, Colorado, Utah .....	43	119	165
Others <sup>3</sup> .....	34	59	84
<b>Potential Resources</b> <sup>4</sup>			
Estimated Additional Resources .....	2,180	3,310	4,850
Speculative Resources .....	1,310	2,230	3,480

<sup>1</sup> Forward costs are all operating and capital costs (in current dollars) yet to be incurred in the production of uranium from estimated resources. Excluded are previous expenditures (such as exploration and land acquisitions), taxes, profit, and the cost of money. Generally, forward costs are lower than market prices. Resource values in forward-cost categories are cumulative; that is, the quantity at each level of forward-cost includes all reserves/resources at the lower cost in that category.

<sup>2</sup> The Energy Information Administration category of uranium reserves is equivalent to the internationally reported category of Reasonably Assured Resources (RAR).

<sup>3</sup> California, Idaho, Nebraska, Nevada, North Dakota, Oregon, South Dakota, and Washington.

<sup>4</sup> Shown are the mean values for the distribution of estimates for each forward-cost category, rounded to the nearest 10 million pounds U<sub>3</sub>O<sub>8</sub>.

Sources: • Forward Costs \$30 or Less or \$50 or Less—Energy Information Administration (EIA), *Uranium Industry Annual 1996* (April 1997), Tables B1 and B4. • Forward Costs \$100 or Less—EIA, Office of Coal, Nuclear, Electric and Alternate Fuels database as of December 31, 1996.

## Energy Resources Notes

1. These volumes are the sum of the respective mean estimates in United States Geological Survey, *1995 National Assessment of United States Oil and Gas Resources*, Circular 1118 (Washington DC, 1995), pp. 2 and 17-19, for the onshore United States and State jurisdiction offshore waters, and in Minerals Management Services, *An Assessment of the Undiscovered Hydrocarbon Potential of the Nation's Outer Continental Shelf*, OCS Report MMS 96-0034 (Washington DC, 1996), pp. 14 and 18, for the Federal jurisdiction offshore.

**Conventionally reservoired deposits** are discrete subsurface accumulations of crude oil or natural gas usually defined, controlled, or limited by hydrocarbon/water contacts. **Unconventionally reservoired deposits (continuous-type accumulations)** are geographically extensive subsurface accumulations of crude oil or natural gas that generally lack well-defined hydrocarbon/water contacts. Examples include coal-bed methane, "tight gas," and auto-sourced oil- and gas-shale reservoirs. **Ultimate recovery appreciation (reserve growth)** is the volume by which the estimate of total recovery from a

known oil or gas reservoir or aggregation of such reservoirs is expected to increase during the time between discovery and permanent abandonment.

For purposes of comparison, the Potential Gas Committee, an industry-sponsored group of experts, biennially provides another geologically-based estimate of the Nation's natural gas resources. The latest mean estimate, published in "Potential Supply of Natural Gas in the United States," December 31, 1996, is 1,067 trillion cubic feet. This volume includes undiscovered conventionally reservoired deposits, expected ultimate recovery appreciation, coalbed methane, and tight gas where it is believed to be technically recoverable and marketable at reasonable cost.

2. For 1970 forward, annual well completions are estimated by EIA based on individual well reports submitted to the American Petroleum Institute (1970-1994) and to Petroleum Information/Dwights LLC (1995 forward). The as-received well completion data for recent years are incomplete due to delays in the reporting of wells drilled. EIA therefore statistically imputes the missing data to provide estimates of total well completions and footage where necessary.

# 5. Petroleum

## Fluctuations in Prices

After the oil embargo in 1973-1974, the real price<sup>1</sup> of crude oil rose to \$23.56 per barrel in 1974, double the price in 1973 (5.19). Successive price hikes in following years brought the real price of crude oil to an all-time high of \$53.47 in 1981. In 1982, however, oil prices began trending downward and then plummeted in 1986. The average annual composite refiner acquisition cost, in real terms, of a barrel of crude oil fell from \$34.12 in 1985 to \$18.05 in 1986. Of the several factors contributing to the unprecedented decline in crude oil prices during 1986, the most important was increased worldwide production, primarily by members of the Organization of Petroleum Exporting Countries (OPEC) seeking to regain market share.

After 1986, crude oil prices fluctuated. In 1990, the Iraqi invasion of Kuwait drove up the real price of a barrel of crude oil to \$23.74. In 1991, oil-producing nations' ability to replace Iraqi and Kuwaiti oil, coupled with an economic recession that restrained petroleum demand, caused the real price to decline to \$19.59 per barrel. The following year, the real price of crude oil declined to \$18.43 per barrel, despite political unrest in several oil-producing countries (most notably Russia) and the oil sales embargo on Iraq, as well as attempts by OPEC to bolster crude oil prices. In 1993, due to restrained demand and increased production worldwide, the real price of crude oil fell to \$15.99. In 1994, the real price of crude oil fell to \$14.86, the lowest annual average in 21 years. Despite continued growth in worldwide production in 1995, the real price of crude oil rose to \$16.01 in 1995 and then to \$18.82 in 1996.

The end-use prices, excluding taxes, of petroleum products also increased in 1996 (5.20). The average price of all types of motor gasoline rose from 77 cents per gallon in 1995 to 85 cents per gallon in 1996. Likewise, the average prices of aviation gasoline, kerosene, kerosene-

<sup>1</sup>Real (inflation-adjusted) prices are expressed in chained (1992) dollars.

*\*Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications. Percentages and numbers in text are calculated by using data in the tables.*

type jet fuel, distillate fuel oils, residual fuel oil, and propane all increased. The across-the-board increases in petroleum products reflected rising world crude oil prices, which stemmed from a long, cold winter and a trend toward leaner stocks.

## Production and Productivity

During much of the 1950's and 1960's, production capacity exceeded demand to such an extent that mechanisms such as production pro-rationing and import ceilings were implemented to protect domestic production. By the 1970's, however, petroleum demand had increased, the average productivity of wells began to decline, and oil production leveled off (5.2). Increases in Alaskan production at the end of the 1970's and through 1988 partially counteracted declines in Lower-48 production. In 1989, however, even Alaskan production declined. In 1996, U.S. oil production totaled 6.5 million barrels per day, the lowest level in 42 years.

Of total U.S. production in 1996, 76 percent came from onshore wells and 24 percent from offshore. The 574 thousand producing wells attained an average productivity of 11 barrels per day per well, significantly below peak productivity of over 18 barrels attained in the early 1970's.

## Imports and Exports

Despite import quotas, net imports of low-priced petroleum increased throughout most of the 1949-to-1973 period, and in 1973 totaled 6.0 million barrels per day (5.1). Thereafter, net imports fluctuated, peaking at 8.6 million barrels per day in 1977, then declining to 4.3 million barrels per day in 1985. In 1986, excess world production drove prices down, inhibiting domestic production and boosting demand, and net imports totaled 5.4 million barrels per day. Subsequently, with prices significantly below peak levels, net imports rose to 7.2 million barrels per day in 1989 and 1990. In 1991, lower demand for petroleum due to the economic recession contributed to a decline in petroleum imports. In addition, in 1991, the United States exported a record level of petroleum products, and petroleum net imports declined to 6.6 million barrels per day. Thereafter, economic recovery contributed to growth in net imports of

petroleum, which totaled 7.9 million barrels per day in 1995 and 8.4 million barrels per day in 1996.

U.S. dependence on petroleum net imports peaked at 47 percent of consumption in 1977, then fell in 1985 to 27 percent, the lowest level since 1971 (5.7). In 1996, dependence on petroleum net imports reached a 19-year high of 46 percent. Venezuela, Saudi Arabia, Canada, Mexico, and Nigeria were the primary foreign suppliers of petroleum to the United States.

## Consumption of Petroleum Products

Consumption of petroleum products (petroleum products supplied) increased throughout the 1949-to-1973 period at an average annual rate of 4.7 percent, and, by 1973, consumption of petroleum products totaled 17.3 million barrels per day (5.1). In 1974, however, marked increases in the price of crude oil, coupled with a petroleum supply interruption caused by the oil embargo, resulted in a 3.8-percent decline in petroleum consumption. Although demand recovered during the late 1970's, peaking at 18.9 million barrels per day in 1978, by 1983 it had declined to 15.2 million barrels per day. After 1983, lower crude oil prices tended to promote consumption, which reached 17.3 million barrels per day in 1989. In 1990 and 1991, however, warm winters and a stagnant economy combined to restrain petroleum consumption, which fell to 16.7 million barrels per day in 1991. The subsequent economic recovery contributed to an increase in consumption to about 18 million barrels per day in 1994, 1995, and 1996.

Consumption of most petroleum products rose in 1996 (5.11). Consumption of motor gasoline, which consistently accounts for the largest share of all petroleum products, increased 1 percent to 7.9 million barrels per day. Distillate fuel oil consumption totaled 3.4 million barrels per day, consumption of jet fuel totaled 1.6 million barrels per day, and consumption of liquefied petroleum gases totaled 2.0 million barrels per day in 1996. By contrast, consumption of residual fuel oil fell for the eighth year in a row, to 0.8 million barrels per day.

## The Refining Industry in a Changing Market

The average daily output from U.S. refineries trended upward from 1949 through 1978, when it reached 16 million barrels per day (5.8).

During the next 5 years, output declined, falling to 13 million barrels per day in 1983. As crude oil prices declined in the mid-1980's and the demand for petroleum rose, refinery output began to recover. In 1996, it reached a record high of over 16 million barrels per day.

The rate of refinery utilization fell below 80 percent in 1980 through 1985, despite deactivation of refinery capacity (5.9). Thereafter, the utilization rate improved. In 1986, the rate was 83 percent, well above its nadir of 69 percent in 1981. After 1986, strong product demand contributed to even higher utilization rates, which reached a 23-year high of 94 percent in 1996.

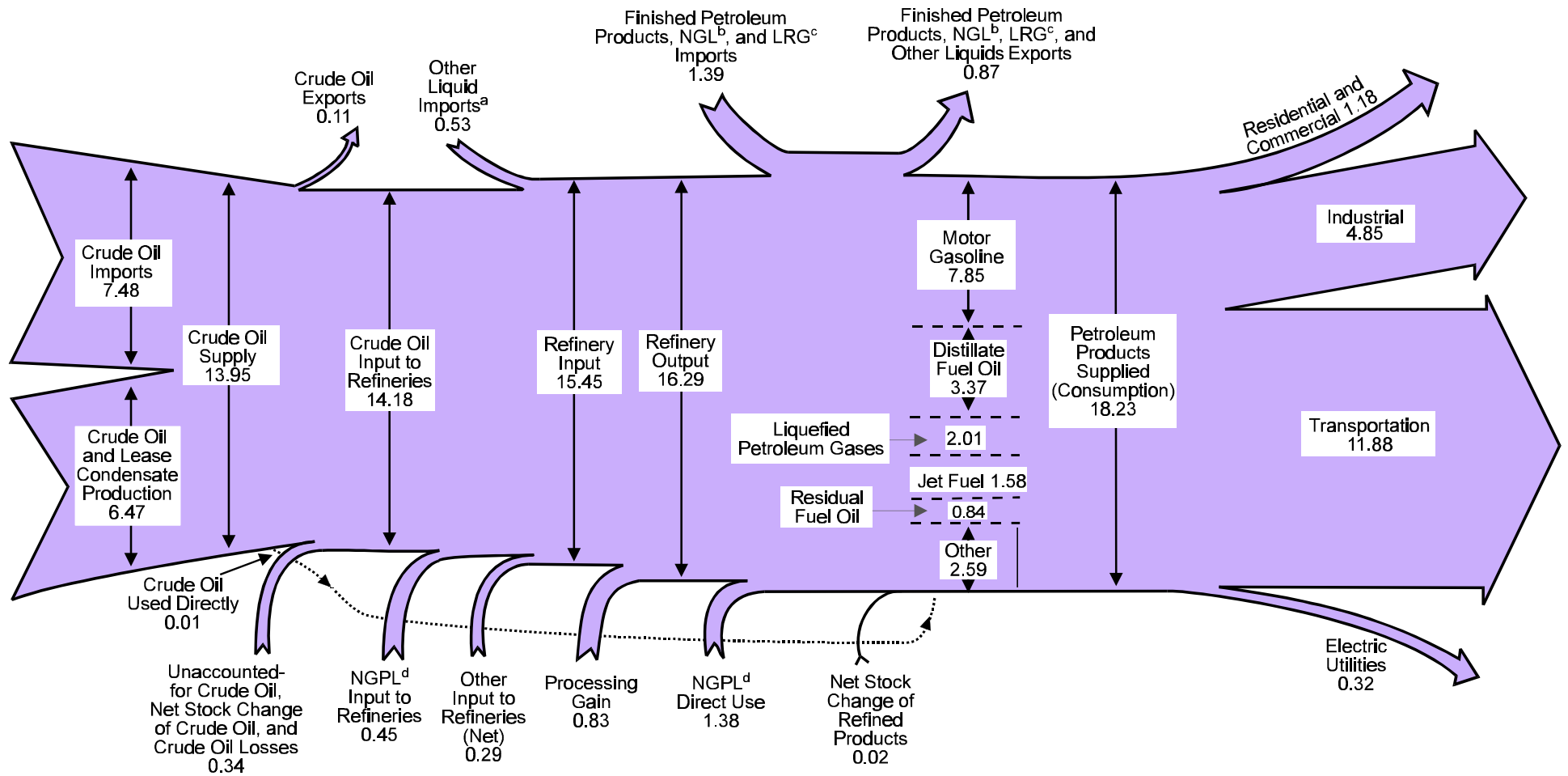
### Petroleum Stocks and the Strategic Petroleum Reserve

The U.S. Government established the Strategic Petroleum Reserve (SPR) in response to the oil supply disruptions of the early 1970's. Intended to minimize the effects of any future disruptions, the SPR began storing crude oil in 1977, and by the end of 1989, it held 580 million barrels (5.15). The first sales of SPR crude oil occurred following the Iraqi invasion of Kuwait in August 1990. In addition, SPR purchases were suspended in August 1990 due to concern about world crude oil supplies. Purchases resumed in 1992. At the end of 1995, the SPR held 592 million barrels. Additional sales reduced SPR stocks to 566 million barrels at the end of 1996.

One measure of the SPR's adequacy is the number of days of petroleum net imports it could provide in the event of an oil supply interruption. Through 1985, that measure of energy security increased every year, due to additions to the SPR and a decline in the level of net imports. In 1986, however, the measure declined for the first time, from 115 days in 1985 to 94 days in 1986. Although SPR stocks in 1995 remained at the 1994 level, a decrease in petroleum net imports caused the measure to increase to 75 days. However, in 1996 the measure fell to a 15-year low of 60 days.

At the end of 1996, SPR stocks, plus 285 million barrels of privately held crude oil stocks, totaled 850 million barrels (5.14). Private stocks of crude oil were less than the 340-million-barrel level recorded in 1977, when filling of the SPR began. At 659 million barrels, private stocks of petroleum products in 1996 remained considerably below the record level of 964 million barrels recorded in 1977.

**Diagram 2. Petroleum Flow, 1996**  
(Million Barrels per Day)



<sup>a</sup> Unfinished oils, motor gasoline and aviation gasoline blending components, and other hydrocarbons, and oxygenates.

<sup>b</sup> Natural gas liquids.

<sup>c</sup> Liquefied refinery gas.

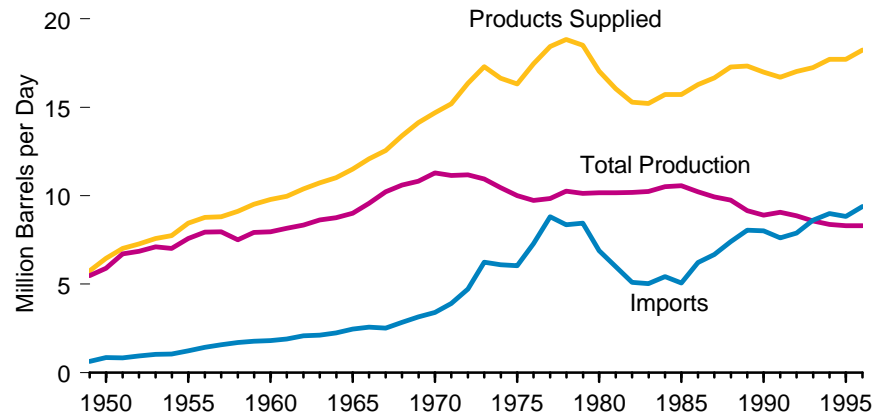
<sup>d</sup> Natural gas plant liquids.

Notes: • Data are preliminary. • Totals may not equal sum of components due to independent rounding.

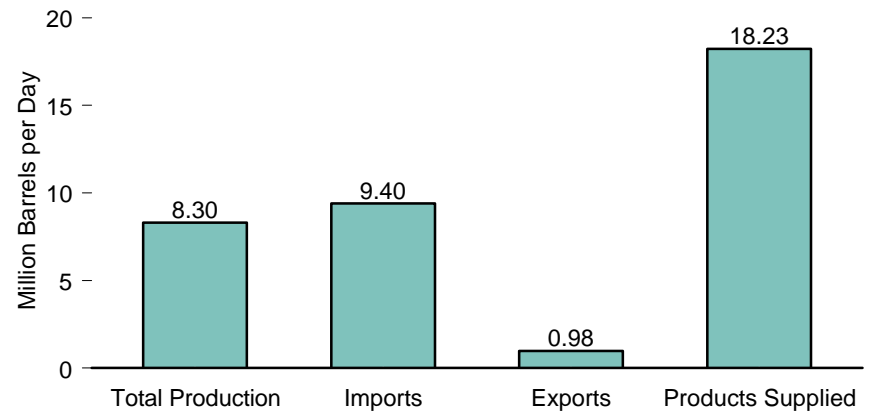
Sources: Tables 5.1, 5.5, 5.8, 5.11, 5.12a, and 5.12b, and *Petroleum Supply Monthly*, March 1997, Table 3.

**Figure 5.1 Petroleum Overview**

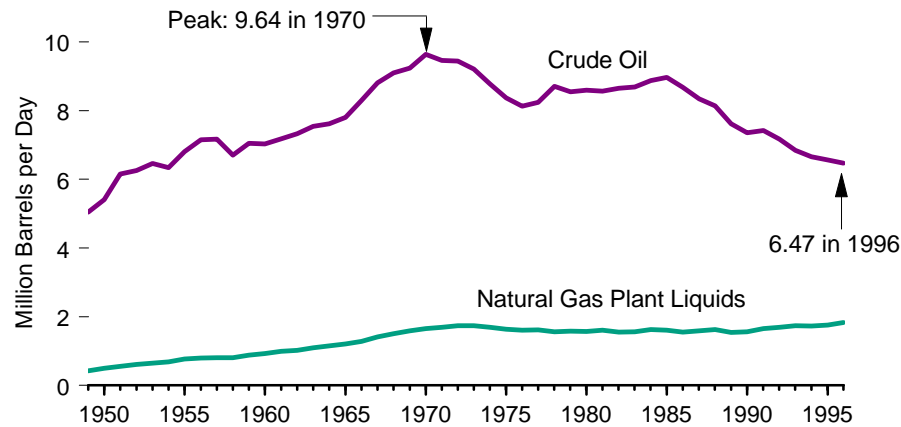
**Overview, 1949-1996**



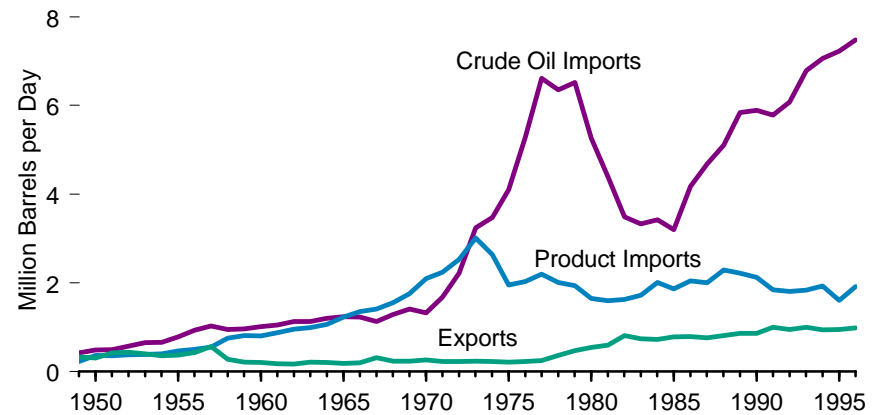
**Overview, 1996**



**Production, 1949-1996**



**Trade, 1949-1996**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 5.1.

**Table 5.1 Petroleum Overview, 1949-1996**  
(Million Barrels per Day)

Year	Production			Other Domestic Supply <sup>2</sup>	Trade					Crude Oil Losses	Change in Stocks <sup>6</sup>	Petroleum Products Supplied
	Crude Oil <sup>1</sup>	Natural Gas Plant Liquids	Total Production		Crude Oil Imports <sup>3</sup>	Petroleum Product Imports <sup>4</sup>	Total Imports	Total Exports	Net Imports <sup>5</sup>			
1949	5.05	0.43	5.48	(s)	0.42	0.22	0.65	0.33	0.32	0.04	-0.01	5.76
1950	5.41	0.50	5.91	(s)	0.49	0.36	0.85	0.30	0.55	0.05	-0.06	6.46
1951	6.16	0.56	6.72	0.01	0.49	0.35	0.84	0.42	0.42	0.03	0.10	7.02
1952	6.26	0.61	6.87	0.01	0.57	0.38	0.95	0.43	0.52	0.02	0.11	7.27
1953	6.46	0.65	7.11	0.02	0.65	0.39	1.03	0.40	0.63	0.02	0.14	7.60
1954	6.34	0.69	7.03	0.02	0.66	0.40	1.05	0.36	0.70	0.03	-0.03	7.76
1955	6.81	0.77	7.58	0.04	0.78	0.47	1.25	0.37	0.88	0.04	(s)	8.46
1956	7.15	0.80	7.95	0.04	0.93	0.50	1.44	0.43	1.01	0.05	0.18	8.78
1957	7.17	0.81	7.98	0.04	1.02	0.55	1.57	0.57	1.01	0.05	0.17	8.81
1958	6.71	0.81	7.52	0.06	0.95	0.75	1.70	0.28	1.42	0.03	-0.14	9.12
1959	7.05	0.88	7.93	0.09	0.97	0.81	1.78	0.21	1.57	0.01	0.05	9.53
1960	7.04	0.93	7.96	0.15	1.02	0.80	1.81	0.20	1.61	0.01	-0.08	9.80
1961	7.18	0.99	8.17	0.18	1.05	0.87	1.92	0.17	1.74	0.01	0.11	9.98
1962	7.33	1.02	8.35	0.18	1.13	0.96	2.08	0.17	1.91	0.01	0.03	10.40
1963	7.54	1.10	8.64	0.20	1.13	0.99	2.12	0.21	1.91	0.01	(s)	10.74
1964	7.61	1.15	8.77	0.22	1.20	1.06	2.26	0.20	2.06	0.01	0.01	11.02
1965	7.80	1.21	9.01	0.22	1.24	1.23	2.47	0.19	2.28	0.01	-0.01	11.51
1966	8.30	1.28	9.58	0.25	1.22	1.35	2.57	0.20	2.37	0.01	0.10	12.08
1967	8.81	1.41	10.22	0.29	1.13	1.41	2.54	0.31	2.23	0.01	0.17	12.56
1968	9.10	1.50	10.60	0.35	1.29	1.55	2.84	0.23	2.61	0.01	0.15	13.39
1969	9.24	1.59	10.83	0.34	1.41	1.76	3.17	0.23	2.93	0.01	-0.05	14.14
1970	9.64	1.66	11.30	0.35	1.32	2.10	3.42	0.26	3.16	0.01	0.10	14.70
1971	9.46	1.69	11.16	0.44	1.68	2.25	3.93	0.22	3.70	0.01	0.07	15.21
1972	9.44	1.74	11.18	0.44	2.22	2.53	4.74	0.22	4.52	0.01	-0.23	16.37
1973	9.21	1.74	10.95	0.49	3.24	3.01	6.26	0.23	6.02	0.01	0.14	17.31
1974	8.77	1.69	10.46	0.49	3.48	2.64	6.11	0.22	5.89	0.01	0.18	16.65
1975	8.37	1.63	10.01	0.51	4.10	1.95	6.06	0.21	5.85	0.01	0.03	16.32
1976	8.13	1.60	9.74	0.59	5.29	2.03	7.31	0.22	7.09	0.01	-0.06	17.46
1977	8.24	1.62	9.86	0.57	6.61	2.19	8.81	0.24	8.56	0.02	0.55	18.43
1978	8.71	1.57	10.27	0.49	6.36	2.01	8.36	0.36	8.00	0.02	-0.09	18.85
1979	8.55	1.58	10.14	0.58	6.52	1.94	8.46	0.47	7.99	0.02	0.17	18.51
1980	8.60	1.57	10.17	0.68	5.26	1.65	6.91	0.54	6.36	0.01	0.14	17.06
1981	8.57	1.61	10.18	0.64	4.40	1.60	6.00	0.59	5.40	(s)	0.16	16.06
1982	8.65	1.55	10.20	0.65	3.49	1.63	5.11	0.82	4.30	(s)	-0.15	15.30
1983	8.69	1.56	10.25	0.65	3.33	1.72	5.05	0.74	4.31	(s)	-0.02	15.23
1984	8.88	1.63	10.51	0.78	3.43	2.01	5.44	0.72	4.72	(s)	0.28	15.73
1985	8.97	1.61	10.58	0.76	3.20	1.87	5.07	0.78	4.29	(s)	-0.10	15.73
1986	8.68	1.55	10.23	0.81	4.18	2.05	6.22	0.78	5.44	(s)	0.20	16.28
1987	8.35	1.60	9.94	0.85	4.67	2.00	6.68	0.76	5.91	(s)	0.04	16.67
1988	8.14	1.62	9.76	0.90	5.11	2.30	7.40	0.82	6.59	(s)	-0.03	17.28
1989	7.61	1.55	9.16	0.92	5.84	2.22	8.06	0.86	7.20	(s)	-0.04	17.33
1990	7.36	1.56	8.91	1.02	5.89	2.12	8.02	0.86	7.16	(s)	0.11	16.99
1991	7.42	1.66	9.08	1.00	5.78	1.84	7.63	1.00	6.63	(s)	-0.01	16.71
1992	7.17	1.70	8.87	1.16	6.08	1.80	7.89	0.95	6.94	(s)	-0.07	17.03
1993	6.85	1.74	8.58	1.19	6.79	1.83	8.62	1.00	7.62	(s)	0.15	17.24
1994	6.66	1.73	8.39	1.29	7.06	1.93	9.00	0.94	8.05	(s)	0.02	17.72
1995	R6.56	1.76	R8.32	R1.27	R7.23	R1.61	8.83	0.95	R7.89	(s)	-0.25	R17.72
1996 <sup>P</sup>	6.47	1.83	8.30	1.37	7.48	1.92	9.40	0.98	8.42	(s)	-0.14	18.23

<sup>1</sup> Includes lease condensate.

<sup>2</sup> Includes benzol, other hydrocarbons, oxygenates, gasoline blending components, finished petroleum products, hydrogen, alcohol, processing gains, and unaccounted-for crude oil.

<sup>3</sup> Includes imports for the Strategic Petroleum Reserve, which began in 1977.

<sup>4</sup> For 1981 forward, includes motor gasoline blending components and aviation gasoline blending components.

<sup>5</sup> Net imports = imports minus exports.

<sup>6</sup> A negative number indicates a decrease in stocks and a positive number indicates an increase.

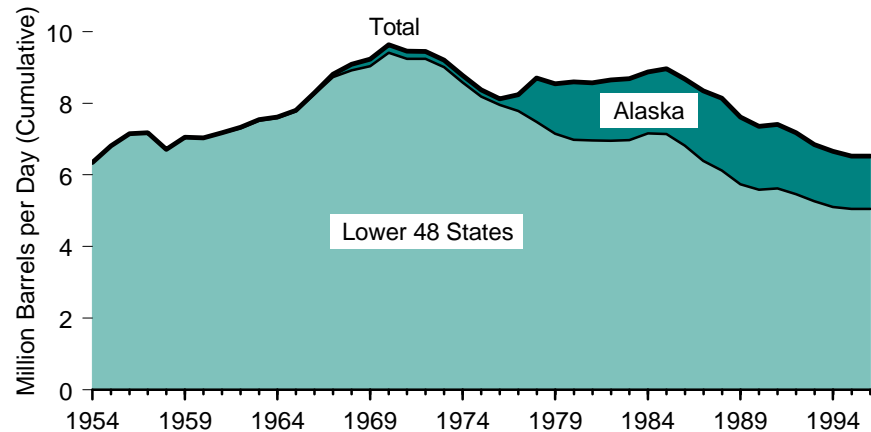
R=Revised data. P=Preliminary data. (s)=Less than 5,000 barrels per day and greater than -5,000 barrels per day.

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

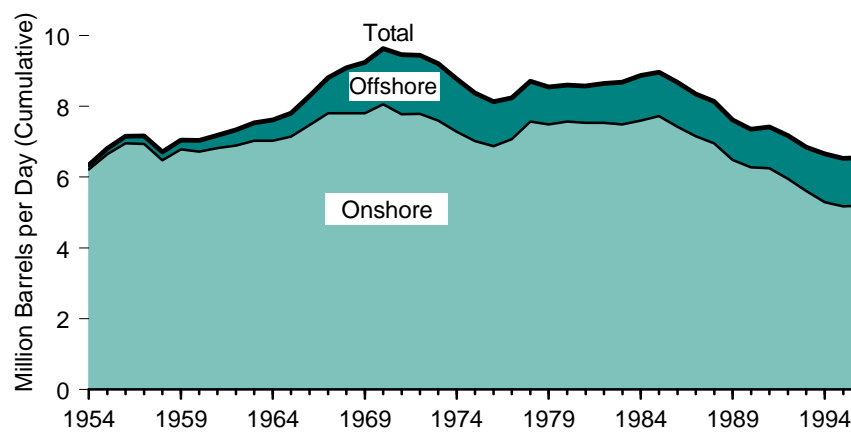
Sources: • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*. • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, *Petroleum Supply Monthly* (February 1997).

**Figure 5.2 Crude Oil and Lease Condensate Production and Oil Well Productivity, 1954-1996**

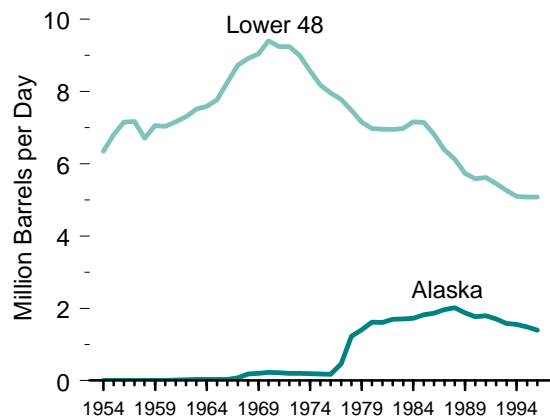
**By Geographic Location**



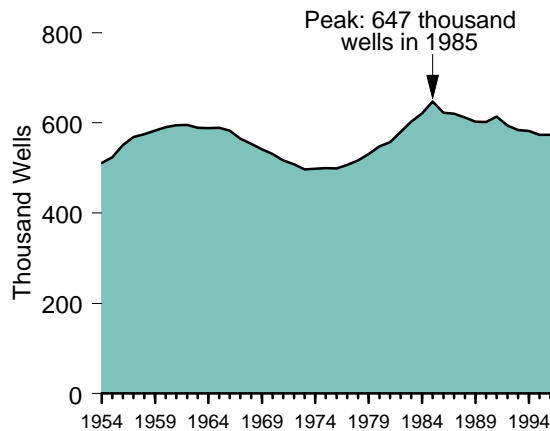
**By Site**



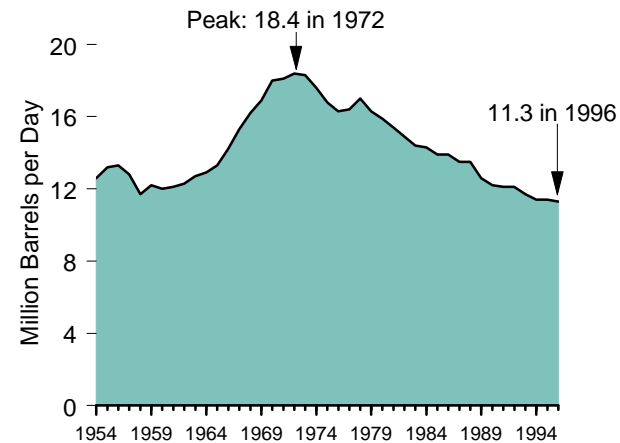
**Lower 48 and Alaska**



**Number of Producing Wells**



**Average Productivity**



Source: Table 5.2.



**Table 5.2 Crude Oil and Lease Condensate Production and Oil Well Productivity, 1954-1996**

(Thousand Barrels per Day, Except as Noted)

Year	Geographic Location		Site		Type		Total Production	Oil Well Productivity	
	Lower 48	Alaska	Onshore	Offshore	Crude Oil	Lease Condensate		Producing Wells <sup>1</sup> (thousands)	Average Productivity <sup>2</sup> (barrels per day per well)
1954	6,342	0	6,209	133	6,342	( <sup>3</sup> )	6,342	511	12.6
1955	6,807	0	6,645	162	6,807	( <sup>3</sup> )	6,807	524	13.2
1956	7,151	0	6,951	201	7,151	( <sup>3</sup> )	7,151	551	13.3
1957	7,170	0	6,940	229	7,170	( <sup>3</sup> )	7,170	569	12.8
1958	6,710	0	6,473	236	6,710	( <sup>3</sup> )	6,710	575	11.7
1959	7,053	1	6,779	274	7,054	( <sup>3</sup> )	7,054	583	12.2
1960	7,034	2	6,716	319	7,035	( <sup>3</sup> )	7,035	591	12.0
1961	7,166	17	6,817	365	7,183	( <sup>3</sup> )	7,183	595	12.1
1962	7,304	28	6,888	444	7,332	( <sup>3</sup> )	7,332	596	12.3
1963	7,512	29	7,026	515	7,542	( <sup>3</sup> )	7,542	589	12.7
1964	7,584	30	7,027	587	7,614	( <sup>3</sup> )	7,614	588	12.9
1965	7,774	30	7,140	665	7,804	( <sup>3</sup> )	7,804	589	13.3
1966	8,256	39	7,473	823	8,295	( <sup>3</sup> )	8,295	583	14.2
1967	8,730	80	7,802	1,009	8,810	( <sup>3</sup> )	8,810	565	15.3
1968	8,915	181	7,808	1,287	8,660	436	9,096	554	16.2
1969	9,035	203	7,797	1,441	8,778	460	9,238	542	16.9
1970	9,408	229	8,060	1,577	9,180	457	9,637	531	18.0
1971	9,245	218	7,779	1,684	9,032	431	9,463	517	18.1
1972	9,242	199	7,780	1,660	8,998	443	9,441	508	18.4
1973	9,010	198	7,592	1,616	8,784	424	9,208	497	18.3
1974	8,581	193	7,285	1,489	8,375	399	8,774	498	17.6
1975	8,183	191	7,012	1,362	8,007	367	8,375	500	16.8
1976	7,958	173	6,868	1,264	7,776	356	8,132	499	16.3
1977	7,781	464	7,069	1,176	7,875	370	8,245	507	16.4
1978	7,478	1,229	7,571	1,136	8,353	355	8,707	517	17.0
1979	7,151	1,401	7,485	1,067	8,181	371	8,552	531	16.3
1980	6,980	1,617	7,562	1,034	8,210	386	8,597	548	15.9
1981	6,962	1,609	7,537	1,034	8,176	395	8,572	557	15.4
1982	6,953	1,696	7,538	1,110	8,261	387	8,649	580	14.9
1983	6,974	1,714	7,492	1,196	8,688	( <sup>3</sup> )	8,688	603	14.4
1984	7,157	1,722	7,596	1,283	8,879	( <sup>3</sup> )	8,879	621	14.3
1985	7,146	1,825	7,722	1,250	8,971	( <sup>3</sup> )	8,971	647	13.9
1986	6,814	1,867	7,426	1,254	8,680	( <sup>3</sup> )	8,680	623	13.9
1987	6,387	1,962	7,153	1,196	8,349	( <sup>3</sup> )	8,349	620	13.5
1988	6,123	2,017	6,949	1,191	8,140	( <sup>3</sup> )	8,140	612	13.5
1989	5,739	1,874	6,486	1,127	7,613	( <sup>3</sup> )	7,613	603	12.6
1990	5,582	1,773	6,273	1,082	7,355	( <sup>3</sup> )	7,355	602	12.2
1991	5,618	1,798	6,245	1,172	7,417	( <sup>3</sup> )	7,417	614	12.1
1992	5,457	1,714	5,953	1,218	7,171	( <sup>3</sup> )	7,171	594	12.1
1993	5,264	1,582	5,606	1,241	6,847	( <sup>3</sup> )	6,847	584	11.7
1994	5,103	1,559	5,291	1,370	6,662	( <sup>3</sup> )	6,662	582	11.4
1995	<sup>R</sup> 5,076	1,484	<sup>R</sup> 5,035	<sup>R</sup> 1,525	<sup>R</sup> 6,560	( <sup>3</sup> )	<sup>R</sup> 6,560	574	<sup>R</sup> 11.4
1996 <sup>P</sup>	5,076	1,396	4,931	1,540	6,471	( <sup>3</sup> )	6,471	574	11.3

<sup>1</sup> As of December 31.

<sup>2</sup> For 1954-1976, average productivity is based on the average number of producing wells. For 1977 forward, average productivity is based on the number of wells producing at end of year.

<sup>3</sup> Included in crude oil.

R=Revised data. P=Preliminary data.

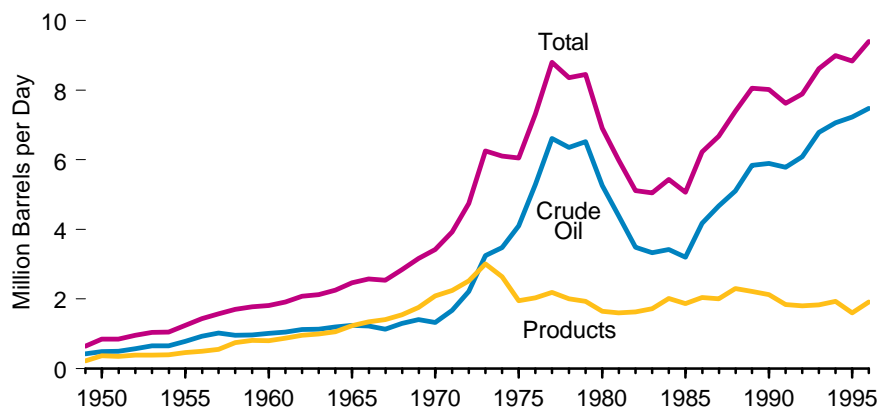
Note: Totals may not equal sum of components due to independent rounding.

Sources: **Offshore:** • 1954-1969—U.S. Geological Survey, *Outer Continental Shelf Statistics*, June 1979. • 1970-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*. • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement,*

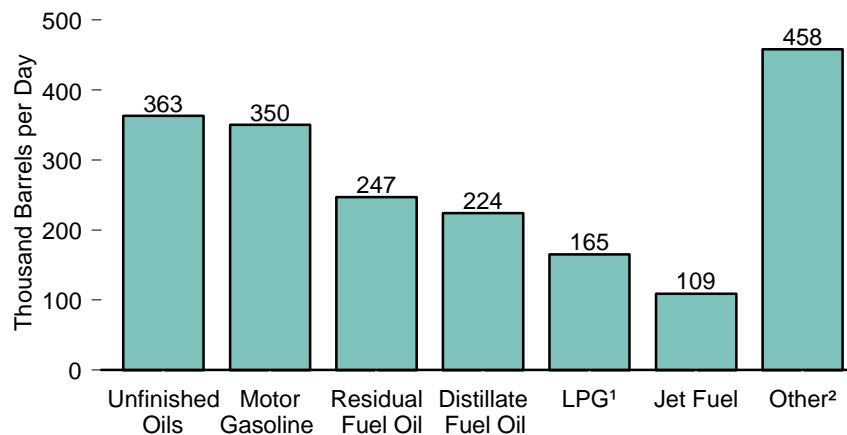
*Annual*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, *Petroleum Supply Monthly* (February 1997). **Oil Well Productivity:** • 1954-1975—Bureau of Mines, *Minerals Yearbook*, "Crude Petroleum and Petroleum Products" chapter. • 1976-1980—EIA, Energy Data Reports, *Petroleum Statement, Annual*. • 1981-1994—Independent Petroleum Association of America, *The Oil Producing Industry in Your State*. • 1995—Gulf Publishing Co., *World Oil*, February 1996. **All Other Data:** • 1954-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*. • 1976-1980—EIA, Energy Data Reports, *Petroleum Statement, Annual*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, *Petroleum Supply Monthly* (February 1997).

**Figure 5.3 Petroleum Imports by Type**

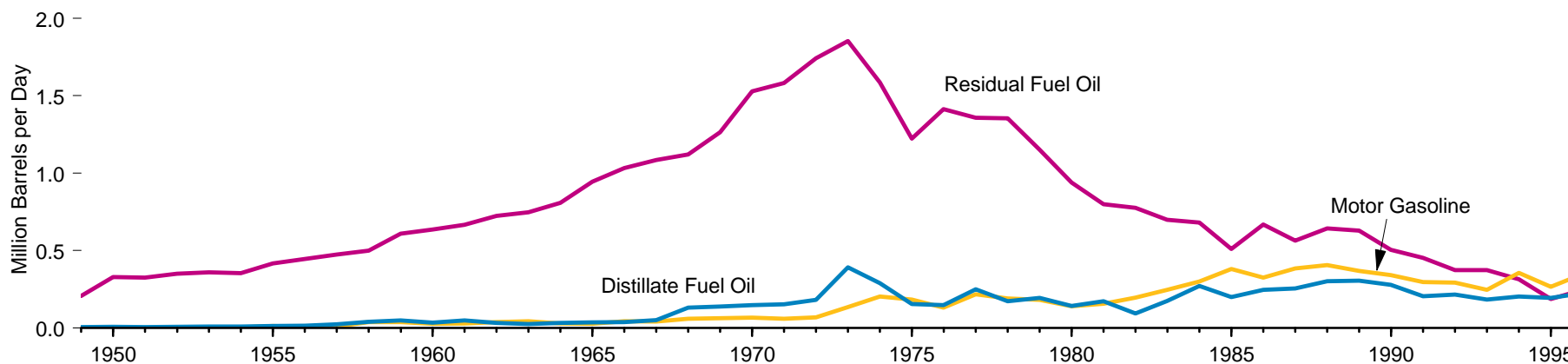
**Total, 1949-1996**



**By Product, 1996**



**By Selected Product, 1949-1996**



<sup>1</sup> Liquefied petroleum gases.

<sup>2</sup> Includes motor gasoline blending components

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 5.3.

**Table 5.3 Petroleum Imports by Type, 1949-1996**  
(Thousand Barrels per Day)

Year	Crude Oil <sup>1</sup>	Petroleum Products										Total Petroleum
		Distillate Fuel Oil	Jet Fuel <sup>2</sup>	Liquefied Petroleum Gases		Motor Gasoline <sup>4</sup>	Motor Gasoline Blending Components	Residual Fuel Oil	Unfinished Oils	Other Products <sup>5</sup>	Total	
				Propane <sup>3</sup>	Total							
1949	421	5	NA	0	0	0	—	206	10	3	224	645
1950	487	7	NA	0	0	(s)	—	329	21	6	363	850
1951	491	5	NA	0	0	1	—	326	14	7	354	844
1952	573	7	NA	0	0	5	—	351	9	7	380	952
1953	648	9	NA	0	0	1	—	360	9	7	386	1,034
1954	656	9	NA	0	0	3	—	354	21	9	396	1,052
1955	782	12	NA	0	0	13	—	417	15	9	466	1,248
1956	934	14	21	0	0	5	—	445	7	10	502	1,436
1957	1,023	23	25	0	0	8	—	475	3	18	552	1,574
1958	953	41	57	0	0	38	—	499	92	21	747	1,700
1959	965	48	37	0	0	37	—	610	63	19	814	1,780
1960	1,015	35	34	NA	4	27	—	637	45	17	799	1,815
1961	1,045	48	28	NA	5	29	—	666	69	26	872	1,917
1962	1,126	32	30	NA	6	38	—	724	89	36	955	2,082
1963	1,131	25	41	NA	7	44	—	747	87	41	992	2,123
1964	1,198	32	33	NA	11	29	—	808	89	58	1,060	2,259
1965	1,238	36	81	NA	21	28	—	946	92	27	1,229	2,468
1966	1,225	38	86	NA	29	43	—	1,032	97	24	1,348	2,573
1967	1,128	51	89	11	27	42	—	1,085	97	20	1,409	2,537
1968	1,291	132	105	15	32	59	—	1,120	80	22	1,549	2,840
1969	1,409	139	125	14	35	62	—	1,265	106	25	1,757	3,166
1970	1,324	147	144	26	52	67	—	1,528	108	49	2,095	3,419
1971	1,681	153	180	32	70	59	—	1,583	124	76	2,245	3,926
1972	2,216	182	194	43	89	68	—	1,742	125	126	2,525	4,741
1973	3,244	392	212	71	132	134	—	1,853	137	152	3,012	6,256
1974	3,477	289	163	59	123	204	—	1,587	121	148	2,635	6,112
1975	4,105	155	133	60	112	184	—	1,223	36	108	1,951	6,056
1976	5,287	146	76	68	130	131	—	1,413	32	97	2,026	7,313
1977	6,615	250	75	86	161	217	—	1,359	31	99	2,193	8,807
1978	6,356	173	86	57	123	190	—	1,355	27	53	2,008	8,363
1979	6,519	193	78	88	217	181	—	1,151	59	58	1,937	8,456
1980	5,263	142	80	69	216	140	—	939	55	76	1,646	6,909
1981	4,396	173	38	70	244	157	24	800	112	<sup>R</sup> 52	1,599	5,996
1982	3,488	93	29	63	226	197	42	776	174	<sup>R</sup> 88	1,625	5,113
1983	3,329	174	29	44	190	247	47	699	234	<sup>R</sup> 101	1,722	5,051
1984	3,426	272	62	67	195	299	83	681	231	<sup>R</sup> 189	2,011	5,437
1985	3,201	200	39	67	187	381	67	510	318	<sup>R</sup> 165	1,866	5,067
1986	4,178	247	57	110	242	326	72	669	250	<sup>R</sup> 182	2,045	6,224
1987	4,674	255	67	88	190	384	60	565	299	<sup>R</sup> 183	2,004	6,678
1988	5,107	302	90	106	209	405	57	644	360	<sup>R</sup> 228	2,295	7,402
1989	5,843	306	106	111	181	369	66	629	348	<sup>R</sup> 214	2,217	8,061
1990	5,894	278	108	115	188	342	62	504	413	<sup>R</sup> 229	2,123	8,018
1991	5,782	205	67	91	147	297	36	453	413	<sup>R</sup> 226	1,844	7,627
1992	6,083	216	82	85	131	294	41	375	443	<sup>R</sup> 223	1,805	7,888
1993	6,787	184	100	103	160	247	27	373	491	<sup>R</sup> 251	1,833	8,620
1994	7,063	203	117	124	183	356	20	314	413	<sup>R</sup> 328	1,933	8,996
1995	<sup>R</sup> 7,230	<sup>R</sup> 193	106	102	146	<sup>R</sup> 265	48	<sup>R</sup> 187	<sup>R</sup> 349	<sup>R</sup> 312	<sup>R</sup> 1,605	<sup>R</sup> 8,835
1996 <sup>P</sup>	7,482	224	109	119	165	350	119	247	363	339	1,917	9,399

<sup>1</sup> Includes imports for the Strategic Petroleum Reserve, which began in 1977.

<sup>2</sup> Prior to 1965, imports of kerosene-type jet fuel were included with kerosene, which is listed under "Other Products."

<sup>3</sup> Includes propylene.

<sup>4</sup> Excludes motor gasoline blending components after 1980. Prior to 1964, motor gasoline data were for total gasoline, including motor gasoline, aviation gasoline, and special naphthas.

<sup>5</sup> Aviation gasoline, aviation gasoline blending components, kerosene, petrochemical feedstocks, special naphthas, lubricants, wax, asphalt and road oil, petroleum coke, pentanes plus, and miscellaneous products.

R=Revised data. P=Preliminary data. NA=Not available. (s)=Less than 500 barrels per day.

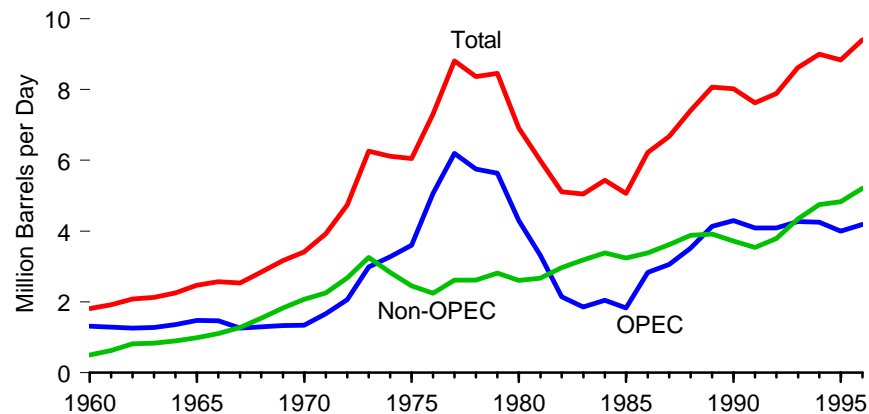
—=Not applicable.

Notes: • Includes imports from U.S. possessions and territories. • Totals may not equal sum of components due to independent rounding.

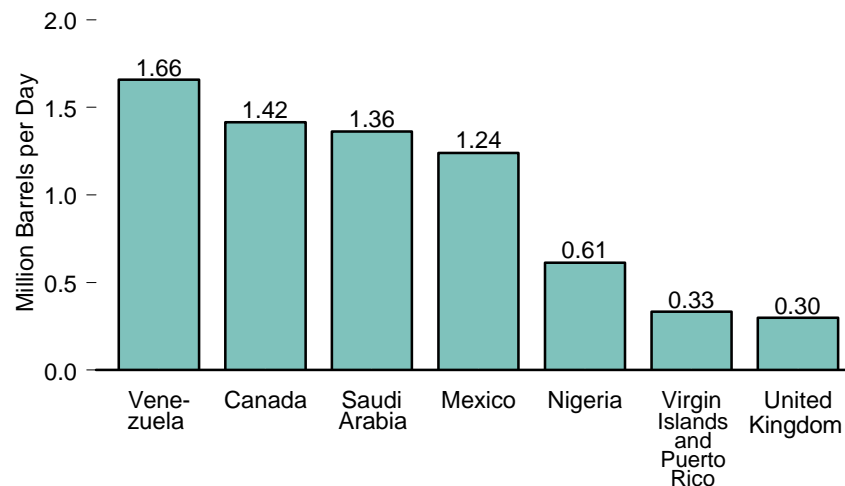
Sources: • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*. • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, *Petroleum Supply Monthly* (February 1997).

**Figure 5.4 Petroleum Imports by Country of Origin**

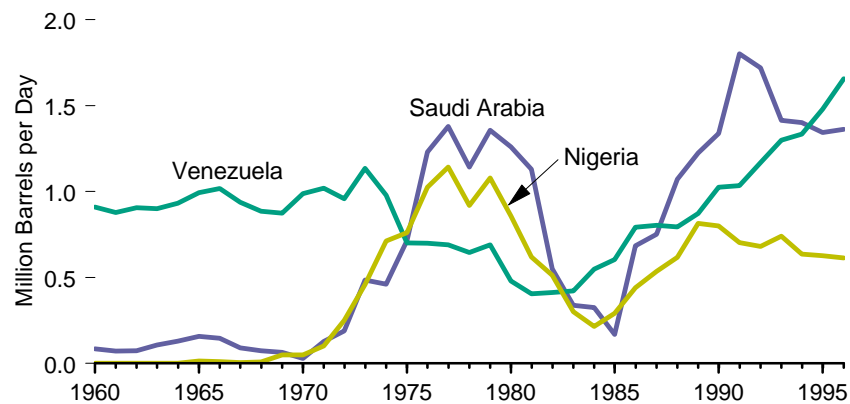
**Total, OPEC, and Non-OPEC, 1960-1996**



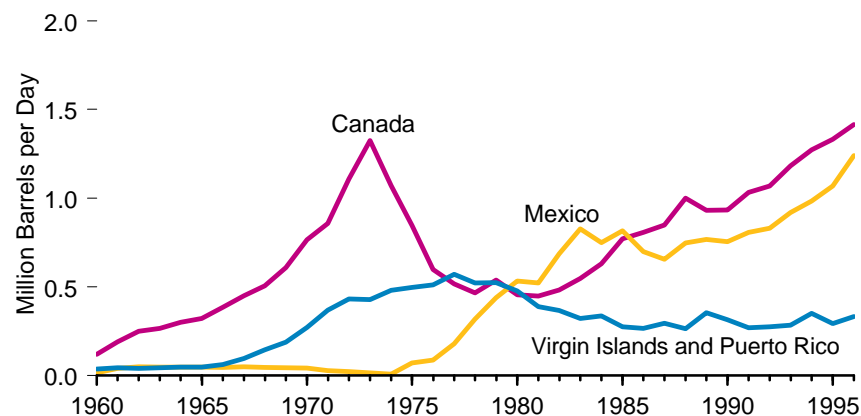
**Top Countries, 1996**



**Selected OPEC Countries, 1960-1996**



**Selected Non-OPEC Countries, 1960-1996**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 5.4.

**Table 5.4 Petroleum Imports by Country of Origin, 1960-1996**

Year	Persian Gulf Nations <sup>2</sup>	Selected OPEC <sup>1</sup> Countries					Selected Non-OPEC Countries					Total Imports	Imports from Persian Gulf Nations as Share of Total Imports	Imports from OPEC as Share of Total Imports
		Algeria	Nigeria	Saudi Arabia	Venezuela	Total OPEC <sup>3</sup>	Canada	Mexico	United Kingdom	Virgin Islands and Puerto Rico	Total Non-OPEC			
Thousand Barrels per Day												Percent		
1960	NA	NA	0	84	911	1,314	120	16	(s)	36	500	1,815	NA	72.4
1961	NA	NA	0	73	879	1,286	190	40	1	44	631	1,917	NA	67.1
1962	NA	NA	0	74	906	1,265	250	49	2	41	816	2,082	NA	60.8
1963	NA	NA	0	108	900	1,283	265	48	3	44	839	2,123	NA	60.5
1964	NA	NA	0	131	933	1,361	299	47	(s)	47	898	2,259	NA	60.2
1965	NA	NA	15	158	994	1,476	323	48	(s)	47	992	2,468	NA	59.8
1966	NA	NA	11	147	1,018	1,471	384	45	6	61	1,102	2,573	NA	57.2
1967	NA	NA	5	92	938	1,259	450	49	11	96	1,278	2,537	NA	49.6
1968	NA	NA	9	74	886	1,302	506	45	28	145	1,538	2,840	NA	45.9
1969	NA	NA	49	65	875	1,336	608	43	20	189	1,830	3,166	NA	42.2
1970	NA	NA	50	30	989	1,343	766	42	11	271	2,076	3,419	NA	39.3
1971	NA	NA	102	128	1,020	1,673	857	27	10	368	2,253	3,926	NA	42.6
1972	471	92	251	190	959	2,063	1,108	21	9	432	2,678	4,741	9.9	43.5
1973	848	136	459	486	1,135	2,993	1,325	16	15	429	3,263	6,256	13.6	47.8
1974	1,039	190	713	461	979	3,280	1,070	8	8	481	2,832	6,112	17.0	53.7
1975	1,165	282	762	715	702	3,601	846	71	14	496	2,454	6,056	19.2	59.5
1976	1,840	432	1,025	1,230	700	5,066	599	87	31	510	2,247	7,313	25.2	69.3
1977	2,448	559	1,143	1,380	690	6,193	517	179	126	571	2,614	8,807	27.8	70.3
1978	2,219	649	919	1,144	646	5,751	467	318	180	522	2,612	8,363	26.5	68.8
1979	2,069	636	1,080	1,356	690	5,637	538	439	202	523	2,819	8,456	24.5	66.7
1980	1,519	488	857	1,261	481	4,300	455	533	176	476	2,609	6,909	22.0	62.2
1981	1,219	311	620	1,129	406	3,323	447	522	375	389	2,672	5,996	20.3	55.4
1982	696	170	514	552	412	2,146	482	685	456	366	2,968	5,113	13.6	42.0
1983	442	240	302	337	422	1,862	547	826	382	322	3,189	5,051	8.8	36.9
1984	506	323	216	325	548	2,049	630	748	402	336	3,388	5,437	9.3	37.7
1985	312	187	293	168	605	1,830	770	816	310	275	3,237	5,067	6.1	36.1
1986	912	271	440	685	793	2,837	807	699	350	265	3,387	6,224	14.7	45.6
1987	1,077	295	535	751	804	3,060	848	655	352	294	3,617	6,678	16.1	45.8
1988	1,532	300	618	1,073	794	3,520	999	747	315	264	3,882	7,402	20.7	47.6
1989	1,861	269	815	1,224	873	4,140	931	767	215	353	3,921	8,061	23.1	51.4
1990	1,966	280	800	1,339	1,025	4,296	934	755	189	315	3,721	8,018	24.5	53.6
1991	1,845	253	703	1,802	1,035	4,092	1,033	807	138	270	3,535	7,627	24.2	53.7
1992	1,778	196	681	1,720	1,170	4,092	1,069	830	230	275	3,796	7,888	22.5	51.9
1993	1,782	220	740	1,414	1,300	4,273	1,181	919	350	283	4,347	8,620	20.7	49.6
1994	1,728	243	637	1,402	1,334	4,247	1,272	984	458	350	4,749	8,996	19.2	47.2
1995	1,573	234	<sup>R</sup> 627	1,344	<sup>R</sup> 1,480	<sup>R</sup> 4,002	<sup>R</sup> 1,332	<sup>R</sup> 1,068	<sup>R</sup> 383	293	4,833	<sup>R</sup> 8,835	17.8	<sup>R</sup> 45.3
1996 <sup>P</sup>	1,604	256	614	1,363	1,657	4,188	1,415	1,240	298	333	5,211	9,399	17.1	44.6

<sup>1</sup> Organization of Petroleum Exporting Countries. See Glossary for current membership.

<sup>2</sup> Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and United Arab Emirates.

<sup>3</sup> Total OPEC imports exclude petroleum imported into the United States indirectly from OPEC countries, primarily from Caribbean and West European refining areas, as petroleum products that were refined from crude oil produced in OPEC countries. Ecuador withdrew from OPEC on December 31, 1992. Beginning in 1993, imports from Ecuador appear under "Non-OPEC." Gabon withdrew from OPEC on December 31, 1994. Beginning in 1995, imports from Gabon appear under "Non-OPEC."

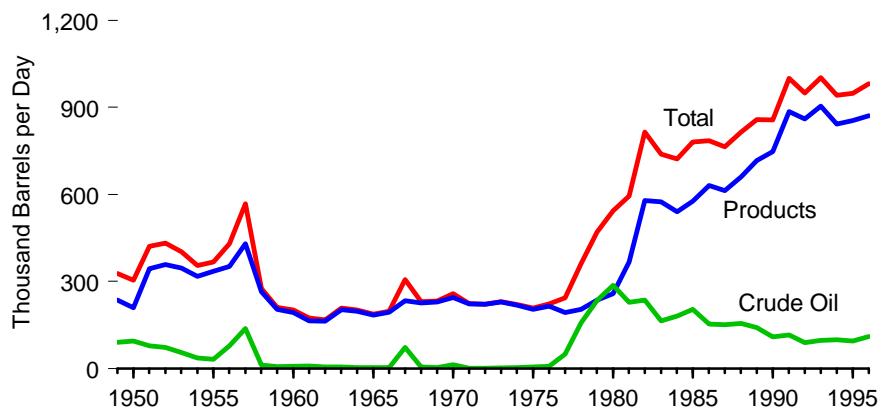
R=Revised data. P=Preliminary data. (s)=Less than 500 barrels per day. NA=Not available.

Notes: • Data include imports for the Strategic Petroleum Reserve, which began in 1977. • Totals may not equal sum of components due to independent rounding.

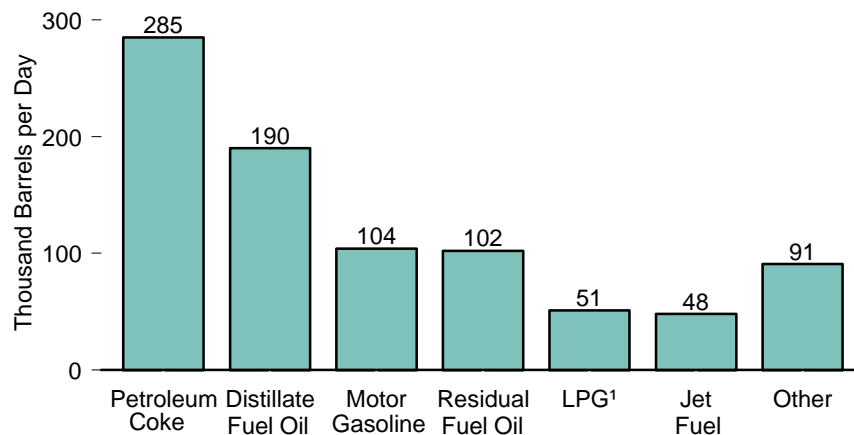
Sources: • 1960-1975—Bureau of Mines, *Minerals Yearbook*, "Crude Petroleum and Petroleum Products" chapter. • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *P.A.D. Districts Supply/Demand, Annual*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, *Petroleum Supply Monthly* (February 1997).

**Figure 5.5 Petroleum Exports by Type**

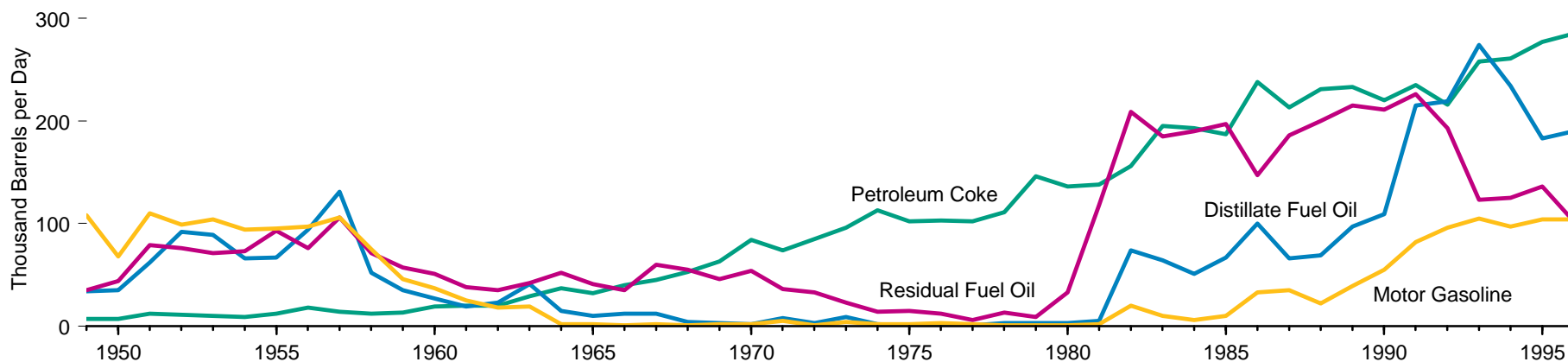
**Total, 1949-1996**



**By Product, 1996**



**By Selected Products, 1949-1996**



<sup>1</sup> Liquefied petroleum gases.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 5.5.

**Table 5.5 Petroleum Exports by Type, 1949-1996**  
(Thousand Barrels per Day)

Year	Crude Oil	Petroleum Products												Total Petroleum
		Distillate Fuel Oil	Jet Fuel	Liquefied Petroleum Gases		Lubricants	Motor Gasoline <sup>2</sup>	Petroleum Coke	Petrochemical Feedstocks	Residual Fuel Oil	Special Naphthas	Other Products <sup>3</sup>	Total	
				Propane <sup>1</sup>	Total									
1949	91	34	NA	NA	4	35	108	7	0	35	NA	15	236	327
1950	95	35	NA	NA	4	39	68	7	0	44	NA	12	210	305
1951	78	62	NA	NA	6	48	110	12	0	79	NA	27	344	422
1952	73	92	NA	NA	7	44	99	11	0	76	NA	31	359	432
1953	55	89	NA	NA	8	36	104	10	0	71	NA	29	347	402
1954	37	66	NA	NA	11	41	94	9	0	73	NA	23	318	355
1955	32	67	NA	NA	12	39	95	12	0	93	NA	18	336	368
1956	78	94	NA	NA	12	38	97	18	0	76	NA	17	352	430
1957	138	131	NA	NA	12	38	106	14	0	106	NA	23	430	568
1958	12	52	NA	NA	8	36	75	12	0	71	NA	11	264	276
1959	7	35	NA	NA	6	38	46	13	0	57	NA	9	204	211
1960	8	27	NA	NA	8	43	37	19	0	51	NA	9	193	202
1961	9	19	NA	NA	10	47	25	20	0	38	NA	7	165	174
1962	5	23	NA	NA	11	48	18	20	0	35	NA	8	163	168
1963	5	41	NA	NA	13	50	19	29	0	42	NA	9	203	208
1964	4	15	NA	NA	15	50	2	37	0	52	NA	28	198	202
1965	3	10	NA	NA	21	45	2	32	5	41	NA	27	184	187
1966	4	12	NA	NA	22	47	1	40	7	35	NA	29	194	198
1967	73	12	NA	5	25	51	2	45	8	60	NA	31	234	307
1968	5	4	NA	7	29	49	1	53	8	55	NA	27	226	231
1969	4	3	NA	7	35	45	2	63	11	46	NA	24	229	233
1970	14	2	NA	6	27	44	2	84	10	54	NA	21	245	259
1971	1	8	NA	13	26	43	5	74	14	36	NA	17	223	224
1972	1	3	3	18	31	41	1	85	13	33	4	R8	222	222
1973	2	9	4	15	27	35	4	96	19	23	5	R8	229	231
1974	3	2	3	14	25	33	2	113	15	14	4	R7	218	221
1975	6	1	2	13	26	25	2	102	22	15	3	R6	204	209
1976	8	1	2	13	25	26	3	103	30	12	7	R6	215	223
1977	50	1	2	10	18	26	2	102	24	6	4	R7	193	243
1978	158	3	1	9	20	27	1	111	23	13	2	R2	204	362
1979	235	3	1	8	15	23	(s)	146	31	9	5	R3	236	471
1980	287	3	1	10	21	23	1	136	29	33	5	R4	258	544
1981	228	5	2	18	42	19	2	138	26	118	11	R4	367	595
1982	236	74	6	31	65	16	20	156	24	209	5	R4	579	815
1983	164	64	6	43	73	16	10	195	20	185	3	R3	575	739
1984	181	51	9	30	48	15	6	193	21	190	2	R6	541	722
1985	204	67	13	48	62	15	10	187	19	197	1	R4	577	781
1986	154	100	18	28	42	23	33	238	22	147	1	R8	631	785
1987	151	66	24	24	38	23	35	213	20	186	2	R7	613	764
1988	155	69	28	31	49	26	22	231	23	200	7	R6	661	815
1989	142	97	27	24	35	19	39	233	26	215	12	R15	717	859
1990	109	109	43	28	40	20	55	220	26	211	11	R13	748	857
1991	116	215	43	28	41	18	82	235	0	226	15	R9	885	1,001
1992	89	219	43	33	49	16	96	216	0	193	14	R16	861	950
1993	98	274	60	26	43	19	105	258	0	123	4	R19	904	1,003
1994	99	234	20	24	38	22	97	261	0	125	20	R26	843	942
1995	95	183	26	38	58	25	104	277	0	136	21	R25	855	949
1996 <sup>P</sup>	110	190	48	28	51	34	104	285	0	102	21	36	871	981

<sup>1</sup> Includes propylene.

<sup>2</sup> Includes aviation gasoline for the years 1949-1963.

<sup>3</sup> Aviation gasoline (for 1964 forward), motor gasoline blending components, kerosene, wax, asphalt, road oil, pentanes plus, and miscellaneous products.

R=Revised data. P=Preliminary data. NA=Not available. (s)=Less than 500 barrels per day.

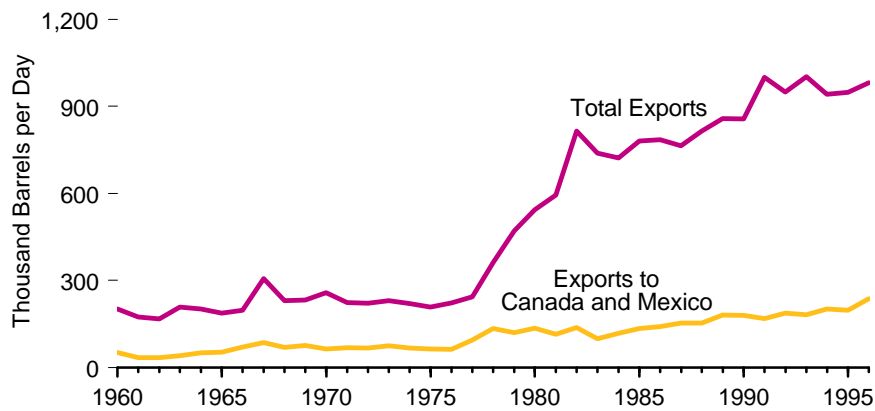
Notes: • Includes exports to U.S. possessions and territories. • Totals may not equal sum of

components due to independent rounding.

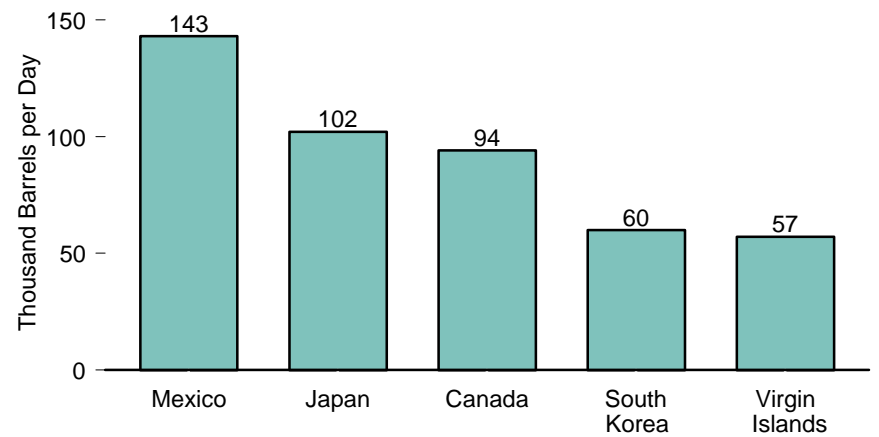
Sources: • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*. • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, *Petroleum Supply Monthly* (February 1997).

**Figure 5.6 Petroleum Exports by Country of Destination**

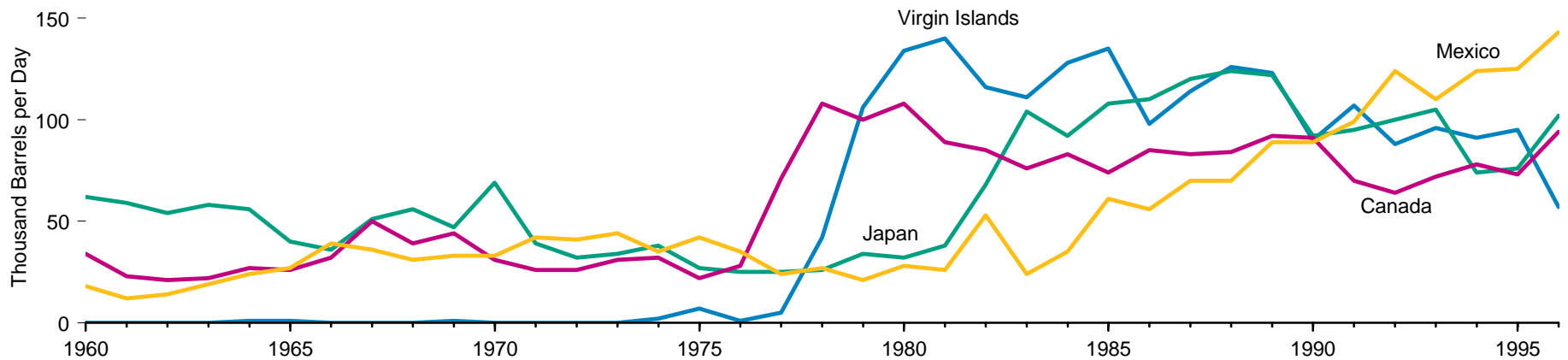
**Total Exports and Exports to Canada and Mexico, 1960-1996**



**By Selected Countries, 1996**



**By Selected Countries, 1960-1996**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 5.6.



**Table 5.6 Petroleum Exports by Country of Destination, 1960-1996**  
(Thousand Barrels per Day)

Year	Belgium <sup>1</sup>	Brazil	Canada	France	Italy	Japan	Mexico	Netherlands	Puerto Rico	South Korea	Spain	United Kingdom	Virgin Islands	Other	Total
1960	3	4	34	4	6	62	18	6	1	NA	NA	12	NA	52	202
1961	4	4	23	4	5	59	12	4	1	NA	NA	10	(s)	48	174
1962	3	5	21	3	5	54	14	5	1	NA	NA	8	(s)	50	168
1963	9	4	22	4	8	58	19	13	1	NA	NA	11	(s)	59	208
1964	4	4	27	4	8	56	24	9	1	NA	NA	10	1	55	202
1965	3	3	26	3	7	40	27	10	1	NA	NA	12	1	54	187
1966	3	4	32	4	7	36	39	9	3	NA	NA	12	(s)	49	198
1967	5	6	50	3	9	51	36	13	7	NA	NA	62	(s)	65	307
1968	4	8	39	4	8	56	31	10	2	NA	NA	14	(s)	55	231
1969	4	7	44	4	9	47	33	9	2	NA	NA	13	1	59	233
1970	5	7	31	5	10	69	33	15	1	NA	NA	12	(s)	71	259
1971	7	9	26	5	8	39	42	11	3	NA	NA	9	(s)	67	224
1972	13	9	26	5	9	32	41	12	3	NA	4	10	(s)	<sup>R</sup> 59	222
1973	15	8	31	5	9	34	44	13	3	NA	4	9	(s)	<sup>R</sup> 56	231
1974	13	9	32	4	9	38	35	17	4	NA	4	6	2	<sup>R</sup> 48	221
1975	9	6	22	6	10	27	42	23	5	NA	4	7	7	<sup>R</sup> 40	209
1976	12	7	28	6	10	25	35	22	21	NA	4	13	1	<sup>R</sup> 39	223
1977	16	6	71	9	10	25	24	17	6	NA	5	9	5	<sup>R</sup> 39	243
1978	15	8	108	9	10	26	27	18	44	NA	5	7	42	<sup>R</sup> 42	362
1979	19	7	100	13	15	34	21	28	64	2	9	7	106	<sup>R</sup> 45	471
1980	20	4	108	11	14	32	28	23	86	2	8	7	134	<sup>R</sup> 70	544
1981	12	1	89	15	22	38	26	42	81	10	18	5	140	<sup>R</sup> 97	595
1982	17	8	85	24	32	68	53	85	95	28	24	14	116	<sup>R</sup> 165	815
1983	22	2	76	23	35	104	24	49	33	15	34	8	111	<sup>R</sup> 202	739
1984	21	1	83	18	39	92	35	37	24	17	29	14	128	<sup>R</sup> 182	722
1985	26	3	74	11	30	108	61	44	26	27	28	14	135	<sup>R</sup> 193	781
1986	30	3	85	11	39	110	56	58	14	12	39	8	98	<sup>R</sup> 222	785
1987	17	2	83	12	42	120	70	39	22	25	31	6	114	<sup>R</sup> 179	764
1988	25	3	84	12	29	124	70	26	21	24	36	9	126	<sup>R</sup> 226	815
1989	23	5	92	11	37	122	89	36	18	17	28	9	123	<sup>R</sup> 249	859
1990	20	2	91	17	48	92	89	54	11	60	33	11	90	<sup>R</sup> 240	857
1991	22	13	70	27	55	95	99	72	10	66	23	13	107	<sup>R</sup> 330	1,001
1992	22	20	64	9	38	100	124	52	7	80	21	12	88	<sup>R</sup> 315	950
1993	21	16	72	8	34	105	110	45	12	74	30	10	96	<sup>R</sup> 370	1,003
1994	26	15	78	11	35	74	124	30	12	66	30	10	91	<sup>R</sup> 338	942
1995	21	16	73	11	46	76	125	33	28	57	38	14	95	<sup>R</sup> 317	949
1996 <sup>P</sup>	27	29	94	18	32	102	143	43	14	60	34	9	57	318	981

<sup>1</sup> Including Luxembourg.

R=Revised data. P=Preliminary data. NA=Not available. (s)=Less than 500 barrels per day.

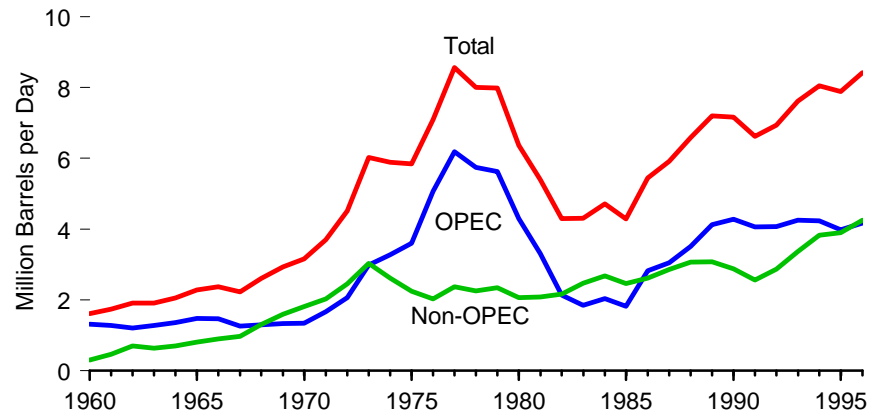
Note: Totals may not equal sum of components due to independent rounding.

Sources: • 1960-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*.

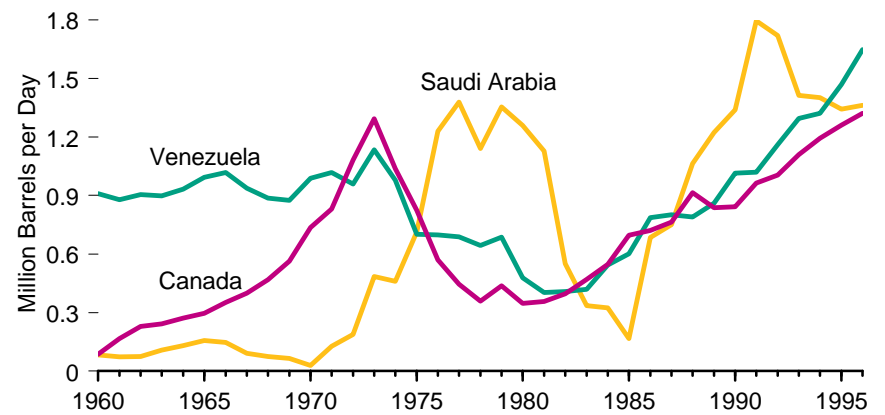
• 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, *Petroleum Supply Monthly* (February 1997).

**Figure 5.7 Petroleum Net Imports by Country of Origin, 1960-1996**

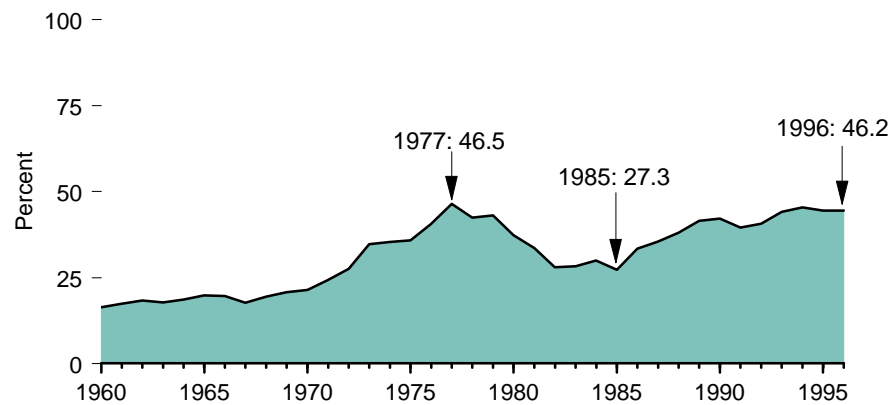
**Total, OPEC, and Non-OPEC**



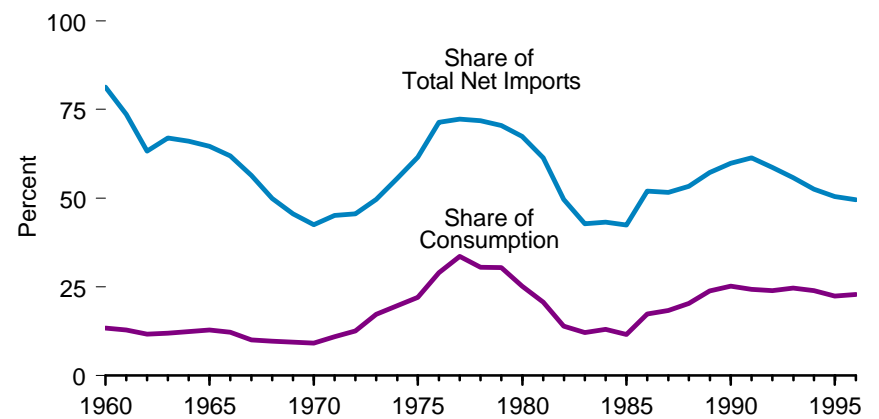
**By Selected Country**



**Total Net Imports as Share of Consumption**



**Net Imports from OPEC**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 5.7.

**Table 5.7 Petroleum Net Imports by Country of Origin, 1960-1996**

Year	Persian Gulf Nations <sup>2</sup>	Selected OPEC <sup>1</sup> Countries					Selected Non-OPEC Countries					Total Net Imports	Total Net Imports as Share of Consumption <sup>4</sup>	Net Imports from OPEC	
		Algeria	Nigeria	Saudi Arabia	Venezuela	Total OPEC <sup>3</sup>	Canada	Mexico	United Kingdom	Virgin Islands and Puerto Rico	Total Non-OPEC			Share of Total Net Imports <sup>5</sup>	Share of Consumption <sup>6</sup>
Thousand Barrels per Day												Percent			
1960	NA	NA	0	84	910	1,311	86	-2	-12	34	302	1,613	16.5	81.3	13.4
1961	NA	NA	0	73	878	1,283	167	27	-10	42	460	1,743	17.5	73.6	12.9
1962	NA	NA	0	74	905	1,210	229	35	-6	40	703	1,913	18.4	63.3	11.6
1963	NA	NA	0	108	899	1,282	243	29	-7	43	632	1,915	17.8	67.0	11.9
1964	NA	NA	0	131	932	1,359	272	23	-9	45	698	2,057	18.7	66.1	12.3
1965	NA	NA	15	158	994	1,475	297	21	-11	45	806	2,281	19.8	64.7	12.8
1966	NA	NA	11	147	1,018	1,470	352	6	-6	58	904	2,375	19.7	61.9	12.2
1967	NA	NA	5	92	937	1,258	400	13	-51	89	972	2,230	17.8	56.4	10.0
1968	NA	NA	9	74	886	1,302	468	15	13	143	1,307	2,609	19.5	49.9	9.7
1969	NA	NA	49	65	875	1,336	564	10	7	186	1,598	2,933	20.8	45.5	9.5
1970	NA	NA	50	30	989	1,343	736	9	-1	270	1,817	3,161	21.5	42.5	9.1
1971	NA	NA	102	128	1,019	1,671	831	-14	1	365	2,030	3,701	24.3	45.2	11.0
1972	NA	NA	251	189	959	2,061	1,082	-20	-1	428	2,458	4,519	27.6	45.6	12.6
1973	NA	NA	459	485	1,134	2,991	1,294	-28	<sup>R</sup> 6	426	3,034	6,025	34.8	49.6	17.3
1974	NA	NA	713	461	978	3,277	1,038	-27	1	475	2,615	5,892	35.4	55.6	19.7
1975	NA	NA	762	714	702	3,599	824	29	7	484	2,248	5,846	35.8	61.6	22.1
1976	NA	NA	1,025	1,229	699	5,063	571	53	<sup>R</sup> 19	488	2,027	7,090	40.6	71.4	29.0
1977	NA	NA	1,143	1,379	689	6,190	446	155	117	560	2,375	8,565	46.5	72.3	33.6
1978	NA	NA	919	1,142	644	5,747	359	291	173	436	2,255	8,002	42.5	71.8	30.5
1979	NA	NA	1,080	1,354	688	5,633	438	418	196	353	2,352	7,985	43.1	70.5	30.4
1980	NA	NA	857	1,259	478	4,293	347	506	169	256	2,071	6,365	37.3	67.5	25.2
1981	1,215	311	620	1,128	403	3,315	358	497	370	169	2,086	5,401	33.6	61.4	20.6
1982	692	170	512	551	409	2,136	397	632	442	154	2,163	4,298	28.1	49.7	14.0
1983	439	240	299	336	420	1,843	471	802	374	178	2,469	4,312	28.3	42.7	12.1
1984	502	323	215	324	544	2,037	547	714	388	184	2,679	4,715	30.0	43.2	13.0
1985	309	187	293	167	602	1,821	696	755	295	114	2,465	4,286	27.3	42.5	11.6
1986	909	271	440	685	788	2,828	721	642	342	152	2,611	5,439	33.4	52.0	17.4
1987	1,074	295	535	751	801	3,055	765	585	346	158	2,859	5,914	35.5	51.7	18.3
1988	1,529	300	618	1,064	790	3,513	916	677	306	117	3,074	6,587	38.1	53.3	20.3
1989	1,858	269	815	1,224	861	4,124	839	678	206	212	3,078	7,202	41.6	57.3	23.8
1990	1,962	280	800	1,339	1,016	4,285	843	666	179	213	2,876	7,161	42.2	59.8	25.2
1991	1,833	253	703	1,796	1,020	4,065	963	707	125	153	2,561	6,626	39.6	61.3	24.3
1992	1,773	196	680	1,720	1,161	4,071	1,005	706	219	180	2,867	6,938	40.7	58.7	23.9
1993	1,774	219	736	1,413	1,296	4,253	1,109	809	340	175	3,365	7,618	44.2	55.8	24.7
1994	1,723	243	637	1,402	1,322	4,233	1,194	860	448	246	3,822	8,054	45.5	52.6	23.9
1995	1,563	234	<sup>R</sup> 626	<sup>R</sup> 1,343	<sup>R</sup> 1,468	<sup>R</sup> 3,980	<sup>R</sup> 1,260	<sup>R</sup> 943	<sup>R</sup> 369	170	3,906	<sup>R</sup> 7,886	44.5	<sup>R</sup> 50.5	<sup>R</sup> 22.5
1996 <sup>P</sup>	1,595	256	613	1,362	1,648	4,170	1,322	1,097	289	262	4,249	8,419	46.2	49.5	22.9

<sup>1</sup> Organization of Petroleum Exporting Countries. See Glossary for membership.

<sup>2</sup> Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and United Arab Emirates.

<sup>3</sup> Total OPEC imports exclude petroleum imported into the United States indirectly from OPEC countries, primarily from Caribbean and West European refining areas, as petroleum products that were refined from crude oil produced in OPEC countries.

<sup>4</sup> Calculated by dividing total net petroleum imports by total U.S. petroleum products supplied (consumption).

<sup>5</sup> Calculated by dividing net petroleum imports from OPEC countries by total net petroleum imports.

<sup>6</sup> Calculated by dividing net petroleum imports from OPEC countries by total U.S. petroleum product

supplied (consumption).

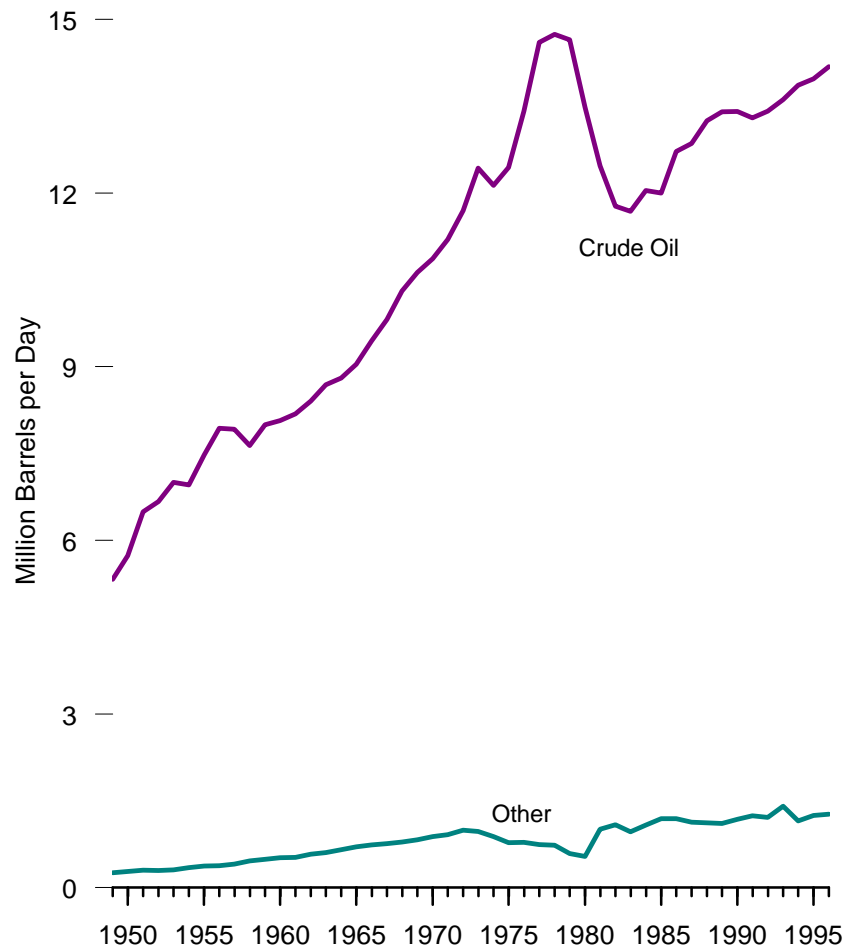
R=Revised data. P=Preliminary data. NA=Not available.

Notes: • Net imports are imports minus exports; negative numbers indicate that exports exceed imports. • Data include imports for the Strategic Petroleum Reserve, which began in 1977. • Totals may not equal sum of components due to independent rounding.

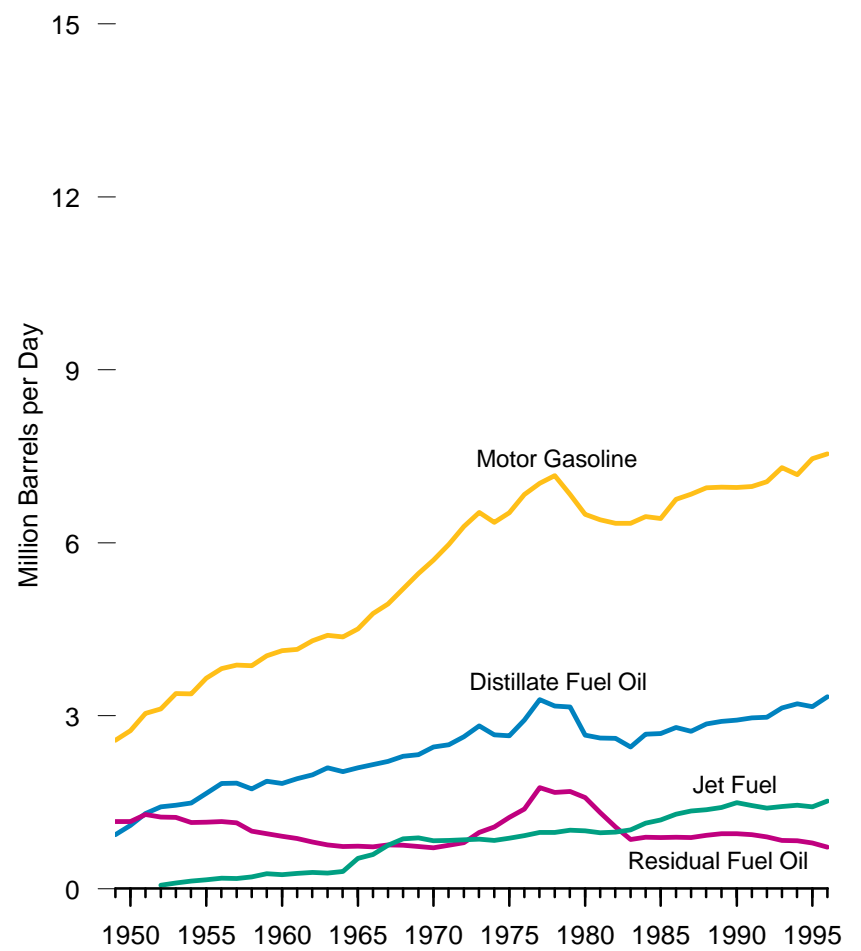
Sources: • 1960-1975—Bureau of Mines, *Minerals Yearbook*, "Crude Petroleum and Petroleum Products" chapter. • 1976-1980—Energy Information Administration (EIA), *Energy Data Reports, P.A.D. Districts Supply/Demand, Annual*. • 1981-1995—EIA, *Petroleum Supply Annual* • 1996—EIA, *Petroleum Supply Monthly* (February 1997).

**Figure 5.8 Refinery Input and Output, 1949-1996**

**Input**



**Output of Selected Products**



Source: Table 5.8

**Table 5.8 Refinery Input and Output, 1949-1996**  
(Million Barrels per Day)

Year	Input				Output							Processing Gain
	Crude Oil	Natural Gas Plant Liquids	Other Liquids <sup>1</sup>	Total Input	Distillate Fuel Oil	Jet Fuel <sup>2</sup>	Liquefied Petroleum Gases	Motor Gasoline <sup>2</sup>	Residual Fuel Oil	Other Products <sup>3</sup>	Total Output	
1949	5.33	0.23	0.03	5.59	0.93	NA	0.06	2.57	1.16	0.85	5.59	(s)
1950	5.74	0.26	0.02	6.02	1.09	NA	0.08	2.74	1.16	0.95	6.02	(s)
1951	6.49	0.27	0.03	6.80	1.30	NA	0.09	3.04	1.29	1.09	6.80	0.01
1952	6.67	0.28	0.01	6.97	1.42	0.06	0.08	3.12	1.24	1.06	6.97	0.01
1953	7.00	0.30	(s)	7.31	1.45	0.10	0.09	3.38	1.23	1.08	7.33	0.02
1954	6.96	0.32	0.02	7.30	1.49	0.13	0.09	3.38	1.14	1.10	7.32	0.02
1955	7.48	0.34	0.03	7.86	1.65	0.16	0.12	3.65	1.15	1.17	7.89	0.03
1956	7.94	0.37	0.01	8.32	1.82	0.18	0.14	3.82	1.17	1.24	8.36	0.04
1957	7.92	0.41	(s)	8.33	1.83	0.17	0.15	3.88	1.14	1.20	8.37	0.04
1958	7.64	0.37	0.09	8.11	1.73	0.20	0.16	3.87	1.00	1.22	8.17	0.06
1959	7.99	0.42	0.07	8.48	1.86	0.25	0.19	4.04	0.95	1.28	8.57	0.09
1960	8.07	0.45	0.06	8.58	1.82	0.24	0.21	4.13	0.91	1.42	8.73	0.15
1961	8.18	0.46	0.06	8.71	1.91	0.26	0.22	4.15	0.86	1.49	8.89	0.18
1962	8.41	0.50	0.08	8.99	1.97	0.28	0.21	4.30	0.81	1.59	9.16	0.18
1963	8.69	0.52	0.09	9.30	2.09	0.27	0.26	4.39	0.76	1.72	9.50	0.20
1964	8.81	0.58	0.07	9.46	2.03	0.29	0.29	4.37	0.73	1.97	9.68	0.22
1965	9.04	0.62	0.09	9.75	2.10	0.52	0.29	4.51	0.74	1.81	9.97	0.22
1966	9.44	0.65	0.09	10.18	2.15	0.59	0.29	4.77	0.72	1.90	10.43	0.25
1967	9.82	0.67	0.09	10.58	2.20	0.75	0.31	4.94	0.76	1.92	10.87	0.29
1968	10.31	0.71	0.08	11.10	2.29	0.86	0.32	5.20	0.75	1.99	11.42	0.32
1969	10.63	0.72	0.11	11.46	2.32	0.88	0.34	5.47	0.73	2.06	11.79	0.34
1970	10.87	0.76	0.12	11.75	2.45	0.83	0.35	5.70	0.71	2.08	12.11	0.36
1971	11.20	0.78	0.14	12.12	2.50	0.83	0.36	5.97	0.75	2.09	12.50	0.38
1972	11.70	0.83	0.17	12.69	2.63	0.85	0.36	6.28	0.80	2.17	13.08	0.39
1973	12.43	0.82	0.15	13.40	2.82	0.86	0.37	6.53	0.97	2.30	13.85	0.45
1974	12.13	0.75	0.14	13.02	2.67	0.84	0.34	6.36	1.07	2.23	13.50	0.48
1975	12.44	0.71	0.07	13.23	2.65	0.87	0.31	6.52	1.24	2.10	13.68	0.46
1976	13.42	0.73	0.06	14.20	2.92	0.92	0.34	6.84	1.38	2.28	14.68	0.48
1977	14.60	0.67	0.07	15.35	3.28	0.97	0.35	7.03	1.75	2.49	15.87	0.52
1978	14.74	0.64	0.09	15.47	3.17	0.97	0.35	7.17	1.67	2.64	15.97	0.50
1979	14.65	0.51	0.08	15.24	3.15	1.01	0.34	6.84	1.69	2.74	15.76	0.53
1980	13.48	0.46	0.08	14.02	2.66	1.00	0.33	6.49	1.58	2.56	14.62	0.60
1981	12.47	0.52	0.49	13.48	2.61	0.97	0.31	6.40	1.32	2.37	13.99	0.51
1982	11.77	0.52	0.57	12.86	2.61	0.98	0.27	6.34	1.07	2.13	13.39	0.53
1983	11.69	0.46	0.50	12.65	2.46	1.02	0.33	6.34	0.85	2.14	13.14	0.49
1984	12.04	0.50	0.58	13.13	2.68	1.13	0.36	6.45	0.89	2.16	13.68	0.55
1985	12.00	0.51	0.68	13.19	2.69	1.19	0.39	6.42	0.88	2.18	13.75	0.56
1986	12.72	0.48	0.71	13.91	2.80	1.29	0.42	6.75	0.89	2.37	14.52	0.62
1987	12.85	0.47	0.67	13.99	2.73	1.34	0.45	6.84	0.89	2.38	14.63	0.64
1988	13.25	0.51	0.61	14.37	2.86	1.37	0.50	6.96	0.93	2.42	15.02	0.66
1989	13.40	0.50	0.61	14.51	2.90	1.40	0.55	6.96	0.95	2.40	15.17	0.66
1990	13.41	0.47	0.71	14.59	2.92	1.49	0.50	6.96	0.95	2.45	15.27	0.68
1991	13.30	0.47	0.77	14.54	2.96	1.44	0.54	6.98	0.93	2.41	15.26	0.71
1992	13.41	0.47	0.75	14.63	2.97	1.40	0.61	7.06	0.89	2.47	15.40	0.77
1993	13.61	0.49	0.92	15.02	3.13	1.42	0.59	7.30	0.84	2.50	15.79	0.77
1994	13.87	0.47	0.69	15.02	3.20	1.45	0.61	7.18	0.83	2.52	15.79	0.77
1995	13.97	0.47	<sup>R</sup> 0.78	<sup>R</sup> 15.22	<sup>R</sup> 3.16	<sup>R</sup> 1.42	0.65	<sup>R</sup> 7.46	0.79	<sup>R</sup> 2.52	<sup>R</sup> 15.99	0.77
1996 <sup>P</sup>	14.18	0.45	0.82	15.45	3.33	1.52	0.66	7.54	0.72	2.52	16.29	0.83

<sup>1</sup> Prior to 1981, included unfinished oils (net), hydrogen, and hydrocarbons not included elsewhere; 1981 forward, included unfinished oils (net), motor gasoline blending components (net), aviation gasoline blending components (net), hydrogen, other hydrocarbons, and alcohol. See Note 1 at end of section.

<sup>2</sup> Prior to 1964, motor gasoline data were for total gasoline, including motor gasoline, aviation gasoline, and special naphthas. Prior to 1965, kerosene-type jet fuel was included in kerosene.

<sup>3</sup> Kerosene, petrochemical feedstocks, lubricants, wax, petroleum coke, asphalt, road oil, still gas, and miscellaneous products. Since 1964, aviation gasoline and special naphthas have been included.

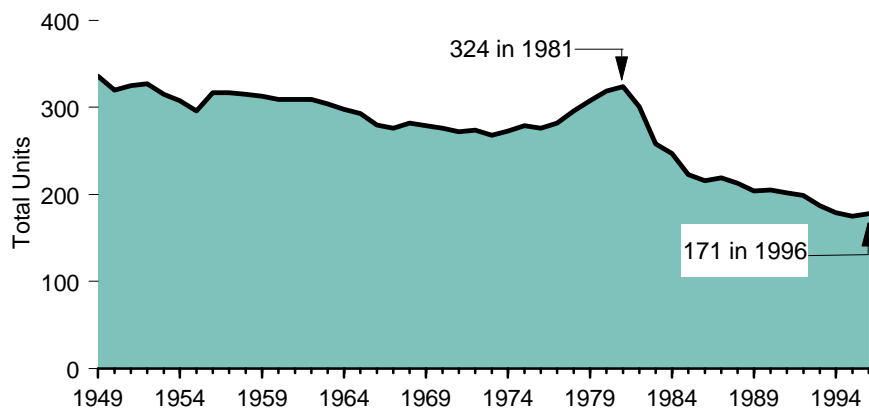
R=Revised data. P=Preliminary data. NA=Not available. (s)=Less than 5,000 barrels per day.

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

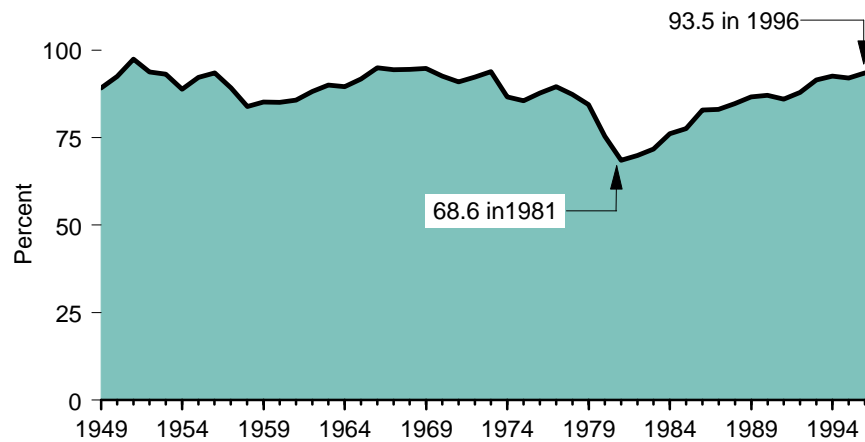
Sources: • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*. • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, *Petroleum Supply Monthly* (February 1997).

**Figure 5.9 Refinery Capacity and Utilization, 1949-1996**

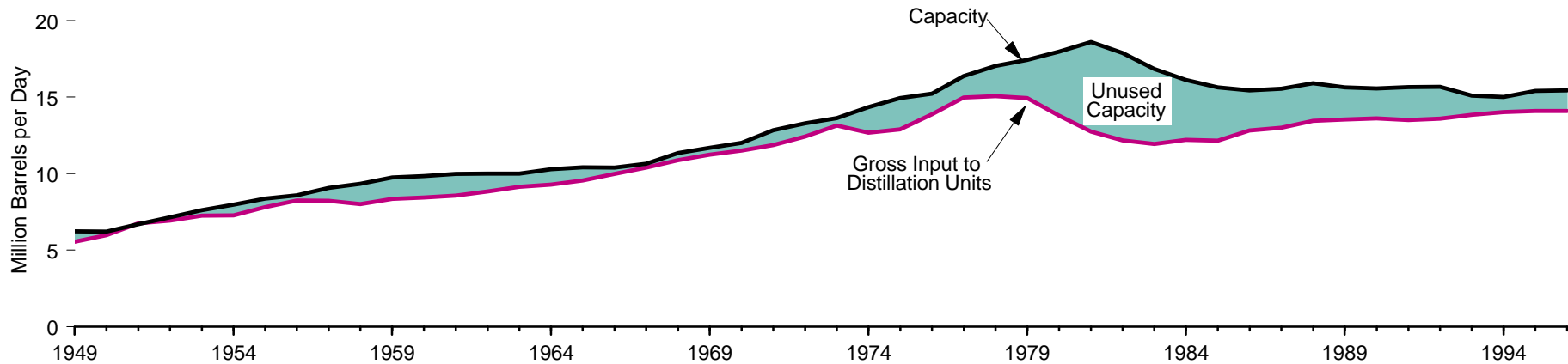
**Number of Operable Refineries**



**Utilization**



**Unused Capacity**



Source: Table 5.9.

**Table 5.9 Refinery Capacity and Utilization, 1949-1996**

Year	Operable Refineries		Gross Input to Distillation Units <sup>2</sup> (million barrels per day)	Utilization <sup>3</sup> (percent)
	Number <sup>4</sup>	Capacity <sup>1</sup> (million barrels per day)		
1949	336	6.23	5.56	89.2
1950	320	6.22	5.98	92.5
1951	325	6.70	6.76	97.5
1952	327	7.16	6.93	93.8
1953	315	7.62	7.26	93.1
1954	308	7.98	7.27	88.8
1955	296	8.39	7.82	92.2
1956	317	8.58	8.25	93.5
1957	317	9.07	8.22	89.2
1958	315	9.36	8.02	83.9
1959	313	9.76	8.36	85.2
1960	309	9.84	8.44	85.1
1961	309	10.00	8.57	85.7
1962	309	10.01	8.83	88.2
1963	304	10.01	9.14	90.0
1964	298	10.31	9.28	89.6
1965	293	10.42	9.56	91.8
1966	280	10.39	9.99	94.9
1967	276	10.66	10.39	94.4
1968	282	11.35	10.89	94.5
1969	279	11.70	11.25	94.8
1970	276	12.02	11.52	92.6
1971	272	12.86	11.88	90.9
1972	274	13.29	12.43	92.3
1973	268	13.64	13.15	93.9
1974	273	14.36	12.69	86.6
1975	279	14.96	12.90	85.5
1976	276	15.24	13.88	87.8
1977	282	16.40	14.98	89.6
1978	296	17.05	15.07	87.4
1979	308	17.44	14.96	84.4
1980	319	17.99	13.80	75.4
1981	324	18.62	12.75	68.6
1982	301	17.89	12.17	69.9
1983	258	16.86	11.95	71.7
1984	247	16.14	12.22	76.2
1985	223	15.66	12.17	77.6
1986	216	15.46	12.83	82.9
1987	219	15.57	13.00	83.1
1988	213	15.92	13.45	84.7
1989	204	15.65	13.55	86.6
1990	205	15.57	13.61	87.1
1991	202	15.68	13.51	86.0
1992	199	15.70	13.60	87.9
1993	187	15.12	13.85	91.5
1994	179	15.03	14.03	92.6
1995	175	15.43	<sup>R</sup> 14.12	<sup>R</sup> 92.0
1996 <sup>P</sup>	171	15.33	14.34	93.5

<sup>1</sup> Capacity in million barrels per calendar day on January 1.

<sup>2</sup> See Note 2 at end of section.

<sup>3</sup> For 1949-1980, utilization is derived by dividing gross input to distillation units by one-half of the current year January 1 capacity and the following year January 1 capacity. Percentages were derived from unrounded numbers. For 1981 forward, utilization has been derived by averaging reported monthly utilization.

<sup>4</sup> Prior to 1956, the number of refineries included only those in operation on January 1. For 1957 forward, the number of refineries has included all operable refineries on January 1. See Glossary.

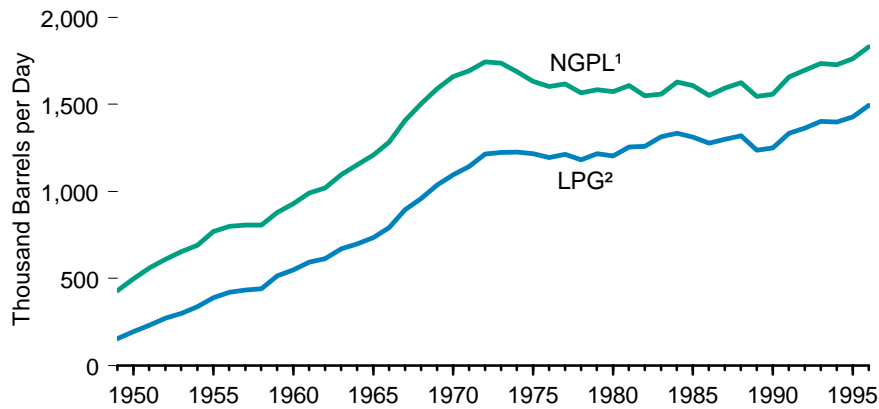
R=Revised data. P=Preliminary data.

Sources: **Operable Refineries:** • 1949-1961—Bureau of Mines Information Circular, "Petroleum Refineries, Including Cracking Plants in the United States." • 1962-1977—Bureau of Mines, Mineral

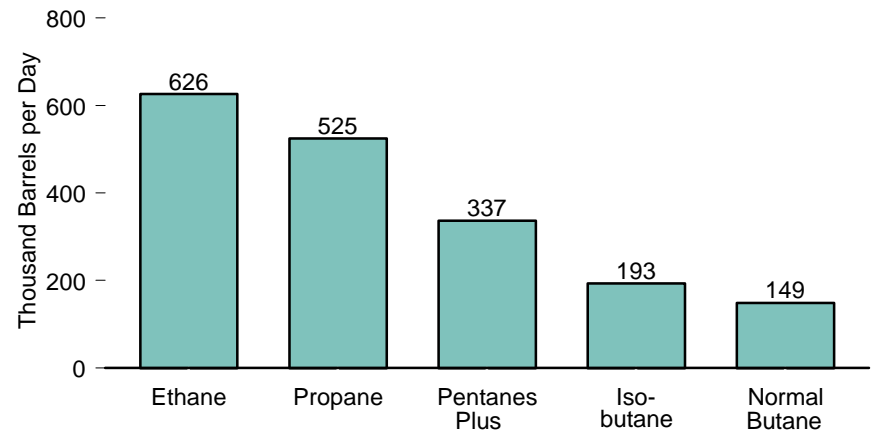
Industry Surveys, *Petroleum Refineries, Annual*. • 1978-1981—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Refineries in the United States and U.S. Territories*. • 1982-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, Form EIA-810 "Monthly Refinery Report" resubmissions as of March 1997. **Gross Input to Distillation Units:** • 1949-1966—Bureau of Mines, *Minerals Yearbook*, "Natural Gas Liquids" and "Crude Petroleum and Petroleum Products" chapters. • 1967-1977—Bureau of Mines, Mineral Industry Surveys, *Petroleum Refineries, Annual*. • 1978-1980—EIA, Energy Data Reports, *Petroleum Refineries in the United States and U.S. Territories*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, Form EIA-810 "Monthly Refinery Report" resubmissions as of March 1997. **Utilization:** • 1949-1980—Calculated. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—Calculated.

**Figure 5.10 Natural Gas Plant Liquids Production**

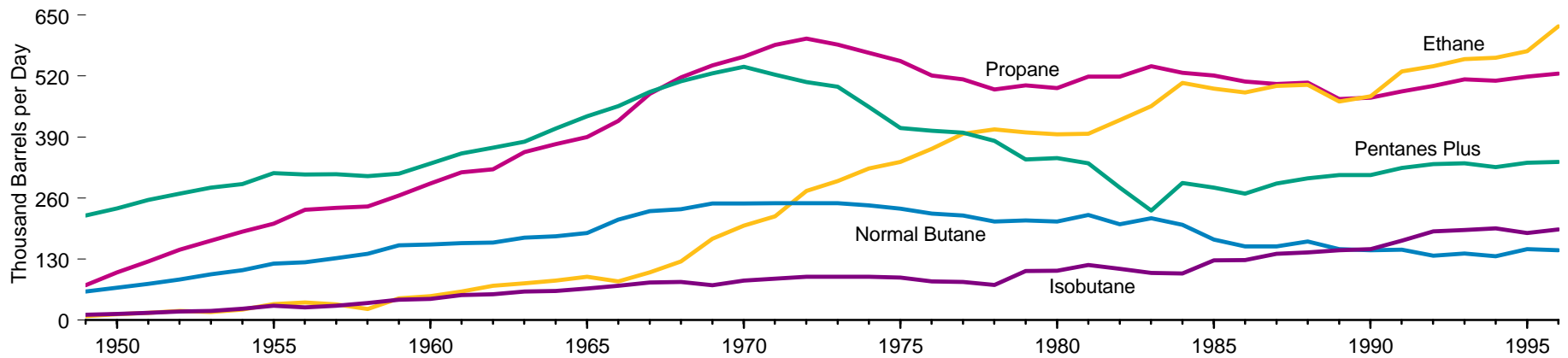
**Total, 1949-1996**



**By Product, 1996**



**By Selected Product, 1949-1996**



<sup>1</sup> Natural gas plant liquids.

<sup>2</sup> Liquefied petroleum gases.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 5.10.



**Table 5.10 Natural Gas Plant Liquids Production, 1949-1996**  
(Thousand Barrels per Day)

Year	Finished Petroleum Products <sup>1</sup>	Liquefied Petroleum Gases				Pentanes Plus <sup>4</sup>	Total	
		Ethane <sup>2</sup>	Isobutane	Normal Butane <sup>3</sup>	Propane <sup>2,3</sup>			Total
1949	53	8	11	61	74	155	223	430
1950	66	12	13	69	101	195	238	499
1951	73	15	15	77	125	232	256	561
1952	70	19	18	86	150	273	269	611
1953	71	17	19	97	169	301	282	654
1954	61	22	24	106	188	339	290	691
1955	68	34	30	120	205	390	313	771
1956	68	37	27	123	235	422	310	800
1957	63	33	30	132	239	434	311	808
1958	58	23	36	141	242	442	307	808
1959	54	46	43	159	265	514	312	879
1960	47	51	45	161	291	549	333	929
1961	43	61	53	164	315	593	355	991
1962	41	73	55	165	321	614	367	1,021
1963	47	78	61	175	358	672	380	1,098
1964	48	84	62	178	375	699	408	1,154
1965	41	92	67	185	390	734	434	1,210
1966	37	82	73	214	424	792	456	1,284
1967	29	101	80	232	482	895	486	1,409
1968	35	125	81	236	517	960	509	1,504
1969	27	173	74	248	543	1,037	526	1,590
1970	25	201	84	248	561	1,095	540	1,660
1971	25	221	88	249	586	1,144	523	1,693
1972	21	275	92	249	600	1,215	507	1,744
1973	16	296	92	249	587	1,225	497	1,738
1974	7	323	92	244	569	1,227	454	1,688
1975	7	337	90	237	552	1,217	409	1,633
1976	6	365	82	227	521	1,195	403	1,604
1977	5	397	81	223	513	1,214	399	1,618
1978	3	406	75	210	491	1,182	382	1,567
1979	26	400	104	212	500	1,216	342	1,584
1980	23	396	105	210	494	1,205	345	1,573
1981	18	397	117	224	519	1,256	334	1,609
1982	11	426	109	204	519	1,258	282	1,550
1983	12	456	100	217	541	1,314	233	1,559
1984	4	505	99	203	527	1,334	292	1,630
1985	14	493	127	171	521	1,313	282	1,609
1986	4	485	128	157	508	1,277	269	1,551
1987	4	499	141	157	503	1,300	291	1,595
1988	4	501	144	167	506	1,319	302	1,625
1989	( <sup>5</sup> )	466	149	151	471	1,237	309	1,546
1990	( <sup>5</sup> )	477	151	149	474	1,250	309	1,559
1991	( <sup>5</sup> )	530	169	150	487	1,336	324	1,659
1992	( <sup>5</sup> )	541	189	137	499	1,365	332	1,697
1993	( <sup>5</sup> )	556	192	142	513	1,402	334	1,736
1994	( <sup>5</sup> )	559	195	136	510	1,400	326	1,727
1995	( <sup>5</sup> )	<sup>R</sup> 573	185	<sup>R</sup> 151	<sup>R</sup> 519	<sup>R</sup> 1,428	<sup>R</sup> 335	<sup>R</sup> 1,762
1996 <sup>P</sup>	( <sup>5</sup> )	626	193	149	525	1,494	337	1,831

<sup>1</sup> Motor gasoline, aviation gasoline, special naphthas, distillate fuel oil, and miscellaneous products.

<sup>2</sup> Reported production of ethane-propane mixtures has been allocated 70 percent ethane and 30 percent propane.

<sup>3</sup> Reported production of butane-propane mixtures has been allocated 60 percent butane and 40 percent propane.

<sup>4</sup> Prior to 1984, this category was reported separately as natural gasoline, isopentane, and plant condensate.

<sup>5</sup> Beginning in 1989, data on finished petroleum products production from natural gas processing plants

were no longer available.

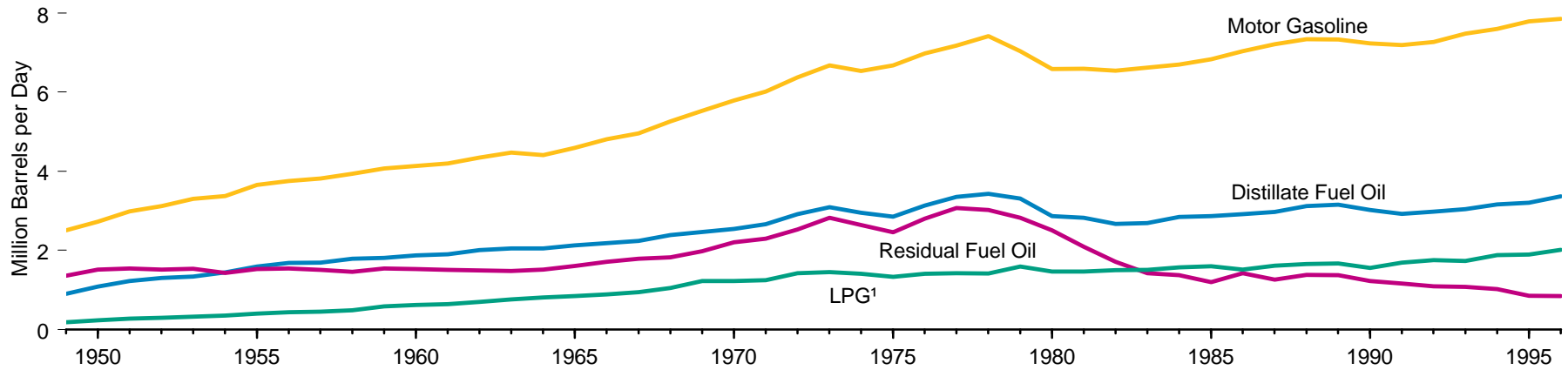
R=Revised data. P=Preliminary data.

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

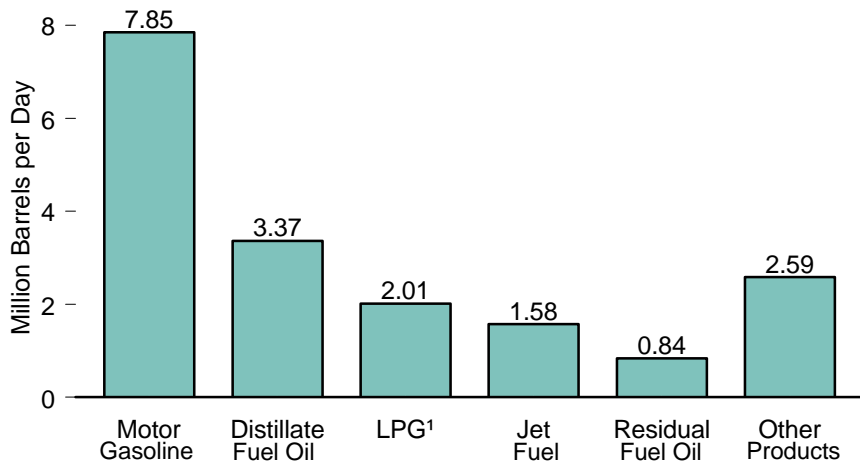
Sources: • 1949-1968—Bureau of Mines, *Minerals Yearbook*, "Crude Petroleum and Petroleum Products" chapter. • 1969-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*. • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, *Petroleum Supply Monthly* (February 1997).

**Figure 5.11 Petroleum Products Supplied by Type**

**By Selected Product, 1949-1996**

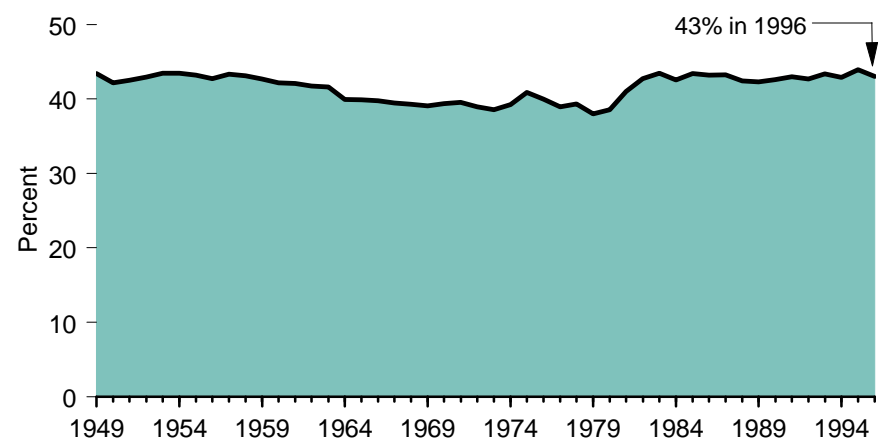


**By Product, 1996**



<sup>1</sup> Liquefied petroleum gases.

**Motor Gasoline's Share of Total Petroleum Products Supplied, 1949-1996**



Source: Table 5.11.

**Table 5.11 Petroleum Products Supplied by Type, 1949-1996**  
(Million Barrels per Day)

Year	Distillate Fuel Oil	Jet Fuel	Liquefied Petroleum Gases		Motor Gasoline <sup>2</sup>	Residual Fuel Oil	Other Products <sup>3</sup>	Total Products	Percentage Change from Previous Year <sup>4</sup>
			Propane <sup>1</sup>	Total					
1949	0.90	NA	NA	0.19	2.50	1.36	0.81	5.76	—
1950	1.08	NA	NA	0.23	2.72	1.52	0.90	6.46	12.1
1951	1.23	NA	NA	0.28	2.99	1.55	0.98	7.02	8.6
1952	1.30	0.05	NA	0.30	3.12	1.52	0.98	7.27	3.9
1953	1.34	0.09	NA	0.33	3.30	1.54	1.00	7.60	4.3
1954	1.44	0.13	NA	0.35	3.37	1.43	1.03	7.76	2.1
1955	1.59	0.15	NA	0.40	3.66	1.53	1.12	8.46	9.0
1956	1.68	0.20	NA	0.44	3.75	1.54	1.16	8.78	4.1
1957	1.69	0.20	NA	0.45	3.82	1.50	1.15	8.81	0.1
1958	1.79	0.26	NA	0.49	3.93	1.45	1.19	9.12	3.5
1959	1.81	0.29	NA	0.58	4.07	1.54	1.24	9.53	4.5
1960	1.87	0.28	NA	0.62	4.13	1.53	1.36	9.80	3.1
1961	1.90	0.29	NA	0.64	4.20	1.50	1.44	9.98	1.5
1962	2.01	0.31	NA	0.70	4.34	1.50	1.55	10.40	4.2
1963	2.05	0.32	NA	0.76	4.47	1.48	1.68	10.74	3.3
1964	2.05	0.32	NA	0.81	4.40	1.52	1.92	11.02	2.9
1965	2.13	0.60	NA	0.84	4.59	1.61	1.74	11.51	4.2
1966	2.18	0.67	NA	0.89	4.81	1.72	1.82	12.08	5.0
1967	2.24	0.82	0.62	0.94	4.96	1.79	1.81	12.56	3.9
1968	2.39	0.95	0.69	1.05	5.26	1.83	1.91	13.39	6.9
1969	2.47	0.99	0.78	1.22	5.53	1.98	1.95	14.14	5.3
1970	2.54	0.97	0.78	1.22	5.78	2.20	1.98	14.70	4.0
1971	2.66	1.01	0.79	1.25	6.01	2.30	1.98	15.21	3.5
1972	2.91	1.05	0.89	1.42	6.38	2.53	2.08	16.37	7.9
1973	3.09	1.06	0.87	1.45	6.67	2.82	2.21	17.31	5.5
1974	2.95	0.99	0.83	1.41	6.54	2.64	2.13	16.65	-3.8
1975	2.85	1.00	0.78	1.33	6.67	2.46	2.00	16.32	-2.0
1976	3.13	0.99	0.83	1.40	6.98	2.80	2.16	17.46	7.3
1977	3.35	1.04	0.82	1.42	7.18	3.07	2.37	18.43	5.3
1978	3.43	1.06	0.78	1.41	7.41	3.02	2.51	18.85	2.3
1979	3.31	1.08	0.85	1.59	7.03	2.83	2.67	18.51	-1.8
1980	2.87	1.07	0.75	1.47	6.58	2.51	2.57	17.06	-7.6
1981	2.83	1.01	0.77	1.47	6.59	2.09	2.08	16.06	-6.1
1982	2.67	1.01	0.80	1.50	6.54	1.72	1.86	15.30	-4.7
1983	2.69	1.05	0.75	1.51	6.62	1.42	1.94	15.23	-0.4
1984	2.84	1.18	0.83	1.57	6.69	1.37	2.07	15.73	3.5
1985	2.87	1.22	0.88	1.60	6.83	1.20	2.01	15.73	-0.3
1986	2.91	1.31	0.83	1.51	7.03	1.42	2.09	16.28	3.5
1987	2.98	1.38	0.92	1.61	7.21	1.26	2.22	16.67	2.4
1988	3.12	1.45	0.92	1.66	7.34	1.38	2.34	17.28	4.0
1989	3.16	1.49	0.99	1.67	7.33	1.37	2.31	17.33	0.0
1990	3.02	1.52	0.92	1.56	7.23	1.23	2.43	16.99	-1.9
1991	2.92	1.47	0.98	1.69	7.19	1.16	2.29	16.71	-1.6
1992	2.98	1.45	1.03	1.76	7.27	1.09	2.48	17.03	2.2
1993	3.04	1.47	1.01	1.73	7.48	1.08	2.44	17.24	0.9
1994	3.16	1.53	1.08	1.88	7.60	1.02	2.53	17.72	2.8
1995	<sup>R</sup> 3.21	1.51	<sup>R</sup> 1.10	1.90	7.79	0.85	2.46	<sup>R</sup> 17.72	<sup>R</sup> 0.0
1996 <sup>P</sup>	3.37	1.58	1.14	2.01	7.85	0.84	2.59	18.23	3.2

<sup>1</sup> Includes propylene.

<sup>2</sup> Prior to 1964, motor gasoline data were for total gasoline, including motor gasoline, aviation gasoline, and special naphthas.

<sup>3</sup> Kerosene, petrochemical feedstocks, lubricants, wax, petroleum coke, asphalt, road oil, still gas, pentanes plus, and miscellaneous products. Since 1964, aviation gasoline and special naphthas have been included. Prior to 1965, kerosene-type jet fuel was included in kerosene. For 1981 forward, other products include negative barrels per day of distillate and residual fuel oil reclassified as unfinished oils and other products (from both primary and secondary supply) reclassified as gasoline blending components. Beginning in 1983, product supplied has also included crude oil burned as fuel.

<sup>4</sup> Percent change from previous year calculated from data in thousand barrels per year.

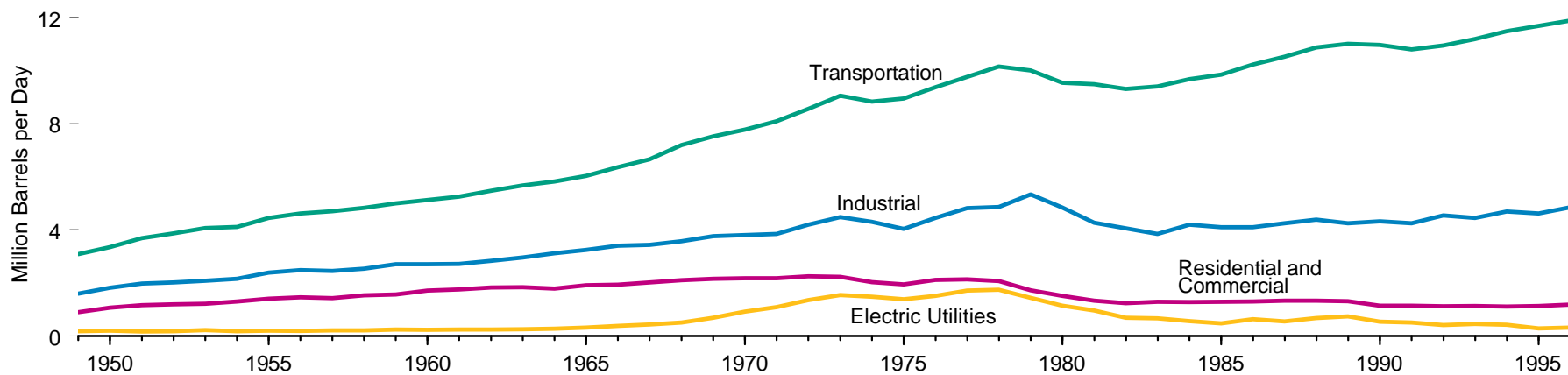
R=Revised data. P=Preliminary. NA=Not available. — = Not applicable.

Notes: • For the definition of petroleum products supplied, see Notes 1, 3, and 4 at end of section. • Totals may not equal sum of components due to independent rounding.

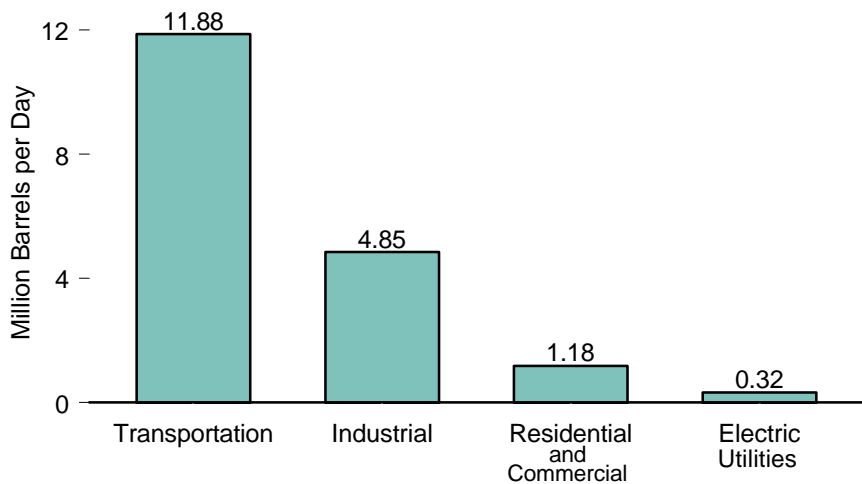
Sources: • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*. • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, *Petroleum Supply Monthly* (February 1997).

**Figure 5.12a Petroleum Products Supplied by Sector**

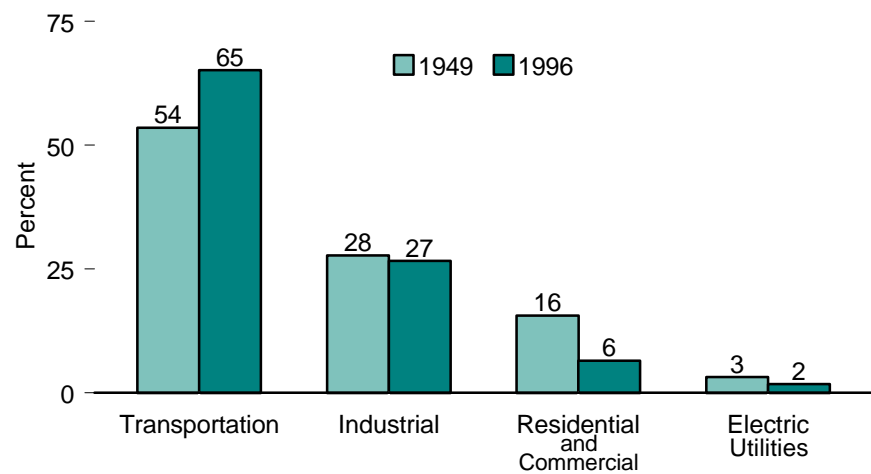
**By Sector, 1949-1996**



**By Sector, 1996**



**Shares<sup>1</sup> by Sector, 1949 and 1996**

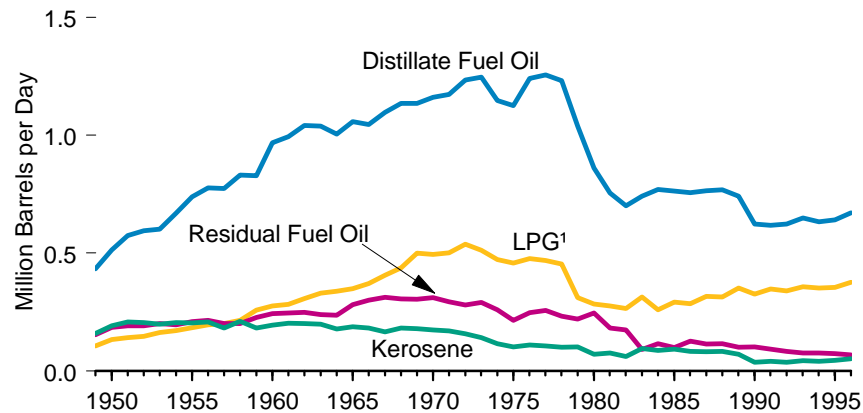


<sup>1</sup> Sum of shares may not equal 100 percent due to independent rounding.  
Note: See related Figure 5.12b.

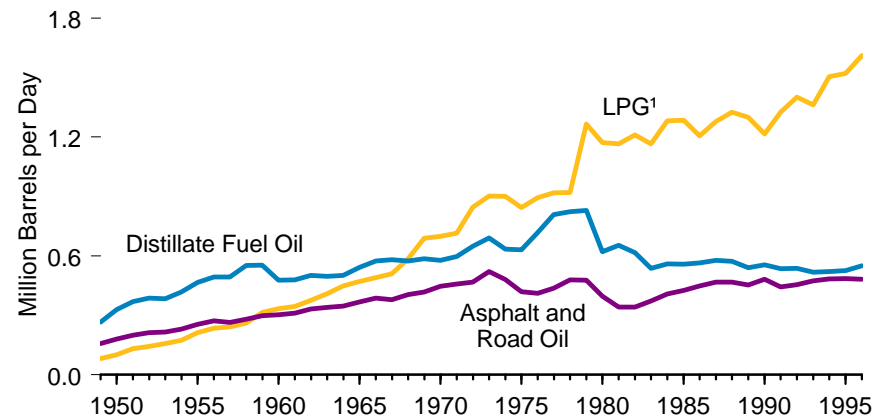
Sources: Tables 5.12a and 5.12b.

**Figure 5.12b Petroleum Products Supplied by Product by Sector, 1949-1996**

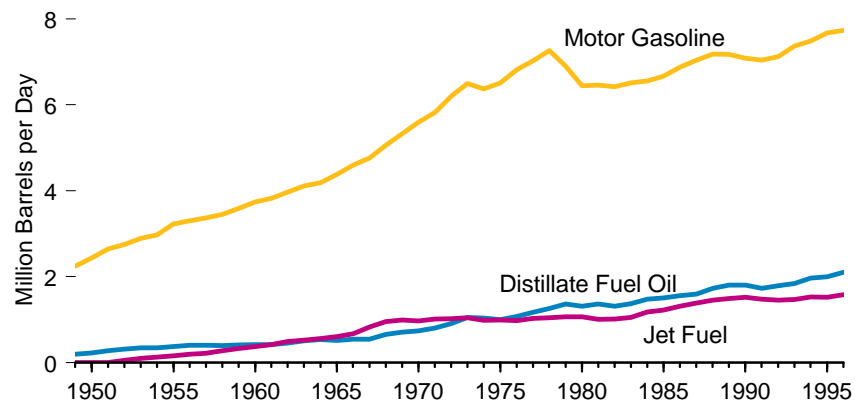
**Residential and Commercial Sector, Selected Products**



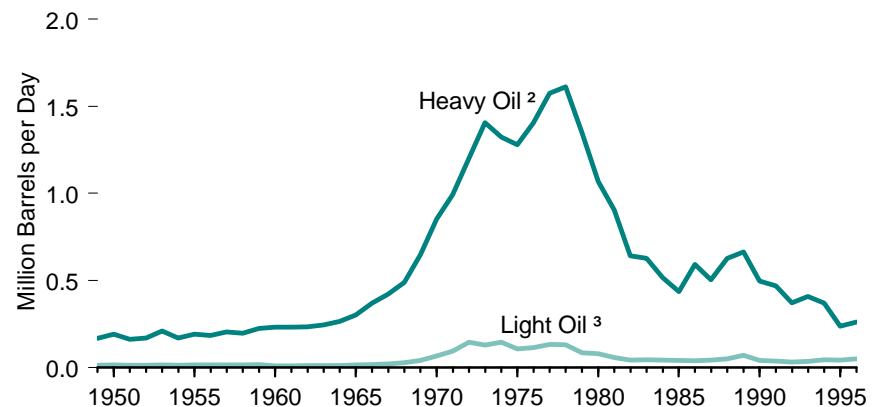
**Industrial Sector, Selected Products**



**Transportation Sector, Selected Products**



**Electric Utilities, Selected Products**



<sup>1</sup> Liquefied petroleum gases.  
<sup>2</sup> Prior to 1980, based on oil used in steam plants. Since 1980, heavy oil includes fuel oil nos. 4, 5, and 6, and residual fuel oil.  
<sup>3</sup> Prior to 1980, based on oil used in internal combustion and gas turbine engine plants. Since 1980, light oil includes fuel nos. 1 and 2, kerosene, and jet fuel.

Notes: •See related Figure 5.12a. •Because vertical scales differ, graphs should not be compared.  
 Sources: Tables 5.12a and 5.12b.

**Table 5.12a Petroleum Products Supplied to the Residential and Commercial Sector and the Industrial Sector, 1949-1996**  
(Million Barrels per Day)

Year	Residential and Commercial						Industrial								
	Distillate Fuel Oil	Kerosene	Liquefied Petroleum Gases	Motor Gasoline	Residual Fuel Oil	Total	Asphalt and Road Oil	Distillate Fuel Oil	Kerosene	Liquefied Petroleum Gases	Lubricants	Motor Gasoline	Residual Fuel Oil	Other <sup>1</sup>	Total
1949	0.43	0.16	0.11	0.05	0.15	0.90	0.16	0.27	0.12	0.08	0.04	0.12	0.53	0.28	1.60
1950	0.51	0.19	0.13	0.05	0.18	1.07	0.18	0.33	0.13	0.10	0.04	0.13	0.62	0.29	1.82
1951	0.57	0.21	0.14	0.06	0.19	1.17	0.20	0.37	0.13	0.13	0.05	0.14	0.63	0.33	1.98
1952	0.59	0.21	0.15	0.06	0.19	1.20	0.21	0.39	0.13	0.14	0.04	0.15	0.63	0.33	2.02
1953	0.60	0.20	0.16	0.06	0.20	1.22	0.22	0.38	0.12	0.16	0.04	0.16	0.65	0.36	2.08
1954	0.67	0.20	0.17	0.06	0.19	1.30	0.23	0.42	0.12	0.17	0.04	0.16	0.64	0.37	2.16
1955	0.74	0.20	0.18	0.07	0.21	1.40	0.25	0.47	0.12	0.21	0.05	0.17	0.69	0.43	2.39
1956	0.78	0.21	0.20	0.07	0.21	1.46	0.27	0.49	0.11	0.23	0.05	0.18	0.70	0.45	2.49
1957	0.77	0.18	0.20	0.07	0.20	1.43	0.26	0.49	0.10	0.24	0.05	0.18	0.66	0.48	2.46
1958	0.83	0.21	0.20	0.07	0.20	1.53	0.28	0.55	0.08	0.26	0.04	0.19	0.64	0.50	2.54
1959	0.83	0.18	0.26	0.08	0.23	1.57	0.30	0.55	0.08	0.31	0.05	0.19	0.70	0.52	2.71
1960	0.97	0.19	0.27	0.03	0.24	1.71	0.30	0.48	0.08	0.33	0.05	0.20	0.69	0.58	2.71
1961	0.99	0.20	0.28	0.04	0.25	1.76	0.31	0.48	0.06	0.34	0.05	0.19	0.66	0.76	2.72
1962	1.04	0.20	0.31	0.04	0.25	1.84	0.33	0.50	0.07	0.38	0.05	0.19	0.67	0.65	2.84
1963	1.04	0.20	0.33	0.04	0.24	1.84	0.34	0.50	0.07	0.41	0.05	0.18	0.67	0.74	2.96
1964	1.00	0.18	0.34	0.04	0.24	1.79	0.35	0.50	0.08	0.45	0.06	0.18	0.68	0.84	3.12
1965	1.06	0.19	0.35	0.04	0.28	1.91	0.37	0.54	0.08	0.47	0.06	0.18	0.69	0.86	3.25
1966	1.04	0.18	0.37	0.04	0.30	1.94	0.39	0.58	0.09	0.49	0.06	0.17	0.71	0.92	3.40
1967	1.10	0.16	0.41	0.04	0.31	2.02	0.38	0.58	0.11	0.51	0.06	0.16	0.69	0.94	3.43
1968	1.14	0.18	0.44	0.04	0.31	2.10	0.41	0.57	0.10	0.59	0.07	0.16	0.68	1.01	3.58
1969	1.13	0.18	0.50	0.04	0.30	2.16	0.42	0.59	0.10	0.69	0.07	0.15	0.69	1.06	3.76
1970	1.16	0.17	0.49	0.05	0.31	2.18	0.45	0.58	0.09	0.70	0.07	0.15	0.71	1.07	3.81
1971	1.17	0.17	0.50	0.04	0.29	2.18	0.46	0.60	0.08	0.71	0.07	0.14	0.71	1.08	3.84
1972	1.23	0.16	0.54	0.05	0.28	2.25	0.47	0.65	0.08	0.85	0.07	0.13	0.77	1.18	4.19
1973	1.24	0.14	0.51	0.05	0.29	2.23	0.52	0.69	0.08	0.90	0.09	0.13	0.81	1.26	4.48
1974	1.15	0.12	0.47	0.04	0.26	2.04	0.48	0.63	0.06	0.90	0.08	0.12	0.75	1.26	4.30
1975	1.13	0.10	0.46	0.05	0.21	1.95	0.42	0.63	0.06	0.84	0.07	0.12	0.66	1.25	4.04
1976	1.24	0.11	0.48	0.05	0.25	2.12	0.41	0.72	0.07	0.90	0.07	0.11	0.79	1.39	4.45
1977	1.26	0.11	0.47	0.05	0.26	2.14	0.44	0.81	0.06	0.92	0.08	0.10	0.84	1.56	4.82
1978	1.23	0.10	0.45	0.06	0.23	2.07	0.48	0.82	0.08	0.92	0.09	0.09	0.75	1.64	4.87
1979	1.04	0.10	0.31	0.05	0.22	1.73	0.48	0.83	0.09	1.27	0.09	0.08	0.72	1.79	5.34
1980	0.86	0.07	0.28	0.06	0.25	1.52	0.40	0.62	0.09	1.17	0.08	0.08	0.59	1.81	4.84
1981	0.75	0.07	0.28	0.05	0.18	1.33	0.34	0.65	0.05	1.17	0.08	0.08	0.47	1.43	4.27
1982	0.70	0.06	0.26	0.05	0.17	1.24	0.34	0.62	0.07	1.21	0.07	0.07	0.46	1.22	4.06
1983	0.74	0.10	0.31	0.05	0.09	1.29	0.37	0.54	0.03	1.17	0.08	0.06	0.34	1.27	3.85
1984	0.77	0.09	0.26	0.06	0.12	1.29	0.41	0.56	0.03	1.28	0.08	0.08	0.39	1.36	4.19
1985	0.76	0.09	0.29	0.05	0.10	1.30	0.43	0.56	0.02	1.29	0.07	0.11	0.33	1.29	4.10
1986	0.76	0.08	0.29	0.06	0.13	1.31	0.45	0.56	0.02	1.21	0.07	0.11	0.32	1.37	4.11
1987	0.76	0.08	0.32	0.06	0.11	1.33	0.47	0.58	0.01	1.28	0.08	0.11	0.25	1.47	4.25
1988	0.77	0.08	0.31	0.06	0.11	1.34	0.47	0.57	0.01	1.33	0.08	0.10	0.24	1.59	4.39
1989	0.74	0.07	0.35	0.05	0.10	1.32	0.45	0.54	0.01	1.30	0.08	0.10	0.18	1.58	4.26
1990	0.62	0.04	0.32	0.06	0.10	1.14	0.48	0.56	0.01	1.22	0.08	0.10	0.18	1.70	4.32
1991	0.62	0.04	0.35	0.04	0.09	1.14	0.44	0.54	0.01	1.33	0.08	0.10	0.15	1.62	4.25
1992	0.62	0.04	0.34	0.04	0.08	1.12	0.45	0.54	(s)	1.40	0.08	0.10	0.17	1.80	4.55
1993	0.65	0.04	0.36	0.02	0.08	1.14	0.47	0.52	0.01	1.36	0.08	0.09	0.20	1.72	4.45
1994	0.63	0.04	0.35	0.01	0.08	1.11	0.48	0.52	0.01	1.50	0.08	0.10	0.19	1.80	4.69
1995 <sup>E</sup>	0.64	0.05	0.35	0.01	0.07	1.13	0.49	0.53	0.01	1.52	0.08	0.10	0.16	<sup>R</sup> 1.74	<sup>R</sup> 4.62
1996 <sup>E</sup>	0.67	0.05	0.38	0.01	0.07	1.18	0.48	0.55	0.01	1.61	0.08	0.10	0.15	1.86	4.85

<sup>1</sup> "Other" is petrochemical feedstocks, special naphthas, waxes, petroleum coke, still gas, natural gasoline, pentanes plus, crude oil, and miscellaneous products.

R=Revised data. E=Estimate. (s)=Less than 5,000 barrels per day.

Notes: • See Table 5.12b for the transportation sector, electric utilities, and overall total. • See Notes 1, 3, and 4 at end of section for comments on the calculation of products supplied. • Totals may not equal

sum of components due to independent rounding.

Sources: • 1949-1959—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*, and Energy Information Administration (EIA) estimates. • 1960-1994—EIA, State Energy Data System 1994. • 1995 and 1996—EIA, Integrated Modeling Data System output for the *Monthly Energy Review* (March 1997).

**Table 5.12b Petroleum Products Supplied to the Transportation Sector, Electric Utilities, and Total, 1949-1996**  
(Million Barrels per Day)

Year	Transportation								Electric Utilities				Total
	Aviation Gasoline	Distillate Fuel Oil	Jet Fuel	Liquefied Petroleum Gases	Lubricants	Motor Gasoline	Residual Fuel Oil	Total	Heavy Oil <sup>1</sup>	Light Oil <sup>2</sup>	Petroleum Coke	Total	
1949	0.09	0.19	0.00	(s)	0.05	2.24	0.50	3.08	0.17	0.01	0.00	0.18	5.76
1950	0.11	0.23	0.00	(s)	0.06	2.43	0.52	3.36	0.19	0.01	0.00	0.21	6.46
1951	0.15	0.27	0.00	(s)	0.07	2.64	0.56	3.69	0.16	0.01	0.00	0.18	7.02
1952	0.17	0.31	0.05	0.01	0.06	2.75	0.52	3.87	0.17	0.01	0.00	0.18	7.27
1953	0.19	0.34	0.09	0.01	0.07	2.89	0.48	4.07	0.21	0.02	0.00	0.23	7.60
1954	0.18	0.34	0.13	0.01	0.06	2.97	0.43	4.11	0.17	0.01	0.00	0.18	7.76
1955	0.19	0.37	0.15	0.01	0.07	3.22	0.44	4.46	0.19	0.01	0.00	0.21	8.46
1956	0.20	0.40	0.20	0.01	0.07	3.30	0.44	4.62	0.18	0.01	0.00	0.20	8.78
1957	0.20	0.41	0.22	0.01	0.07	3.36	0.44	4.71	0.20	0.02	0.00	0.22	8.81
1958	0.22	0.39	0.27	0.01	0.06	3.45	0.41	4.83	0.20	0.02	0.00	0.21	9.12
1959	0.21	0.41	0.33	0.01	0.07	3.59	0.39	5.01	0.22	0.02	0.00	0.24	9.53
1960	0.16	0.42	0.37	0.01	0.07	3.74	0.37	5.14	0.23	0.01	0.00	0.24	9.80
1961	0.16	0.42	0.42	0.01	0.07	3.82	0.36	5.25	0.23	0.01	0.00	0.24	9.98
1962	0.14	0.45	0.49	0.02	0.07	3.97	0.34	5.48	0.23	0.01	0.00	0.24	10.40
1963	0.14	0.50	0.52	0.02	0.07	4.11	0.33	5.68	0.24	0.01	0.00	0.26	10.74
1964	0.13	0.53	0.56	0.02	0.07	4.19	0.34	5.83	0.26	0.01	0.00	0.28	11.02
1965	0.12	0.51	0.60	0.02	0.07	4.37	0.34	6.04	0.30	0.01	0.00	0.32	11.51
1966	0.11	0.55	0.67	0.03	0.07	4.60	0.34	6.36	0.37	0.02	0.00	0.39	12.08
1967	0.09	0.54	0.82	0.03	0.06	4.76	0.36	6.66	0.42	0.02	0.00	0.44	12.56
1968	0.08	0.65	0.95	0.03	0.07	5.06	0.35	7.20	0.49	0.03	0.00	0.52	13.39
1969	0.07	0.70	0.99	0.03	0.07	5.33	0.33	7.52	0.65	0.04	0.00	0.69	14.14
1970	0.05	0.74	0.97	0.03	0.07	5.59	0.33	7.78	0.85	0.07	0.01	0.93	14.70
1971	0.05	0.80	1.01	0.04	0.07	5.83	0.31	8.09	0.99	0.09	0.01	1.09	15.21
1972	0.05	0.91	1.02	0.04	0.07	6.20	0.28	8.57	1.20	0.15	0.01	1.36	16.37
1973	0.05	1.05	1.04	0.04	0.07	6.50	0.32	9.05	1.41	0.13	0.01	1.54	17.31
1974	0.04	1.04	0.98	0.03	0.07	6.37	0.30	8.84	1.32	0.15	0.01	1.48	16.65
1975	0.04	1.00	0.99	0.03	0.07	6.51	0.31	8.95	1.28	0.11	(s)	1.39	16.32
1976	0.04	1.07	0.98	0.03	0.08	6.82	0.36	9.37	1.40	0.11	(s)	1.52	17.46
1977	0.04	1.17	1.02	0.04	0.08	7.02	0.40	9.76	1.57	0.13	(s)	1.71	18.43
1978	0.04	1.26	1.04	0.04	0.08	7.26	0.43	10.16	1.61	0.13	0.01	1.75	18.85
1979	0.04	1.37	1.07	0.02	0.09	6.90	0.54	10.01	1.35	0.08	(s)	1.44	18.51
1980	0.03	1.31	1.06	0.01	0.08	6.44	0.61	9.55	1.07	0.08	(s)	1.15	17.06
1981	0.03	1.36	1.01	0.02	0.07	6.46	0.53	9.49	0.90	0.06	(s)	0.96	16.06
1982	0.03	1.31	1.01	0.02	0.07	6.42	0.44	9.31	0.64	0.04	(s)	0.69	15.30
1983	0.03	1.37	1.05	0.03	0.07	6.51	0.36	9.41	0.63	0.05	(s)	0.68	15.23
1984	0.02	1.47	1.18	0.03	0.08	6.55	0.35	9.68	0.52	0.04	(s)	0.56	15.73
1985	0.03	1.51	1.22	0.02	0.07	6.67	0.34	9.85	0.44	0.04	(s)	0.48	15.73
1986	0.03	1.55	1.31	0.02	0.07	6.87	0.38	10.23	0.59	0.04	(s)	0.64	16.28
1987	0.02	1.59	1.38	0.02	0.08	7.04	0.39	10.53	0.50	0.04	(s)	0.55	16.67
1988	0.03	1.73	1.45	0.02	0.08	7.18	0.40	10.87	0.63	0.05	0.01	0.68	17.28
1989	0.03	1.81	1.49	0.02	0.08	7.17	0.43	11.01	0.66	0.07	0.01	0.74	17.33
1990	0.02	1.80	1.52	0.02	0.08	7.08	0.45	10.97	0.50	0.04	0.01	0.55	16.99
1991	0.02	1.73	1.47	0.02	0.07	7.04	0.45	10.80	0.47	0.04	0.01	0.52	16.71
1992	0.02	1.79	1.45	0.01	0.07	7.13	0.47	10.95	0.37	0.03	0.01	0.42	17.03
1993	0.02	1.84	1.47	0.01	0.07	7.37	0.40	11.18	0.41	0.04	0.02	0.46	17.24
1994	0.02	1.96	1.53	0.02	0.08	7.49	0.39	11.49	0.37	0.04	0.01	0.43	17.72
1995 <sup>E</sup>	0.02	<sup>R</sup> 2.00	1.51	0.02	0.08	7.67	0.38	11.68	0.24	0.04	0.01	0.29	<sup>R</sup> 17.72
1996 <sup>E</sup>	0.02	2.10	1.58	0.03	0.07	7.73	0.36	11.88	0.26	0.05	0.01	0.32	18.23

<sup>1</sup> Prior to 1980, based on oil used in steam plants. Since 1980, heavy oil has included fuel oil nos. 4, 5, and 6, and residual fuel oils.

<sup>2</sup> Prior to 1980, based on oil used in internal combustion and gas turbine engine plants. Since 1980, light oil has included fuel oil nos. 1 and 2, kerosene, and jet fuel.

<sup>R</sup>=Revised data. <sup>E</sup>=Estimate. (s)=Less than 5 thousand barrels per day.

Notes: • See Table 5.12a for the residential and commercial sector and the industrial sector. • See

Notes 1, 3, and 4 at end of section for comments on the calculation of products supplied.

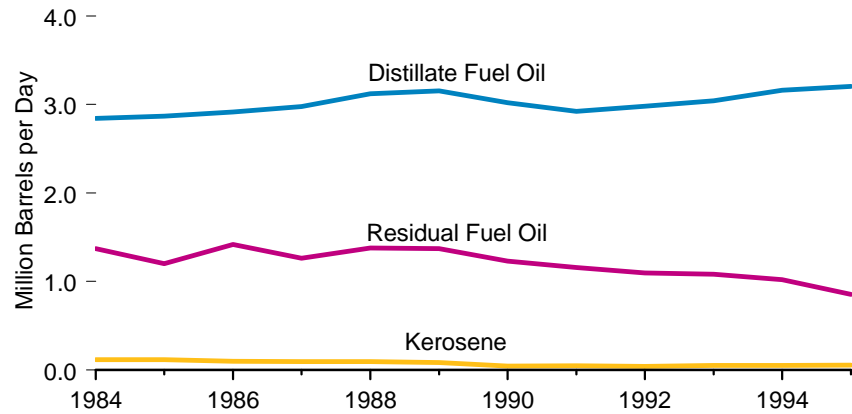
• Totals may not equal sum of components due to independent rounding.

Sources: • 1949-1959—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*, and Energy Information Administration (EIA) estimates. • 1960-1994—EIA, State Energy Data System 1994.

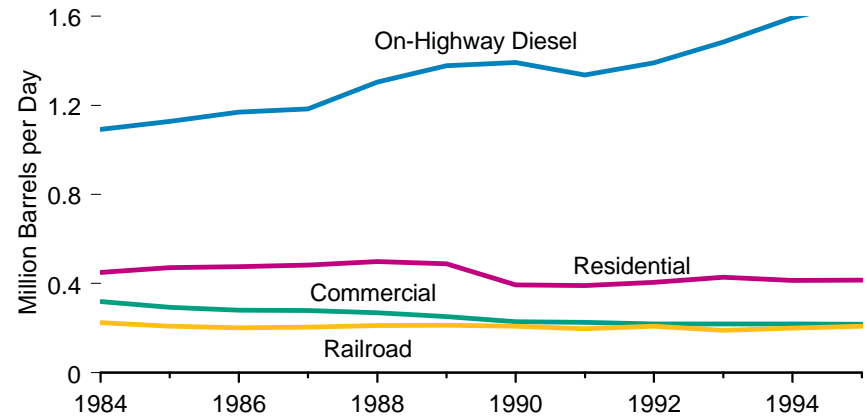
• 1995 and 1996—EIA, Integrated Modeling Data System output for the *Monthly Energy Review* (March 1997).

**Figure 5.13 Fuel Oil and Kerosene Adjusted Sales, 1984-1995**

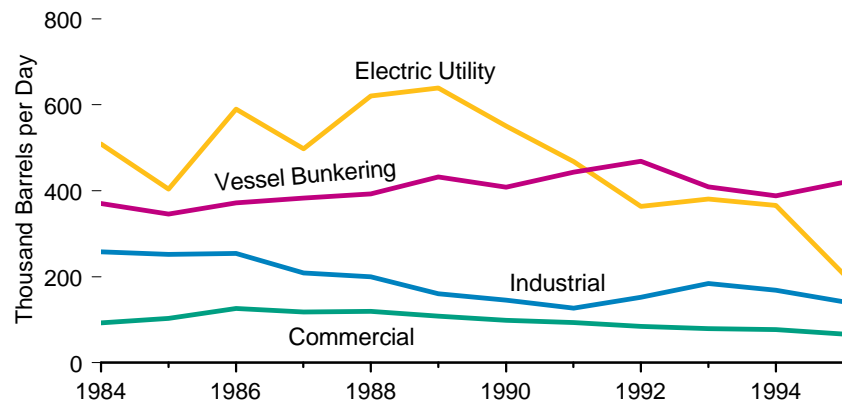
**Total by Fuel**



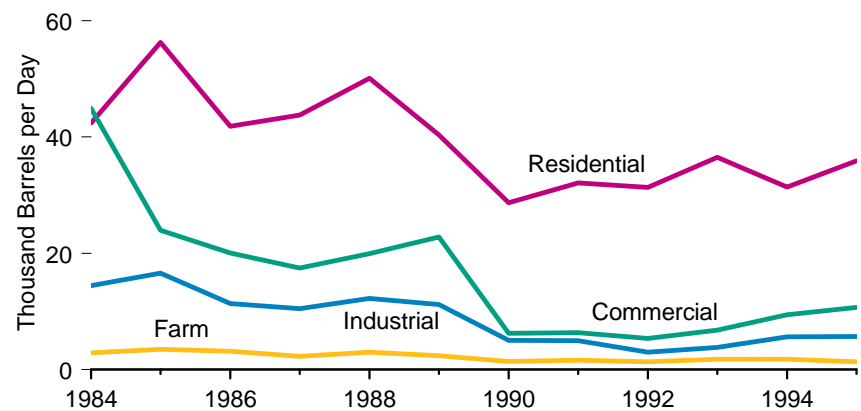
**Distillate Fuel Oil, Major End Uses**



**Residual Fuel, Major End Uses**



**Kerosene, Major End Uses**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 5.13.



**Table 5.13 Fuel Oil and Kerosene Adjusted Sales, 1984-1995**

(Thousand Barrels per Day)

Year	Residential	Commercial	Industrial	Oil Company	Farm	Electric Utility	Railroad	Vessel Bunkering	On-Highway Diesel	Military	Off-Highway Diesel	All Other	Total
Distillate Fuel Oil													
1984	450	319	153	59	193	45	225	110	1,093	45	109	44	2,845
1985	471	294	169	57	216	34	209	124	1,127	50	105	12	2,868
1986	476	280	175	49	220	40	202	133	1,169	50	111	9	2,914
1987	484	279	190	58	211	42	205	145	1,185	58	113	5	2,976
1988	498	269	170	57	223	52	212	150	1,304	64	119	4	3,122
1989	489	252	167	55	209	70	213	154	1,378	61	107	2	3,157
1990	393	228	160	63	215	48	209	143	1,393	51	116	(s)	3,021
1991	391	226	152	59	214	39	197	141	1,336	54	110	(s)	2,921
1992	406	218	144	51	228	30	209	146	1,391	42	113	(s)	2,979
1993	429	218	128	50	211	38	190	133	1,485	31	127	(s)	3,041
1994	413	218	136	46	209	49	200	132	1,594	34	130	(s)	3,162
1995	416	216	132	36	211	39	208	129	1,668	24	126	—	3,207
Residual Fuel Oil													
1984	—	92	258	76	—	509	( <sup>1</sup> )	370	—	14	—	50	1,369
1985	—	103	252	71	—	403	( <sup>1</sup> )	346	—	13	—	15	1,202
1986	—	126	254	51	—	590	( <sup>1</sup> )	371	—	<sup>E</sup> 12	—	15	1,418
1987	—	118	208	42	—	498	( <sup>1</sup> )	383	—	12	—	3	1,264
1988	—	119	200	34	—	621	( <sup>1</sup> )	392	—	9	—	4	1,378
1989	—	108	160	22	—	639	( <sup>1</sup> )	432	—	7	—	2	1,370
1990	—	98	145	21	—	550	( <sup>1</sup> )	408	—	5	—	2	1,229
1991	—	93	126	20	—	468	NA	443	—	8	—	1	1,158
1992	—	84	152	19	—	363	NA	468	—	7	—	1	1,094
1993	—	79	184	21	—	381	NA	409	—	6	—	(s)	1,080
1994	—	76	168	17	—	366	NA	388	—	4	—	(s)	1,021
1995	—	66	141	15	—	206	NA	420	—	4	—	(s)	852
Kerosene													
1984	42	45	14	—	3	—	—	—	—	—	—	11	115
1985	56	24	17	—	3	—	—	—	—	—	—	14	114
1986	42	20	11	—	3	—	—	—	—	—	—	22	98
1987	44	17	10	—	2	—	—	—	—	—	—	21	95
1988	50	20	12	—	3	—	—	—	—	—	—	11	96
1989	40	23	11	—	2	—	—	—	—	—	—	8	84
1990	29	6	5	—	1	—	—	—	—	—	—	1	43
1991	32	6	5	—	2	—	—	—	—	—	—	1	46
1992	31	5	3	—	1	—	—	—	—	—	—	(s)	41
1993	37	7	4	—	2	—	—	—	—	—	—	1	50
1994	31	9	6	—	2	—	—	—	—	—	—	1	49
1995	36	11	6	—	1	—	—	—	—	—	—	(s)	54

<sup>1</sup> Included in "All Other."

E = Annual estimate based on eleven months of data. NA=Not available. — = Not applicable. (s)=Less than 0.5 thousand barrels per day.

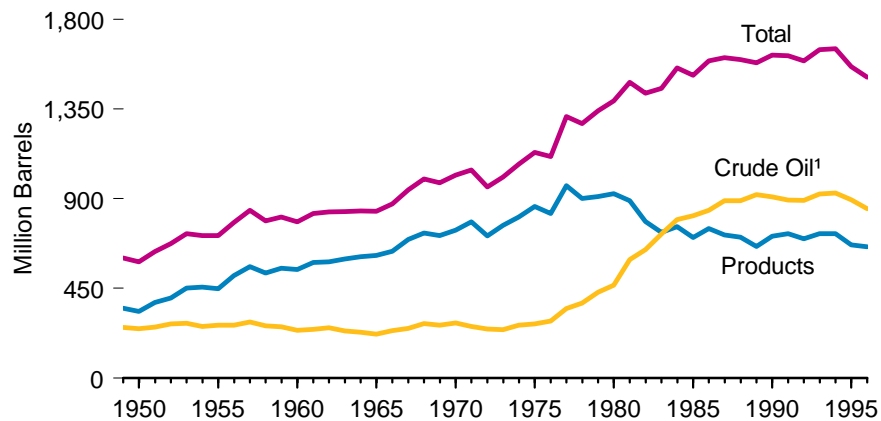
Notes: • Distillate fuel oil and kerosene data are sales data that were adjusted at the Petroleum Administration for Defense district level to equal Energy Information Administration (EIA) volume estimates of products supplied in the U.S. marketplace. The residual fuel data are sales data adjusted at the national level to equal the EIA volume estimate of residual fuel oil products supplied. Additional information is available in EIA's report *Fuel Oil and Kerosene Sales 1994* (October 1995). • Totals may not equal sum of components due to independent rounding.

Sources: **Distillate Fuel Oil and Kerosene:** • 1984—EIA, *Petroleum Marketing Annual 1988* (October 1989), Tables 13 and 15. • 1985—EIA, *Fuel Oil and Kerosene Sales 1989* (January 1991), Tables 13 and 15. • 1986—EIA, *Fuel Oil and Kerosene Sales 1990* (October 1991), Tables 13 and 15. • 1987—EIA,

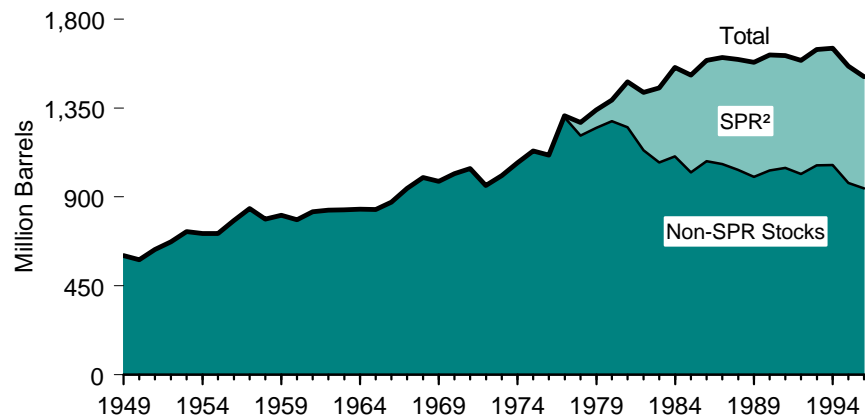
*Fuel Oil and Kerosene Sales 1991* (November 1992), Tables 13 and 15. • 1988—EIA, *Fuel Oil and Kerosene Sales 1992* (October 1993), Tables 13 and 15. • 1989—EIA, *Fuel Oil and Kerosene Sales 1993* (September 1994), Tables 13 and 15. • 1990—EIA, *Fuel Oil and Kerosene Sales 1994* (September 1995), Tables 13 and 15. • 1991 forward—EIA, *Fuel Oil and Kerosene Sales 1995* (September 1996), Tables 13 and 15. **Residual Fuel Oil:** • 1984—EIA, *Petroleum Marketing Annual 1988*, (October 1989) Table 14. • 1985—EIA, *Fuel Oil and Kerosene Sales 1989* (January 1991), Table 14. 1986—EIA, *Fuel Oil and Kerosene Sales 1990* (October 1991), Table 14. • 1987—EIA, *Fuel Oil and Kerosene Sales 1991* (November 1992), Table 14. • 1988—EIA, *Fuel Oil and Kerosene Sales 1992* (October 1993), Table 14. 1989—EIA, *Fuel Oil and Kerosene Sales 1993* (September 1994), Table 14. 1990—EIA, *Fuel Oil and Kerosene Sales 1994* (September 1995), Table 14. 1991 forward—EIA, *Fuel Oil and Kerosene Sales 1995* (September 1996), Table 14.

**Figure 5.14 Petroleum Primary Stocks by Type, End of Year**

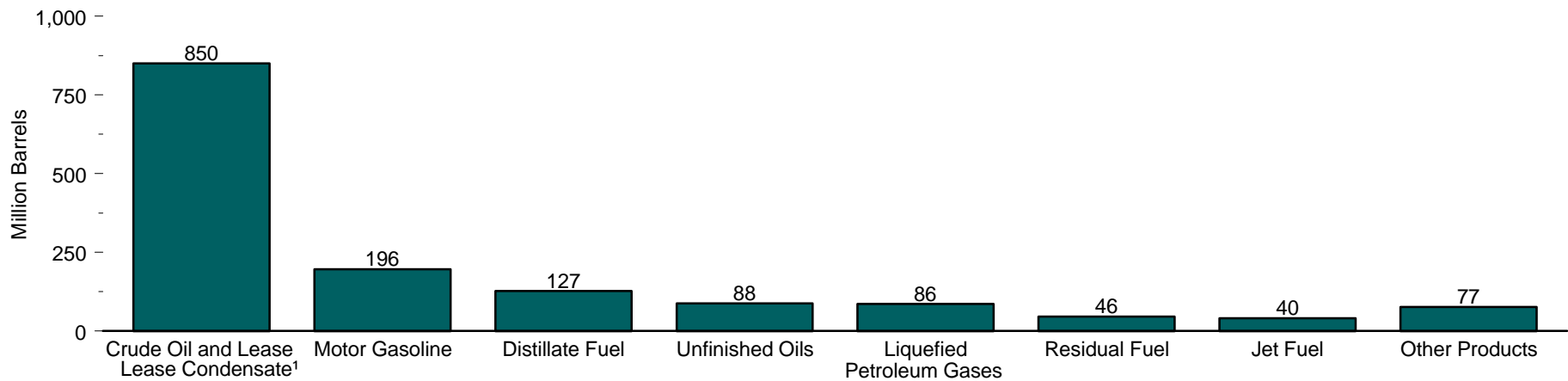
**Total, Products, and Crude Oil,<sup>1</sup> 1949-1996**



**SPR,<sup>2</sup> Non-SPR, and Total Stocks, 1949-1996**



**By Type, 1996**



<sup>1</sup> Includes crude oil stored in the Strategic Petroleum Reserve (SPR).

<sup>2</sup> See Figure 5.15 for additional Strategic Petroleum Reserve information.

Note: Because vertical scales differ, graphs should not be compared.

Sources: Tables 5.14 and 5.15.

**Table 5.14 Petroleum Primary Stocks by Type, End of Year 1949-1996**

(Million Barrels)

Year	Crude Oil and Lease Condensate			Petroleum Products										Total Petroleum
	Strategic Petroleum Reserve	Other Primary	Total	Distillate Fuel Oil		Jet Fuel	Liquefied Petroleum Gases		Motor Gasoline <sup>3</sup>	Residual Fuel Oil	Unfinished Oils	Other Products <sup>4</sup>	Total Products	
				Low Sulfur <sup>1</sup>	Total		Propane <sup>2</sup>	Total						
1949	0	253	253	NA	75	NA	( <sup>5</sup> )	1	110	60	66	37	350	603
1950	0	248	248	NA	72	NA	( <sup>5</sup> )	2	116	41	70	34	334	583
1951	0	256	256	NA	87	NA	( <sup>5</sup> )	2	135	43	67	45	378	634
1952	0	272	272	NA	99	2	( <sup>5</sup> )	3	135	49	62	53	402	674
1953	0	274	274	NA	112	3	( <sup>5</sup> )	4	158	49	69	56	451	726
1954	0	258	258	NA	108	3	( <sup>5</sup> )	7	155	52	74	57	457	715
1955	0	266	266	NA	111	3	( <sup>5</sup> )	7	165	39	68	55	449	715
1956	0	266	266	NA	134	5	( <sup>5</sup> )	14	187	44	67	63	514	780
1957	0	282	282	NA	149	5	( <sup>5</sup> )	14	197	60	69	66	560	841
1958	0	263	263	NA	125	6	( <sup>5</sup> )	16	187	60	70	63	526	789
1959	0	257	257	NA	151	8	( <sup>5</sup> )	19	188	54	67	66	552	809
1960	0	240	240	NA	138	7	( <sup>5</sup> )	23	195	45	62	76	545	785
1961	0	245	245	NA	152	8	( <sup>5</sup> )	31	184	45	79	81	580	825
1962	0	252	252	NA	144	10	( <sup>5</sup> )	25	189	50	82	83	582	834
1963	0	237	237	NA	157	9	( <sup>5</sup> )	28	191	48	82	85	598	836
1964	0	230	230	NA	156	19	( <sup>5</sup> )	30	186	40	87	92	609	839
1965	0	220	220	NA	155	19	( <sup>5</sup> )	30	175	56	89	92	616	836
1966	0	238	238	NA	154	19	( <sup>5</sup> )	35	186	61	89	91	636	874
1967	0	249	249	NA	160	22	( <sup>5</sup> )	64	200	66	90	93	695	944
1968	0	272	272	NA	173	24	( <sup>5</sup> )	76	204	67	93	89	727	1,000
1969	0	265	265	NA	172	28	( <sup>5</sup> )	60	211	58	98	88	715	980
1970	0	276	276	NA	195	28	( <sup>5</sup> )	67	209	54	99	89	741	1,018
1971	0	260	260	NA	191	28	( <sup>5</sup> )	95	219	60	101	92	784	1,044
1972	0	246	246	NA	154	25	( <sup>5</sup> )	86	213	55	95	84	713	959
1973	0	242	242	NA	196	29	( <sup>5</sup> )	99	209	53	99	80	766	1,008
1974	0	265	265	NA	200	29	( <sup>5</sup> )	113	218	60	106	82	809	1,074
1975	0	271	271	NA	209	30	( <sup>5</sup> )	125	235	74	106	82	862	1,133
1976	0	285	285	NA	186	32	( <sup>5</sup> )	116	231	72	110	78	826	1,112
1977	7	340	348	NA	250	35	( <sup>5</sup> )	136	258	90	113	82	964	1,312
1978	67	309	376	NA	216	34	( <sup>5</sup> )	132	238	90	109	82	901	1,278
1979	91	339	430	NA	229	39	( <sup>5</sup> )	111	237	96	118	82	911	1,341
1980	108	358	466	NA	205	42	( <sup>5</sup> )	120	261	92	124	82	926	1,392
1981	230	363	594	NA	192	41	( <sup>5</sup> )	135	253	78	111	80	890	1,484
1982	294	350	644	NA	179	37	( <sup>5</sup> )	94	235	66	105	70	786	1,430
1983	379	344	723	NA	140	39	( <sup>5</sup> )	101	222	49	108	72	731	1,454
1984	451	345	796	NA	161	42	58	101	243	53	94	67	760	1,556
1985	493	321	814	NA	144	40	39	74	223	50	107	67	705	1,519
1986	512	331	843	NA	155	50	63	103	233	47	94	68	750	1,593
1987	541	349	890	NA	134	50	48	97	226	47	93	70	718	1,607
1988	560	330	890	NA	124	44	50	97	228	45	100	70	707	1,597
1989	580	341	921	NA	106	41	32	80	213	44	106	70	660	1,581
1990	586	323	908	NA	132	52	49	98	220	49	99	63	712	1,621
1991	569	325	893	NA	144	49	48	92	219	50	98	72	724	1,617
1992	575	318	893	NA	141	43	39	89	216	43	95	73	699	1,592
1993	587	335	922	64	141	40	51	106	226	44	88	78	725	1,647
1994	592	337	929	73	145	47	46	99	215	42	91	84	724	1,653
1995	592	<sup>R</sup> 303	<sup>R</sup> 895	<sup>R</sup> 67	130	40	43	93	202	37	<sup>R</sup> 86	79	668	<sup>R</sup> 1,563
1996 <sup>P</sup>	566	285	850	69	127	40	43	86	196	46	88	77	659	1,510

<sup>1</sup> Sulfur content of 0.05 percent or less by weight.

<sup>2</sup> Includes propylene.

<sup>3</sup> Prior to 1964, motor gasoline data were for total gasoline, which included motor gasoline, aviation gasoline, and special naphthas. For 1981 forward, includes motor gasoline blending components.

<sup>4</sup> Kerosene, petrochemical feedstocks, lubricants, wax, petroleum coke, asphalt, road oil, pentanes plus, and miscellaneous products. Since 1964, aviation gasoline and special naphthas have been included. For 1981 forward, includes aviation gasoline blending components, hydrogen, other hydrocarbons, and alcohol.

<sup>5</sup> Included in liquefied petroleum gases total.

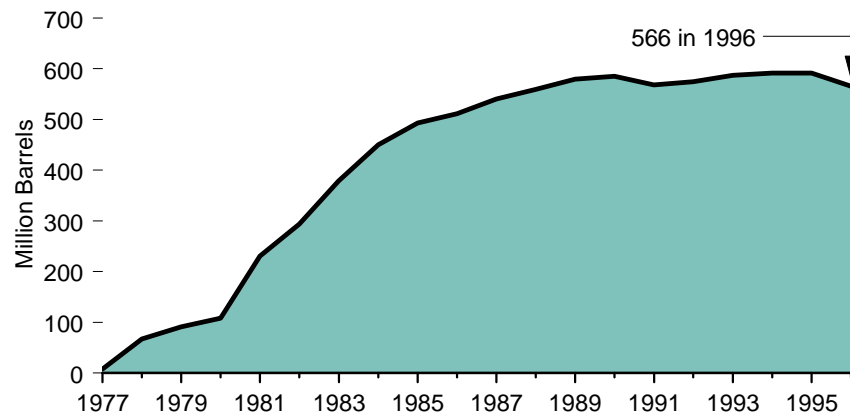
R=Revised data. P=Preliminary data. NA=Not available.

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

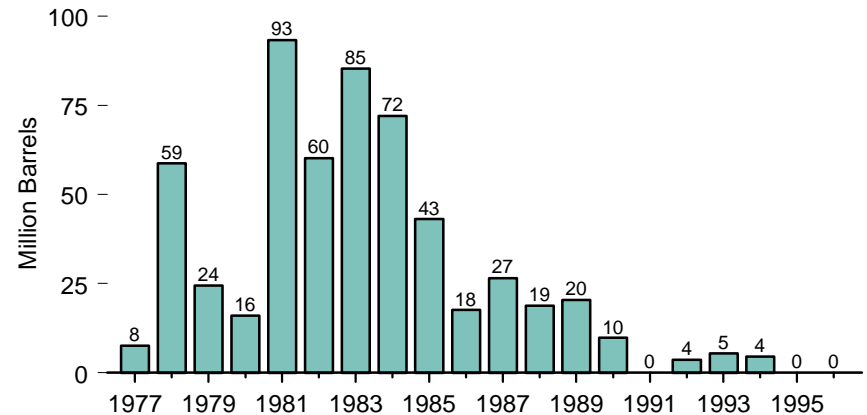
Sources: • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*.  
 • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual*.  
 • 1981-1995—EIA, *Petroleum Supply Annual*.  
 • 1996—EIA, *Petroleum Supply Monthly* (February 1997).

**Figure 5.15 Strategic Petroleum Reserve, 1977-1996**

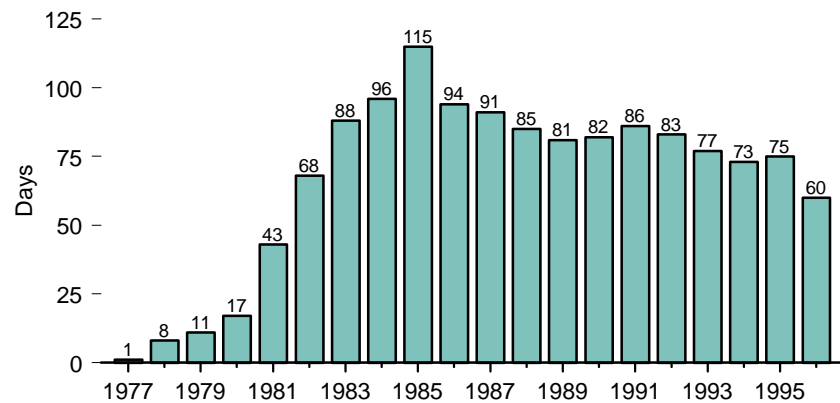
**End-of-Year Stocks in SPR**



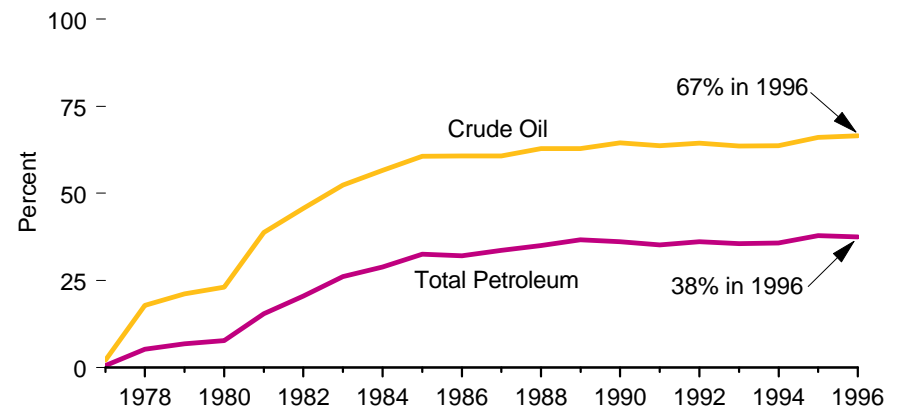
**Crude Oil Imports for SPR**



**Days of Net Petroleum Imports Stored in SPR<sup>1</sup>**



**SPR as Share of Domestic Stocks**



<sup>1</sup> Derived by dividing end-of-year Strategic Petroleum Reserve stocks by average daily net imports of all petroleum.

Notes: • SPR=Strategic Petroleum Reserve.

• Because vertical scales differ, graphs should not be compared.  
Source: Table 5.15.

**Table 5.15 Strategic Petroleum Reserve, 1977-1996**  
(Million Barrels, Except as Noted)

Year	Crude Oil Imports	Domestic Crude Oil Deliveries	Domestic Crude Oil Sales	End-of-Year Stocks			Days of Net Petroleum Imports <sup>3</sup>
				Quantity <sup>1</sup>	Share of Crude Oil <sup>2</sup> (percent)	Share of Total Petroleum Stocks (percent)	
1977	7.54	<sup>4</sup> 0.37	0.00	7.46	2.1	0.6	1
1978	58.80	0.00	0.00	66.86	17.8	5.2	8
1979	24.43	(s)	0.00	91.19	21.2	6.8	11
1980	16.07	1.30	0.00	107.80	23.1	7.7	17
1981	93.30	28.79	0.00	230.34	38.8	15.5	43
1982	60.19	3.79	0.00	293.83	45.7	20.5	68
1983	85.29	0.42	0.00	379.09	52.4	26.1	88
1984	72.04	0.05	0.00	450.51	56.6	28.9	96
1985	43.12	0.17	0.00	493.32	60.6	32.5	115
1986	17.56	1.21	0.00	511.57	60.7	32.1	94
1987	26.52	2.69	0.00	540.65	60.8	33.6	91
1988	18.76	0.01	0.00	559.52	62.9	35.0	85
1989	20.35	0.00	0.00	579.86	62.9	36.7	81
1990	9.77	0.00	3.91	585.69	64.5	36.1	82
1991	0.00	0.00	17.22	568.51	63.7	35.2	86
1992	3.59	2.60	0.00	574.72	64.4	36.1	83
1993	5.37	6.96	0.00	587.08	63.6	35.6	77
1994	4.49	0.11	0.00	591.67	63.7	35.8	73
1995	0.00	0.00	0.00	591.64	<sup>R</sup> 66.1	37.9	75
1996	0.00	0.00	25.82	565.82	66.5	37.5	60

<sup>1</sup> Stocks do not include imported quantities in transit to Strategic Petroleum Reserve terminals, pipeline fill, and above-ground storage.

<sup>2</sup> Including lease condensate stocks.

<sup>3</sup> Derived by dividing end-of-year Strategic Petroleum Reserve stocks by annual average daily net imports of all petroleum. Calculated prior to rounding.

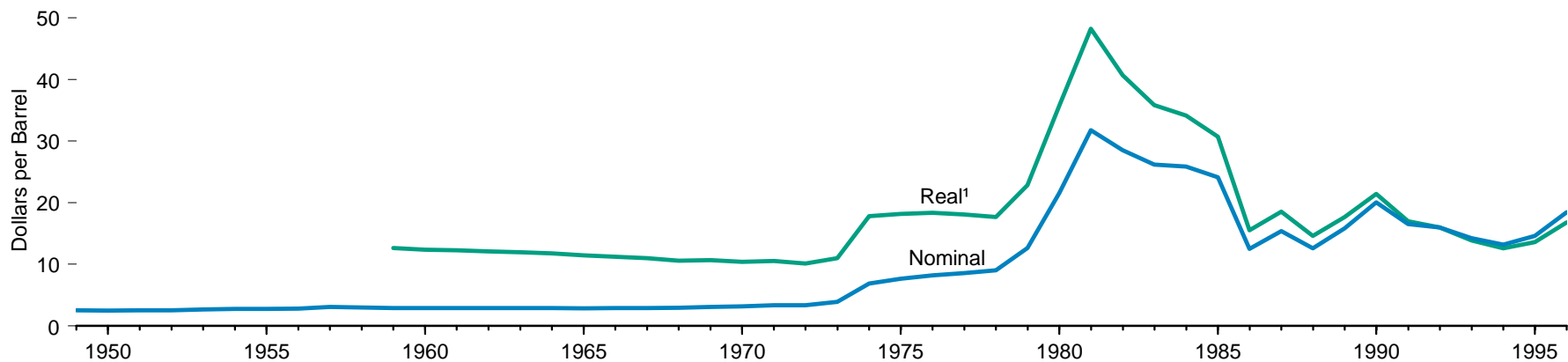
<sup>4</sup> The quantity of domestic fuel oil which was in storage prior to injection of foreign crude oil.

R=Revised data. (s)=Less than 0.005 million barrels.

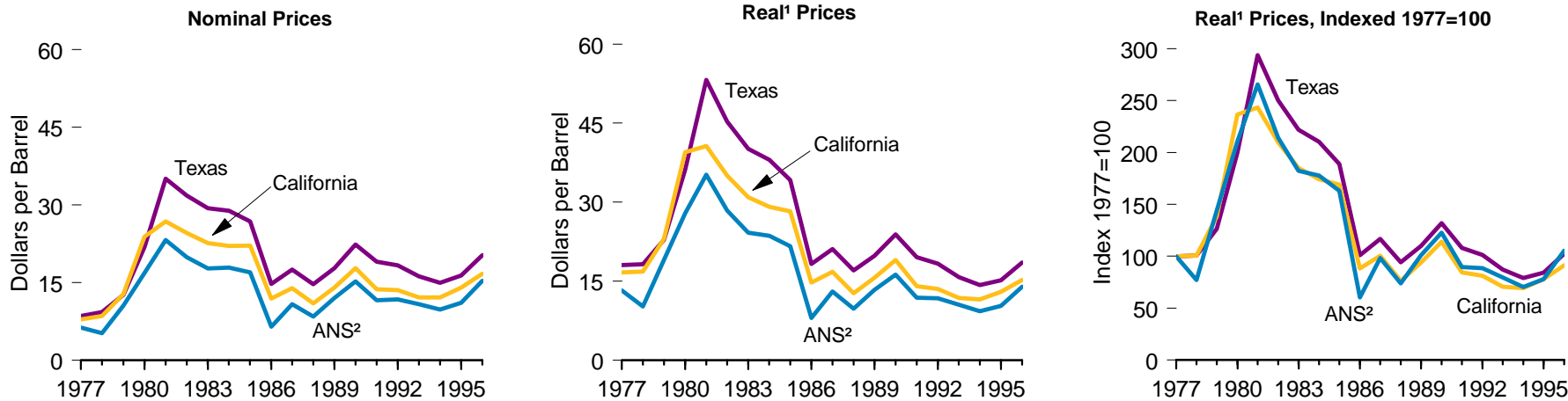
Sources: **Domestic Crude Oil Deliveries and Domestic Crude Oil Sales:** U.S. Department of Energy, Assistant Secretary for Fossil Energy, unpublished data. **All Other Data:** • 1977-1980—Energy Information Administration (EIA), Energy Data Report, *Petroleum Statement, Annual*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, *Petroleum Supply Monthly* (February 1997).

**Figure 5.16 Crude Oil Domestic First Purchase Prices**

**U.S. Average Real<sup>1</sup> and Nominal Prices, 1949-1996**



**Alaska North Slope, California, and Texas, 1977-1996**



<sup>1</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>2</sup> Alaska North Slope.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 5.16.

**Table 5.16 Crude Oil Domestic First Purchase Prices, 1949-1996**

(Dollars per Barrel)

Year	Alaska North Slope		California		Texas		U.S. Average	
	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>
1949	—	—	—	—	—	—	2.54	( <sup>2</sup> )
1950	—	—	—	—	—	—	2.51	( <sup>2</sup> )
1951	—	—	—	—	—	—	2.53	( <sup>2</sup> )
1952	—	—	—	—	—	—	2.53	( <sup>2</sup> )
1953	—	—	—	—	—	—	2.68	( <sup>2</sup> )
1954	—	—	—	—	—	—	2.78	( <sup>2</sup> )
1955	—	—	—	—	—	—	2.77	( <sup>2</sup> )
1956	—	—	—	—	—	—	2.79	( <sup>2</sup> )
1957	—	—	—	—	—	—	3.09	( <sup>2</sup> )
1958	—	—	—	—	—	—	3.01	( <sup>2</sup> )
1959	—	—	—	—	—	—	2.90	12.66
1960	—	—	—	—	—	—	2.88	12.36
1961	—	—	—	—	—	—	2.89	12.25
1962	—	—	—	—	—	—	2.90	12.13
1963	—	—	—	—	—	—	2.89	11.94
1964	—	—	—	—	—	—	2.88	11.76
1965	—	—	—	—	—	—	2.86	11.44
1966	—	—	—	—	—	—	2.88	11.21
1967	—	—	—	—	—	—	2.92	11.02
1968	—	—	—	—	—	—	2.94	10.61
1969	—	—	—	—	—	—	3.09	10.66
1970	—	—	—	—	—	—	3.18	10.39
1971	—	—	—	—	—	—	3.39	10.53
1972	—	—	—	—	—	—	3.39	10.12
1973	—	—	—	—	—	—	3.89	10.99
1974	—	—	—	—	—	—	6.87	17.84
1975	—	—	—	—	—	—	7.67	18.18
1976	—	—	—	—	—	—	8.19	18.36
1977	<sup>3</sup> 6.29	<sup>3</sup> 13.27	7.92	16.71	8.58	18.10	8.57	18.08
1978	5.21	10.22	8.58	16.82	9.29	18.22	9.00	17.65
1979	10.57	19.11	12.78	23.11	12.65	22.88	12.64	22.86
1980	16.87	27.93	23.87	39.52	21.84	36.16	21.59	35.75
1981	23.23	35.25	26.80	40.67	35.06	53.20	31.77	48.21
1982	19.92	28.42	24.58	35.06	31.77	45.32	28.52	40.68
1983	17.69	24.20	22.61	30.93	29.35	40.15	26.19	35.83
1984	17.91	23.60	22.09	29.10	28.87	38.04	25.88	34.10
1985	16.98	21.66	22.14	28.24	26.80	34.18	24.09	30.73
1986	6.45	8.00	11.90	14.76	14.73	18.28	12.51	15.52
1987	10.83	13.03	13.92	16.75	17.55	21.12	15.40	18.53
1988	8.43	9.79	10.97	12.74	14.71	17.08	12.58	14.61
1989	12.00	13.38	14.06	15.67	17.81	19.86	15.86	17.68
1990	15.23	16.27	17.81	19.03	22.37	23.90	20.03	21.40
1991	11.57	11.89	13.72	14.10	19.04	19.57	16.54	17.00
1992	11.73	11.73	13.55	13.55	18.32	18.32	15.99	15.99
1993	10.84	10.57	12.11	11.80	16.19	15.78	14.25	13.89
1994	9.77	<sup>R</sup> 9.31	12.12	<sup>R</sup> 11.55	14.98	<sup>R</sup> 14.28	13.19	<sup>R</sup> 12.57
1995	11.12	<sup>R</sup> 10.33	14.00	<sup>R</sup> 13.01	<sup>R</sup> 16.38	<sup>R</sup> 15.22	14.62	<sup>R</sup> 13.59
1996 <sup>P</sup>	15.32	13.97	16.71	15.23	20.31	18.51	18.46	16.83

<sup>1</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>2</sup> For 1949-1958, the gross domestic product implicit price deflators, which are used to convert nominal dollars to real (inflation-adjusted) values, were not available in time to use in this report.

<sup>3</sup> Average for July through December only.

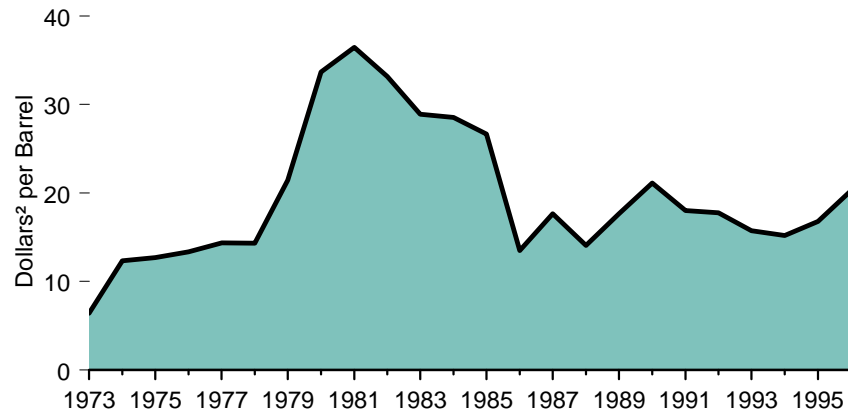
R=Revised data. P=Preliminary data. — = Not applicable.

Note: For the definition of crude oil domestic first purchase prices, see Note 5 at end of section.

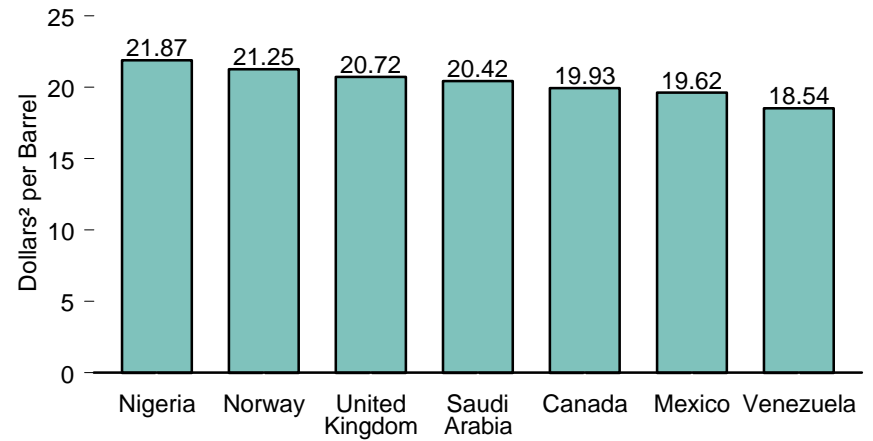
Sources: • 1949-1973—Bureau of Mines, *Minerals Yearbook*, "Crude Petroleum and Petroleum Products" chapter. • 1974 through January 1976—Federal Energy Administration (FEA), Form FEA-90, "Crude Petroleum Production Monthly Report." • February 1976 through September 1979—FEA, Form FEA-P-124, "Domestic Crude Oil Purchaser's Monthly Report." • October 1979 through 1982—Economic Regulatory Administration, Form ERA-182, "Domestic Crude Oil First Purchase Report." • 1983 forward—Energy Information Administration, Form EIA-182, "Domestic Crude Oil First Purchase Report."

**Figure 5.17 Landed Costs of Crude Oil Imports From Selected Countries**

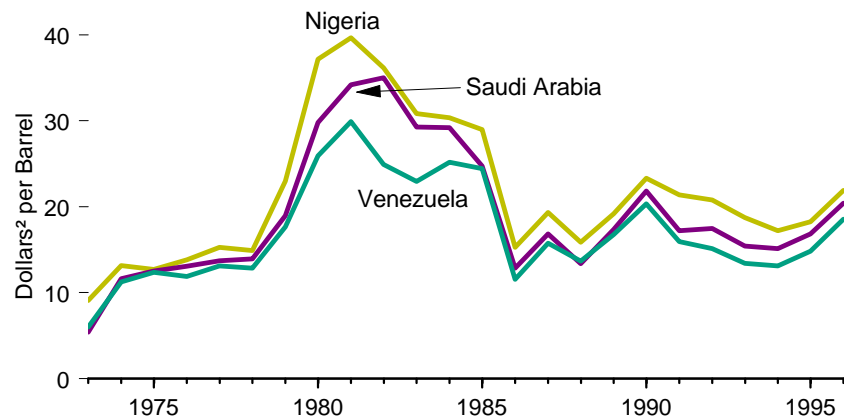
**Total, 1973<sup>1</sup>-1996**



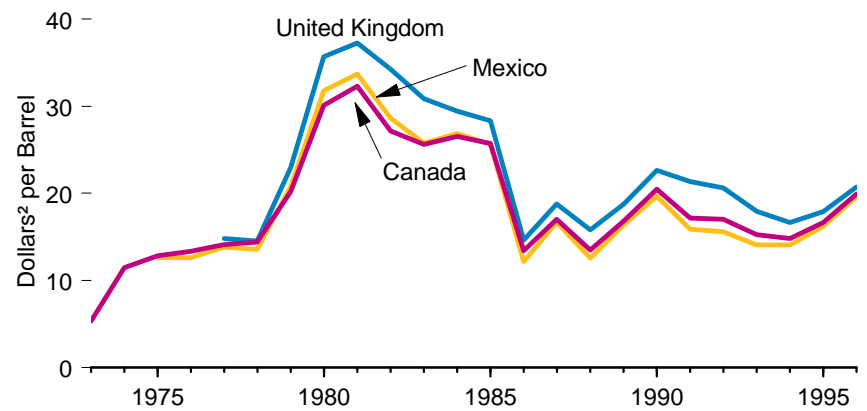
**By Selected Country, 1996**



**By Selected OPEC Country, 1973<sup>1</sup>-1996**



**By Selected Non-OPEC Country, 1973<sup>1</sup>-1996**



<sup>1</sup> Based on October, November, and December data only.

<sup>2</sup> Nominal dollars.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 5.17.



**Table 5.17 Landed Costs of Crude Oil Imports From Selected Countries, 1973-1996**

(Dollars<sup>1</sup> per Barrel)

Year	Persian Gulf Nations	Selected OPEC <sup>2</sup> Countries					Selected Non-OPEC Countries						Total	
		Kuwait	Nigeria	Saudi Arabia	Venezuela	Total OPEC <sup>3</sup>	Angola	Canada	Colombia	Mexico	Norway	United Kingdom		Total Non-OPEC
1973 <sup>4</sup>	5.91	NA	9.08	5.37	5.99	6.85	NA	5.33	NA	NA	NA	NA	5.76	6.41
1974	12.21	NA	13.16	11.63	11.25	12.49	12.48	11.48	NA	W	NA	NA	11.91	12.32
1975	12.64	NA	12.70	12.50	12.36	12.70	11.81	12.84	NA	12.61	12.80	NA	12.65	12.70
1976	13.03	NA	13.81	13.06	11.89	13.32	12.71	13.36	NA	12.64	13.74	W	13.30	13.32
1977	13.85	NA	15.29	13.69	13.11	14.35	14.04	14.13	NA	13.82	14.93	14.83	14.36	14.36
1978	14.01	NA	14.88	13.94	12.84	14.34	14.07	14.41	NA	13.56	14.68	14.53	14.34	14.35
1979	20.42	NA	22.97	18.95	17.65	21.29	21.06	20.22	NA	20.77	22.55	22.97	22.15	21.45
1980	30.59	NA	37.15	29.80	25.92	33.56	34.76	30.11	NA	31.77	36.82	35.68	34.02	33.67
1981	34.61	NA	39.66	34.20	29.91	36.60	36.84	32.32	NA	33.70	38.70	37.29	36.14	36.47
1982	34.94	NA	36.16	34.99	24.93	34.81	33.08	27.15	NA	28.63	34.70	34.25	31.47	33.18
1983	29.37	NA	30.85	29.27	22.94	29.84	29.31	25.63	NA	25.78	30.72	30.87	28.08	28.93
1984	29.07	NA	30.36	29.20	25.19	29.06	28.49	26.56	NA	26.85	30.05	29.45	28.14	28.54
1985	25.50	NA	28.96	24.72	24.43	26.86	27.39	25.71	NA	25.63	28.32	28.36	26.53	26.67
1986	12.92	11.70	15.29	12.84	11.52	13.46	14.09	13.43	12.85	12.17	15.98	14.63	13.52	13.49
1987	17.47	18.14	19.32	16.81	15.76	17.64	18.20	17.04	18.43	16.69	19.10	18.78	17.66	17.65
1988	13.51	12.84	15.88	13.37	13.66	14.18	14.48	13.50	14.47	12.58	15.43	15.82	13.96	14.08
1989	17.37	16.90	19.19	17.34	16.78	17.78	18.36	16.81	18.10	16.35	19.06	18.74	17.54	17.68
1990	20.55	17.01	23.33	21.82	20.31	21.23	21.51	20.48	22.34	19.64	21.11	22.65	20.98	21.13
1991	17.34	18.48	21.39	17.22	15.92	18.08	19.90	17.16	19.55	15.89	21.44	21.37	17.93	18.02
1992	17.58	16.99	20.78	17.48	15.13	17.81	19.36	17.04	18.46	15.60	20.90	20.63	17.67	17.75
1993	15.26	14.23	18.73	15.40	13.39	15.68	17.40	15.27	16.54	14.11	18.99	17.92	15.78	15.72
1994	15.00	14.49	17.21	15.11	13.12	15.08	16.36	14.83	15.80	14.09	17.09	16.64	15.29	15.18
1995	16.78	16.47	<sup>R</sup> 18.25	<sup>R</sup> 16.84	<sup>R</sup> 14.81	<sup>R</sup> 16.61	17.66	<sup>R</sup> 16.65	17.45	16.19	18.06	17.91	16.95	<sup>R</sup> 16.78
1996 <sup>P</sup>	20.38	20.29	21.87	20.42	18.54	20.18	21.69	19.93	22.02	19.62	21.25	20.72	20.33	20.26

<sup>1</sup> Nominal dollars.

<sup>2</sup> Organization of Petroleum Exporting Countries (OPEC). See Glossary for current membership.

<sup>3</sup> Ecuador, which withdrew from OPEC on December 31, 1992, is included through 1992. In June 1996, OPEC retroactively ended Gabon's membership in OPEC effective December 31, 1994. However, data for Gabon are still included here for 1995 and 1996. Total OPEC imports exclude petroleum imported into the United States indirectly from OPEC countries, primarily from Caribbean and West European refining areas, as petroleum products that were refined from crude oil produced in OPEC countries.

<sup>4</sup> Based on October, November, and December data only.

R=Revised data. P=Preliminary data. NA=Not available, included in "Total Non-OPEC." W=Value

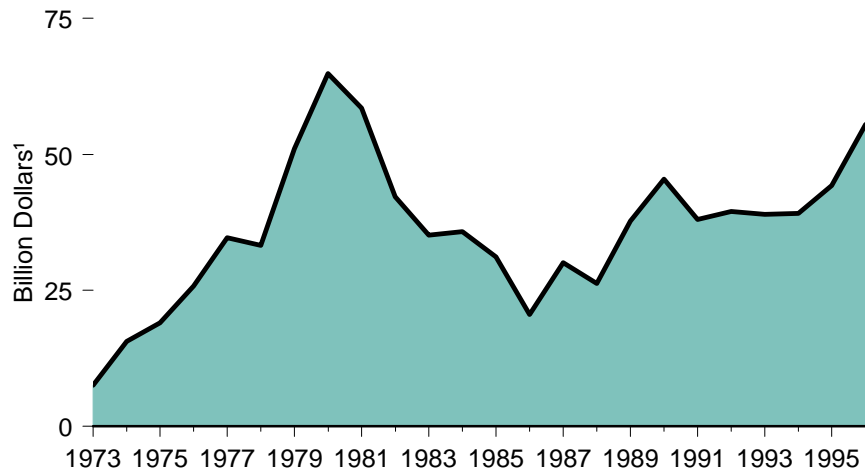
withheld to avoid disclosure of individual company data.

Notes: • Data include imports for the Strategic Petroleum Reserve, which began in 1977. • Totals may not equal sum of components due to independent rounding.

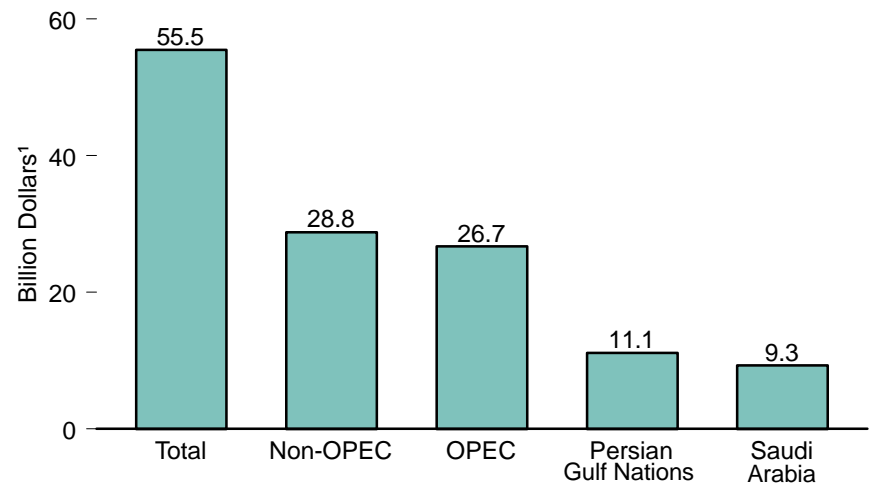
Sources: • 1973 through September 1977—Federal Energy Administration, Form FEA-F701-M-0, "Transfer Pricing Report." • October 1977 through January 1979—Energy Information Administration (EIA), Form FEA-F701-M-0, "Transfer Pricing Report." • February 1979 through September 1982—EIA, Form ERA-51, "Transfer Pricing Report." • October 1982 through June 1984—EIA, Form EP-51, "Foreign Crude Oil Transaction Report." • July 1984 forward—EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report."

**Figure 5.18 Value of Crude Oil Imports**

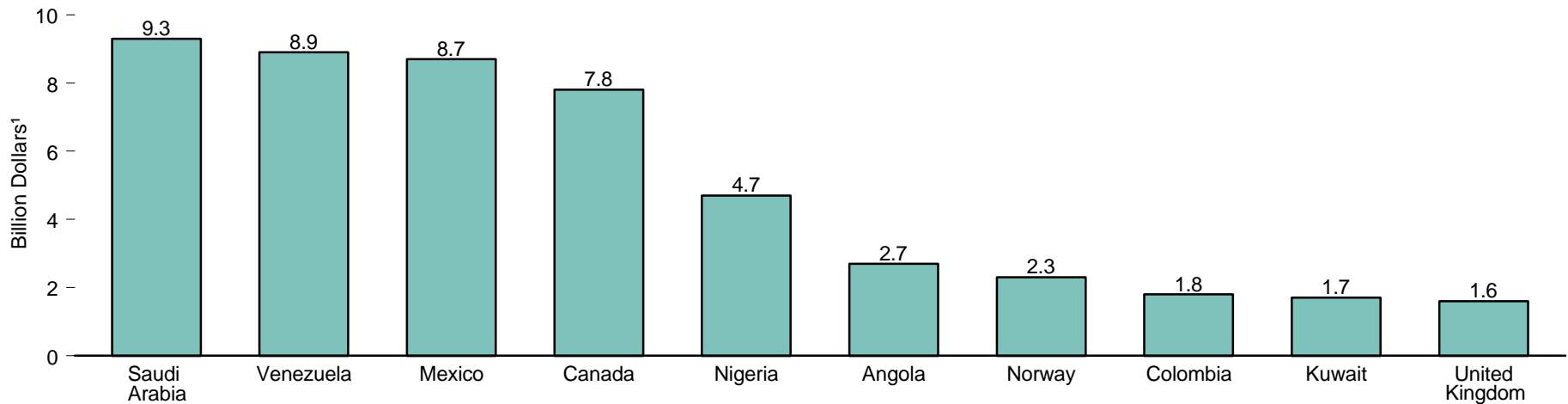
**Total, 1973-1996**



**Totals, 1996**



**By Selected Country, 1996**



<sup>1</sup>Nominal Dollars.

Notes: • OPEC = Organization of Petroleum Exporting Countries. • Because vertical scales differ, graphs should not be compared.

Source: Table 5.18.

**Table 5.18 Value of Crude Oil Imports From Selected Countries, 1973-1996**  
(Billion Dollars<sup>1</sup>)

Year	Persian Gulf Nations	Selected OPEC <sup>2</sup> Countries					Selected Non-OPEC Countries							Total <sup>4</sup>
		Kuwait	Nigeria	Saudi Arabia	Venezuela	Total OPEC <sup>3</sup>	Angola	Canada	Colombia	Mexico	Norway	United Kingdom	Total Non-OPEC	
1973	1.7	NA	1.5	0.9	0.8	5.2	NA	1.9	NA	NA	NA	NA	2.4	7.6
1974	4.4	NA	3.3	1.9	1.3	11.6	0.2	3.3	NA	W	NA	NA	4.1	15.6
1975	5.2	NA	3.5	3.2	1.8	14.9	0.3	2.8	NA	0.3	0.1	NA	4.1	19.0
1976	8.7	NA	5.1	5.8	1.0	22.2	(s)	1.8	NA	0.4	0.2	W	3.6	25.8
1977	12.2	NA	6.3	6.9	1.2	29.6	0.1	1.4	NA	0.9	0.3	0.5	5.1	34.7
1978	11.3	NA	4.9	5.8	0.8	27.1	(s)	1.3	NA	1.6	0.6	0.9	6.2	33.3
1979	15.3	NA	9.0	9.3	1.9	39.7	0.3	2.0	NA	3.3	0.6	1.7	11.3	51.0
1980	16.9	NA	11.4	13.6	1.5	47.5	0.5	2.2	NA	5.9	1.9	2.3	17.4	64.9
1981	15.1	NA	8.8	13.9	1.6	39.0	0.6	1.9	NA	5.8	1.6	5.0	19.5	58.5
1982	8.4	NA	6.7	6.8	1.4	22.0	0.5	2.1	NA	6.7	1.3	5.5	20.2	42.2
1983	4.3	NA	3.4	3.4	1.4	16.1	0.8	2.6	NA	7.2	0.7	4.1	19.1	35.2
1984	4.8	NA	2.3	3.3	2.3	16.1	0.9	3.3	NA	6.5	1.2	4.1	19.7	35.8
1985	2.3	NA	3.0	1.2	2.7	12.9	1.0	4.4	NA	6.7	0.3	2.9	18.3	31.2
1986	3.8	0.1	2.4	2.9	1.8	10.4	0.5	2.8	0.3	2.8	0.3	1.7	10.2	20.6
1987	6.0	0.5	3.7	3.9	2.8	15.5	1.2	3.8	0.8	3.7	0.5	2.1	14.7	30.1
1988	6.7	0.4	3.5	4.4	2.2	14.0	1.1	3.4	0.6	3.1	0.3	1.5	12.3	26.3
1989	11.0	1.0	5.6	7.1	3.0	21.9	1.9	3.9	0.9	4.3	0.9	1.1	15.8	37.7
1990	13.5	0.5	6.7	9.5	4.9	27.2	1.9	4.8	1.1	4.9	0.7	1.3	18.2	45.5
1991	11.0	(s)	5.3	10.7	3.9	22.3	1.8	4.7	0.9	4.4	0.6	0.8	15.7	38.0
1992	10.5	0.2	5.1	10.2	4.6	22.2	2.4	5.0	0.7	4.5	0.9	1.5	17.3	39.5
1993	9.1	1.8	4.9	7.2	4.9	20.7	2.1	5.0	0.9	4.4	0.9	2.0	18.3	38.9
1994	8.8	1.6	3.9	7.2	5.0	19.7	1.9	5.3	0.8	4.8	1.2	2.4	19.4	39.1
1995	9.1	1.3	4.1	<sup>R</sup> 7.7	6.2	<sup>R</sup> 21.6	2.3	6.3	1.3	6.1	1.7	2.2	22.6	44.3
1996 <sup>P</sup>	11.1	1.7	4.7	9.3	8.9	26.7	2.7	7.8	1.8	8.7	2.3	1.6	28.8	55.5

<sup>1</sup> Nominal dollars.

<sup>2</sup> Organization of Petroleum Exporting Countries. See Glossary for current membership.

<sup>3</sup> Ecuador, which withdrew from OPEC on December 31, 1992, is included through 1992. In June 1996, OPEC retroactively ended Gabon's membership in OPEC effective December 31, 1994. However, data for Gabon are still included here for 1995 and 1996. Total OPEC imports exclude petroleum imported into the United States indirectly from OPEC countries, primarily from Caribbean and West European refining areas, as petroleum products that were refined from crude oil produced in OPEC countries.

<sup>4</sup> Data shown here represent landed value; they differ from data in Table 3.7, which are data from U.S. Customs that represent crude oil value at the port of loading.

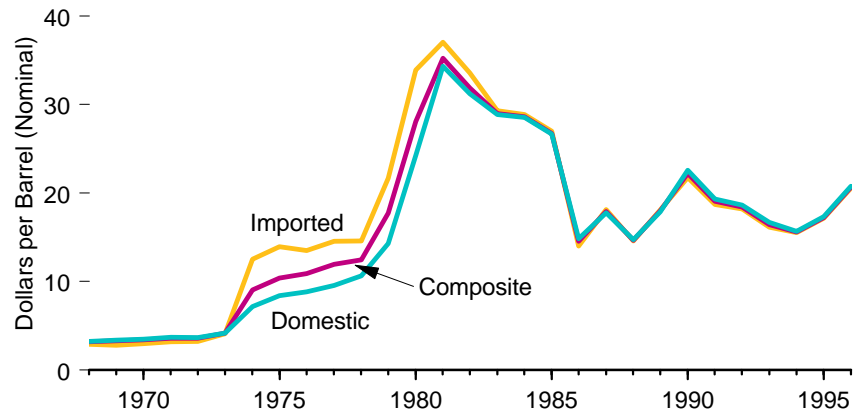
R=Revised data. P=Preliminary data. NA=Not available, included in "Total Non-OPEC." W=Value withheld to avoid disclosure of individual company data. (s)=Less than \$0.05 billion.

Note: Because the volumes associated with the landed costs are not the same as those used in the calculation of this table, the value of imports do not sum. The values were calculated independently.

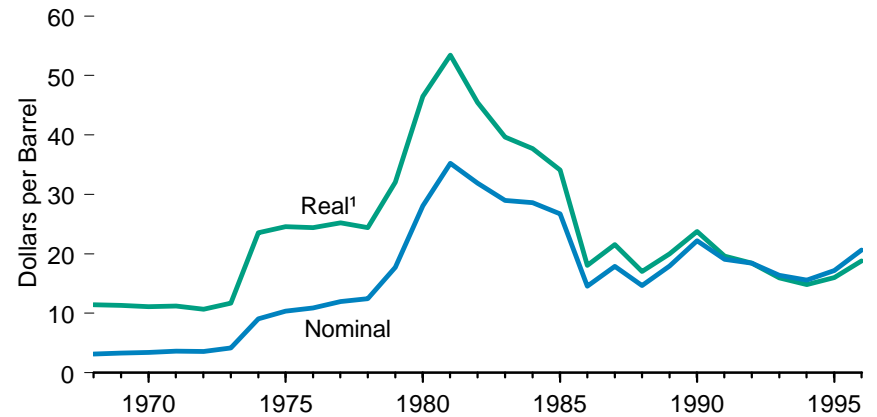
Sources: Calculated by using prices on Table 5.17 and volume data as follows: • 1973-1975—U.S. Department of the Interior, Bureau of Mines, *Petroleum Statement, Annual*. • 1976-1980—Energy Information Administration (EIA), *Petroleum Statement, Annual*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, *Petroleum Supply Monthly* (March 1997).

**Figure 5.19 Crude Oil Refiner Acquisition Costs, 1968-1996**

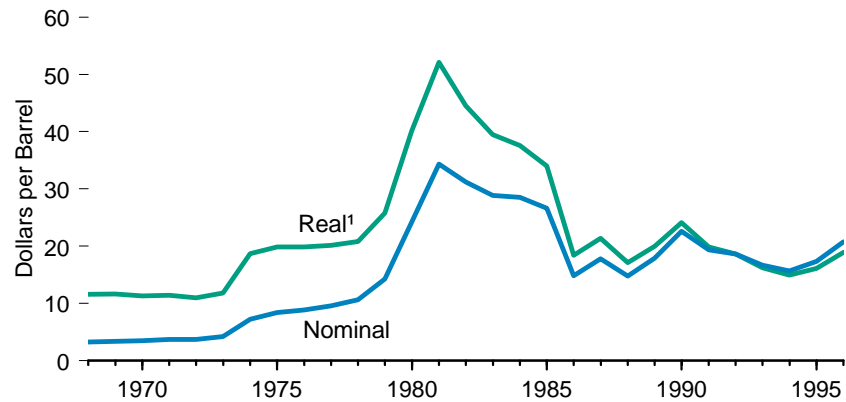
**Summary**



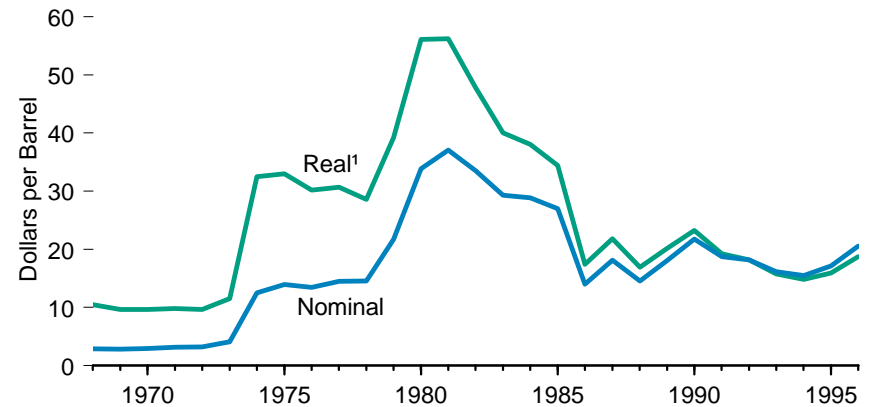
**Composite Costs**



**Domestic Costs**



**Imported Costs**



<sup>1</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

Note: Because vertical scales differ, graphs should not be compared.  
Source: Table 5.19.

**Table 5.19 Crude Oil Refiner Acquisition Costs, 1968-1996**  
(Dollars per Barrel)

Year	Domestic		Imported		Composite	
	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>	Nominal	Real <sup>1</sup>
1968	3.21	11.59	2.90	10.47	3.17	11.44
1969	3.37	11.62	2.80	9.66	3.29	11.34
1970	3.46	11.31	2.96	9.67	3.40	11.11
1971	3.68	11.43	3.17	9.84	3.60	11.18
1972	3.67	10.96	3.22	9.61	3.58	10.69
1973	4.17	11.78	4.08	11.53	4.15	11.72
1974	7.18	18.65	12.52	32.52	9.07	23.56
1975	8.39	19.88	13.93	33.01	10.38	24.60
1976	8.84	19.82	13.48	30.22	10.89	24.42
1977	9.55	20.15	14.53	30.65	11.96	25.23
1978	10.61	20.80	14.57	28.57	12.46	24.43
1979	14.27	25.80	21.67	39.19	17.72	32.04
1980	24.23	40.12	33.89	56.11	28.07	46.47
1981	34.33	52.09	37.05	56.22	35.24	53.47
1982	31.22	44.54	33.55	47.86	31.87	45.46
1983	28.87	39.49	29.30	40.08	28.99	39.66
1984	28.53	37.59	28.88	38.05	28.63	37.72
1985	26.66	34.01	26.99	34.43	26.75	34.12
1986	14.82	18.39	14.00	17.37	14.55	18.05
1987	17.76	21.37	18.13	21.82	17.90	21.54
1988	14.74	17.12	14.56	16.91	14.67	17.04
1989	17.87	19.92	18.08	20.16	17.97	20.03
1990	22.59	24.13	21.76	23.25	22.22	23.74
1991	19.33	19.87	18.70	19.22	19.06	19.59
1992	18.63	18.63	18.20	18.20	18.43	18.43
1993	16.67	16.25	16.14	15.73	16.41	15.99
1994	15.67	<sup>R</sup> 14.94	15.51	<sup>R</sup> 14.79	15.59	<sup>R</sup> 14.86
1995	17.33	<sup>R</sup> 16.11	<sup>R</sup> 17.14	15.93	17.23	<sup>R</sup> 16.01
1996 <sup>P</sup>	20.75	18.92	20.55	18.73	20.65	18.82

<sup>1</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

R=Revised data. P=Preliminary data.

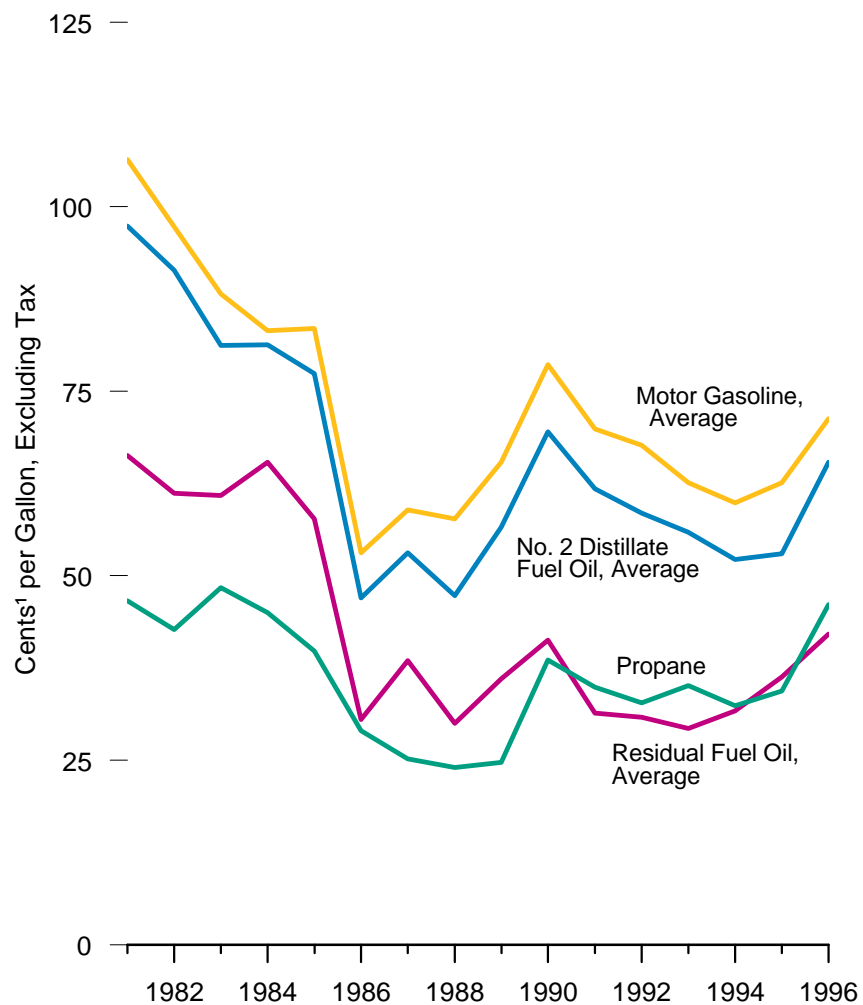
Note: Refiner acquisition cost of crude oil for each category and for the composite is derived by dividing the sum of the total purchasing (acquisition) costs of all refiners by the total volume of all refiners' purchases.

Sources: • 1968-1973—Estimated. See Note 6 at end of section. • 1974 through January

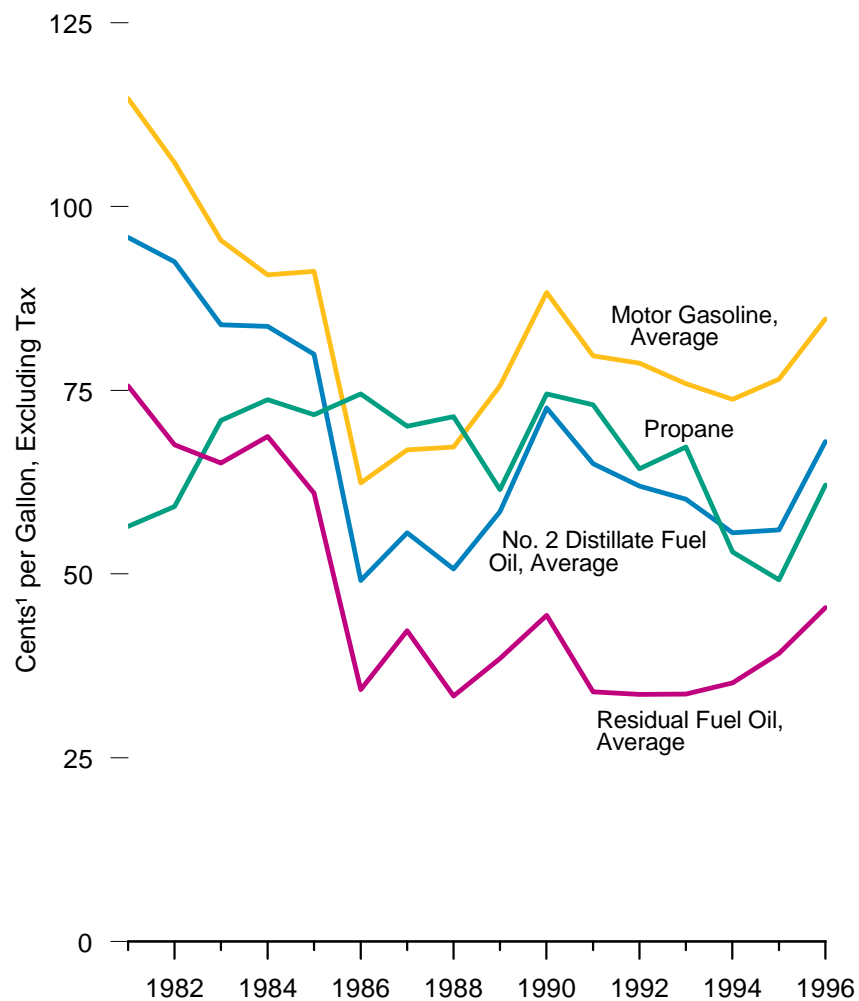
1976—Federal Energy Administration (FEA), Form FEA-96, "Monthly Cost Allocation Report." • February 1976 through September 1977—FEA, Form FEA-P110-M-1, "Refiners' Monthly Cost Allocation Report." • October 1977 through June 1978—Energy Information Administration (EIA), Form FEA-P110-M-1, "Refiners' Monthly Cost Allocation Report." • July 1978 through December 1980—EIA, Form ERA-49, "Domestic Crude Oil Entitlements Program Refiners Monthly Report." • 1981 forward—EIA, Form EIA-14, "Refiners' Monthly Cost Report."

**Figure 5.20 Refiner Sales Prices of Selected Petroleum Products, 1981-1996**

**To Resellers**



**To End Users**



<sup>1</sup> Nominal dollars.

Source: Table 5.20.

**Table 5.20 Refiner Sales Prices and Refiner Margins of Selected Petroleum Products, 1981-1996**

(Cents<sup>1</sup> per Gallon, Excluding Taxes)

Product	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996 <sup>P</sup>
<b>Sales Prices to Resellers:<sup>2</sup></b>																
Aviation Gasoline .....	125.0	122.8	117.8	116.5	113.0	91.2	85.9	85.0	95.0	106.3	100.1	99.1	96.5	93.3	97.5	105.5
Motor Gasoline .....	106.4	97.3	88.2	83.2	83.5	53.1	58.9	57.7	65.4	78.6	69.9	67.7	62.6	59.9	62.6	71.3
Leaded Regular .....	NA	NA	85.0	79.5	79.3	50.1	56.5	54.8	63.1	75.4	65.7	69.3	NA	NA	NA	NA
Unleaded Regular .....	NA	NA	89.5	84.2	84.3	52.2	56.9	54.8	61.8	75.8	67.2	64.5	59.3	56.6	59.3	68.5
Unleaded Midgrade .....	NA	NA	NA	NA	NA	NA	NA	NA	68.6	81.4	73.3	70.8	66.0	63.8	67.0	76.0
Premium .....	NA	NA	96.4	91.6	92.2	61.0	67.1	67.2	74.9	87.4	79.2	77.4	72.2	69.5	72.2	80.3
Kerosene .....	106.6	101.8	89.2	91.6	87.4	60.6	59.2	54.9	66.9	83.9	72.2	63.2	60.4	61.8	58.0	71.3
Jet Fuel, Kerosene-Type .....	101.2	95.3	85.4	83.0	79.4	49.5	53.8	49.5	58.3	77.3	65.0	60.5	57.7	53.4	53.9	64.6
No. 1 Distillate Fuel Oil .....	107.1	103.8	89.6	89.2	86.3	57.9	59.9	54.9	66.8	83.8	73.0	65.2	64.6	61.5	62.5	75.1
No. 2 Distillate Fuel Oil .....	97.4	91.4	81.2	81.3	77.4	47.0	53.1	47.3	56.6	69.5	61.8	58.5	55.9	52.2	53.0	65.4
No. 2 Fuel Oil .....	97.6	91.4	81.5	82.1	77.6	48.6	52.7	47.3	56.5	69.7	62.2	57.9	54.4	50.6	51.1	63.9
No. 2 Diesel Oil .....	97.2	91.4	80.8	80.3	77.2	45.2	53.4	47.3	56.7	69.4	61.5	59.1	57.0	52.9	53.8	65.9
No. 4 Distillate Fuel Oil <sup>3</sup> .....	78.3	73.7	72.6	70.7	67.2	40.9	46.2	42.5	48.0	59.0	55.6	49.5	48.8	46.2	46.3	60.3
Residual Fuel Oil .....	66.3	61.2	60.9	65.4	57.7	30.5	38.5	30.0	36.0	41.3	31.4	30.8	29.3	31.7	<sup>R</sup> 36.3	42.1
1% or Less Sulfur Content .....	74.8	69.5	64.3	68.5	61.0	32.8	41.2	33.3	40.7	47.2	36.4	35.1	33.7	34.5	<sup>R</sup> 38.3	45.7
Greater than 1% Sulfur Content .....	62.2	57.2	59.1	63.9	56.0	28.9	36.2	27.1	33.1	37.2	29.2	28.6	25.6	28.7	33.8	39.1
Propane (Consumer Grade) .....	46.6	42.7	48.4	45.0	39.8	29.0	25.2	24.0	24.7	38.6	34.9	32.8	35.1	32.4	34.4	46.1
<b>Sale Prices to End Users:<sup>2</sup></b>																
Aviation Gasoline .....	130.3	131.2	125.5	123.4	120.1	101.1	90.7	89.1	99.5	112.0	104.7	102.7	99.0	95.7	100.5	111.1
Motor Gasoline .....	114.7	106.0	95.4	90.7	91.2	62.4	66.9	67.3	75.6	88.3	79.7	78.7	75.9	73.8	76.5	84.7
Leaded Regular .....	NA	NA	90.6	84.8	84.2	57.3	61.8	61.9	71.0	83.1	71.5	78.5	NA	NA	NA	NA
Unleaded Regular .....	NA	NA	97.0	91.5	91.7	61.6	65.0	64.1	71.4	84.9	76.1	74.3	71.2	68.9	71.7	80.6
Unleaded Midgrade .....	NA	NA	NA	NA	NA	NA	NA	NA	79.2	92.1	84.3	82.7	80.5	78.5	80.8	89.6
Premium .....	NA	NA	105.7	101.5	102.3	73.7	78.4	78.8	86.7	98.5	90.7	91.4	88.9	86.5	89.0	97.2
Kerosene .....	112.3	108.9	96.1	103.6	103.0	79.0	77.0	73.8	70.9	92.3	83.8	78.8	75.4	66.0	58.9	71.6
Jet Fuel, Kerosene-Type .....	102.4	96.3	87.8	84.2	79.6	52.9	54.3	51.3	59.2	76.6	65.2	61.0	58.0	53.4	54.0	65.1
No. 1 Distillate Fuel Oil .....	103.9	102.3	96.2	92.7	88.0	62.0	60.4	56.4	66.1	81.9	74.0	66.6	66.6	64.0	62.0	72.6
No. 2 Distillate Fuel Oil .....	95.8	92.5	83.9	83.7	79.9	49.1	55.6	50.7	58.5	72.6	65.0	62.0	60.2	55.6	56.0	68.0
No. 2 Fuel Oil .....	91.4	90.5	91.6	91.6	84.9	56.0	58.1	54.4	58.7	73.4	66.5	62.7	60.2	57.2	<sup>R</sup> 56.2	67.2
No. 2 Diesel Oil .....	99.5	94.2	82.6	82.3	78.9	47.8	55.1	50.0	58.5	72.5	64.8	61.9	60.2	55.4	56.0	68.1
No. 4 Distillate Fuel Oil <sup>3</sup> .....	79.7	75.0	76.6	79.6	77.3	48.9	51.3	46.1	51.2	62.2	58.0	52.6	50.1	50.1	50.5	60.3
Residual Fuel Oil .....	75.6	67.6	65.1	68.7	61.0	34.3	42.3	33.4	38.5	44.4	34.0	33.6	33.7	35.2	<sup>R</sup> 39.2	45.4
1% or Less Sulfur Content .....	82.9	74.7	69.5	72.0	64.4	37.2	44.7	37.2	43.6	50.5	40.2	38.9	39.7	40.1	<sup>R</sup> 43.6	52.5
Greater than 1% Sulfur Content .....	67.3	61.1	61.1	65.9	58.2	31.7	39.6	30.0	34.4	40.0	30.6	31.2	30.3	33.0	37.7	43.2
Propane (Consumer Grade) .....	56.5	59.2	70.9	73.7	71.7	74.5	70.1	71.4	61.5	74.5	73.0	64.3	67.3	53.0	49.2	62.1
<b>Refiner Margins<sup>4</sup></b>																
Motor Gasoline .....	22.5	21.4	19.2	15.1	19.8	18.4	16.3	22.8	22.6	25.7	24.5	23.8	23.5	22.8	21.6	22.1
Jet Fuel, Kerosene-Type .....	17.3	19.4	16.4	14.9	15.8	14.9	11.2	14.6	15.5	24.4	19.6	16.5	18.6	16.3	12.9	15.4
No. 2 Distillate Fuel Oil .....	13.5	15.5	12.2	13.1	13.8	12.4	10.4	12.4	13.8	16.6	16.4	14.6	16.8	15.1	12.0	16.2
Residual Fuel Oil .....	-17.6	-14.7	-8.1	-2.8	-6.0	-4.1	-4.1	-5.0	-6.8	-11.6	-14.0	-13.2	-9.8	-5.4	-4.8	-7.1
Composite <sup>5</sup> .....	19.4	19.4	16.0	13.7	17.0	15.8	13.8	18.7	18.8	22.1	20.7	19.8	19.0	19.8	18.1	19.5

<sup>1</sup> Nominal dollars.

<sup>2</sup> Sales for resale, that is, wholesale sales, are those made to purchasers who are other than ultimate consumers. Sales to end users are those made directly to the ultimate consumer, including bulk customers, such as agriculture, industry, and utilities, as well as residential and commercial customers.

<sup>3</sup> Includes No. 4 fuel oil and No. 4 diesel fuel.

<sup>4</sup> On this table, refiner margin is the difference between the composite refiner acquisition price of crude oil and the price to resellers.

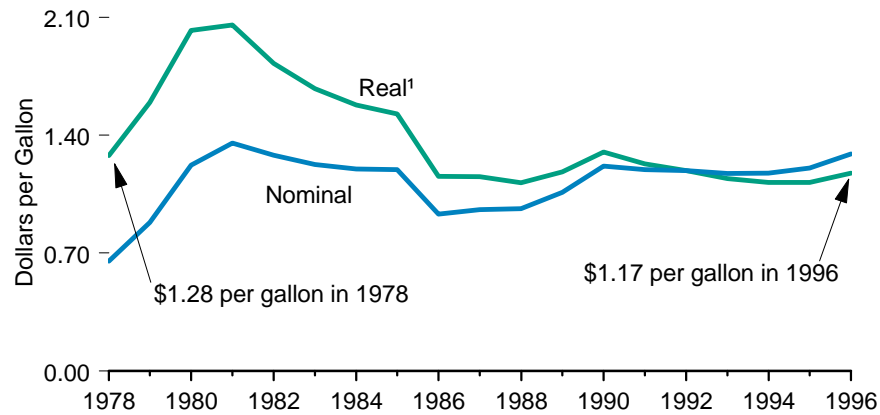
<sup>5</sup> Composite of aviation gasoline, kerosene-type jet fuel, kerosene, motor gasoline, distillate fuel nos. 1, 2, and 4, and residual fuel.

R=Revised data. P=Preliminary data. NA=Not available.

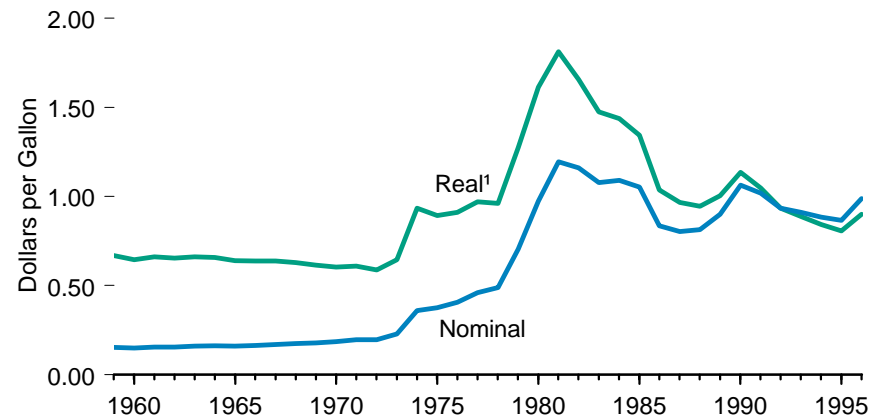
Sources: • 1981-1992—Energy Information Administration (EIA), Form EIA-460, "Petroleum Industry Monthly Report for Product Prices," the source for backcast estimates • 1983 forward—EIA, Form EIA-782A, "Monthly Petroleum Product Sales Report."

**Figure 5.21 Motor Gasoline and Residential Heating Oil Retail Prices**

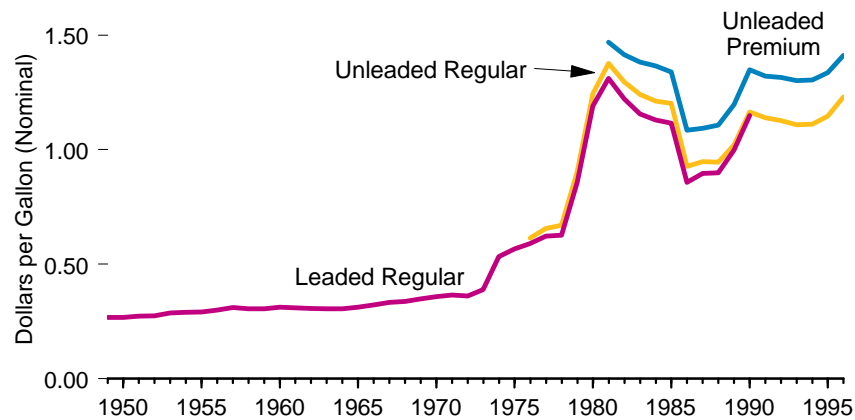
**Motor Gasoline, All Types, 1978-1996**



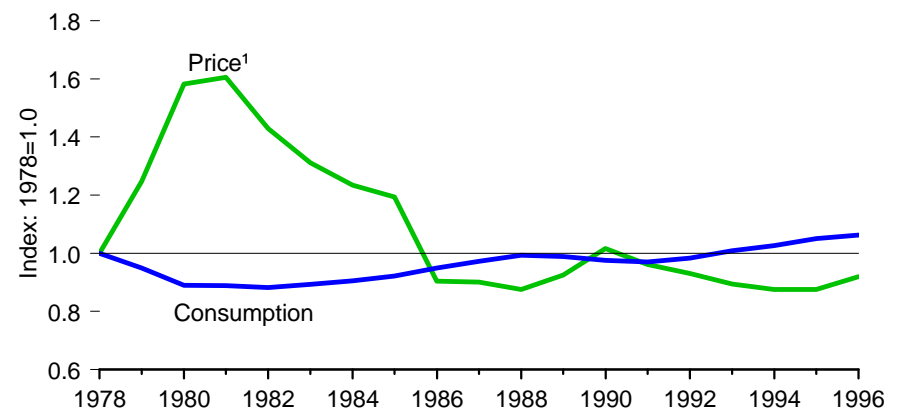
**Residential Heating Oil, 1959-1996**



**Motor Gasoline by Type, 1949-1996**



**Motor Gasoline<sup>2</sup> Price and Consumption, Indexed to 1978, 1978-1996**



<sup>1</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>2</sup> All types.

Notes: • Residential heating oil prices from 1978 forward exclude all taxes.  
 • Because vertical scales differ, graphs should not be compared.  
 Sources: Tables 5.11 and 5.21.



**Table 5.21 Motor Gasoline and Residential Heating Oil Retail Prices, 1949-1996**  
(Cents per Gallon)

Year	Motor Gasoline (Including Taxes)								Residential Heating Oil <sup>2</sup>	
	Leaded Regular <sup>1</sup>		Unleaded Regular		Unleaded Premium		All Types		Nominal	Real <sup>3</sup>
	Nominal	Real <sup>3</sup>	Nominal	Real <sup>3</sup>	Nominal	Real <sup>3</sup>	Nominal	Real <sup>3</sup>	Nominal	Real <sup>3</sup>
1949	26.8	( <sup>4</sup> )	NA	NA	NA	NA	NA	NA	NA	NA
1950	26.8	( <sup>4</sup> )	NA	NA	NA	NA	NA	NA	NA	NA
1951	27.2	( <sup>4</sup> )	NA	NA	NA	NA	NA	NA	NA	NA
1952	27.4	( <sup>4</sup> )	NA	NA	NA	NA	NA	NA	NA	NA
1953	28.7	( <sup>4</sup> )	NA	NA	NA	NA	NA	NA	NA	NA
1954	29.0	( <sup>4</sup> )	NA	NA	NA	NA	NA	NA	NA	NA
1955	29.1	( <sup>4</sup> )	NA	NA	NA	NA	NA	NA	NA	NA
1956	29.9	( <sup>4</sup> )	NA	NA	NA	NA	NA	NA	15.2	( <sup>4</sup> )
1957	31.0	( <sup>4</sup> )	NA	NA	NA	NA	NA	NA	16.0	( <sup>4</sup> )
1958	30.4	( <sup>4</sup> )	NA	NA	NA	NA	NA	NA	15.1	( <sup>4</sup> )
1959	30.5	133.2	NA	NA	NA	NA	NA	NA	15.3	66.8
1960	31.1	133.5	NA	NA	NA	NA	NA	NA	15.0	64.4
1961	30.8	130.5	NA	NA	NA	NA	NA	NA	15.6	66.1
1962	30.6	128.0	NA	NA	NA	NA	NA	NA	15.6	65.3
1963	30.4	125.6	NA	NA	NA	NA	NA	NA	16.0	66.1
1964	30.4	124.1	NA	NA	NA	NA	NA	NA	16.1	65.7
1965	31.2	124.8	NA	NA	NA	NA	NA	NA	16.0	64.0
1966	32.1	124.9	NA	NA	NA	NA	NA	NA	16.4	63.8
1967	33.2	125.3	NA	NA	NA	NA	NA	NA	16.9	63.8
1968	33.7	121.7	NA	NA	NA	NA	NA	NA	17.4	62.8
1969	34.8	120.0	NA	NA	NA	NA	NA	NA	17.8	61.4
1970	35.7	116.7	NA	NA	NA	NA	NA	NA	18.5	60.5
1971	36.4	113.0	NA	NA	NA	NA	NA	NA	19.6	60.9
1972	36.1	107.8	NA	NA	NA	NA	NA	NA	19.7	58.8
1973	38.8	109.6	NA	NA	NA	NA	NA	NA	22.8	64.4
1974	53.2	138.2	NA	NA	NA	NA	NA	NA	36.0	93.5
1975	56.7	134.4	NA	NA	NA	NA	NA	NA	37.7	89.3
1976	59.0	132.3	61.4	137.7	NA	NA	NA	NA	40.6	91.0
1977	62.2	131.2	65.6	138.4	NA	NA	NA	NA	46.0	97.0
1978	62.6	122.7	67.0	131.4	NA	NA	65.2	127.8	49.0	96.1
1979	85.7	155.0	90.3	163.3	NA	NA	88.2	159.5	70.4	127.3
1980	119.1	197.2	124.5	206.1	NA	NA	122.1	202.2	97.4	161.3
1981	131.1	198.9	137.8	209.1	<sup>5</sup> 147.0	<sup>5</sup> 223.1	135.3	205.3	119.4	181.2
1982	122.2	174.3	129.6	184.9	141.5	201.9	128.1	182.7	116.0	165.5
1983	115.7	158.3	124.1	169.8	138.3	189.2	122.5	167.6	107.8	147.5
1984	112.9	148.7	121.2	159.7	136.6	180.0	119.8	157.8	109.1	143.7
1985	111.5	142.2	120.2	153.3	134.0	170.9	119.6	152.6	105.3	134.3
1986	85.7	106.3	92.7	115.0	108.5	134.6	93.1	115.5	83.6	103.7
1987	89.7	107.9	94.8	114.1	109.3	131.5	95.7	115.2	80.3	96.6
1988	89.9	104.4	94.6	109.9	110.7	128.6	96.3	111.8	81.3	94.4
1989	99.8	111.3	102.1	113.8	119.7	133.4	106.0	118.2	90.0	100.3
1990	114.9	122.8	116.4	124.4	134.9	144.1	121.7	130.0	106.3	113.6
1991	NA	NA	114.0	117.2	132.1	135.8	119.6	122.9	101.9	104.7
1992	NA	NA	112.7	112.7	131.6	131.6	119.0	119.0	93.4	93.4
1993	NA	NA	110.8	108.0	130.2	126.9	117.3	114.3	91.1	88.8
1994	NA	NA	111.2	<sup>R</sup> 106.0	130.5	<sup>R</sup> 124.4	117.4	<sup>R</sup> 111.9	88.4	<sup>R</sup> 84.3
1995	NA	NA	114.7	<sup>R</sup> 106.6	133.6	<sup>R</sup> 124.2	120.5	<sup>R</sup> 112.0	<sup>R</sup> 86.7	<sup>R</sup> 80.6
1996	NA	NA	123.1	112.2	141.3	128.8	128.8	117.4	<sup>P</sup> 98.8	<sup>P</sup> 90.1

<sup>1</sup> Average motor gasoline prices are calculated from a sample of service stations providing all types of service (i.e., full-, mini-, and self-serve). Geographic coverage - 1949-1973, 55 representative cities; 1974-1977, 56 urban areas; 1978 forward, 85 urban areas.

<sup>2</sup> Average residential heating oil (No. 2 fuel oil) prices are derived by dividing the sum of the estimated national value of retail sales for residential heating by the estimated volume of retail sales for residential heating. Data for 1978 forward exclude all taxes.

<sup>3</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>4</sup> For 1949-1958, the gross domestic product implicit price deflators, which are used to convert nominal dollars to real (inflation-adjusted) values, were not available in time to use in this report.

<sup>5</sup> Based on September through December data only.

R=Revised data. P=Preliminary data. NA=Not available.

Sources: **Motor Gasoline:** • 1949-1973—*Platt's Oil Price Handbook and Oilmanac*, 1974, 51st Edition. • 1974 forward—Energy Information Administration (EIA), simple annual averages of monthly data from Bureau of Labor Statistics, *Consumer Prices: Energy*. **Residential Heating Oil:** • 1956-1974—Bureau of Labor Statistics, *Retail Prices and Indexes of Fuels and Utilities for Residential Usage*, monthly. • January 1975 through September 1977—Federal Energy Administration, Form FEA-P112-M-1, "No. 2 Heating Oil Supply/Price Monitoring Report." • October 1977 through December 1977—EIA, Form EIA-9, "No. 2 Heating Oil Supply/Price Monitoring Report." • 1978-forward—EIA, *Petroleum Marketing Monthly* (March 1997), Table 18.

## Petroleum Notes

1. Accurate calculation of the quantity of petroleum products supplied to the domestic market is complicated by the recycling of products at the refinery, the renaming of products involved in a transfer, and the receipt of products from outside the primary supply system. Beginning in 1981, a single adjustment (always a negative quantity) is made to total product supplied to correct this accounting problem. The calculation of this adjustment, called "reclassified," involves only unfinished oils and gasoline blending components. It is the sum of their net changes in primary stocks (net withdrawals is a plus quantity, net additions is a minus quantity) plus imports minus net input to refineries.

2. The methods for deriving Gross Input to Distillation Units (GIDU) in this report are as follows: 1949-1966, GIDU is estimated by summing annual crude oil runs to stills, net unfinished oil reruns at refineries, and shipments of natural gasoline and plant condensate from natural gas processing plants to refineries. 1967-1973, GIDU is estimated by summing annual crude oil runs to stills, net unfinished oil reruns, and refinery input of natural gasoline and plant condensate. 1974-1980, GIDU is published annual data. 1981 forward, GIDU is the sum of reported monthly data.

3. Total petroleum products supplied is the sum of the product supplied for each petroleum product, crude oil, unfinished oils, and gasoline blending components. For each of these, except crude oil, product supplied is calculated by adding refinery production, natural gas plant liquids production, new supply of other liquids, imports, and stock withdrawals, and subtracting stock additions, refinery inputs, and exports. Crude oil product supplied is the sum of crude oil burned on leases and at pipeline pump stations as reported on Form EIA-813. Prior to 1983, crude oil burned on leases and at pipeline pump stations was reported as either distillate or residual fuel oil and was included as product supplied for these products. Petroleum product supplied is an

approximation of petroleum consumption and is synonymous with the term "Petroleum Consumption" in Section 1. Sector data for petroleum products used in more than one sector are derived from surveys of sales to ultimate consumers by refiners, marketers, distributors, and dealers and from receipts at electric utilities.

4. Beginning in January 1981, several Energy Information Administration survey forms and calculation methodologies were changed to reflect new developments in refinery and blending plant practices and to improve data integrity. Those changes affect production and product supplied statistics for motor gasoline, distillate fuel oil, and residual fuel oil, and stocks of motor gasoline. On the basis of those changes, motor gasoline production during the last half of 1980 would have averaged 289,000 barrels per day higher than that which was published on the old basis. Distillate and residual fuel oil production and product supplied for all of 1980 would have averaged, respectively, 105,000 and 54,000 barrels per day higher than the numbers that were published.

5. The Crude Oil Domestic First Purchase Prices were derived as follows: 1949-1973, weighted average domestic first purchase values as reported by State agencies and calculated by the Bureau of Mines; 1974 and 1975, weighted averages of a sample survey of major first purchasers' purchases; 1976 forward, weighted averages of all first purchasers' purchases.

6. The Refiner Acquisition Cost of Crude Oil was estimated for 1968-1973. The cost of domestic crude oil was derived by adding estimated transportation costs to the reported average domestic first purchase value. The cost of imported crude oils was derived by adding an estimated ocean transport cost based on the published "Average Freight Rate Assessment" to the average "Free Alongside Ship" value published by the U.S. Bureau of the Census. The composite cost was derived by weighting domestic costs and imported costs on the basis of quantities produced and imported.

## 6. Natural Gas

### Prices

Through the early 1970's, natural gas prices were relatively stable. Thereafter, the natural gas market underwent a period of price fluctuations brought on by deregulation and industry restructuring. The annual average wellhead price, in real terms,<sup>1</sup> trended downward from a 1983 peak of \$3.54 per thousand cubic feet to a 19-year low of \$1.44 per thousand cubic feet in 1995 (6.8).\* In 1995, the average price, in real terms, paid by residential consumers was down by 32 percent from the 1983 price (6.9 and Appendix D). Corresponding prices paid by the commercial, industrial, and electric utilities sectors were down 39 percent, 57 percent, and 62 percent, respectively.

However, this trend reversed in 1996. The beginning of the 1996 heating season was marked by two conditions—historically low levels of natural gas in storage and unusually cold weather—that drove real prices back up. The year ended with real prices higher for all sectors, by 1 percent for residential users, 3 percent for commercial users, 20 percent for industrial users, and 27 percent for electric utilities.

### Sectoral Patterns of Demand

Throughout the 1950's and 1960's, the market for natural gas expanded as low prices encouraged demand. Of the many factors affecting natural gas markets during those decades, Federal and State regulatory commissions were the most influential. Below-market rates for certain categories of natural gas, coupled with strong demand, ultimately resulted in regional shortages during the second half of the 1970's.

In 1972, total consumption of natural gas reached an all-time high of 22 trillion cubic feet (6.6). Thereafter, uncertainties about supply and rising energy prices began to erode demand. By the 1980's, lower demand resulted in a short-term surplus of deliverable gas and gas well shut-ins in many producing

<sup>1</sup>Real (inflation-adjusted) prices are expressed in chained (1992) dollars. Prices are nominal unless specifically noted as real.

*\*Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications. Percentages and numbers in text are calculated by using data in the tables.*

areas. In 1986, natural gas consumption totaled 16 trillion cubic feet, the lowest annual total since 1965.

Weakened demand spanned all end-use sectors but was most severe in the industrial and electric utility sectors, where, particularly during the early and mid-1980's, the option of fuel switching proved to be most viable. Lower consumption by the industrial sector accounted for over half of the 5.9-trillion-cubic-foot reduction from 1972 through 1986, and lower use at electric utilities accounted for close to one-fourth.

After the 1986 low point, natural gas consumption trended upward, reaching 22 trillion cubic feet in 1996 (6.6). All sectors except electric utilities consumed more natural gas in 1996 than they had in 1995. Industrial consumption of natural gas rose to 10.0 trillion cubic feet, a 2.4-percent increase, and residential consumption rose to 5.2 trillion cubic feet, up 7.6 percent. Consumption in the commercial sector rose to 3.3 trillion cubic feet, an 8.3-percent increase, in 1996. Transportation consumption of natural gas

### Meeting Peak Demand

Seasonal, and even daily, fluctuations in natural gas demand are met by withdrawals from storage when demand is high and by injections into storage when demand is low compared with available gas flow in transmission lines. Net withdrawals from storage can provide more than half of some companies' peak winter deliveries. During the 1995-1996 heating season (October through March), net withdrawals from storage supplied 13 percent of total natural gas consumed.<sup>2</sup>

Natural gas in storage at the end of the year generally increased throughout the period of the 1970's, when local shortages resulted in curtailments to some consumers (6.7). Underground storage of working gas (that in excess of the base gas needed to maintain optimum reservoir pressure) equaled 7.1 percent of annual consumption in 1969 and 9.9 percent in 1996 (6.1 and 6.7). At the end of 1996, working gas in storage was 2.2 trillion cubic feet and base gas was 4.3 trillion cubic feet.

<sup>2</sup>Energy Information Administration, *Monthly Energy Review* March 1997, DOE/EIA-0035(97/03) (Washington, DC, March 1997), Tables 4.4 and 4.5.

edged up to just over 0.7 trillion cubic feet. Electric utility consumption totaled 2.7 trillion cubic feet, 14 percent lower than in 1995.

## Natural Gas Delivered for the Account of Others

During the 1980's, regulatory and legislative changes allowed consumers to purchase natural gas directly from producers and to arrange for pipeline and distribution companies to deliver it to them for a fee. Federal Energy Regulatory Commission Order 636 (implemented November 1, 1993) extended that trend toward a more efficient market by requiring interstate pipeline companies to unbundle (separate) their sales and transportation services. In 1995, natural gas delivered for the account of others to industrial, electric utility, and commercial customers reached 9.3 trillion cubic feet (6.5). Such deliveries accounted for 76 percent of total deliveries to industrial customers, 66 percent of total deliveries to electric utilities, and 23 percent of total deliveries to commercial customers.

## Natural Gas Production and Productivity

In 1996, gross withdrawals of natural gas from wells totaled 24 trillion cubic feet (6.2). Texas, Louisiana, and Oklahoma, the largest producers of natural gas, accounted for 59 percent of the U.S. total in 1996 (6.4). Most withdrawals came from onshore wells and State offshore wells, but 5.1 trillion cubic feet were Federal offshore withdrawals. The 24 trillion cubic feet of gross withdrawals in 1996 yielded 20 trillion cubic feet of marketed production (6.2).

The U.S. total of natural gas gross well withdrawals includes a small but rapidly growing amount of methane produced from coalbeds. In 1995, gross withdrawals of coalbed methane grew 12 percent to 956 billion cubic feet, an amount equal to 5 percent of U.S. total dry production.<sup>3</sup> The rate of increase in coalbed methane reserves slowed after 1992, when Federal tax incentives for new

<sup>3</sup>Energy Information Administration, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 1995 Annual Report*, DOE/EIA-0216(95) (Washington, DC, November 1996), pp. 33, 35.

coalbed methane wells expired, and in 1994 coalbed methane reserves declined for the first time since data collection began in 1988. However, reserves growth resumed in 1995, with total reserves increasing by 8 percent. U.S. total reserves in coalbed methane fields accounted for about 6 percent of U.S. natural gas total reserves in 1995.

About 304 thousand gas wells were in operation at the end of 1996 (6.4). Withdrawals from those wells accounted for almost three-fourths of all gross withdrawals, while oil wells supplied the remainder. After peaking at 435 thousand cubic feet per day in 1971 (6.4), average gas well productivity trended downward and has remained below 165 thousand cubic feet per day since 1985. In 1996, gas well productivity averaged 159 thousand cubic feet per day.

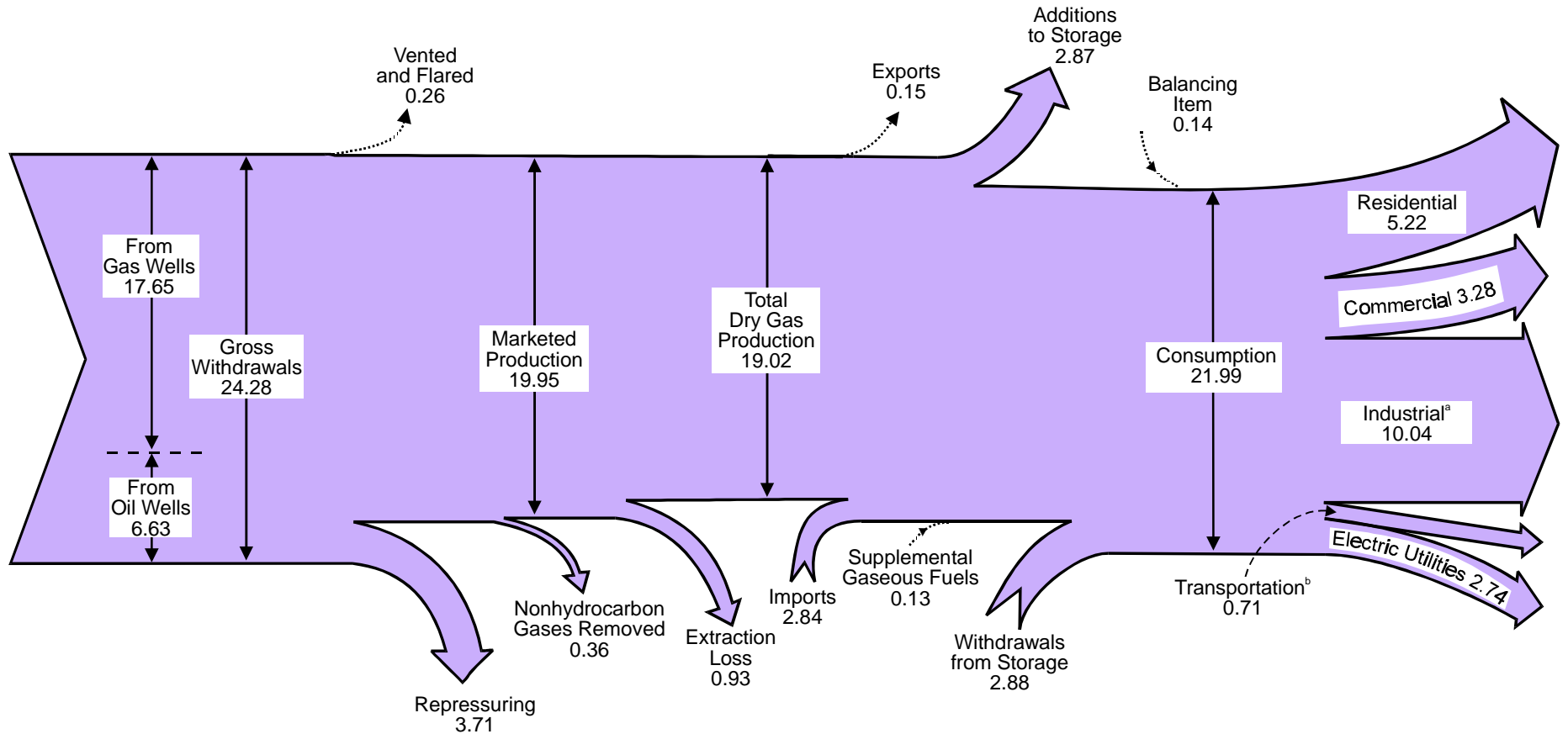
## Imports and Exports

U.S. natural gas trade was limited to the border countries of Mexico and Canada until shipping natural gas in liquefied form emerged as an alternative to pipelines. In 1969, the first shipments of liquefied natural gas (LNG) were sent to Japan, and U.S. imports from Algeria began the following year (6.3). In 1996, U.S. net imports of natural gas by all routes totaled 2.7 trillion cubic feet, or about 12 percent of domestic consumption.

Historically, Canada has been the major supplier of U.S. natural gas imports, with Algeria and Mexico supplying smaller amounts. The remarkable growth in U.S. net imports of natural gas from the 1986 level of 689 billion cubic feet (a 17-year low at the time) to 2.7 trillion cubic feet in 1996 was due almost entirely to higher levels of imports from Canada. In 1996, Canada supplied net imports of 2.8 trillion cubic feet. Importing Canadian natural gas was facilitated by the completion of the Iroquois transportation system in January 1992.

From 1970 through 1990 and again in 1993 through 1996, Japan was the leading purchaser of U.S. natural gas. In 1996, Japan purchased 68 billion cubic feet of U.S. natural gas.

**Diagram 3. Natural Gas Flow, 1996**  
(Trillion Cubic Feet)



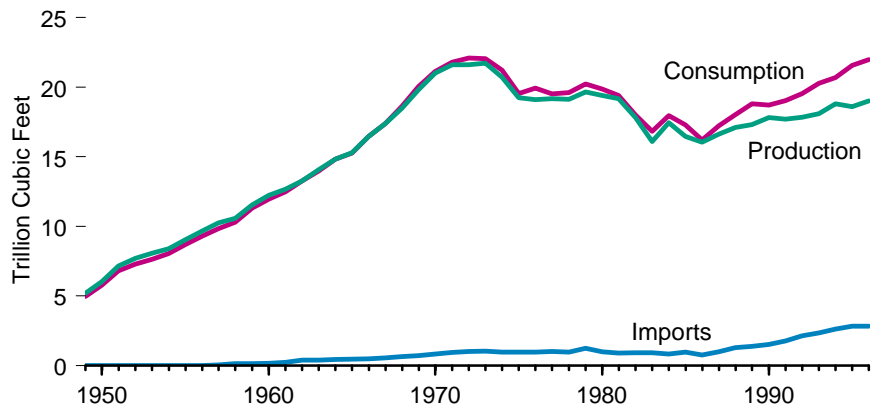
<sup>a</sup>Includes lease and plant fuel.

<sup>b</sup>Natural gas consumed in the operation of pipelines, primarily in compressors, and a small quantity used as vehicle fuel.

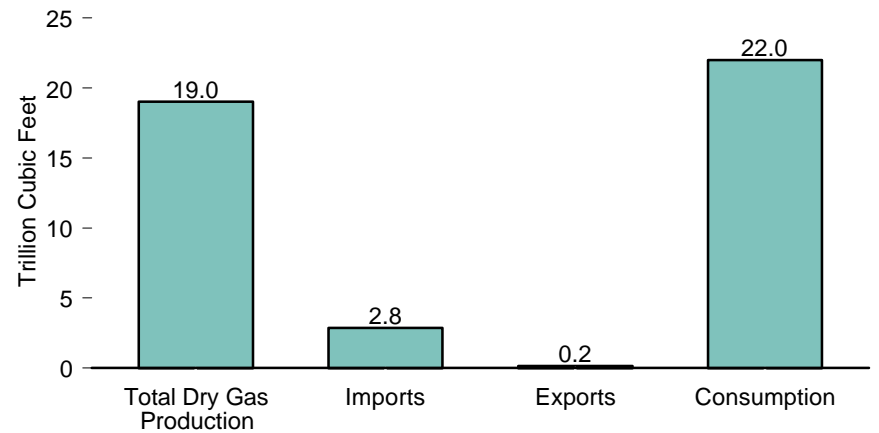
Notes: • Data are preliminary. • Totals may not equal sum of components due to independent rounding.  
Sources: Tables 6.1, 6.2, and 6.6.

**Figure 6.1 Natural Gas Overview**

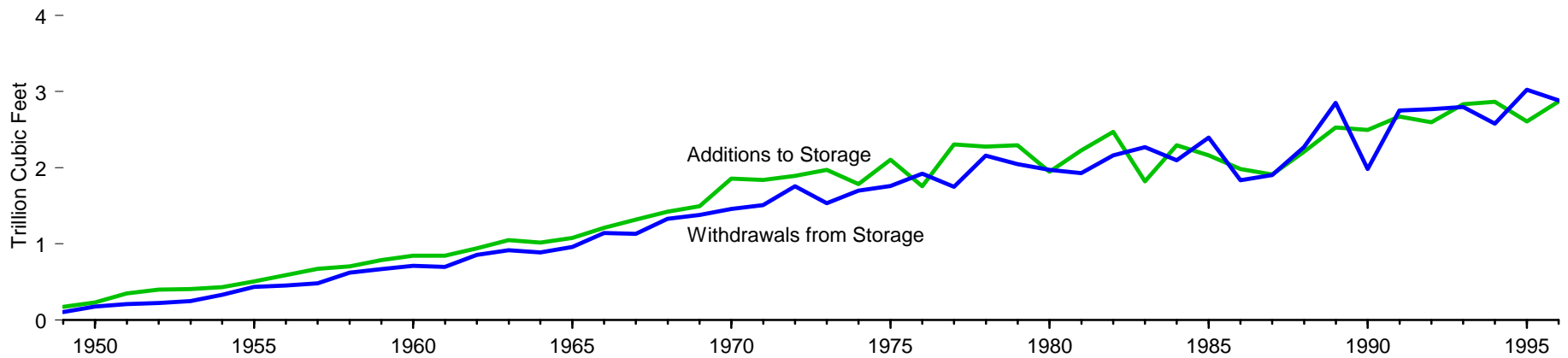
**Overview, 1949-1996**



**Overview, 1996**



**Storage Additions and Withdrawals<sup>1</sup>, 1949-1996**



<sup>1</sup> Beginning with 1980, includes liquefied natural gas stored in above-ground tanks.  
 Note: Because vertical scales differ, graphs should not be compared.

Source: Table 6.1.

**Table 6.1 Natural Gas Overview, 1949-1996**  
(Trillion Cubic Feet)

Year	Total Dry Gas Production	Supplemental Gaseous Fuels	Imports	Exports	Withdrawals from Storage <sup>1</sup>	Additions to Storage <sup>1</sup>	Balancing Item <sup>2</sup>	Consumption
1949	5.20	NA	0.00	0.02	0.11	0.17	-0.14	4.97
1950	6.02	NA	0.00	0.03	0.18	0.23	-0.18	5.77
1951	7.16	NA	0.00	0.02	0.21	0.35	-0.19	6.81
1952	7.69	NA	0.01	0.03	0.22	0.40	-0.20	7.29
1953	8.06	NA	0.01	0.03	0.25	0.40	-0.24	7.64
1954	8.39	NA	0.01	0.03	0.33	0.43	-0.22	8.05
1955	9.03	NA	0.01	0.03	0.44	0.51	-0.25	8.69
1956	9.66	NA	0.01	0.04	0.45	0.59	-0.21	9.29
1957	10.25	NA	0.04	0.04	0.48	0.67	-0.21	9.85
1958	10.57	NA	0.14	0.04	0.62	0.70	-0.28	10.30
1959	11.55	NA	0.13	0.02	0.67	0.79	-0.22	11.32
1960	12.23	NA	0.16	0.01	0.71	0.84	-0.27	11.97
1961	12.66	NA	0.22	0.01	0.70	0.84	-0.23	12.49
1962	13.25	NA	0.40	0.02	0.85	0.94	-0.29	13.27
1963	14.08	NA	0.41	0.02	0.92	1.05	-0.36	13.97
1964	14.82	NA	0.44	0.02	0.89	1.01	-0.30	14.81
1965	15.29	NA	0.46	0.03	0.96	1.08	-0.32	15.28
1966	16.47	NA	0.48	0.02	1.14	1.21	-0.40	16.45
1967	17.39	NA	0.56	0.08	1.13	1.32	-0.30	17.39
1968	18.49	NA	0.65	0.09	1.33	1.43	-0.33	18.63
1969	19.83	NA	0.73	0.05	1.38	1.50	-0.33	20.06
1970	21.01	NA	0.82	0.07	1.46	1.86	-0.23	21.14
1971	21.61	NA	0.93	0.08	1.51	1.84	-0.34	21.79
1972	21.62	NA	1.02	0.08	1.76	1.89	-0.33	22.10
1973	21.73	NA	1.03	0.08	1.53	1.97	-0.20	22.05
1974	20.71	NA	0.96	0.08	1.70	1.78	-0.29	21.22
1975	19.24	NA	0.95	0.07	1.76	2.10	-0.24	19.54
1976	19.10	NA	0.96	0.06	1.92	1.76	-0.22	19.95
1977	19.16	NA	1.01	0.06	1.75	2.31	-0.04	19.52
1978	19.12	NA	0.97	0.05	2.16	2.28	-0.29	19.63
1979	19.66	NA	1.25	0.06	2.05	2.30	-0.37	20.24
1980	19.40	0.15	0.98	0.05	1.97	1.95	-0.64	19.88
1981	19.18	0.18	0.90	0.06	1.93	2.23	-0.50	19.40
1982	17.82	0.14	0.93	0.05	2.16	2.47	-0.54	18.00
1983	16.09	0.13	0.92	0.05	2.27	1.82	-0.70	16.83
1984	17.47	0.11	0.84	0.05	2.10	2.30	-0.22	17.95
1985	16.45	0.13	0.95	0.06	2.40	2.16	-0.43	17.28
1986	16.06	0.11	0.75	0.06	1.84	1.98	-0.49	16.22
1987	16.62	0.10	0.99	0.05	1.91	1.91	-0.44	17.21
1988	17.10	0.10	1.29	0.07	2.27	2.21	-0.45	18.03
1989	17.31	0.11	1.38	0.11	2.85	2.53	-0.22	18.80
1990	17.81	0.12	1.53	0.09	1.99	2.50	-0.15	18.72
1991	17.70	0.11	1.77	0.13	2.75	2.67	-0.50	19.04
1992	17.84	0.12	2.14	0.22	2.77	2.60	-0.51	19.54
1993	18.10	0.12	2.35	0.14	2.80	2.83	-0.11	20.28
1994	<sup>R</sup> 18.82	0.11	2.62	0.16	<sup>R</sup> 2.58	2.86	<sup>R</sup> -0.40	<sup>R</sup> 20.71
1995	<sup>R</sup> 18.60	<sup>R</sup> 0.11	<sup>R</sup> 2.84	<sup>R</sup> 0.15	<sup>R</sup> 3.02	<sup>R</sup> 2.61	<sup>R</sup> -0.23	<sup>R</sup> 21.58
1996 <sup>P</sup>	19.02	0.13	2.84	0.15	2.88	2.87	0.14	21.99

<sup>1</sup> Beginning with 1980, includes liquefied natural gas stored in above-ground tanks.

<sup>2</sup> Quantities lost and imbalances in data due to differences among data sources. Since 1980, excludes intratit shipments that cross the U.S.-Canada border (i.e., natural gas delivered to its destination via the other country).

R=Revised data. P=Preliminary data. NA=Not available.

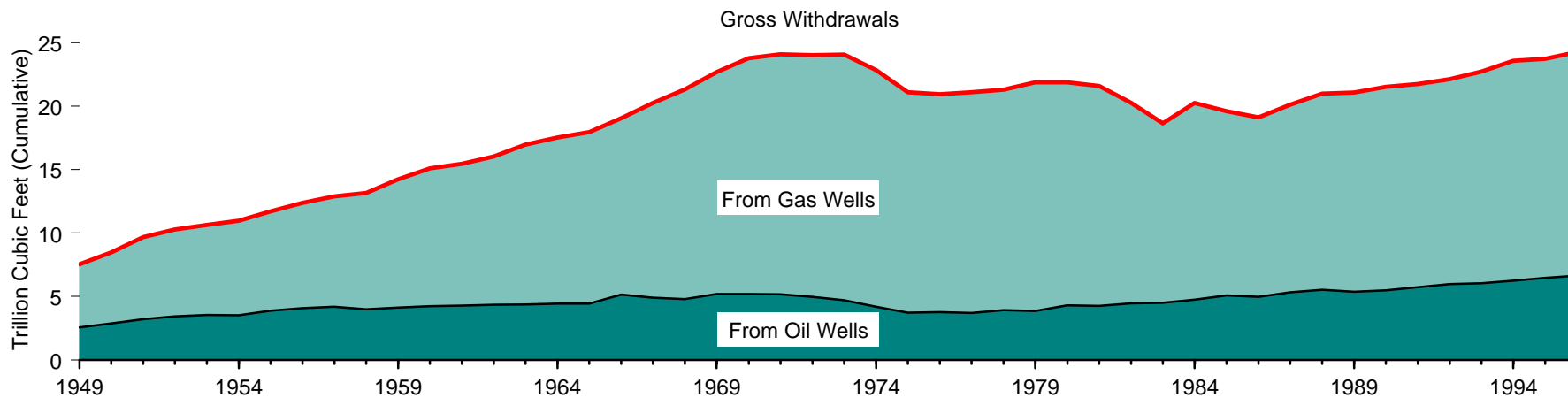
Notes: • Beginning with 1965, all volumes are shown on a pressure base of 14.73 p.s.i.a. at 60° F. For

prior years, the pressure base was 14.65 p.s.i.a. at 60° F. • Totals may not equal sum of components due to independent rounding.

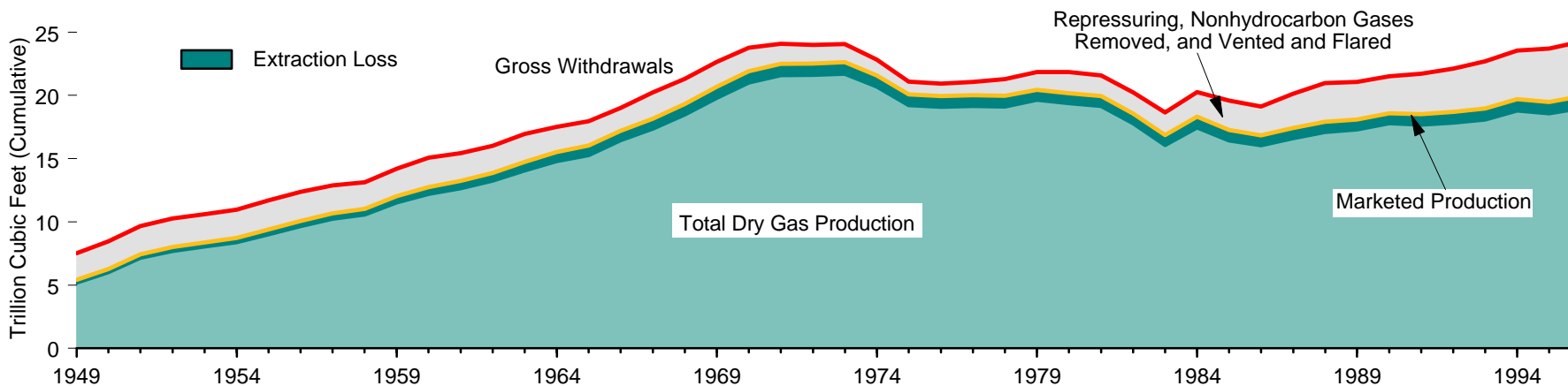
Sources: **1949-1988:** • Supplemental Gaseous Fuels—Energy Information Administration (EIA), *Natural Gas Annual 1992, Volume 2* (November 1993), Table 12. • All Other Data— EIA, *Natural Gas Annual 1994* (November 1995), Table 100. **1989 forward:** EIA, *Natural Gas Monthly* (March 1997), Table 2.

**Figure 6.2 Natural Gas Production, 1949-1996**

**Gross Withdrawals by Well Type**



**Natural Gas Production by Phase**



Source: Table 6.2.



**Table 6.2 Natural Gas Production, 1949-1996**  
(Trillion Cubic Feet)

Year	Gross Withdrawals			Repressuring	Nonhydrocarbon Gases Removed	Vented and Flared	Marketed Production	Extraction Loss <sup>1</sup>	Total Dry Gas Production
	From Gas Wells	From Oil Wells	Total						
1949	4.99	2.56	7.55	1.27	NA	0.85	5.42	0.22	5.20
1950	5.60	2.88	8.48	1.40	NA	0.80	6.28	0.26	6.02
1951	6.48	3.21	9.69	1.44	NA	0.79	7.46	0.29	7.16
1952	6.84	3.43	10.27	1.41	NA	0.85	8.01	0.32	7.69
1953	7.10	3.55	10.65	1.44	NA	0.81	8.40	0.34	8.06
1954	7.47	3.52	10.98	1.52	NA	0.72	8.74	0.35	8.39
1955	7.84	3.88	11.72	1.54	NA	0.77	9.41	0.38	9.03
1956	8.31	4.07	12.37	1.43	NA	0.86	10.08	0.42	9.66
1957	8.72	4.19	12.91	1.42	NA	0.81	10.68	0.43	10.25
1958	9.15	3.99	13.15	1.48	NA	0.63	11.03	0.46	10.57
1959	10.10	4.13	14.23	1.61	NA	0.57	12.05	0.50	11.55
1960	10.85	4.23	15.09	1.75	NA	0.56	12.77	0.54	12.23
1961	11.20	4.27	15.46	1.68	NA	0.52	13.25	0.59	12.66
1962	11.70	4.34	16.04	1.74	NA	0.43	13.88	0.62	13.25
1963	12.61	4.37	16.97	1.84	NA	0.38	14.75	0.67	14.08
1964	13.11	4.43	17.54	1.65	NA	0.34	15.55	0.72	14.82
1965	13.52	4.44	17.96	1.60	NA	0.32	16.04	0.75	15.29
1966	13.89	5.14	19.03	1.45	NA	0.38	17.21	0.74	16.47
1967	15.35	4.91	20.25	1.59	NA	0.49	18.17	0.78	17.39
1968	16.54	4.79	21.33	1.49	NA	0.52	19.32	0.83	18.49
1969	17.49	5.19	22.68	1.46	NA	0.53	20.70	0.87	19.83
1970	18.59	5.19	23.79	1.38	NA	0.49	21.92	0.91	21.01
1971	18.93	5.16	24.09	1.31	NA	0.28	22.49	0.88	21.61
1972	19.04	4.97	24.02	1.24	NA	0.25	22.53	0.91	21.62
1973	19.37	4.70	24.07	1.17	NA	0.25	22.65	0.92	21.73
1974	18.67	4.18	22.85	1.08	NA	0.17	21.60	0.89	20.71
1975	17.38	3.72	21.10	0.86	NA	0.13	20.11	0.87	19.24
1976	17.19	3.75	20.94	0.86	NA	0.13	19.95	0.85	19.10
1977	17.42	3.68	21.10	0.93	NA	0.14	20.03	0.86	19.16
1978	17.39	3.91	21.31	1.18	NA	0.15	19.97	0.85	19.12
1979	18.03	3.85	21.88	1.25	NA	0.17	20.47	0.81	19.66
1980	17.57	4.30	21.87	1.37	0.20	0.13	20.18	0.78	19.40
1981	17.34	4.25	21.59	1.31	0.22	0.10	19.96	0.77	19.18
1982	15.81	4.46	20.27	1.39	0.21	0.09	18.58	0.76	17.82
1983	14.15	4.51	18.66	1.46	0.22	0.09	16.88	0.79	16.09
1984	15.51	4.75	20.27	1.63	0.22	0.11	18.30	0.84	17.47
1985	14.54	5.07	19.61	1.92	0.33	0.09	17.27	0.82	16.45
1986	14.15	4.98	19.13	1.84	0.34	0.10	16.86	0.80	16.06
1987	14.81	5.33	20.14	2.21	0.38	0.12	17.43	0.81	16.62
1988	15.47	5.53	21.00	2.48	0.46	0.14	17.92	0.82	17.10
1989	15.71	5.37	21.07	2.48	0.36	0.14	18.10	0.78	17.31
1990	16.05	5.47	21.52	2.49	0.29	0.15	18.59	0.78	17.81
1991	16.02	5.73	21.75	2.77	0.28	0.17	18.53	0.83	17.70
1992	16.16	5.97	22.13	2.97	0.28	0.17	18.71	0.87	17.84
1993	16.69	6.03	22.73	3.10	0.41	0.23	18.98	0.89	18.10
1994	<sup>R</sup> 17.35	6.23	<sup>R</sup> 23.58	<sup>R</sup> 3.23	0.41	0.23	<sup>R</sup> 19.71	0.89	<sup>R</sup> 18.82
1995	<sup>R</sup> 17.28	<sup>R</sup> 6.46	<sup>R</sup> 23.74	<sup>R</sup> 3.57	<sup>R</sup> 0.39	<sup>R</sup> 0.28	<sup>R</sup> 19.51	0.91	<sup>R</sup> 18.60
1996 <sup>P</sup>	17.65	6.63	24.28	3.71	0.36	0.26	19.95	0.93	19.02

<sup>1</sup> Volume reduction resulting from the removal of natural gas plant liquids. Natural gas plant liquids are transferred to petroleum supply.

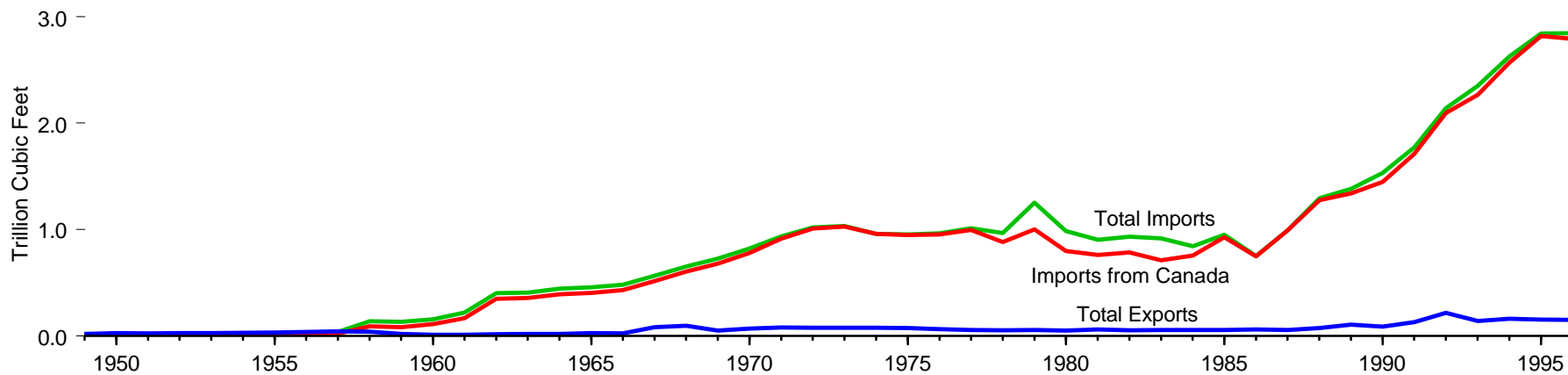
R=Revised data. P=Preliminary data. NA=Not available.

Notes: • Beginning with 1965 data, all volumes are shown on a pressure base of 14.73 p.s.i.a. at 60° F. For prior years, the pressure base was 14.65 p.s.i.a. at 60° F. • Totals may not equal sum of components due to independent rounding.

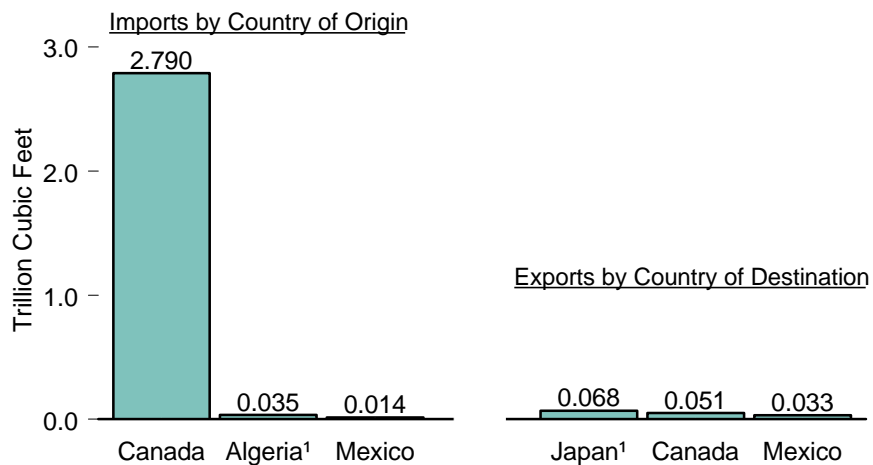
Sources: **From Gas Wells and From Oil Wells:** • 1949-1966—Bureau of Mines, *Minerals Yearbook*, "Natural Gas" chapter. • 1967-1988—Energy Information Administration (EIA), *Natural Gas Annual 1992*, Volume 2 (November 1993), Table 5. • 1989-1995—EIA, *Natural Gas Annual 1994* (October 1995), Table 3. • 1996—EIA, estimated data. **All Other Data:** • 1949-1989—EIA, *Natural Gas Annual 1994* (October 1995), Table 99. • 1990 forward—EIA, *Natural Gas Monthly* (March 1997), Table 1.

**Figure 6.3 Natural Gas Imports, Exports, and Net Imports**

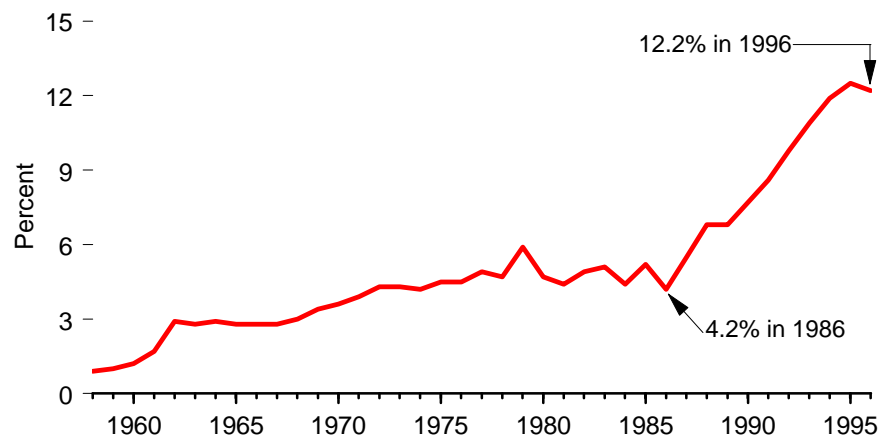
**Trade Overview, 1949-1996**



**Trade, 1996**



**Net Imports as Share of Consumption, 1958-1996**



<sup>1</sup> Imports from Algeria and exports to Japan are liquefied natural gases.

Source: Table 6.3.

**Table 6.3 Natural Gas Imports, Exports, and Net Imports, 1949-1996**

(Billion Cubic Feet, Except as Noted)

Year	Imports by Country of Origin						Exports by Country of Destination				Net Imports <sup>1</sup>	
	Canada	Mexico	Algeria <sup>2</sup>	Indonesia <sup>2</sup>	United Arab Emirates <sup>2</sup>	Total	Canada	Mexico	Japan <sup>2</sup>	Total	Total	Percent of U.S. Consumption
1949	0	0	0	0	0	0	(s)	20	0	20	-20	( <sup>3</sup> )
1950	0	0	0	0	0	0	3	23	0	26	-26	( <sup>3</sup> )
1951	0	0	0	0	0	0	4	21	0	24	-24	( <sup>3</sup> )
1952	8	(s)	0	0	0	8	6	22	0	27	-20	( <sup>3</sup> )
1953	9	0	0	0	0	9	6	22	0	28	-19	( <sup>3</sup> )
1954	7	0	0	0	0	7	6	23	0	29	-22	( <sup>3</sup> )
1955	11	(s)	0	0	0	11	11	20	0	31	-20	( <sup>3</sup> )
1956	10	(s)	0	0	0	10	17	19	0	36	-26	( <sup>3</sup> )
1957	21	17	0	0	0	38	31	11	0	42	-4	( <sup>3</sup> )
1958	90	46	0	0	0	136	32	7	0	39	97	0.9
1959	83	51	0	0	0	134	12	7	0	18	116	1.0
1960	109	47	0	0	0	156	6	6	0	11	144	1.2
1961	167	52	0	0	0	219	6	5	0	11	208	1.7
1962	350	51	0	0	0	402	6	10	0	16	386	2.9
1963	356	50	0	0	0	406	7	10	0	17	389	2.8
1964	391	53	0	0	0	443	10	10	0	20	424	2.9
1965	405	52	0	0	0	456	18	8	0	26	430	2.8
1966	430	50	0	0	0	480	20	4	0	25	455	2.8
1967	513	51	0	0	0	564	70	11	0	82	483	2.8
1968	604	47	0	0	0	652	82	12	0	94	558	3.0
1969	680	47	0	0	0	727	35	13	3	51	676	3.4
1970	779	41	1	0	0	821	11	15	44	70	751	3.6
1971	912	21	1	0	0	935	14	16	50	80	854	3.9
1972	1,009	8	2	0	0	1,019	16	15	48	78	941	4.3
1973	1,028	2	3	0	0	1,033	15	14	48	77	956	4.3
1974	959	(s)	0	0	0	959	13	13	50	77	882	4.2
1975	948	0	5	0	0	953	10	9	53	73	880	4.5
1976	954	0	10	0	0	964	8	7	50	65	899	4.5
1977	997	2	11	0	0	1,011	(s)	4	52	56	955	4.9
1978	881	0	84	0	0	966	(s)	4	48	53	913	4.7
1979	1,001	0	253	0	0	1,253	(s)	4	51	56	1,198	5.9
1980	797	102	86	0	0	985	(s)	4	45	49	936	4.7
1981	762	105	37	0	0	904	(s)	3	56	59	845	4.4
1982	783	95	55	0	0	933	(s)	2	50	52	882	4.9
1983	712	75	131	0	0	918	(s)	2	53	55	864	5.1
1984	755	52	36	0	0	843	(s)	2	53	55	788	4.4
1985	926	0	24	0	0	950	(s)	2	53	55	894	5.2
1986	749	0	0	2	0	750	9	2	50	61	689	4.2
1987	993	0	0	0	0	993	3	2	49	54	939	5.5
1988	1,276	0	17	0	0	1,294	20	2	52	74	1,220	6.8
1989	1,339	0	42	0	0	1,382	38	17	51	107	1,275	6.8
1990	1,448	0	84	0	0	1,532	17	16	53	<sup>R</sup> 87	1,446	7.7
1991	1,710	0	64	0	0	1,773	15	60	54	129	1,644	8.6
1992	2,094	0	43	0	0	2,138	68	96	53	216	1,921	9.8
1993	2,267	2	82	0	0	2,350	45	40	56	140	2,210	10.9
1994	2,566	7	51	0	0	2,624	53	47	63	162	2,462	11.9
1995	<sup>R</sup> 2,816	<sup>R</sup> 7	18	0	0	<sup>R</sup> 2,841	<sup>R</sup> 28	61	<sup>R</sup> 65	<sup>R</sup> 154	<sup>R</sup> 2,687	<sup>R</sup> 12.5
1996 <sup>P</sup>	2,790	14	35	0	5	2,844	51	33	68	151	2,693	12.2

<sup>1</sup> Net imports = imports minus exports.

<sup>2</sup> Imports from Algeria, Indonesia, and United Arab Emirates, and exports to Japan are liquefied natural gas.

<sup>3</sup> Not meaningful because there were net exports during this year.

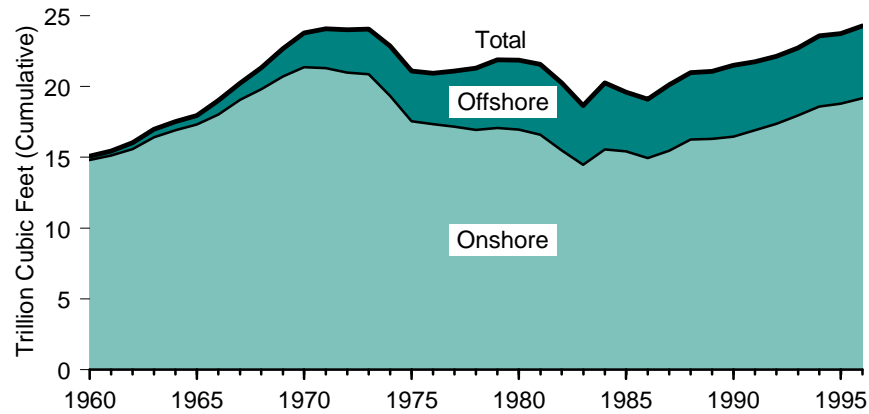
R=Revised data. P=Preliminary data. (s)=Less than 0.5 billion cubic feet.

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

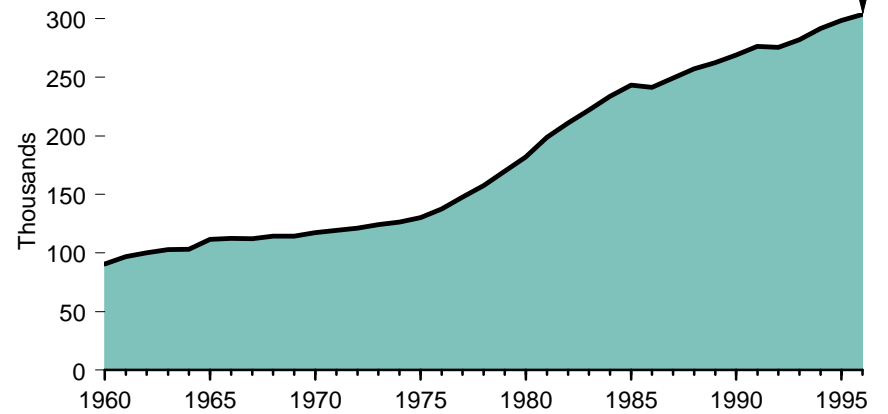
 Sources: **Total Imports and Total Exports:** • 1949-1995—Energy Information Administration (EIA), *Natural Gas Annual 1995* (November 1996), Table 100. • 1996—EIA estimates. **All Other Data:** • 1949-1954—Energy Information Administration (EIA), Office of Oil and Gas, Reserves and Natural Gas Division, unpublished data. • 1955-1995—EIA, *Natural Gas Monthly* (March 1997), Tables 5, 6, and unpublished revisions. • 1996—EIA estimates.

**Figure 6.4 Natural Gas Gross Withdrawals by State and Location and Gas Well Productivity, 1960-1996**

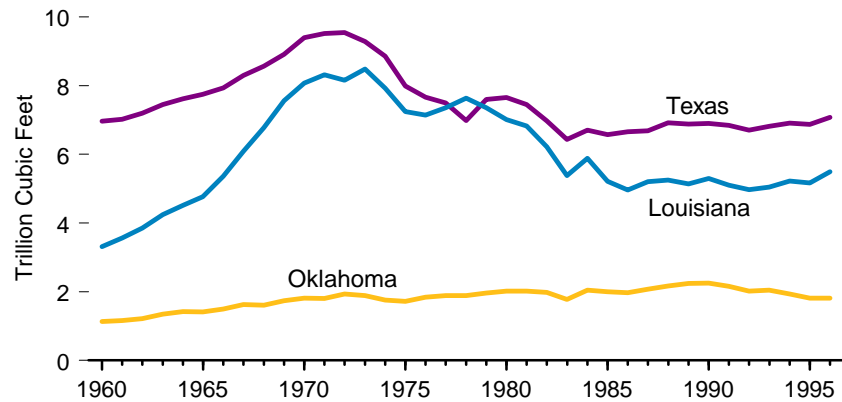
**Gross Withdrawals by Location**



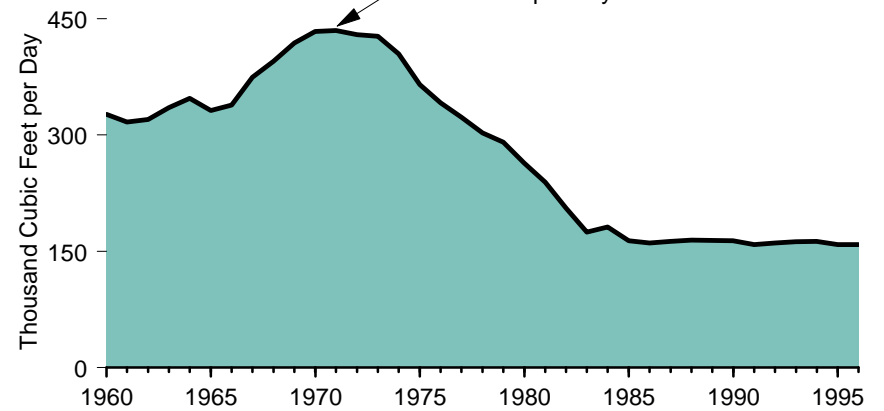
**Number of Producing Wells**



**Gross Withdrawals by Top Producing States**



**Average Gas Well Productivity**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 6.4.

**Table 6.4 Natural Gas Gross Withdrawals by State and Location and Gas Well Productivity, 1960-1996**

(Trillion Cubic Feet, Except as Noted)

Year	State				Location		Gross Withdrawals from Oil and Gas Wells	Gas Well <sup>1</sup> Productivity		
	Texas	Louisiana	Oklahoma	Other	Onshore <sup>2</sup>	Offshore <sup>3</sup>		Gross Withdrawals from Gas Wells	Thousands of Producing Wells <sup>4</sup>	Average Productivity (thousand cubic feet per day)
1960	6.96	3.31	1.13	3.68	14.81	0.27	15.09	10.85	91	326.7
1961	7.02	3.57	1.16	3.71	15.14	0.32	15.46	11.20	97	316.8
1962	7.20	3.85	1.22	3.76	15.59	0.45	16.04	11.70	100	319.8
1963	7.45	4.25	1.35	3.92	16.41	0.56	16.97	12.61	103	335.4
1964	7.62	4.52	1.42	3.98	16.91	0.62	17.54	13.11	103	347.4
1965	7.74	4.76	1.41	4.04	17.32	0.65	17.96	13.52	112	331.8
1966	7.93	5.37	1.50	4.23	18.03	1.01	19.03	13.89	112	338.4
1967	8.29	6.09	1.62	4.25	19.06	1.19	20.25	15.35	112	374.3
1968	8.57	6.78	1.61	4.37	19.80	1.52	21.33	16.54	114	395.1
1969	8.91	7.56	1.74	4.46	20.72	1.95	22.68	17.49	114	418.6
1970	9.40	8.08	1.81	4.50	21.37	2.42	23.79	18.59	117	433.6
1971	9.52	8.32	1.81	4.44	21.31	2.78	24.09	18.93	119	434.8
1972	9.55	8.16	1.93	4.38	20.98	3.04	24.02	19.04	121	429.4
1973	9.29	8.49	1.89	4.40	20.86	3.21	24.07	19.37	124	427.4
1974	8.86	7.92	1.76	4.31	19.34	3.51	22.85	18.67	126	404.9
1975	7.99	7.24	1.72	4.15	17.55	3.55	21.10	17.38	130	365.3
1976	7.67	7.14	1.84	4.29	17.35	3.60	20.94	17.19	138	341.5
1977	7.50	7.35	1.89	4.36	17.16	3.93	21.10	17.42	148	323.1
1978	6.99	7.64	1.89	4.79	16.95	4.36	21.31	17.39	157	302.7
1979	7.59	7.36	1.96	4.97	17.06	4.82	21.88	18.03	170	290.8
1980	7.66	7.01	2.02	5.19	16.97	4.90	21.87	17.57	182	263.8
1981	7.45	6.83	2.02	5.29	16.60	4.99	21.59	17.34	199	238.9
1982	6.98	6.22	1.99	5.09	15.50	4.77	20.27	15.81	211	205.5
1983	6.43	5.38	1.78	5.07	14.48	4.18	18.66	14.15	222	174.7
1984	6.71	5.89	2.05	5.62	15.56	4.71	20.27	15.51	234	181.2
1985	6.58	5.22	1.99	5.82	15.42	4.19	19.61	14.54	243	163.6
1986	6.66	4.96	1.97	5.54	14.95	4.19	19.13	14.15	242	160.6
1987	6.69	5.20	2.07	6.17	15.47	4.67	20.14	14.81	249	162.8
1988	6.92	5.25	2.17	6.67	16.25	4.75	21.00	15.47	257	164.3
1989	6.88	5.14	2.24	6.81	16.30	4.77	21.07	15.71	262	164.0
1990	6.91	5.30	2.26	7.05	16.48	5.05	21.52	16.05	269	163.4
1991	6.85	5.10	2.15	7.65	16.90	4.85	21.75	16.02	276	158.8
1992	6.71	4.98	2.02	8.43	17.36	4.77	22.13	16.16	275	160.8
1993	6.82	5.05	2.05	8.81	17.96	4.77	22.73	16.69	282	162.1
1994	6.91	5.23	1.93	<sup>R</sup> 9.51	<sup>R</sup> 18.58	<sup>R</sup> 5.00	<sup>R</sup> 23.58	<sup>R</sup> 17.35	<sup>R</sup> 292	<sup>R</sup> 162.9
1995	<sup>R</sup> 6.87	<sup>R</sup> 5.16	<sup>R</sup> 1.81	<sup>R</sup> 9.90	<sup>R</sup> 18.80	<sup>R</sup> 4.94	<sup>R</sup> 23.74	<sup>R</sup> 17.28	<sup>R</sup> 299	<sup>R</sup> 158.6
1996 <sup>P</sup>	7.08	5.49	1.81	9.89	19.18	5.10	24.28	17.65	304	158.8

<sup>1</sup> See Glossary.

<sup>2</sup> Includes State offshore gross withdrawals.

<sup>3</sup> Excludes State offshore gross withdrawals; includes Federal offshore (Outer Continental Shelf) gross withdrawals.

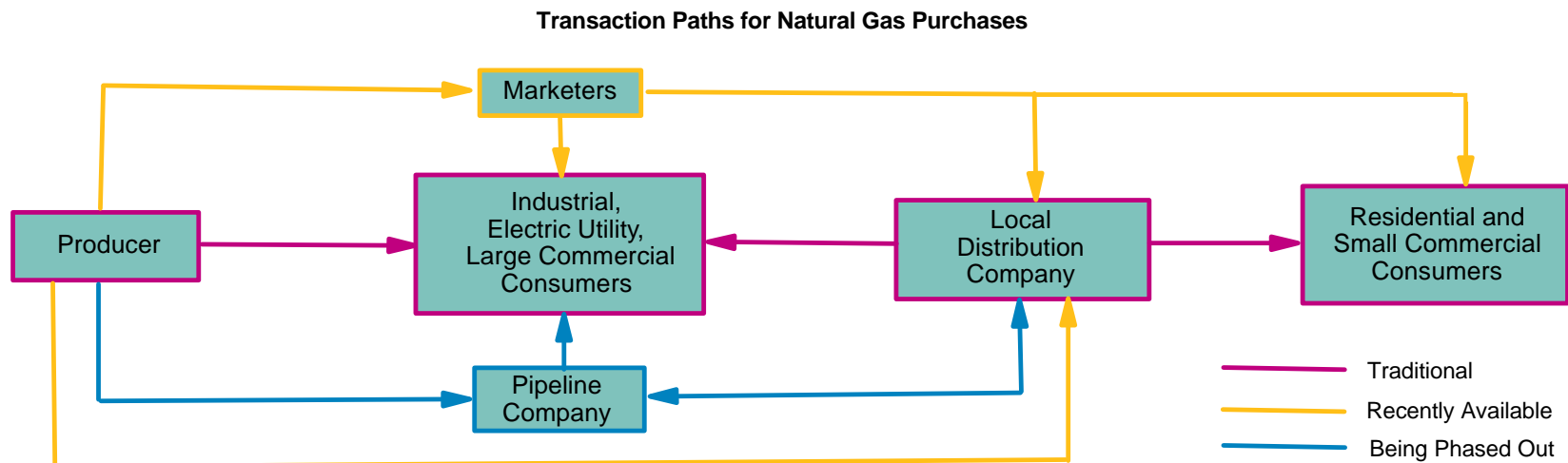
<sup>4</sup> As of December 31 each year.

R=Revised data. P=Preliminary data.

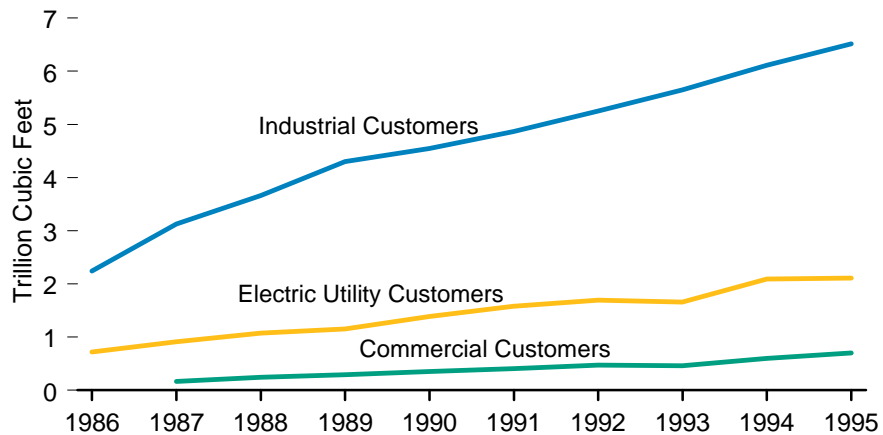
Sources: **Offshore** (Outer Continental Shelf): • 1960-1981—U.S. Geological Survey. • 1982-1985—The United States Minerals Management Service, *Mineral Revenues - The 1989 Report on Receipts from Federal and Indian Leases*, and predecessor annual reports. • 1986—Energy Information Administration (EIA), *Natural Gas Annual 1990, Volume 1* (December 1991), Table 4. • 1987—EIA,

*Natural Gas Annual 1991* (October 1992), Table 4. • 1988—EIA, *Natural Gas Annual 1992, Volume 1* (November 1993), Table 4. • 1989-1994—EIA, *Natural Gas Annual 1994* (November 1995), Table 4. • 1995—The United States Minerals Management Service. **Gross Withdrawals:** • 1960-1966—Bureau of Mines, *Minerals Yearbook*, "Natural Gas" chapter. • 1967-1988—EIA, *Natural Gas Annual 1992, Volume 2* (November 1993), Table 5. • 1989-1994—EIA, *Natural Gas Annual 1994* (November 1995), Table 3. • 1995—EIA, estimated data. **All Other Data:** • 1960-1966—Bureau of Mines, *Natural Gas Production and Consumption*. • 1967-1992—EIA, *Natural Gas Annual 1992, Volume 2* (November 1993), Tables 5 and 6. • 1993-1995—EIA, *Natural Gas Annual 1995* (November 1996), Tables 3 and 5. • 1996—EIA, *Natural Gas Monthly* (March 1996), Table 1, and Gulf Publishing Company, *World Oil*, February 1997.

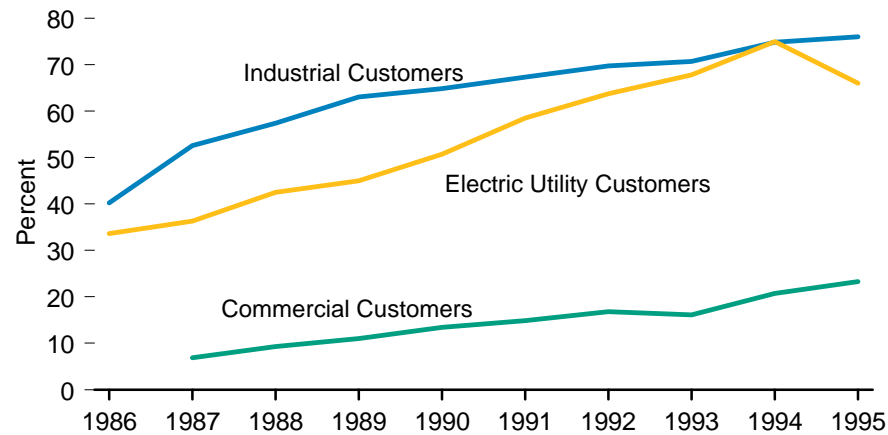
**Figure 6.5 Natural Gas Delivered for the Account of Others**



**Natural Gas Delivered for the Account of Others, 1986-1995**



**Account of Others Share of Total Deliveries to Sector, 1986-1995**



Source: Table 6.5.

**Table 6.5 Natural Gas Delivered for the Account of Others, 1986-1995**

Year	Commercial Customers			Industrial Customers			Electric Utilities <sup>1</sup>		
	Delivered for the Account of Others	Total Deliveries <sup>2</sup>	Account of Others Share of Total	Delivered for the Account of Others	Total Deliveries	Account of Others Share of Total	Delivered for the Account of Others	Total Deliveries	Account of Others Share of Total <sup>1</sup>
	Billion Cubic Feet		Percent	Billion Cubic Feet		Percent	Billion Cubic Feet		Percent
1986	NA	2,318	NA	2,240	5,579	40	721	2,602	34
1987	167	2,430	7	3,129	5,953	53	914	2,844	36
1988	247	2,670	9	3,663	6,383	57	1,076	2,636	43
1989	296	2,718	11	4,298	6,816	63	1,152	2,787	45
1990	353	2,623	13	4,545	7,018	65	1,390	2,787	51
1991	406	2,729	15	4,864	7,231	67	1,580	2,789	59
1992	471	2,803	17	5,249	7,527	70	1,697	2,766	64
1993	460	2,863	16	5,645	7,981	71	1,658	2,682	68
1994	599	2,897	21	<sup>R</sup> 6,113	<sup>R</sup> 8,167	75	2,092	2,987	75
1995	706	3,034	23	6,517	8,580	76	2,110	3,197	66

<sup>1</sup> For electric utilities, total deliveries data are from Energy Information Administration (EIA), Form EIA-759, "Monthly Power Plant Report"; deliveries for the account of others and their share of total deliveries are from EIA, Form EIA-176, "Annual Report of Natural and Supplemental Gas Supply and Disposition." Because of the different reporting universes for the two data collection forms, the account-of-others share of total deliveries for electric utilities cannot be derived from the data shown on this table.

<sup>2</sup> Small quantities of natural gas delivered for use as vehicle fuel are included for 1990-1993.

R=Revised data. NA=Not available.

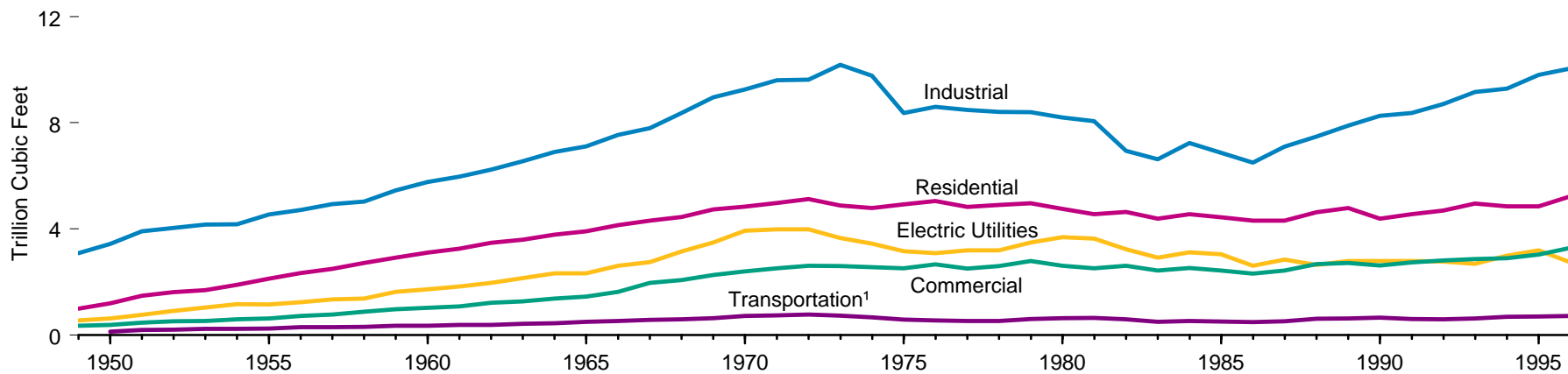
Notes: • Percentages are based on data prior to rounding. • Deliveries for the account of others are

deliveries to customers by transporters that do not own the natural gas but provide transportation services. These quantities may include gas covered by long-term contracts and quantities involved in short-term or spot market sales.

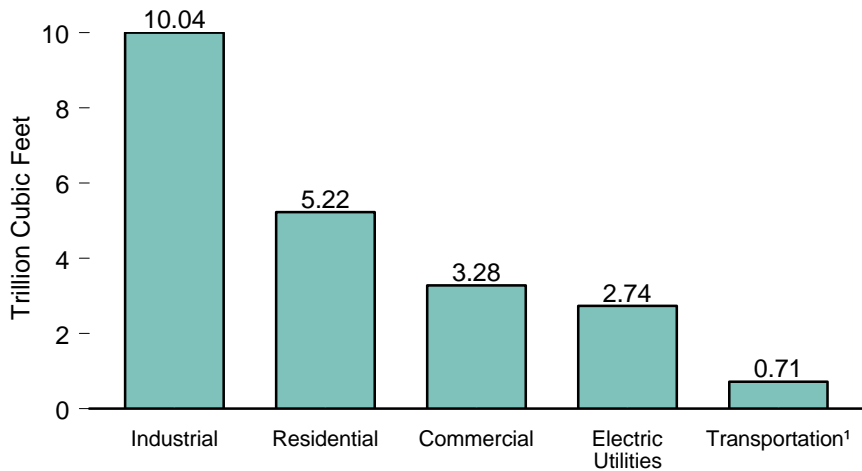
Sources: **Electric Utilities Total Deliveries:** EIA, Form EIA-759, "Monthly Power Plant Report." **All Other Data:** • 1986—EIA, *Natural Gas Annual 1990, Volume 1* (December 1991), Tables 17-20. • 1987—EIA, *Natural Gas Annual 1991* (October 1992), Tables 17-20. • 1988—EIA, *Natural Gas Annual 1992, Volume 1* (November 1993), Tables 17-20. • 1989 forward—EIA, *Natural Gas Annual 1995* (November 1996), Tables 16-18.

**Figure 6.6 Natural Gas Consumption by Sector**

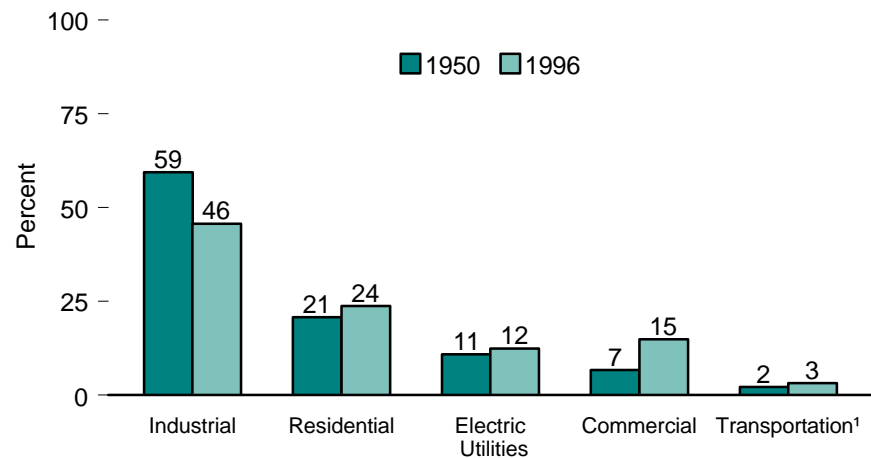
**By Sector, 1949-1996**



**By Sector, 1996**



**Shares<sup>2</sup> by Sector, 1950 and 1996**



<sup>1</sup> Pipeline fuel and vehicle fuel.

<sup>2</sup> Shares are based on data prior to rounding for publication and may not sum exactly to 100 percent.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 6.6.



**Table 6.6 Natural Gas Consumption by Sector, 1949-1996**  
(Trillion Cubic Feet)

Year	Residential	Commercial <sup>1</sup>	Industrial			Transportation			Electric Utilities	Total
			Lease and Plant Fuel	Other	Total	Pipeline Fuel <sup>2</sup>	Vehicle Fuel	Total		
1949	0.99	0.35	0.84	2.25	3.08	NA	NA	NA	0.55	4.97
1950	1.20	0.39	0.93	2.50	3.43	0.13	NA	0.13	0.63	5.77
1951	1.47	0.46	1.15	2.77	3.91	0.19	NA	0.19	0.76	6.81
1952	1.62	0.52	1.16	2.87	4.04	0.21	NA	0.21	0.91	7.29
1953	1.69	0.53	1.13	3.03	4.16	0.23	NA	0.23	1.03	7.64
1954	1.89	0.58	1.10	3.07	4.17	0.23	NA	0.23	1.17	8.05
1955	2.12	0.63	1.13	3.41	4.54	0.25	NA	0.25	1.15	8.69
1956	2.33	0.72	1.00	3.71	4.71	0.30	NA	0.30	1.24	9.29
1957	2.50	0.78	1.05	3.89	4.93	0.30	NA	0.30	1.34	9.85
1958	2.71	0.87	1.15	3.89	5.03	0.31	NA	0.31	1.37	10.30
1959	2.91	0.98	1.24	4.22	5.46	0.35	NA	0.35	1.63	11.32
1960	3.10	1.02	1.24	4.53	5.77	0.35	NA	0.35	1.72	11.97
1961	3.25	1.08	1.29	4.67	5.96	0.38	NA	0.38	1.83	12.49
1962	3.48	1.21	1.37	4.86	6.23	0.38	NA	0.38	1.97	13.27
1963	3.59	1.27	1.41	5.13	6.55	0.42	NA	0.42	2.14	13.97
1964	3.79	1.37	1.37	5.52	6.89	0.44	NA	0.44	2.32	14.81
1965	3.90	1.44	1.16	5.96	7.11	0.50	NA	0.50	2.32	15.28
1966	4.14	1.62	1.03	6.51	7.55	0.54	NA	0.54	2.61	16.45
1967	4.31	1.96	1.14	6.65	7.79	0.58	NA	0.58	2.75	17.39
1968	4.45	2.08	1.24	7.13	8.37	0.59	NA	0.59	3.15	18.63
1969	4.73	2.25	1.35	7.61	8.96	0.63	NA	0.63	3.49	20.06
1970	4.84	2.40	1.40	7.85	9.25	0.72	NA	0.72	3.93	21.14
1971	4.97	2.51	1.41	8.18	9.59	0.74	NA	0.74	3.98	21.79
1972	5.13	2.61	1.46	8.17	9.62	0.77	NA	0.77	3.98	22.10
1973	4.88	2.60	1.50	8.69	10.18	0.73	NA	0.73	3.66	22.05
1974	4.79	2.56	1.48	8.29	9.77	0.67	NA	0.67	3.44	21.22
1975	4.92	2.51	1.40	6.97	8.36	0.58	NA	0.58	3.16	19.54
1976	5.05	2.67	1.63	6.96	8.60	0.55	NA	0.55	3.08	19.95
1977	4.82	2.50	1.66	6.82	8.47	0.53	NA	0.53	3.19	19.52
1978	4.90	2.60	1.65	6.76	8.40	0.53	NA	0.53	3.19	19.63
1979	4.97	2.79	1.50	6.90	8.40	0.60	NA	0.60	3.49	20.24
1980	4.75	2.61	1.03	7.17	8.20	0.63	NA	0.63	3.68	19.88
1981	4.55	2.52	0.93	7.13	8.06	0.64	NA	0.64	3.64	19.40
1982	4.63	2.61	1.11	5.83	6.94	0.60	NA	0.60	3.23	18.00
1983	4.38	2.43	0.98	5.64	6.62	0.49	NA	0.49	2.91	16.83
1984	4.56	2.52	1.08	6.15	7.23	0.53	NA	0.53	3.11	17.95
1985	4.43	2.43	0.97	5.90	6.87	0.50	NA	0.50	3.04	17.28
1986	4.31	2.32	0.92	5.58	6.50	0.49	NA	0.49	2.60	16.22
1987	4.31	2.43	1.15	5.95	7.10	0.52	NA	0.52	2.84	17.21
1988	4.63	2.67	1.10	6.38	7.48	0.61	NA	0.61	2.64	18.03
1989	4.78	2.72	1.07	6.82	7.89	0.63	NA	0.63	2.79	18.80
1990	4.39	2.62	1.24	7.02	8.25	0.66	(s)	0.66	2.79	18.72
1991	4.56	2.73	1.13	7.23	8.36	0.60	(s)	0.60	2.79	19.04
1992	4.69	2.80	1.17	7.53	8.70	0.59	(s)	0.59	2.77	19.54
1993	4.96	2.86	1.17	7.98	9.15	0.62	(s)	0.62	2.68	20.28
1994	4.85	2.90	<sup>R</sup> 1.12	<sup>R</sup> 8.17	<sup>R</sup> 9.29	0.69	(s)	0.69	2.99	<sup>R</sup> 20.71
1995	<sup>R</sup> 4.85	<sup>R</sup> 3.03	<sup>R</sup> 1.22	<sup>R</sup> 8.58	<sup>R</sup> 9.80	<sup>R</sup> 0.70	(s)	<sup>R</sup> 0.70	<sup>R</sup> 3.20	<sup>R</sup> 21.58
1996 <sup>P</sup>	5.22	3.28	1.25	8.79	10.04	0.71	NA	0.71	2.74	21.99

<sup>1</sup> Includes deliveries to municipalities and public authorities for institutional heating and other purposes.

<sup>2</sup> Natural gas consumed in the operation of pipelines, primarily in compressors.

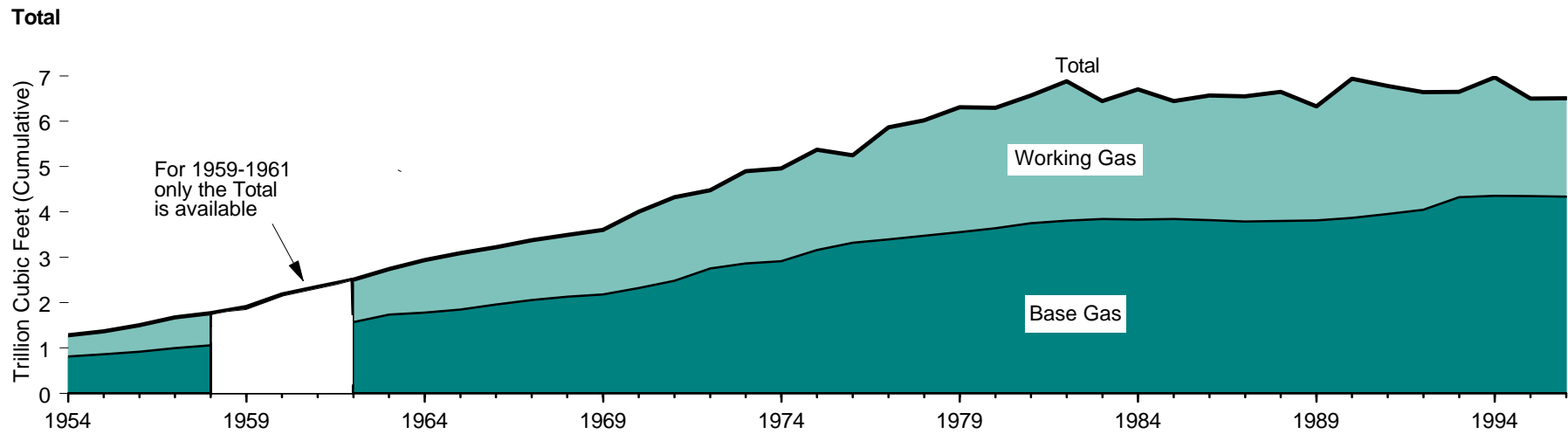
R=Revised data. P=Preliminary data. NA=Not available. (s)=Less than 5 billion cubic feet.

Notes: • For the definition of natural gas consumption, see Note 1 at end of section. • Beginning with

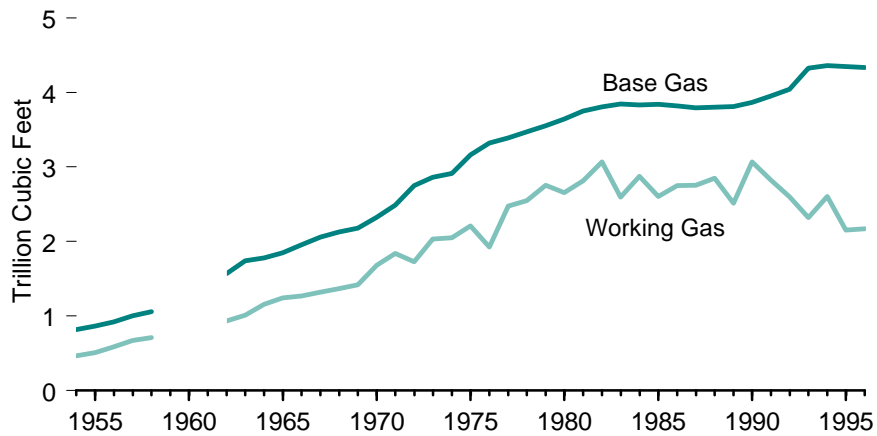
1965, all volumes are shown on a pressure base of 14.73 p.s.i.a. at 60° F. For prior years, the pressure base was 14.65 p.s.i.a. at 60° F. • Totals may not equal sum of components due to independent rounding.

Sources: • 1949-1993—Energy Information Administration (EIA), *Natural Gas Annual 1995* (November 1996), Table 101. • 1995 and 1996—EIA, *Natural Gas Monthly* (March 1997), Table 3.

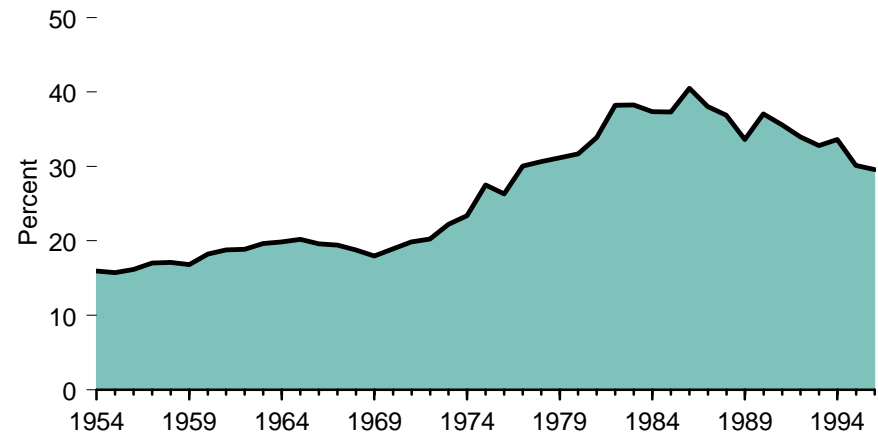
**Figure 6.7 Natural Gas in Underground Storage, End of Year 1954-1996**



**Base Gas and Working Gas**



**End-of-Year Storage as a Share of Total Consumption**



Note: Because vertical scales differ, graphs should not be compared.

Sources: Tables 6.6 and 6.7.

**Table 6.7 Natural Gas in Underground Storage, End of Year 1954-1996**  
(Billion Cubic Feet)

Year	Base Gas <sup>1</sup>	Working Gas	Total <sup>1</sup>
1954	817	465	1,281
1955	863	505	1,368
1956	919	583	1,502
1957	1,001	673	1,674
1958	1,056	708	1,764
1959	NA	NA	1,901
1960	NA	NA	2,184
1961	NA	NA	2,344
1962	1,571	933	2,504
1963	1,738	1,007	2,745
1964	1,781	1,159	2,940
1965	1,848	1,242	3,090
1966	1,958	1,267	3,225
1967	2,058	1,318	3,376
1968	2,128	1,366	3,495
1969	2,181	1,421	3,602
1970	2,326	1,678	4,004
1971	2,485	1,840	4,325
1972	2,751	1,729	4,480
1973	2,864	2,034	4,898
1974	2,912	2,050	4,962
1975	3,162	2,212	5,374
1976	3,323	1,926	5,250
1977	3,391	2,475	5,866
1978	3,473	2,547	6,020
1979	3,553	2,753	6,306
1980	3,642	2,655	6,297
1981	3,752	2,817	6,569
1982	3,808	3,071	6,879
1983	3,847	2,595	6,442
1984	3,830	2,876	6,706
1985	3,842	2,607	6,448
1986	3,819	2,749	6,567
1987	3,792	2,756	6,548
1988	3,800	2,850	6,650
1989	3,812	2,513	6,325
1990	3,868	3,068	6,936
1991	3,954	2,824	6,778
1992	4,044	2,597	6,641
1993	4,327	2,322	6,649
1994	<sup>R</sup> 4,360	<sup>R</sup> 2,606	<sup>R</sup> 6,966
1995	4,349	2,153	6,503
1996	4,335	2,170	6,505

<sup>1</sup> Includes native gas.

R=Revised data. NA=Not available.

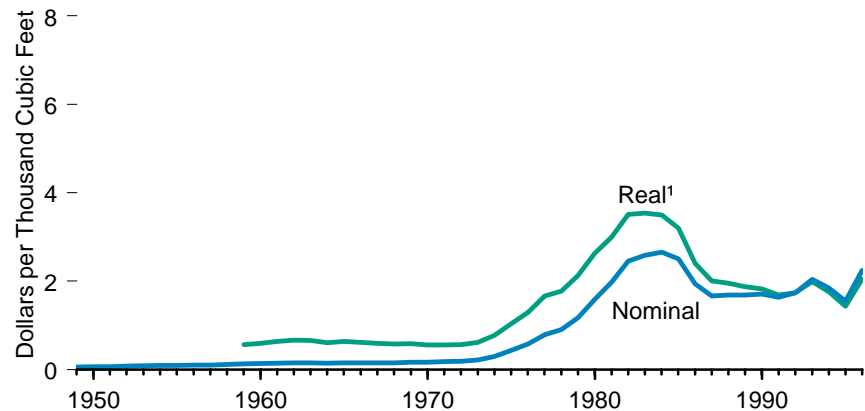
Notes: • Beginning with 1965, all volumes are shown on a pressure base of 14.73 p.s.i.a. at 60 degrees F. For prior years, the pressure base was 14.65 p.s.i.a. at 60 degrees F. • Totals may not equal sum of components due to independent rounding.

Sources: • 1954-1974—American Gas Association, *Gas Facts*. • 1975 and 1976—Federal Energy Administration, Form FEA-G318-M-O, "Underground Gas Storage Report," and Federal Power Commission, Form FPC-8, "Underground Gas Storage Report." • 1977 and 1978—Energy Information

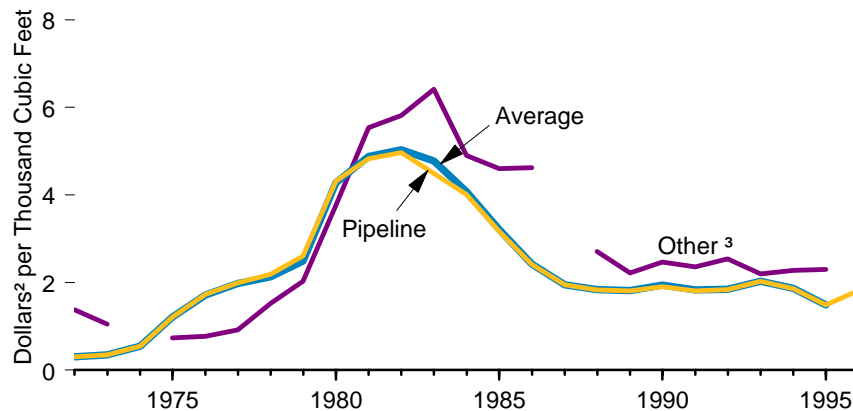
Administration (EIA), and Federal Energy Administration, Form FEA-G318-M-O, "Underground Gas Storage Report," and Federal Power Commission, Form FPC-8, "Underground Gas Storage Report." • 1979-1984—EIA, Form EIA-191, "Underground Gas Storage Report" and Federal Energy Regulatory Commission, Form FERC-8, "Underground Gas Storage Report." • 1985—EIA, *Natural Gas Monthly* (March 1991), Table 17. • 1986—EIA, *Natural Gas Monthly* (March 1992), Table 17. • 1987—EIA, *Natural Gas Monthly* (March 1993), Table 13. • 1988—EIA, *Natural Gas Monthly* (March 1994), Table 13. • 1989—EIA, *Natural Gas Monthly* (March 1995), Table 13. • 1990 forward—EIA, *Natural Gas Monthly* (March 1997), Table 9.

**Figure 6.8 Natural Gas Wellhead and Import Prices**

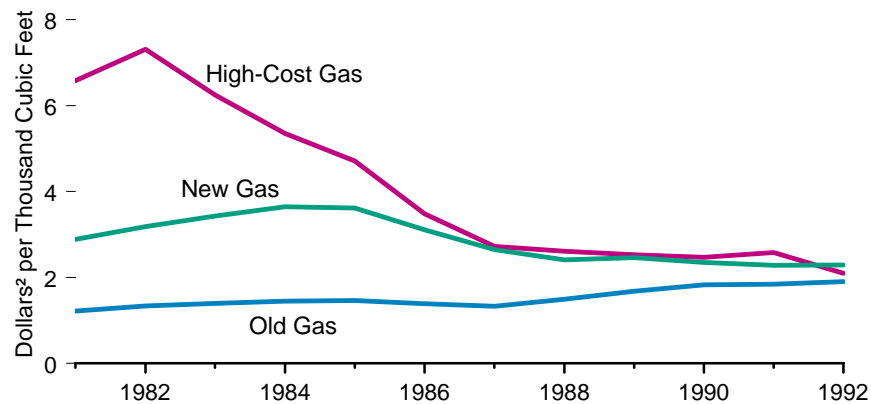
**Wellhead, 1949-1996**



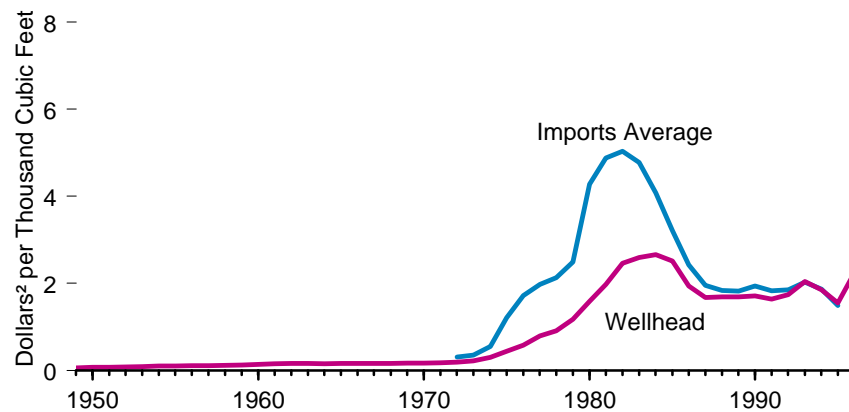
**Imports, 1972-1996**



**Purchases by NGPA⁴ Categories, 1981-1992**



**Domestic and Imported Average Prices, 1949-1996**



<sup>1</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>2</sup> Nominal dollars.

<sup>3</sup> In 1974 and 1987, all imports were by pipeline.

<sup>4</sup> NGPA=Natural Gas Policy Act.

Source: Table 6.8.

**Table 6.8 Natural Gas Wellhead and Import Prices, 1949-1996**  
(Dollars per Thousand Cubic Feet)

Year	Wellhead <sup>2</sup>		Purchases by NGPA Categories <sup>1</sup>			Imports		
			Old Gas	New Gas	High-Cost Gas	Pipeline	Other <sup>3</sup>	Average
	Nominal	Real <sup>4</sup>	Nominal	Nominal	Nominal	Nominal	Nominal	Nominal
1949	0.06	( <sup>5</sup> )	—	—	—	NA	NA	NA
1950	0.07	( <sup>5</sup> )	—	—	—	NA	NA	NA
1951	0.07	( <sup>5</sup> )	—	—	—	NA	NA	NA
1952	0.08	( <sup>5</sup> )	—	—	—	NA	NA	NA
1953	0.09	( <sup>5</sup> )	—	—	—	NA	NA	NA
1954	0.10	( <sup>5</sup> )	—	—	—	NA	NA	NA
1955	0.10	( <sup>5</sup> )	—	—	—	NA	NA	NA
1956	0.11	( <sup>5</sup> )	—	—	—	NA	NA	NA
1957	0.11	( <sup>5</sup> )	—	—	—	NA	NA	NA
1958	0.12	( <sup>5</sup> )	—	—	—	NA	NA	NA
1959	0.13	0.57	—	—	—	NA	NA	NA
1960	0.14	0.60	—	—	—	NA	NA	NA
1961	0.15	0.64	—	—	—	NA	NA	NA
1962	0.16	0.67	—	—	—	NA	NA	NA
1963	0.16	0.66	—	—	—	NA	NA	NA
1964	0.15	0.61	—	—	—	NA	NA	NA
1965	0.16	0.64	—	—	—	NA	NA	NA
1966	0.16	0.62	—	—	—	NA	NA	NA
1967	0.16	0.60	—	—	—	NA	NA	NA
1968	0.16	0.58	—	—	—	NA	NA	NA
1969	0.17	0.59	—	—	—	NA	NA	NA
1970	0.17	0.56	—	—	—	NA	NA	NA
1971	0.18	0.56	—	—	—	NA	NA	NA
1972	0.19	0.57	—	—	—	0.31	1.38	0.31
1973	0.22	0.62	—	—	—	0.35	1.05	0.35
1974	0.30	0.78	—	—	—	0.55	( <sup>6</sup> )	0.55
1975	0.44	1.04	—	—	—	1.21	0.74	1.21
1976	0.58	1.30	—	—	—	1.73	0.77	1.72
1977	0.79	1.67	—	—	—	1.99	0.92	1.98
1978	0.91	1.78	—	—	—	2.19	1.53	2.13
1979	1.18	2.13	—	—	—	2.61	2.03	2.49
1980	1.59	2.63	—	—	—	4.32	3.77	4.28
1981	1.98	3.00	1.22	2.89	6.58	4.83	5.54	4.88
1982	2.46	3.51	1.34	3.19	7.31	4.97	5.82	5.03
1983	2.59	3.54	1.40	3.43	6.25	4.49	6.41	4.78
1984	2.66	3.50	1.45	3.65	5.35	4.01	4.90	4.08
1985	2.51	3.20	1.47	3.62	4.71	3.17	4.60	3.21
1986	1.94	2.41	1.39	3.11	3.48	2.42	4.62	2.43
1987	1.67	2.01	1.33	2.65	2.72	1.95	( <sup>6</sup> )	1.95
1988	1.69	1.96	1.49	2.41	2.61	1.83	2.71	1.84
1989	1.69	1.88	1.68	2.46	2.53	1.81	2.22	1.82
1990	1.71	1.83	1.83	2.35	2.47	1.91	2.47	1.94
1991	1.64	1.69	1.84	2.28	2.58	1.81	2.36	1.83
1992	1.74	1.74	1.91	2.29	2.10	1.84	2.54	1.85
1993	2.04	1.99	—	—	—	<sup>R</sup> 2.03	2.20	2.03
1994	<sup>R</sup> 1.85	<sup>R</sup> 1.76	—	—	—	1.86	<sup>R</sup> 2.28	<sup>R</sup> 1.87
1995	<sup>R</sup> 1.55	<sup>R</sup> 1.44	—	—	—	<sup>R</sup> 1.49	<sup>R</sup> 2.30	<sup>R</sup> 1.49
1996 <sup>E</sup>	2.25	2.05	—	—	—	1.82	NA	NA

<sup>1</sup> Projected natural gas wellhead purchase prices by major interstate pipeline companies by Natural Gas Policy Act of 1978 categories. See Note 2 at end of section.

<sup>2</sup> See Glossary for definition of Natural Gas Wellhead Price.

<sup>3</sup> Primarily liquefied natural gas from Algeria.

<sup>4</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>5</sup> For 1949-1958, the gross domestic product implicit price deflators, which are used to convert nominal dollars to real (inflation-adjusted) values, were not available in time to use in this report.

<sup>6</sup> Not applicable. All imports were by pipeline.

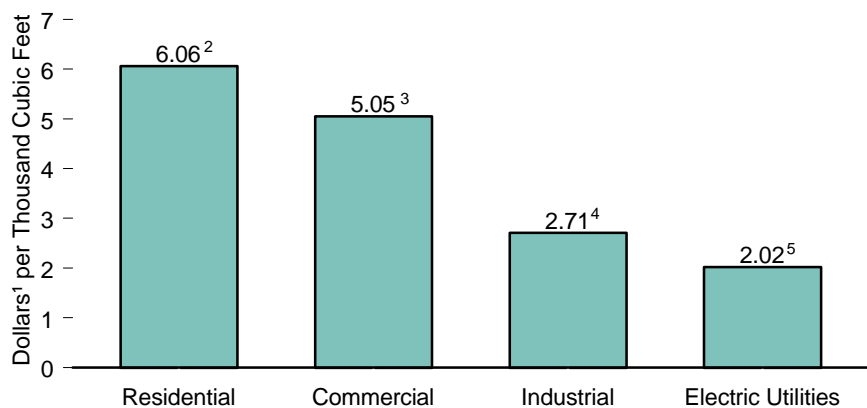
<sup>R</sup>=Revised data. <sup>E</sup>=Estimate. NA=Not available. — = Not applicable.

Sources: **Wellhead:** • 1949-1988—Energy Information Administration (EIA), *Natural Gas Annual 1993*

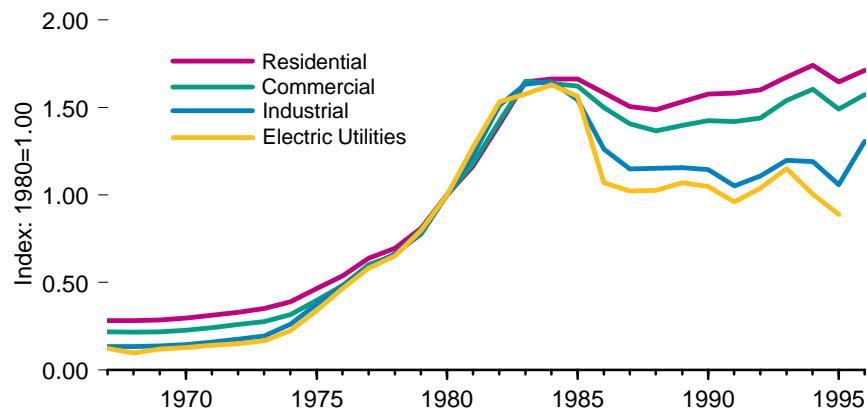
(October 1994), Table 99. • 1989 forward—EIA, *Natural Gas Monthly* (March 1996), Table 4. **Old Gas, 1981-1986 and New Gas, 1981:** EIA, *Natural Gas Monthly*, November 1987 (January 1988), Table 5. **New Gas, 1982-1986:** EIA, *Natural Gas Monthly*, January 1988 (March 1988), Table 5. **High-Cost Gas:** • 1981-1983—EIA, *Natural Gas Monthly*, December 1984 (February 1985), Table 22. • 1984-1986—EIA, *Natural Gas Monthly*, December 1987 (February 1988), Table 5. **Old Gas, New Gas, and High-Cost Gas:** • 1987-1992—EIA, *Natural Gas Monthly* (February 1993), Table 5. **Imports:** • 1972 and 1973—Federal Power Commission (FPC), *Pipeline Imports and Exports of Natural Gas - Imports and Exports of LNG*. • 1974-1976—FPC, *United States Imports and Exports of Natural Gas*, annual. • 1977-1988—EIA, *Natural Gas Monthly* (August 1994), Table FE7. • 1989 forward—EIA, *Natural Gas Monthly* (March 1997), Table 5.

**Figure 6.9 Natural Gas Prices by Sector**

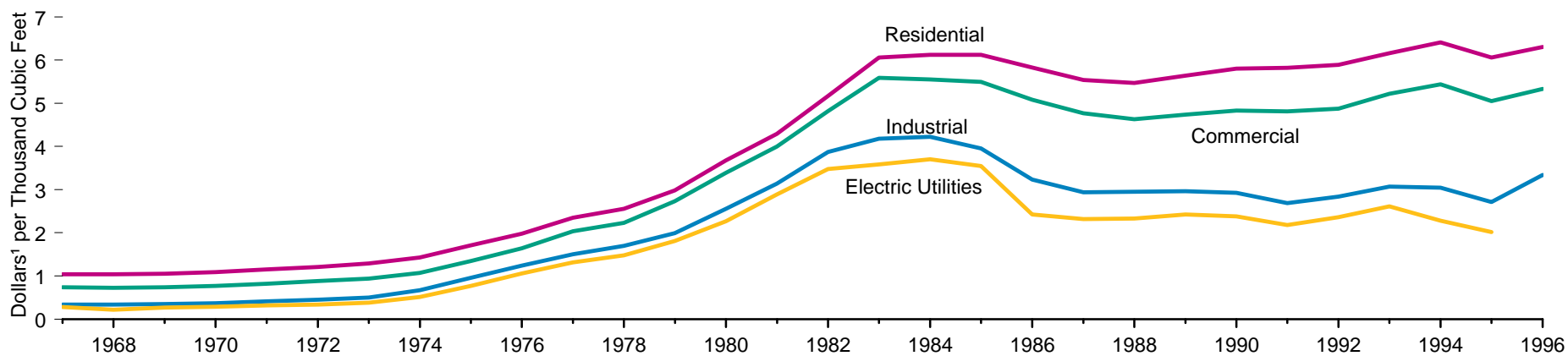
**Prices, 1995**



**Prices, Indexed, 1967-1996**



**Prices, 1967-1996**



<sup>1</sup> Nominal dollars.

<sup>2</sup> Based on 100 percent of volume delivered.

<sup>3</sup> Based on 76.7 percent of volume delivered.

<sup>4</sup> Based on 24.5 percent of volume delivered.

<sup>5</sup> Based on all steam-electric utility plants with a combined capacity of 50 megawatts or greater.

Source: Table 6.9.

**Table 6.9 Natural Gas Prices by Sector, 1967-1996**

(Price: Dollars<sup>1</sup> per Thousand Cubic Feet; Share of Total Volume Delivered: Percentage)

Year	Residential	Commercial <sup>2</sup>		Industrial		Vehicle Fuel <sup>3</sup>		Electric Utilities
	Price <sup>4</sup>	Price	Share of Total Volume Delivered	Price	Share of Total Volume Delivered	Price	Share of Total Volume Delivered	Price <sup>5</sup>
1967	1.04	0.74	NA	0.34	NA	NA	NA	0.28
1968	1.04	0.73	NA	0.34	NA	NA	NA	0.22
1969	1.05	0.74	NA	0.35	NA	NA	NA	0.27
1970	1.09	0.77	NA	0.37	NA	NA	NA	0.29
1971	1.15	0.82	NA	0.41	NA	NA	NA	0.32
1972	1.21	0.88	NA	0.45	NA	NA	NA	0.34
1973	1.29	0.94	NA	0.50	NA	NA	NA	0.38
1974	1.43	1.07	NA	0.67	NA	NA	NA	0.51
1975	1.71	1.35	NA	0.96	NA	NA	NA	0.77
1976	1.98	1.64	NA	1.24	NA	NA	NA	1.06
1977	2.35	2.04	NA	1.50	NA	NA	NA	1.32
1978	2.56	2.23	NA	1.70	NA	NA	NA	1.48
1979	2.98	2.73	NA	1.99	NA	NA	NA	1.81
1980	3.68	3.39	NA	2.56	NA	NA	NA	2.27
1981	4.29	4.00	NA	3.14	NA	NA	NA	2.89
1982	5.17	4.82	NA	3.87	85.1	NA	NA	3.48
1983	6.06	5.59	NA	4.18	80.7	NA	NA	3.58
1984	6.12	5.55	NA	4.22	74.7	NA	NA	3.70
1985	6.12	5.50	NA	3.95	68.8	NA	NA	3.55
1986	5.83	5.08	NA	3.23	59.8	NA	NA	2.43
1987	5.54	4.77	93.1	2.94	47.4	NA	NA	2.32
1988	5.47	4.63	90.7	2.95	42.6	NA	NA	2.33
1989	5.64	4.74	89.1	2.96	36.9	NA	NA	2.43
1990	5.80	4.83	86.6	2.93	35.2	3.39	NA	2.38
1991	5.82	4.81	85.1	2.69	32.7	3.96	NA	2.18
1992	5.89	4.88	83.2	2.84	30.3	4.05	NA	2.36
1993	6.16	5.22	83.9	3.07	29.7	4.27	87.8	2.61
1994	6.41	5.44	79.3	3.05	25.5	4.13	86.9	2.28
1995	6.06	<sup>R</sup> 5.05	<sup>R</sup> 76.7	<sup>R</sup> 2.71	<sup>R</sup> 24.5	<sup>R</sup> 3.98	<sup>R</sup> 86.6	<sup>R</sup> 2.02
1996 <sup>P</sup>	6.30	5.33	70.4	3.34	17.6	NA	NA	NA

<sup>1</sup> Nominal dollars.

<sup>2</sup> Includes deliveries to municipalities and public authorities for institutional heating and other purposes.

<sup>3</sup> Much of the natural gas delivered for vehicle fuel represents deliveries to fueling stations that are used primarily or exclusively by respondents' fleet vehicles. Thus, the prices are often those associated with the operation of fleet vehicles.

<sup>4</sup> Based on 100 percent of volume delivered.

<sup>5</sup> Based on all steam-electric utility plants with a combined capacity of 50 megawatts or greater.

R=Revised data. P=Preliminary data. NA=Not available.

Notes: • Natural gas includes supplemental gaseous fuels. • Residential, commercial, and industrial

price data represent prices of natural gas sold and delivered by local distribution companies to residential, commercial, and industrial consumers, respectively. The data do not reflect prices of natural gas transported for the account of others. • The average for each end-use sector is calculated by dividing the total value of the gas consumed by each sector by the total quantity consumed. See Note 1 at end of section.

Sources: **Vehicle Fuel:** • 1990-1995—EIA, *Natural Gas Annual 1995* (November 1996), Table 102. **All Other Data:** • 1967-1989—EIA, *Natural Gas Annual 1994* (November 1995), Table 102. • 1990 forward—EIA, *Natural Gas Monthly* (March 1997), Table 4.

## Natural Gas Notes

1. Natural gas consumption statistics are compiled from surveys of natural gas production, transmission, and distribution companies and electric utility companies. Consumption by sector from these surveys is compiled on a national and individual State basis and then balanced with national and individual State supply data. Included in the data are the following: Commercial Sector—consumption by nonmanufacturing establishments, by municipalities for institutional heating and lighting, and those engaged in agriculture, forestry, and fishing; Electric Utility Sector—consumption by electric utilities for the generation of electric power; Industrial Sector—consumption by establishments engaged primarily in processing unfinished materials into another form of product (includes mining, petroleum refining, manufacturing,

and natural gas industry use for lease and plant fuel); Residential Sector—consumption by private households for space heating, cooking, and other household uses; Transportation Sector—natural gas transmission (pipeline) fuel.

### 2. **Natural Gas Prices by Natural Gas Policy Act of 1978 (NGPA)**

**Categories: Old Gas:** Includes natural gas dedicated to interstate commerce and natural gas purchased under existing interstate or roll-over contracts (NGPA Sections 104, 105, and 106). **New Gas:** Includes new natural gas and certain natural gas produced from the Outer Continental Shelf, stripper well gas, and other new gas categories (NGPA Sections 102, 103, 108, and 109). **High-Cost Gas:** Includes natural gas from deep wells and low permeability (tight) reservoirs and unregulated gas (NGPA Section 107).



# 7. Coal

## Changing Patterns of Coal Production

In 1996, estimated production of all types of coal totaled 1,063 million short tons, a record high and nearly 3 percent above the 1995 total (7.1).<sup>\*</sup> Of all coal production, bituminous and subbituminous coal accounted for by far the largest share (91 percent) in 1996 (7.2). Lignite and anthracite accounted for the remainder of coal produced. Anthracite, which is mined in northeastern Pennsylvania and is known for its superior burning qualities, commands a much higher price and accounts for a diminishing share of total coal production. In 1949, anthracite accounted for 8.9 percent of the total; by 1996, its share had shrunk to 0.4 percent.

More coal is mined east of the Mississippi than in the West, but the West's share of total production increased almost every year after 1965 (7.2), when production of western coal was 27 million short tons, 5.2 percent of the total. By 1996, western production had increased by nearly a factor of 19, to 505 million short tons (48 percent of the total). The growth in western coal production was due in part to environmental concerns that led to increased demand for low-sulfur coal, which is concentrated in the West. Surface mining, with its higher average productivity, is also much more prevalent in the West.

Production of coke, which is generally made from bituminous coal, trended downward during the 1949-to-1995 period, particularly after 1981. In 1996, coke production totaled 23 million short tons (7.7). The decline in coke production was due to a decline in the use of coke by the U.S. iron and steel industry, the principal consumer of coke.

## Domestic Markets: Changes in Coal End Use

Electric utilities are the dominant consumers of coal (7.3). Their consumption grew from 84 million short tons, a 17-percent share, in 1949, to 874 million short tons, an 87-percent share, in 1996. By contrast, consumption by all other economic sectors in 1996 was lower than it had

*\*Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications. Percentages and numbers in text are calculated by using data in the tables.*

been in 1949. The most dramatic declines occurred in the transportation sector, where railroads switched to petroleum, and in the residential and commercial sector. In 1949, those two sectors accounted for 187 million short tons, 39 percent of total coal consumption. By 1996, their consumption totaled 6.0 million short tons, less than 1 percent of U.S. coal consumption.

Consumption by the industrial sector, including coke plants, trended downward after the mid-1960's. From 205 million short tons in 1966, industrial consumption fell to about 112 million short tons in 1986 and 1987. In 1988, growth in manufacturing activity was accompanied by a modest increase in industrial consumption, which rose to 118 million short tons. In 1989, industrial consumption fell to 117 million short tons, and, through 1996, slow growth in the economy restrained industrial demand for coal. In 1996, industrial consumption totaled 103 million short tons, down 3.0 percent from the 1995 level.

### Coal Mining Productivity

The average productivity of all types of mines in the United States increased each year from 1949 to 1969, when it reached 2.4 short tons per miner hour (7.6). Productivity during the 1970's and early 1980's was lower, due primarily to the coal industry's compliance with the Federal Coal Mine Health and Safety Act of 1969, as well as to environmental and other factors.

The growing importance of surface coal mining, where productivity is generally higher than for underground mining, and the closing of non-productive mines, led to increases in average productivity during the 1980's and 1990's. In 1995, average productivity in all types of mines (excluding anthracite) reached an all-time high of 5.4 short tons per miner hour. That year, productivity of underground mines (excluding anthracite) was 3.4 short tons per miner hour and productivity of surface mines (excluding anthracite) was 8.7 short tons per miner hour.

## Foreign Markets

Since World War II, coal has been the United States' major energy export (1.4). Throughout most of the 1960's and 1970's, U.S. exports of coal increased, peaking at 113 million short tons in 1981 (7.4). Increased shipments to Canada, Japan, and European markets contributed to the growth. The level of U.S. coal exports fluctuated throughout the 1980's, falling as low as 78 million short tons in 1983 but attaining 95 million short tons in 1988. That year, difficulties experienced by competing countries (particularly China, Australia, and Poland) allowed the United States to recapture some export markets, and thereafter coal exports rose each year through 1991, when coal exports totaled 109 million short tons. In 1992, coal exports fell to 103 million short tons and in 1993, the continuing weakness of the European economy and ongoing subsidies for domestic European coal caused exports to fall dramatically to 75 million short tons. In 1994, coal exports fell to 71 million short tons, the lowest level in 15 years. In 1995 and 1996, however, coal exports to almost all countries increased and the U.S. total rose to 91 million short tons, up 27 percent from the 1994 level. Canada, Japan, and Italy remained the three largest foreign purchasers of U.S. coal.

## Prices

In 1996, the average real price<sup>1</sup> of bituminous coal and lignite at the minemouth fell to \$16.63 per short ton, down for the seventeenth year in a row (7.8). The 1996 price was nearly two-thirds lower than the peak real price of \$45.57 per short ton recorded in 1975. The average real price of anthracite of \$36.93 per short ton was less than half the 1975 peak of \$76.45 per short ton. The decline in coal prices was the result of gains in

<sup>1</sup>Real (inflation-adjusted) prices are expressed in chained (1992) dollars.

productivity, the expanded use of longwall mining in underground mines, and the increased use of less-expensive western coal.

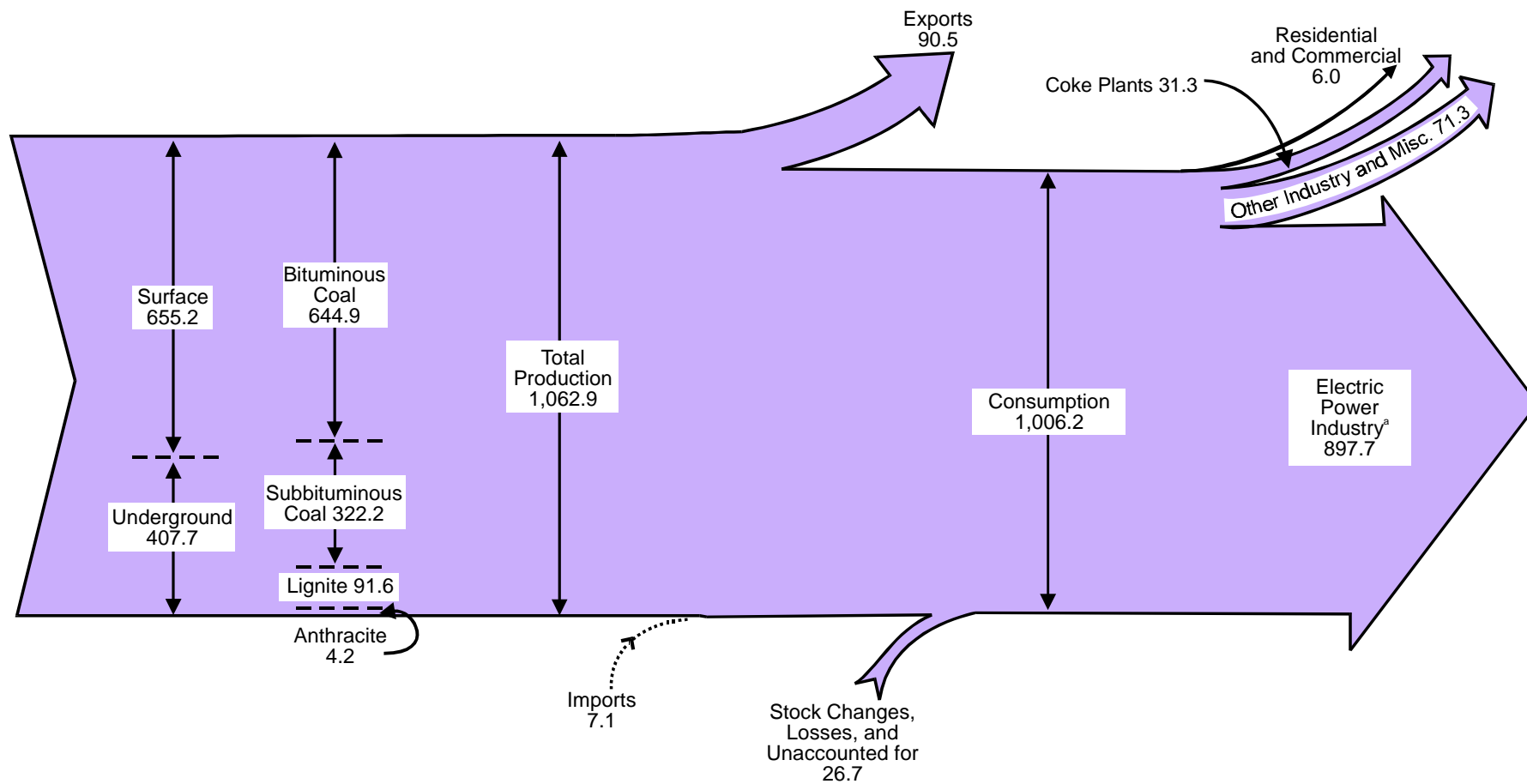
From 1961 on, electric utilities were the primary consumers of coal (7.3). Throughout the 1960's, the average real price of coal delivered to electric utilities declined (7.8). However, when prices of other fossil fuels rose rapidly after 1973, coal prices at electric utilities also increased, from \$25.45 per short ton in 1973 to \$40.16 per short ton the following year. (Despite that increase, coal remained the least expensive fossil fuel, on a Btu basis.) The price of coal at electric utilities gradually rose after 1974, peaking at \$49.80 per short ton in 1982, and then declined each year through 1996, by which time the price had fallen to \$24.11 per short ton.

## Stocks

Although there is little seasonal variation in demand, production of coal can vary considerably due to such factors as coal miners' strikes and bad weather. To compensate for possible supply interruptions, coal producers and distributors, as well as such major consumers as electric utilities and coke plants, generally maintain large stockpiles. For example, wildcat strikes in 1989 resulted in year-end stocks of 175 million short tons, the lowest level since 1978 (7.5). Similarly, in 1993, a series of strikes by the United Mine Workers of America led to lower levels of coal production and stocks were drawn down to compensate. At year end, coal stocks totaled 146 million short tons. In 1994, a major stock build-up by electric utilities brought year-end stocks to 169 million short tons, where they remained for 1995. However, stocks at the end of 1996 were 8 percent lower, due primarily to drawdowns by electric utilities.

In 1996, electric utilities held 74 percent of the coal. Coal producers and distributors held most of the remainder. Stocks at coke plants and other industrial sites were relatively small.

**Diagram 4. Coal Flow, 1996**  
(Million Short Tons)

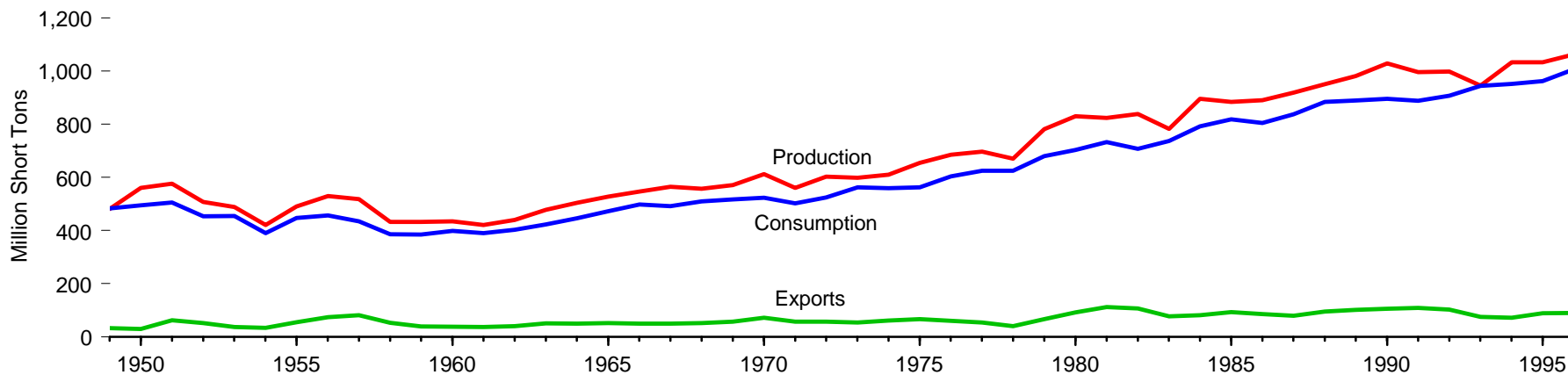


<sup>a</sup> Includes 24.0 million short tons consumed by independent power producers.  
Notes: • Data are preliminary. • Totals may not equal sum of components due to independent rounding.

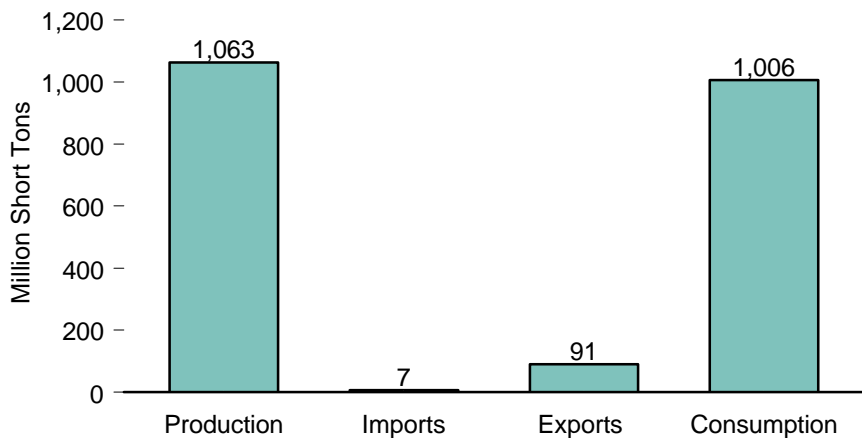
Sources: Tables 7.1, 7.2, and 7.3.

**Figure 7.1 Coal Overview**

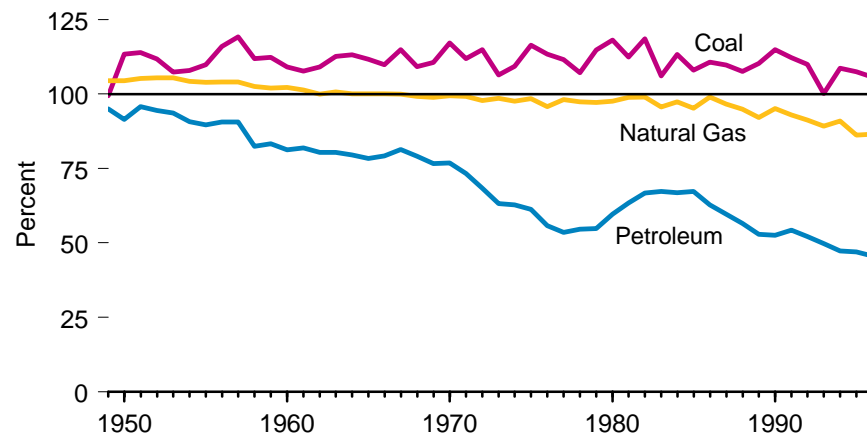
**Overview, 1949-1996**



**Overview, 1996**



**Production as Share of Consumption by Type of Fossil Fuel, 1949-1996**



Sources: Tables 5.1, 6.1, and 7.1.

**Table 7.1 Coal Overview, 1949-1996**  
(Million Short Tons)

Year	Production	Imports	Exports	Stock Changes, Losses, and Unaccounted for <sup>1</sup>	Consumption <sup>2</sup>
1949	480.6	0.3	32.8	35.1	483.2
1950	560.4	0.4	29.4	-37.3	494.1
1951	576.3	0.3	62.7	-8.1	505.9
1952	507.4	0.3	52.2	-1.4	454.1
1953	488.2	0.3	36.5	2.8	454.8
1954	420.8	0.2	33.9	2.8	389.9
1955	490.8	0.3	54.4	10.3	447.0
1956	529.8	0.4	73.8	0.5	456.9
1957	518.0	0.4	80.8	-3.2	434.5
1958	431.6	0.3	52.6	6.4	385.7
1959	432.7	0.4	39.0	-9.0	385.1
1960	434.3	0.3	38.0	1.5	398.1
1961	420.4	0.2	36.4	6.2	390.4
1962	439.0	0.2	40.2	3.2	402.3
1963	477.2	0.3	50.4	-3.6	423.5
1964	504.2	0.3	49.5	-9.3	445.7
1965	527.0	0.2	51.0	-4.1	472.0
1966	546.8	0.2	50.1	0.8	497.7
1967	564.9	0.2	50.1	-23.6	491.4
1968	556.7	0.2	51.2	4.1	509.8
1969	571.0	0.1	56.9	2.2	516.4
1970	612.7	(s)	71.7	-17.7	523.2
1971	560.9	0.1	57.3	-2.2	501.6
1972	602.5	(s)	56.7	-21.5	524.3
1973	598.6	0.1	53.6	17.5	562.6
1974	610.0	2.1	60.7	7.0	558.4
1975	654.6	0.9	66.3	-26.6	562.6
1976	684.9	1.2	60.0	-22.3	603.8
1977	697.2	1.6	54.3	-19.2	625.3
1978	670.2	3.0	40.7	-7.2	625.2
1979	781.1	2.1	66.0	-36.6	680.5
1980	829.7	1.2	91.7	-36.4	702.7
1981	823.8	1.0	112.5	20.3	732.6
1982	838.1	0.7	106.3	-25.7	706.9
1983	782.1	1.3	77.8	31.1	736.7
1984	895.9	1.3	81.5	-24.4	791.3
1985	883.6	2.0	92.7	25.1	818.0
1986	890.3	2.2	85.5	-2.8	804.2
1987	918.8	1.7	79.6	-4.0	836.9
1988	950.3	2.1	95.0	26.3	883.6
1989	980.7	2.9	100.8	6.9	889.7
1990	1,029.1	2.7	105.8	-30.5	895.5
1991	996.0	3.4	109.0	-2.8	887.6
1992	997.5	3.8	102.5	R8.4	R2907.3
1993	945.4	7.3	74.5	R65.5	R943.7
1994	1,033.5	7.6	71.4	R-18.7	R951.1
1995	R1,033.0	7.2	88.5	R10.2	R961.8
1996	1,062.9	7.1	90.5	26.7	1,006.2

<sup>1</sup> Includes changes in stocks at electric utilities, coke plants, other industries, retail dealers, producers/distributors, and the balancing item of losses and unaccounted for.

<sup>2</sup> Independent power producers' use of coal (nonutility power producers in SIC 49, "Electric Services") are included beginning in 1992. See Table 7.3.

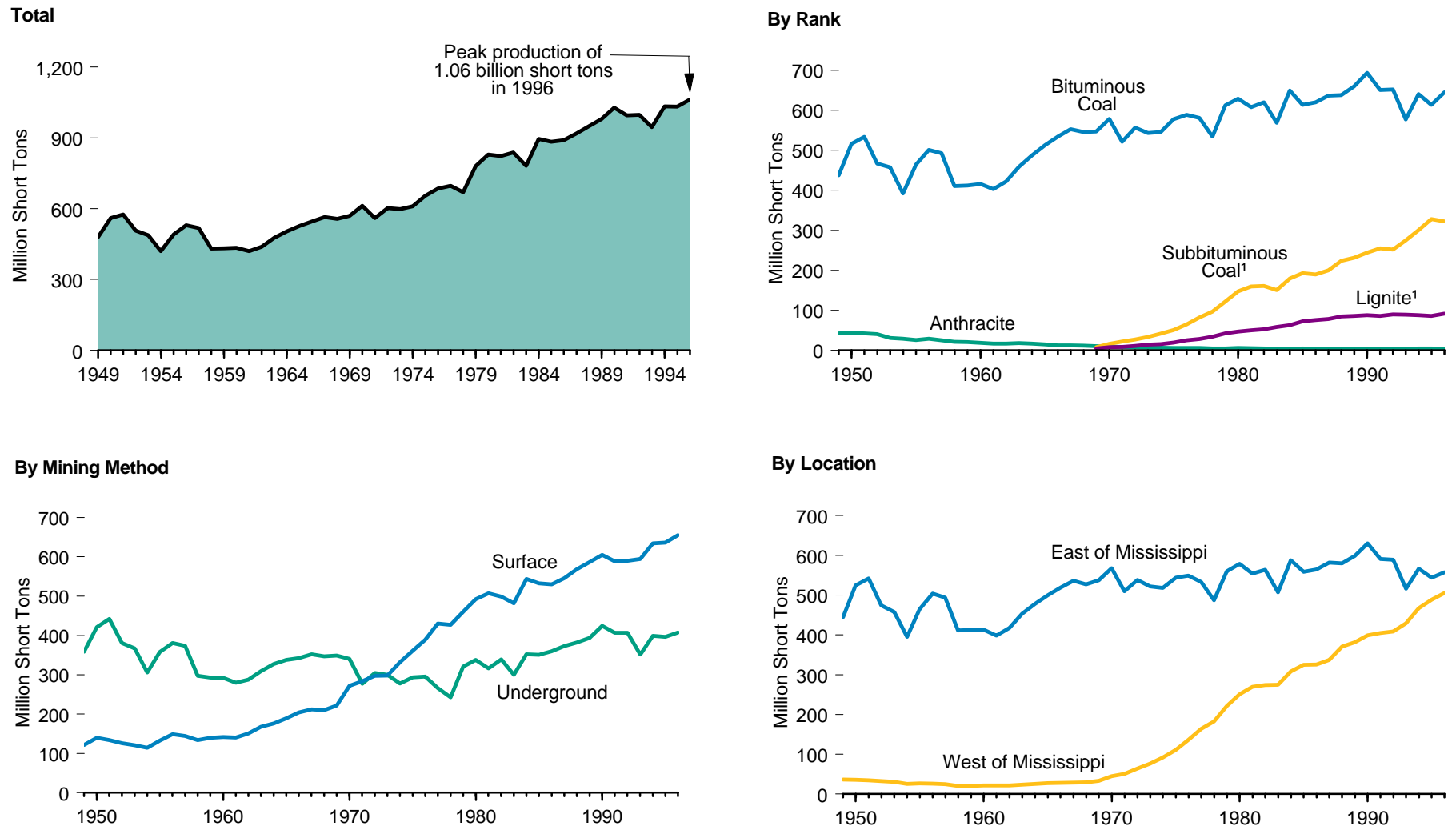
R=Revised data. (s)=Less than 0.05 million short tons.

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

Sources: • 1949-1975—Bureau of Mines, *Minerals Yearbook*, "Coal-Bituminous and Lignite" and

"Coal-Pennsylvania Anthracite" chapters. • 1976—Energy Information Administration (EIA), *Energy Data Report, Coal-Bituminous and Lignite in 1976 and Coal-Pennsylvania Anthracite 1976*. • 1977 and 1978—EIA, *Energy Data Reports, Bituminous Coal and Lignite Production and Mine Operations-1977; 1978 and Coal-Pennsylvania Anthracite 1977; 1978*. • 1979 and 1980—EIA, *Energy Data Report, Weekly Coal Report*. • 1981-1995—EIA, *Weekly Coal Production, Coal Production (annual), Coal Industry Annual 1996*, (October 1996), and *Quarterly Coal Report October-December 1996* (May 1997), Table 1. • 1996—Tables 7.2, 7.3, and 7.4 of this report, and EIA, *Monthly Energy Review* (March 1997), Table 6.1.

**Figure 7.2 Coal Production, 1949-1996**



<sup>1</sup> Included with bituminous coal prior to 1969.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 7.2.

**Table 7.2 Coal Production, 1949-1996**  
(Million Short Tons)

Year	Rank				Mining Method		Location		Total
	Bituminous Coal	Subbituminous Coal	Lignite	Anthracite	Underground	Surface	West of the Mississippi	East of the Mississippi	
1949	437.9	( <sup>1</sup> )	( <sup>1</sup> )	42.7	358.9	121.7	36.4	444.2	480.6
1950	516.3	( <sup>1</sup> )	( <sup>1</sup> )	44.1	421.0	139.4	36.0	524.4	560.4
1951	533.7	( <sup>1</sup> )	( <sup>1</sup> )	42.7	442.2	134.2	34.6	541.7	576.3
1952	466.8	( <sup>1</sup> )	( <sup>1</sup> )	40.6	381.2	126.3	32.7	474.8	507.4
1953	457.3	( <sup>1</sup> )	( <sup>1</sup> )	30.9	367.4	120.8	30.6	457.7	488.2
1954	391.7	( <sup>1</sup> )	( <sup>1</sup> )	29.1	306.0	114.8	25.4	395.4	420.8
1955	464.6	( <sup>1</sup> )	( <sup>1</sup> )	26.2	358.0	132.9	26.6	464.2	490.8
1956	500.9	( <sup>1</sup> )	( <sup>1</sup> )	28.9	380.8	148.9	25.8	504.0	529.8
1957	492.7	( <sup>1</sup> )	( <sup>1</sup> )	25.3	373.6	144.5	24.7	493.4	518.0
1958	410.4	( <sup>1</sup> )	( <sup>1</sup> )	21.2	297.6	134.0	20.3	411.3	431.6
1959	412.0	( <sup>1</sup> )	( <sup>1</sup> )	20.6	292.8	139.8	20.3	412.4	432.7
1960	415.5	( <sup>1</sup> )	( <sup>1</sup> )	18.8	292.6	141.7	21.3	413.0	434.3
1961	403.0	( <sup>1</sup> )	( <sup>1</sup> )	17.4	279.6	140.9	21.8	398.6	420.4
1962	422.1	( <sup>1</sup> )	( <sup>1</sup> )	16.9	287.9	151.1	21.4	417.6	439.0
1963	458.9	( <sup>1</sup> )	( <sup>1</sup> )	18.3	309.0	168.2	23.7	453.5	477.2
1964	487.0	( <sup>1</sup> )	( <sup>1</sup> )	17.2	327.7	176.5	25.7	478.5	504.2
1965	512.1	( <sup>1</sup> )	( <sup>1</sup> )	14.9	338.0	189.0	27.4	499.5	527.0
1966	533.9	( <sup>1</sup> )	( <sup>1</sup> )	12.9	342.6	204.2	28.0	518.8	546.8
1967	552.6	( <sup>1</sup> )	( <sup>1</sup> )	12.3	352.4	212.5	28.9	536.0	564.9
1968	545.2	( <sup>1</sup> )	( <sup>1</sup> )	11.5	346.6	210.1	29.7	527.0	556.7
1969	547.2	8.3	5.0	10.5	349.2	221.7	33.3	537.7	571.0
1970	578.5	16.4	8.0	9.7	340.5	272.1	44.9	567.8	612.7
1971	521.3	22.2	8.7	8.7	277.2	283.7	51.0	509.9	560.9
1972	556.8	27.5	11.0	7.1	305.0	297.4	64.3	538.2	602.5
1973	543.5	33.9	14.3	6.8	300.1	298.5	76.4	522.1	598.6
1974	545.7	42.2	15.5	6.6	278.0	332.1	91.9	518.1	610.0
1975	577.5	51.1	19.8	6.2	293.5	361.2	110.9	543.7	654.6
1976	588.4	64.8	25.5	6.2	295.5	389.4	136.1	548.8	684.9
1977	581.0	82.1	28.2	5.9	266.6	430.6	163.9	533.3	697.2
1978	534.0	96.8	34.4	5.0	242.8	427.4	183.0	487.2	670.2
1979	612.3	121.5	42.5	4.8	320.9	460.2	221.4	559.7	781.1
1980	628.8	147.7	47.2	6.1	337.5	492.2	251.0	578.7	829.7
1981	608.0	159.7	50.7	5.4	316.5	507.3	269.9	553.9	823.8
1982	620.2	160.9	52.4	4.6	339.2	499.0	273.9	564.3	838.1
1983	568.6	151.0	58.3	4.1	300.4	481.7	274.7	507.4	782.1
1984	649.5	179.2	63.1	4.2	352.1	543.9	308.3	587.6	895.9
1985	613.9	192.7	72.4	4.7	350.8	532.8	324.9	558.7	883.6
1986	620.1	189.6	76.4	4.3	360.4	529.9	325.9	564.4	890.3
1987	636.6	200.2	78.4	3.6	372.9	545.9	336.8	581.9	918.8
1988	638.1	223.5	85.1	3.6	382.2	568.1	370.7	579.6	950.3
1989	659.8	231.2	86.4	3.3	393.8	586.9	381.7	599.0	980.7
1990	693.2	244.3	88.1	3.5	424.5	604.5	398.9	630.2	1,029.1
1991	650.7	255.3	86.5	3.4	407.2	588.8	404.7	591.3	996.0
1992	651.9	252.1	90.1	3.5	407.2	590.3	409.0	588.6	997.5
1993	576.7	274.9	89.5	4.3	351.1	594.4	429.2	516.2	945.4
1994	640.3	300.5	88.1	4.6	399.1	634.4	467.2	566.3	1,033.5
1995	<sup>R</sup> 613.8	<sup>R</sup> 328.0	<sup>R</sup> 86.5	<sup>R</sup> 4.7	<sup>R</sup> 396.2	<sup>R</sup> 636.7	<sup>R</sup> 488.7	<sup>R</sup> 544.2	<sup>R</sup> 1,033.0
1996 <sup>E</sup>	644.9	322.2	91.6	4.2	407.7	655.2	505.1	557.8	1,062.9

<sup>1</sup> Included in bituminous coal.

R=Revised data. E=Estimate.

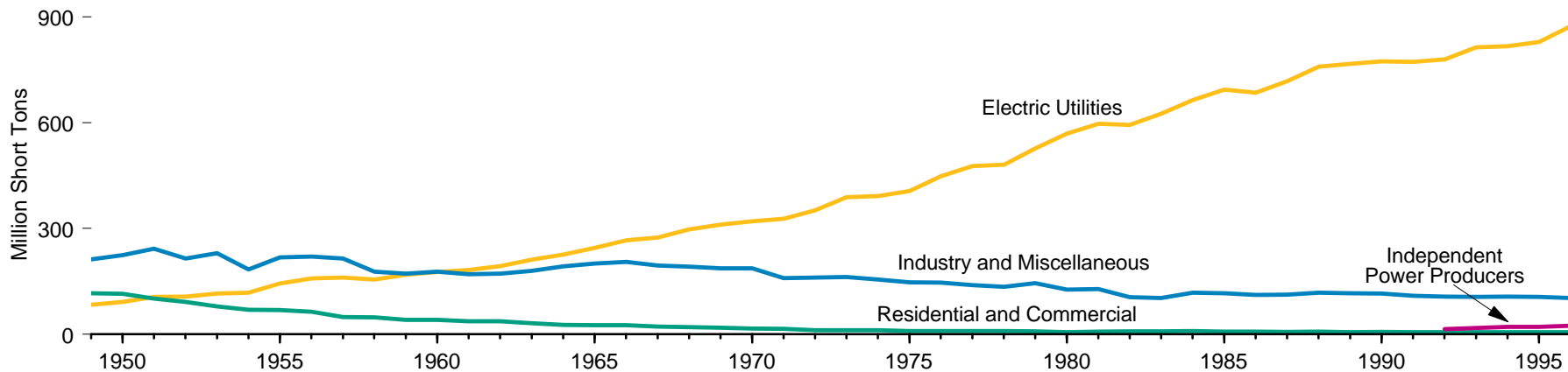
Note: Totals may not equal sum of components due to independent rounding.

Sources: • 1949-1975—Bureau of Mines, *Minerals Yearbook*, "Coal-Bituminous and Lignite" and "Coal-Pennsylvania Anthracite" chapters. • 1976—Energy Information Administration (EIA), Energy Data Report, *Coal-Bituminous and Lignite in 1976* and *Coal-Pennsylvania Anthracite 1976*. • 1977 and

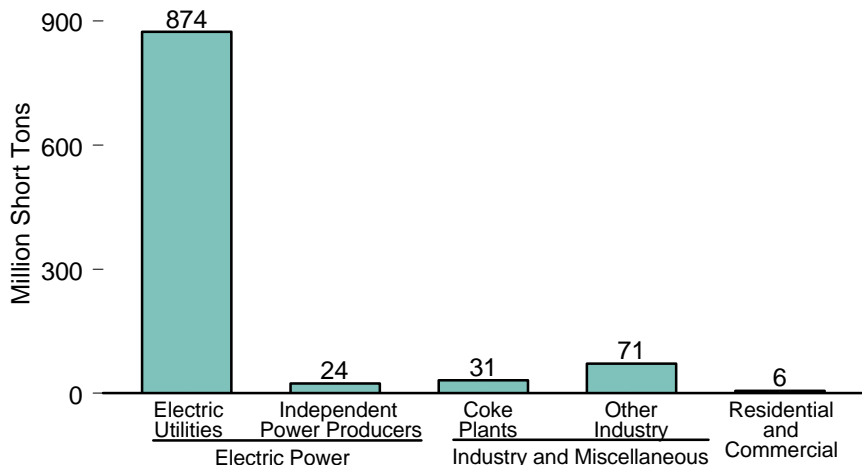
1978—EIA, Energy Data Report, *Bituminous Coal and Lignite Production and Mine Operations-1977; 1978, Coal-Pennsylvania Anthracite 1977; 1978, and Coal Production (annual)*. • 1979 and 1980—EIA, Energy Data Report, *Weekly Coal Report and Coal Production (annual)*. • 1981-1994—EIA, *Weekly Coal Production and Coal Production (annual)*. • 1995—EIA, *Coal Industry Annual 1995* (October 1996), Tables 1, 3, and 9. • 1996—EIA estimates.

**Figure 7.3 Coal Consumption by Sector**

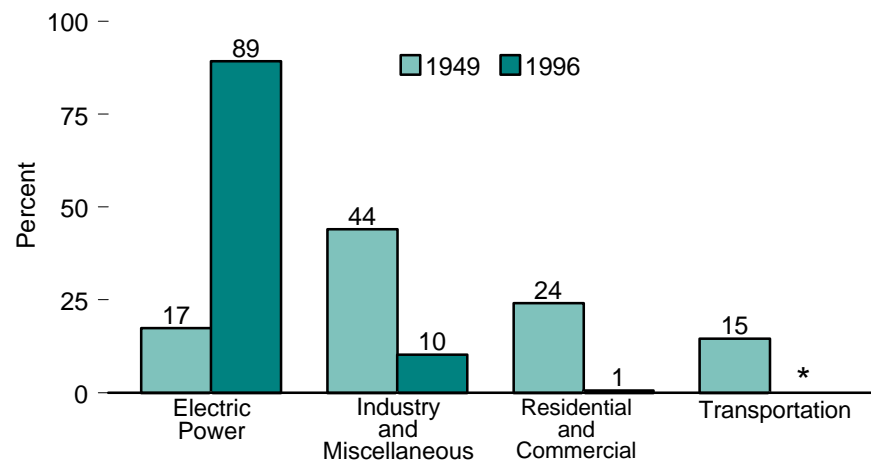
**By Sector, 1949-1996**



**By Sector, 1996**



**Shares by Sector, 1949 and 1996**



\* Small amounts of coal for transportation use are included in Industry and Miscellaneous.

Source: Table 7.3.



**Table 7.3 Coal Consumption by Sector, 1949-1996**  
(Million Short Tons)

Year	Residential and Commercial	Industry and Miscellaneous			Transportation	Electric Power Industry			Total
		Coke Plants	Other Industry <sup>1</sup> and Miscellaneous	Total		Electric Utilities	Independent Power Producers <sup>2</sup>	Total	
1949	116.5	91.4	121.2	212.6	70.2	84.0	NA	84.0	483.2
1950	114.6	104.0	120.6	224.6	63.0	91.9	NA	91.9	494.1
1951	101.5	113.7	128.7	242.4	56.2	105.8	NA	105.8	505.9
1952	92.3	97.8	117.1	214.9	39.8	107.1	NA	107.1	454.1
1953	79.2	113.1	117.0	230.1	29.6	115.9	NA	115.9	454.8
1954	69.1	85.6	98.2	183.9	18.6	118.4	NA	118.4	389.9
1955	68.4	107.7	110.1	217.8	17.0	143.8	NA	143.8	447.0
1956	64.2	106.3	114.3	220.6	13.8	158.3	NA	158.3	456.9
1957	49.0	108.4	106.5	214.9	9.8	160.8	NA	160.8	434.5
1958	47.9	76.8	100.5	177.4	4.7	155.7	NA	155.7	385.7
1959	40.8	79.6	92.7	172.3	3.6	168.4	NA	168.4	385.1
1960	40.9	81.4	96.0	177.4	3.0	176.7	NA	176.7	398.1
1961	37.3	74.2	95.9	170.1	0.8	182.2	NA	182.2	390.4
1962	36.5	74.7	97.1	171.7	0.7	193.3	NA	193.3	402.3
1963	31.5	78.1	101.9	180.0	0.7	211.3	NA	211.3	423.5
1964	27.2	89.2	103.1	192.4	0.7	225.4	NA	225.4	445.7
1965	25.7	95.3	105.6	200.8	0.7	244.8	NA	244.8	472.0
1966	25.6	96.4	108.7	205.1	0.6	266.5	NA	266.5	497.7
1967	22.1	92.8	101.8	194.6	0.5	274.2	NA	274.2	491.4
1968	20.0	91.3	100.4	191.6	0.4	297.8	NA	297.8	509.8
1969	18.9	93.4	93.1	186.6	0.3	310.6	NA	310.6	516.4
1970	16.1	96.5	90.2	186.6	0.3	320.2	NA	320.2	523.2
1971	15.2	83.2	75.6	158.9	0.2	327.3	NA	327.3	501.6
1972	11.7	87.7	72.9	160.6	0.2	351.8	NA	351.8	524.3
1973	11.1	94.1	68.0	162.1	0.1	389.2	NA	389.2	562.6
1974	11.4	90.2	64.9	155.1	0.1	391.8	NA	391.8	558.4
1975	9.4	83.6	63.6	147.2	(s)	406.0	NA	406.0	562.6
1976	8.9	84.7	61.8	146.5	(s)	448.4	NA	448.4	603.8
1977	9.0	77.7	61.5	139.2	(s)	477.1	NA	477.1	625.3
1978	9.5	71.4	63.1	134.5	( <sup>3</sup> )	481.2	NA	481.2	625.2
1979	8.4	77.4	67.7	145.1	( <sup>3</sup> )	527.1	NA	527.1	680.5
1980	6.5	66.7	60.3	127.0	( <sup>3</sup> )	569.3	NA	569.3	702.7
1981	7.4	61.0	67.4	128.4	( <sup>3</sup> )	596.8	NA	596.8	732.6
1982	8.2	40.9	64.1	105.0	( <sup>3</sup> )	593.7	NA	593.7	706.9
1983	8.4	37.0	66.0	103.0	( <sup>3</sup> )	625.2	NA	625.2	736.7
1984	9.1	44.0	73.7	117.8	( <sup>3</sup> )	664.4	NA	664.4	791.3
1985	7.8	41.1	75.4	116.4	( <sup>3</sup> )	693.8	NA	693.8	818.0
1986	7.7	35.9	75.6	111.5	( <sup>3</sup> )	685.1	NA	685.1	804.2
1987	6.9	37.0	75.2	112.1	( <sup>3</sup> )	717.9	NA	717.9	836.9
1988	7.1	41.9	76.3	118.1	( <sup>3</sup> )	758.4	NA	758.4	883.6
1989	6.2	40.5	76.1	116.6	( <sup>3</sup> )	766.9	NA	766.9	889.7
1990	6.7	38.9	76.3	115.2	( <sup>3</sup> )	773.5	NA	773.5	895.5
1991	6.1	33.9	75.4	109.3	( <sup>3</sup> )	772.3	NA	772.3	887.6
1992	6.2	32.4	74.0	106.4	( <sup>3</sup> )	779.9	14.8	779.7	R,4907.3
1993	6.2	31.3	74.9	106.2	( <sup>3</sup> )	813.5	17.8	831.3	4943.7
1994	6.0	31.7	75.2	106.9	( <sup>3</sup> )	817.3	20.9	838.1	4951.1
1995	5.8	33.0	72.8	105.8	( <sup>3</sup> )	829.0	21.2	850.2	4961.8
1996	6.0	31.3	71.3	102.6	( <sup>3</sup> )	873.7	E24.0	897.7	1,006.2

<sup>1</sup> See Note 2 at end of section.

<sup>2</sup> Standard Industrial Classification code 49, "Electric, Gas, and Sanitary Services."

<sup>3</sup> After 1977, small amounts of coal consumed by Transportation Sector are included in "Other Industry and Miscellaneous."

<sup>4</sup> There is a discontinuity in this time series between 1991 and 1992 due to the addition of the coal consumed by independent power producers beginning in 1992.

R=Revised data. E=Estimate. NA=Not available. (s)=Less than 0.05 million short tons.

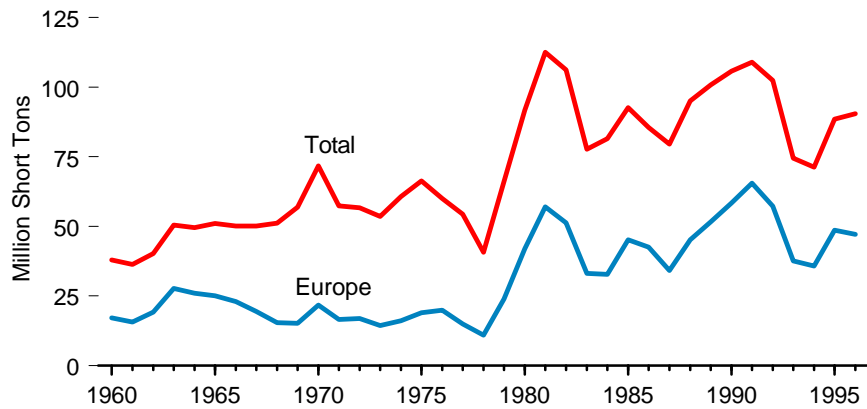
Notes: • See Note 1 at end of section. • Totals may not equal sum of components due to independent rounding.

Sources: **Independent Power Producers:** Energy Information Administration (EIA), Form EIA-867, "Annual Nonutility Power Producers Report." **All Other Data:** • 1949-1975—Bureau of Mines, *Minerals*

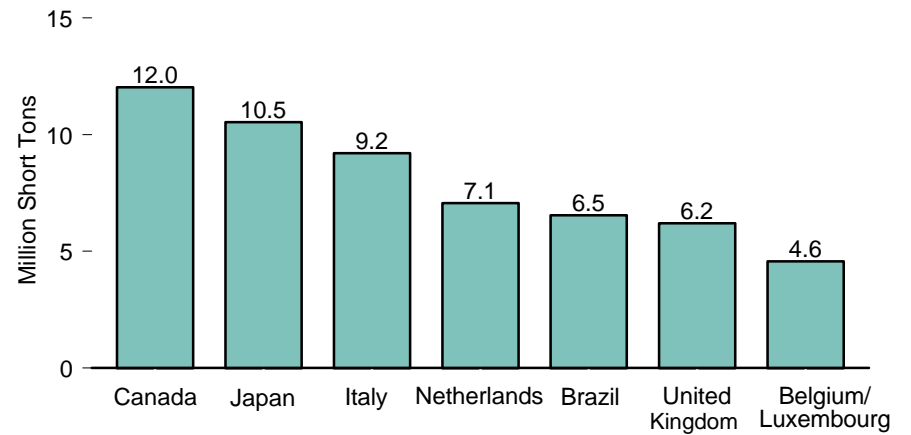
*Yearbook*, "Coal-Bituminous and Lignite" and "Coal-Pennsylvania Anthracite" chapters. • 1976—EIA, *Energy Data Report, Coal-Bituminous and Lignite in 1976 and Coal-Pennsylvania Anthracite 1976*. • 1977 and 1978—EIA, *Energy Data Report, Coal-Pennsylvania Anthracite 1977; 1978, and Weekly Coal Report*. • 1979 and 1980—EIA, *Energy Data Report, Weekly Coal Report*. • 1981—EIA, *Weekly Coal Production*. • 1982—EIA, *Quarterly Coal Report October-December 1990* (May 1991), Table 23. • 1983—EIA, *Quarterly Coal Report October-December 1991* (May 1992), Table 23. • 1984—EIA, *Quarterly Coal Report October-December 1992* (May 1993), Table 45. • 1985—EIA, *Quarterly Coal Report October-December 1993* (May 1994), Table 45. • 1986—EIA, *Quarterly Coal Report October-December 1994* (May 1995), Table 45. • 1987-1995—EIA, *Quarterly Coal Report October-December 1996* (May 1997), Table 45. • 1996—EIA, *Monthly Energy Review* (March 1997), Table 6.2.

**Figure 7.4 Coal Exports by Country of Destination**

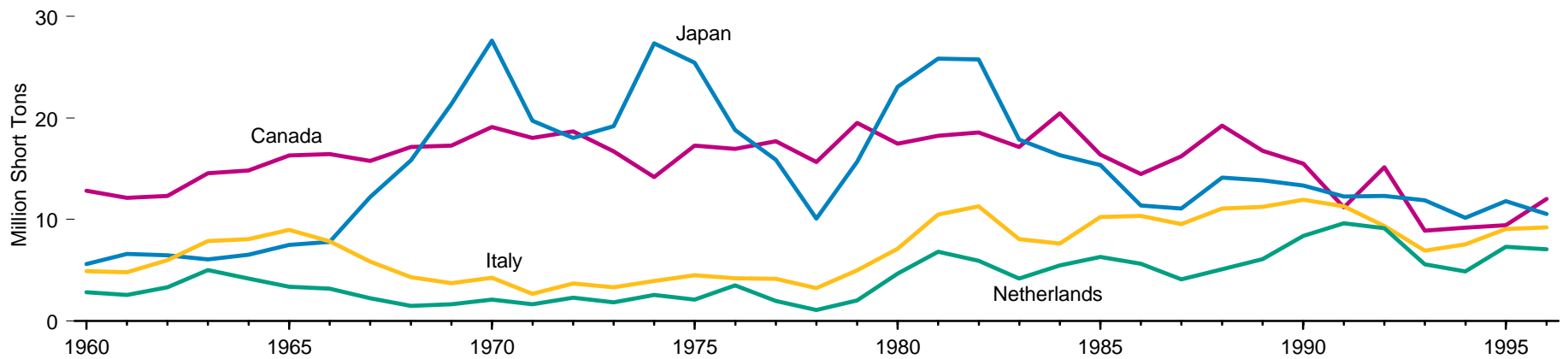
**Total and Europe, 1960-1996**



**By Selected Country, 1996**



**By Selected Country, 1960-1996**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 7.4.

**Table 7.4 Coal Exports by Country of Destination, 1960-1996**  
(Million Short Tons)

Year	Canada	Brazil	Europe										Japan	Other	Total
			Belgium/ Luxembourg	Denmark	France	Germany <sup>1</sup>	Italy	Netherlands	Spain	United Kingdom	Other	Total			
1960	12.8	1.1	1.1	0.1	0.8	4.6	4.9	2.8	0.3	0.0	2.4	17.1	5.6	1.3	38.0
1961	12.1	1.0	1.0	0.1	0.7	4.3	4.8	2.6	0.2	0.0	2.0	15.7	6.6	1.0	36.4
1962	12.3	1.3	1.3	(s)	0.9	5.1	6.0	3.3	0.8	(s)	1.8	19.1	6.5	1.0	40.2
1963	14.6	1.2	2.7	(s)	2.7	5.6	7.9	5.0	1.5	0.0	2.4	27.7	6.1	0.9	50.4
1964	14.8	1.1	2.3	(s)	2.2	5.2	8.1	4.2	1.4	0.0	2.6	26.0	6.5	1.1	49.5
1965	16.3	1.2	2.2	(s)	2.1	4.7	9.0	3.4	1.4	(s)	2.3	25.1	7.5	0.9	51.0
1966	16.5	1.7	1.8	(s)	1.6	4.9	7.8	3.2	1.2	(s)	2.5	23.1	7.8	1.0	50.1
1967	15.8	1.7	1.4	0.0	2.1	4.7	5.9	2.2	1.0	0.0	2.1	19.4	12.2	1.0	50.1
1968	17.1	1.8	1.1	0.0	1.5	3.8	4.3	1.5	1.5	0.0	1.9	15.5	15.8	0.9	51.2
1969	17.3	1.8	0.9	0.0	2.3	3.5	3.7	1.6	1.8	0.0	1.3	15.2	21.4	1.2	56.9
1970	19.1	2.0	1.9	0.0	3.6	5.0	4.3	2.1	3.2	(s)	1.8	21.8	27.6	1.2	71.7
1971	18.0	1.9	0.8	0.0	3.2	2.9	2.7	1.6	2.6	1.7	1.1	16.6	19.7	1.1	57.3
1972	18.7	1.9	1.1	0.0	1.7	2.4	3.7	2.3	2.1	2.4	1.1	16.9	18.0	1.2	56.7
1973	16.7	1.6	1.2	0.0	2.0	1.6	3.3	1.8	2.2	0.9	1.3	14.4	19.2	1.6	53.6
1974	14.2	1.3	1.1	0.0	2.7	1.5	3.9	2.6	2.0	1.4	0.9	16.1	27.3	1.8	60.7
1975	17.3	2.0	0.6	0.0	3.6	2.0	4.5	2.1	2.7	1.9	1.6	19.0	25.4	2.6	66.3
1976	16.9	2.2	2.2	(s)	3.5	1.0	4.2	3.5	2.5	0.8	2.1	19.9	18.8	2.1	60.0
1977	17.7	2.3	1.5	0.1	2.1	0.9	4.1	2.0	1.6	0.6	2.1	15.0	15.9	3.5	54.3
1978	15.7	1.5	1.1	0.0	1.7	0.6	3.2	1.1	0.8	0.4	2.2	11.0	10.1	2.5	40.7
1979	19.5	2.8	3.2	0.2	3.9	2.6	5.0	2.0	1.4	1.4	4.4	23.9	15.7	4.1	66.0
1980	17.5	3.3	4.6	1.7	7.8	2.5	7.1	4.7	3.4	4.1	6.0	41.9	23.1	6.0	91.7
1981	18.2	2.7	4.3	3.9	9.7	4.3	10.5	6.8	6.4	2.3	8.8	57.0	25.9	8.7	112.5
1982	18.6	3.1	4.8	2.8	9.0	2.3	11.3	5.9	5.6	2.0	7.6	51.3	25.8	7.5	106.3
1983	17.2	3.6	2.5	1.7	4.2	1.5	8.1	4.2	3.3	1.2	6.4	33.1	17.9	6.1	77.8
1984	20.4	4.7	3.9	0.6	3.8	0.9	7.6	5.5	2.3	2.9	5.3	32.8	16.3	7.2	81.5
1985	16.4	5.9	4.4	2.2	4.5	1.1	10.3	6.3	3.5	2.7	10.3	45.1	15.4	9.9	92.7
1986	14.5	5.7	4.4	2.1	5.4	0.8	10.4	5.6	2.6	2.9	8.4	42.6	11.4	11.4	85.5
1987	16.2	5.8	4.6	0.9	2.9	0.5	9.5	4.1	2.5	2.6	6.6	34.2	11.1	12.3	79.6
1988	19.2	5.3	6.5	2.8	4.3	0.7	11.1	5.1	2.5	3.7	8.5	45.1	14.1	11.3	95.0
1989	16.8	5.7	7.1	3.2	6.5	0.7	11.2	6.1	3.3	4.5	8.9	51.6	13.8	12.9	100.8
1990	15.5	5.8	8.5	3.2	6.9	1.1	11.9	8.4	3.8	5.2	9.5	58.4	13.3	12.7	105.8
1991	11.2	7.1	7.5	4.7	9.5	1.7	11.3	9.6	4.7	6.2	10.4	65.5	12.3	13.0	109.0
1992	15.1	6.4	7.2	3.8	8.1	1.0	9.3	9.1	4.5	5.6	8.5	57.3	12.3	11.4	102.5
1993	8.9	5.2	5.2	0.3	4.0	0.5	6.9	5.6	4.1	4.1	6.9	37.6	11.9	11.0	74.5
1994	9.2	5.5	4.9	0.5	2.9	0.3	7.5	4.9	4.1	3.4	7.3	35.8	10.2	10.7	71.4
1995	9.4	6.4	4.5	2.1	3.7	2.0	9.1	7.3	4.7	4.7	10.7	48.6	11.8	12.4	88.5
1996	12.0	6.5	4.6	1.3	3.9	1.1	9.2	7.1	4.1	6.2	9.9	47.2	10.5	14.2	90.5

<sup>1</sup> Through 1990, the data for Germany are for the former West Germany only. Beginning with 1991, the data for Germany are for the unified Germany, i.e., the former East Germany and West Germany.

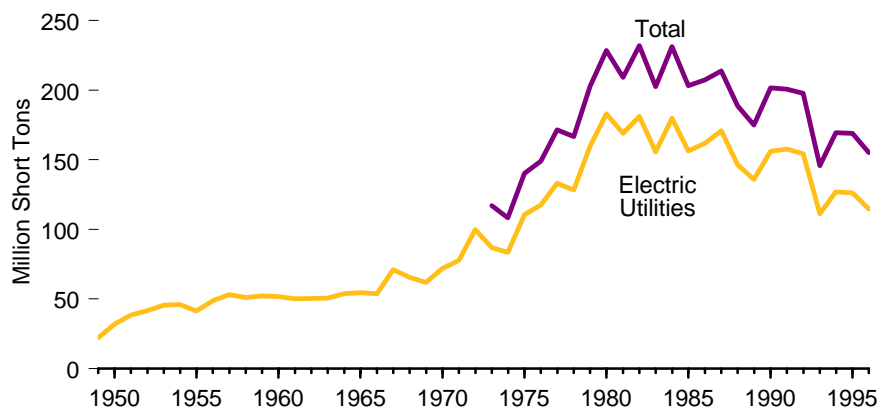
(s)=Less than 50,000 tons.

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

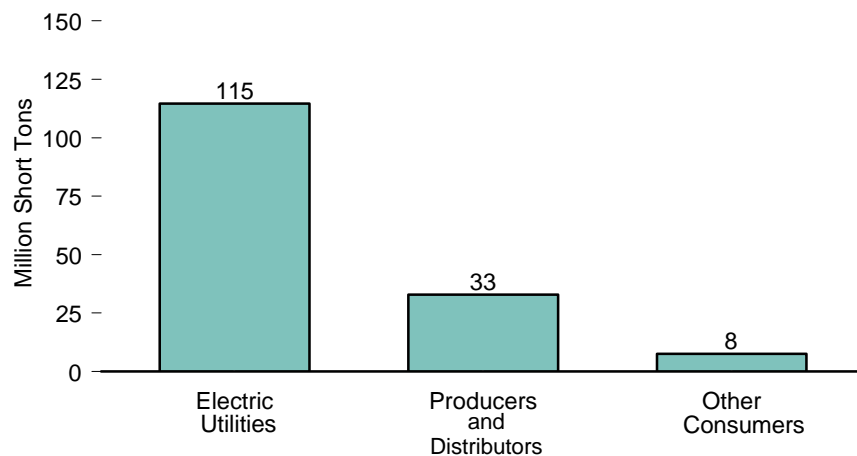
Sources: • 1960-1988—U.S. Department of Commerce, Bureau of the Census. *U.S. Exports by Schedule B Commodities, EM 522.* • 1989 forward—U.S. Department of Commerce, Bureau of the Census, "Monthly Report EM 545."

**Figure 7.5 Coal Stocks, End of Year**

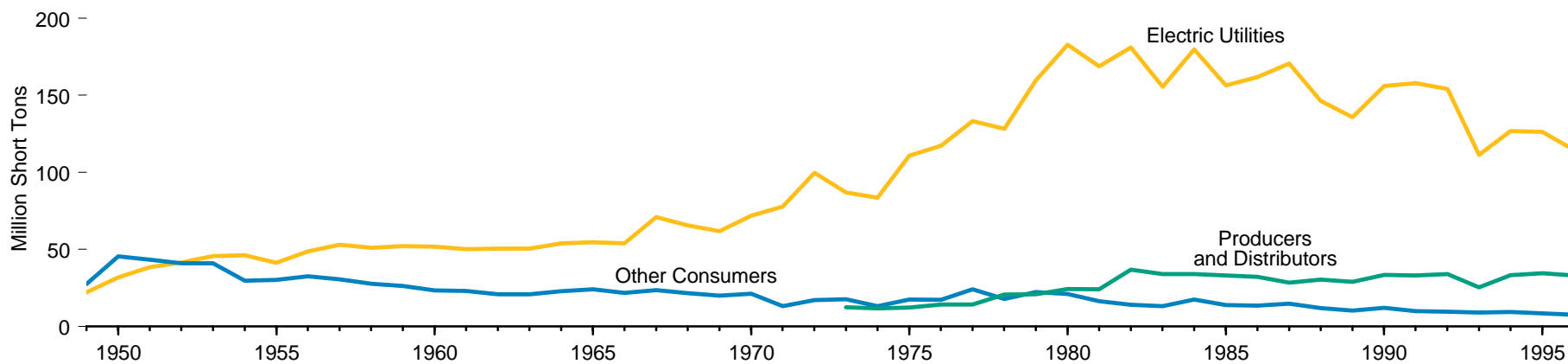
**Total and Electric Utility Stocks, 1949-1996**



**By Holding Entity, 1996**



**By Holding Entity, 1949-1996**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 7.5.

**Table 7.5 Coal Stocks, End of Year 1949-1996**  
(Million Short Tons)

Year	Consumer					Producers and Distributors	Total
	Residential <sup>1</sup> and Commercial	Coke Plants	Other Industry <sup>2</sup>	Electric Utilities	Total		
1949	1.4	10.0	16.1	22.1	49.5	NA	NA
1950	2.5	16.8	26.2	31.8	77.3	NA	NA
1951	1.8	15.3	26.2	38.5	81.8	NA	NA
1952	1.7	14.5	24.7	41.5	82.4	NA	NA
1953	1.5	16.6	22.8	45.6	86.6	NA	NA
1954	0.8	12.4	16.4	46.1	75.7	NA	NA
1955	1.0	13.4	15.9	41.4	71.7	NA	NA
1956	1.1	14.0	17.4	48.8	81.3	NA	NA
1957	0.9	14.2	15.5	53.1	83.7	NA	NA
1958	0.9	13.1	13.7	51.0	78.7	NA	NA
1959	1.0	11.6	13.6	52.1	78.4	NA	NA
1960	0.7	11.1	11.6	51.7	75.2	NA	NA
1961	0.5	10.5	11.9	50.1	73.0	NA	NA
1962	0.5	8.4	12.0	50.4	71.3	NA	NA
1963	0.5	8.1	12.3	50.6	71.5	NA	NA
1964	0.4	10.2	12.2	53.9	76.7	NA	NA
1965	0.4	10.6	13.1	54.5	78.6	NA	NA
1966	0.2	9.3	12.2	53.9	75.6	NA	NA
1967	0.2	11.1	12.3	71.0	94.6	NA	NA
1968	0.2	9.7	11.7	65.5	87.0	NA	NA
1969	0.2	9.1	10.8	61.9	81.9	NA	NA
1970	0.3	9.0	11.8	71.9	93.0	NA	NA
1971	0.3	7.3	5.6	77.8	91.0	NA	NA
1972	0.3	9.1	7.6	99.7	116.8	NA	NA
1973	0.3	7.0	10.4	87.0	104.6	12.5	117.2
1974	0.3	6.2	6.6	83.5	96.6	11.6	108.2
1975	0.2	8.8	8.5	110.7	128.3	12.1	140.4
1976	0.2	9.9	7.1	117.4	134.7	14.2	148.9
1977	0.2	12.8	11.1	133.2	157.3	14.2	171.5
1978	0.4	8.3	9.0	128.2	145.9	20.7	166.6
1979	0.3	10.2	11.8	159.7	182.0	20.8	202.8
1980	NA	9.1	12.0	183.0	204.0	24.4	228.4
1981	NA	6.5	9.9	168.9	185.3	24.1	209.4
1982	NA	4.6	9.5	181.1	195.3	36.8	232.0
1983	NA	4.3	8.7	155.6	168.7	33.9	202.6
1984	NA	6.2	11.3	179.7	197.2	34.1	231.3
1985	NA	3.4	10.4	156.4	170.2	33.1	203.4
1986	NA	3.0	10.4	161.8	175.2	32.1	207.3
1987	NA	3.9	10.8	170.8	185.5	28.3	213.8
1988	NA	3.1	8.8	146.5	158.4	30.4	188.8
1989	NA	2.9	7.4	135.9	146.1	29.0	175.1
1990	NA	3.3	8.7	156.2	168.2	33.4	201.6
1991	NA	2.8	7.1	157.9	167.7	33.0	200.7
1992	NA	2.6	7.0	154.1	163.7	34.0	197.7
1993	NA	2.4	6.7	111.3	120.5	25.3	145.7
1994	NA	2.7	6.6	126.9	136.1	33.2	169.4
1995	NA	2.6	<sup>R</sup> 5.7	<sup>R</sup> 126.3	<sup>R</sup> 134.6	34.4	<sup>R</sup> 169.1
1996	NA	2.2	5.4	114.6	122.2	33.0	155.2

<sup>1</sup> Stocks at retail dealers, excluding anthracite.

<sup>2</sup> Includes transportation sector.

R=Revised data. NA=Not available.

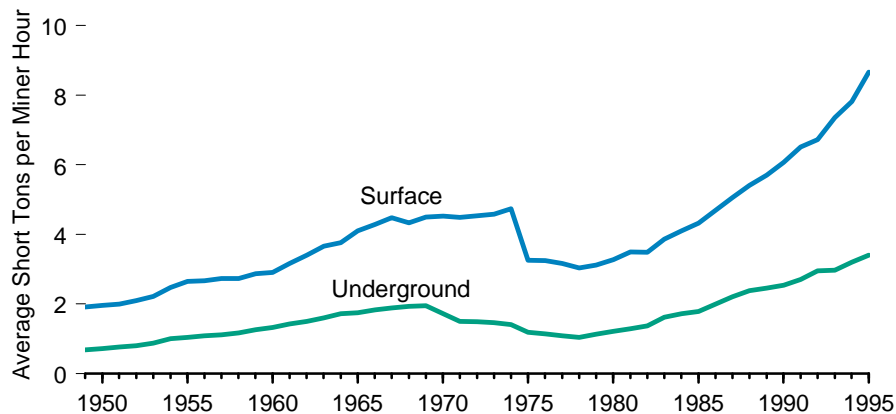
Note: Totals may not equal sum of components due to independent rounding.

Sources: • 1949-1975—Bureau of Mines, *Minerals Yearbook*, "Coal-Bituminous and Lignite" and "Coal-Pennsylvania Anthracite" chapters. • 1976—Energy Information Administration (EIA), *Energy Data Report, Coal-Bituminous and Lignite in 1976 and Coal-Pennsylvania Anthracite 1976*. • 1977 and 1978—EIA, *Energy Data Report, Coal-Pennsylvania Anthracite 1977, 1978, and Weekly Coal Report*.

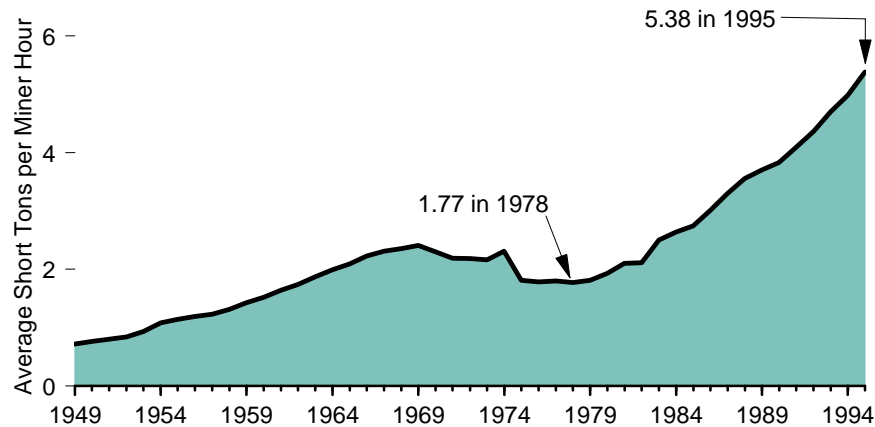
• 1979 and 1980—EIA, *Energy Data Report, Weekly Coal Report*. • 1981—EIA, *Weekly Coal Production*. • 1982—EIA, *Quarterly Coal Report October-December 1990* (May 1991), Table 31. • 1983—EIA, *Quarterly Coal Report October-December 1991* (May 1992), Table 31. • 1984—EIA, *Quarterly Coal Report October-December 1992* (May 1993), Table 52. • 1985—EIA, *Quarterly Coal Report October-December 1993* (May 1994), Table 52. • 1986—EIA, *Quarterly Coal Report October-December 1994* (May 1995), Table 52. • 1987-1995—EIA, *Quarterly Coal Report October-December 1996* (May 1997), Table 52. • 1996—EIA, *Monthly Energy Review* (March 1997), Table 6.3.

**Figure 7.6 Coal Mining Productivity, 1949-1995**

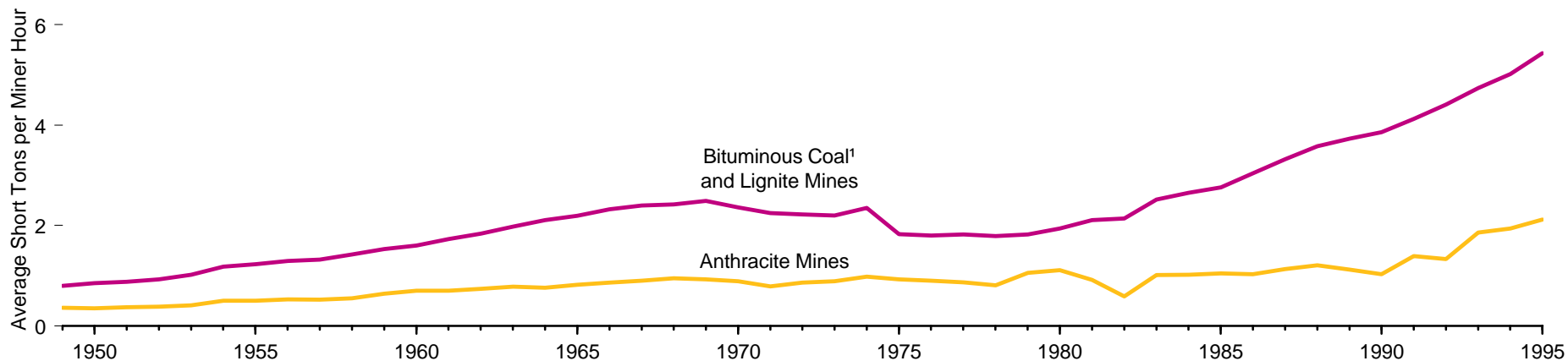
**Bituminous Coal<sup>1</sup> and Lignite Mines, by Type**



**All Mines, Average**



**All Mines, by Coal Type**



<sup>1</sup> Includes subbituminous coal.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 7.6.

**Table 7.6 Coal Mining Productivity, 1949-1995**  
(Short Tons per Miner Hour <sup>1</sup>)

Year	Bituminous Coal <sup>2</sup> and Lignite Mines			Anthracite Mines	All Mines
	Underground	Surface	Average		
1949	0.68	1.92	0.80	0.36	0.72
1950	0.72	1.96	0.85	0.35	0.76
1951	0.76	2.00	0.88	0.37	0.80
1952	0.80	2.10	0.93	0.38	0.84
1953	0.88	2.22	1.02	0.41	0.93
1954	1.00	2.48	1.18	0.50	1.08
1955	1.04	2.65	1.23	0.50	1.14
1956	1.08	2.67	1.29	0.53	1.19
1957	1.11	2.73	1.32	0.52	1.23
1958	1.17	2.73	1.42	0.55	1.31
1959	1.26	2.87	1.53	0.64	1.43
1960	1.33	2.91	1.60	0.70	1.52
1961	1.43	3.16	1.73	0.70	1.64
1962	1.50	3.40	1.84	0.74	1.74
1963	1.60	3.66	1.98	0.78	1.87
1964	1.72	3.76	2.11	0.76	1.99
1965	1.75	4.10	2.19	0.82	2.09
1966	1.83	4.28	2.32	0.86	2.23
1967	1.88	4.48	2.40	0.90	2.31
1968	1.93	4.33	2.42	0.95	2.35
1969	1.95	4.50	2.49	0.93	2.41
1970	1.72	4.53	2.36	0.89	2.30
1971	1.50	4.49	2.25	0.79	2.19
1972	1.49	4.54	2.22	0.86	2.18
1973	1.46	4.58	2.20	0.89	2.16
1974	1.41	4.74	2.35	0.98	2.31
1975	1.19	3.26	1.83	0.93	1.81
1976	1.14	3.25	1.80	0.90	1.78
1977	1.09	3.16	1.82	0.87	1.80
1978	1.04	3.03	1.79	0.81	1.77
1979	1.13	3.12	1.82	1.06	1.81
1980	1.21	3.27	1.94	1.11	1.93
1981	1.29	3.50	2.11	0.92	2.10
1982	1.37	3.48	2.14	0.59	2.11
1983	1.62	3.87	2.52	1.01	2.50
1984	1.72	4.10	2.65	1.02	2.64
1985	1.79	4.32	2.76	1.05	2.74
1986	2.00	4.69	3.04	1.03	3.01
1987	2.21	5.06	3.32	1.13	3.30
1988	2.38	5.41	3.58	1.21	3.55
1989	2.46	5.70	3.73	1.12	3.70
1990	2.54	6.07	3.86	1.03	3.83
1991	2.70	6.51	4.12	1.39	4.09
1992	2.95	6.73	4.41	1.33	4.36
1993	2.97	7.36	4.74	1.86	4.70
1994	3.20	7.82	5.02	1.94	4.98
1995	3.40	8.66	5.43	2.12	5.38

<sup>1</sup> Data for bituminous coal and lignite mines 1949-1973 and anthracite mines 1949-1978 were originally reported in short tons per miner-day. The data were converted to short-tons per miner-hour by assuming an eight-hour day. All remaining data were calculated by dividing total production by total labor hours worked by all mine employees except office workers.

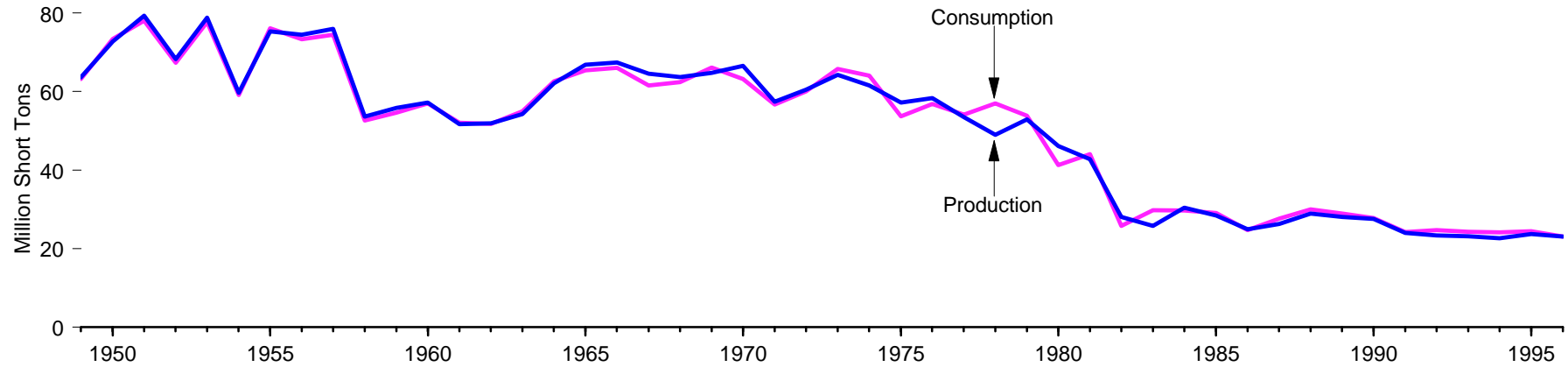
<sup>2</sup> Includes subbituminous coal.

Sources: • 1949-1975—Bureau of Mines, *Minerals Yearbook*, "Coal-Bituminous and Lignite" and "Coal-Pennsylvania Anthracite" chapters. • 1976—Energy Information Administration (EIA), Energy Data

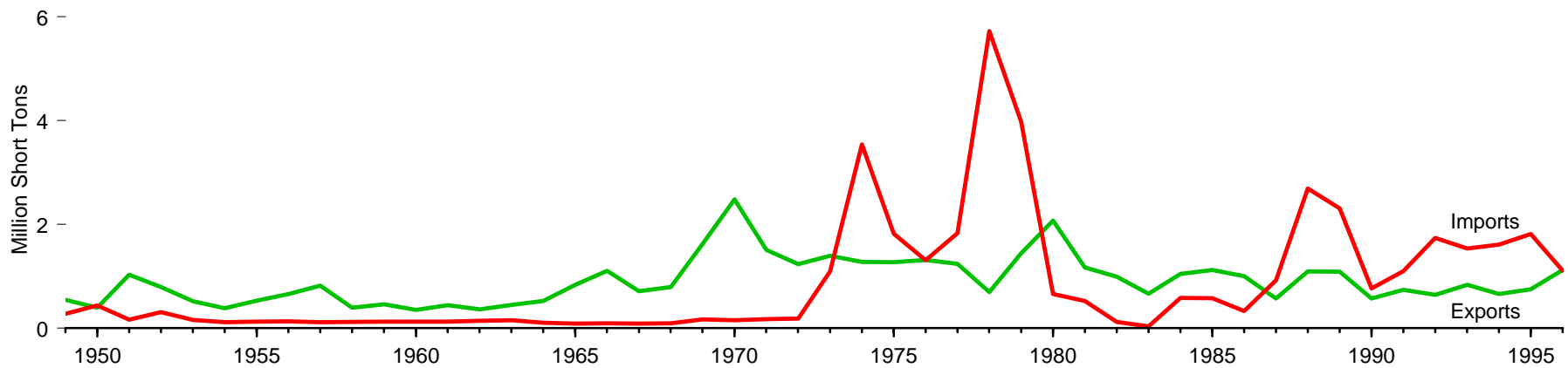
Report, *Coal-Bituminous and Lignite in 1976 and Coal-Pennsylvania Anthracite 1976*. • 1977 and 1978—EIA, Energy Data Report, *Bituminous Coal and Lignite Production and Mine Operations-1977; 1978 and Coal-Pennsylvania Anthracite 1977; 1978*. • 1979—EIA, Energy Data Report, *Coal Production-1979*. • 1980-1992—EIA, *Coal Production* (annual). • 1993—EIA, *Coal Industry Annual 1993* (December 1994). • 1994—EIA, *Coal Industry Annual 1994* (October 1995). • 1995—EIA, *Coal Industry Annual 1995* (October 1996).

**Figure 7.7 Coke Overview, 1949-1996**

**Production and Consumption**



**Imports and Exports**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 7.7.



**Table 7.7 Coke Overview, 1949-1996**  
(Million Short Tons)

Year	Production	Imports	Exports	Stock Change <sup>1</sup>	Consumption <sup>2</sup>
1949	63.64	0.28	0.55	-0.18	63.19
1950	72.72	0.44	0.40	0.66	73.42
1951	79.33	0.16	1.03	-0.37	78.09
1952	68.25	0.31	0.79	-0.42	67.36
1953	78.84	0.16	0.52	-0.78	77.70
1954	59.66	0.12	0.39	-0.27	59.12
1955	75.30	0.13	0.53	1.25	76.15
1956	74.48	0.13	0.66	-0.63	73.32
1957	75.95	0.12	0.82	-0.81	74.43
1958	53.60	0.12	0.39	-0.68	52.66
1959	55.86	0.12	0.46	-0.86	54.67
1960	57.23	0.13	0.35	-0.06	56.95
1961	51.71	0.13	0.45	0.70	52.09
1962	51.91	0.14	0.36	0.14	51.82
1963	54.28	0.15	0.45	1.02	55.00
1964	62.15	0.10	0.52	0.91	62.64
1965	66.85	0.09	0.83	-0.73	65.38
1966	67.40	0.10	1.10	-0.38	66.02
1967	64.58	0.09	0.71	-2.39	61.57
1968	63.65	0.09	0.79	-0.52	62.44
1969	64.76	0.17	1.63	2.87	66.17
1970	66.53	0.15	2.48	-0.99	63.21
1971	57.44	0.17	1.51	0.59	56.69
1972	60.51	0.19	1.23	0.59	60.05
1973	64.33	1.09	1.40	1.74	65.77
1974	61.58	3.54	1.28	0.25	64.09
1975	57.21	1.82	1.27	-4.06	53.69
1976	58.33	1.31	1.32	-1.50	56.83
1977	53.51	1.83	1.24	0.05	54.14
1978	49.01	5.72	0.69	2.91	56.95
1979	52.94	3.97	1.44	-1.65	53.83
1980	46.13	0.66	2.07	-3.44	41.28
1981	42.79	0.53	1.17	1.90	44.05
1982	28.12	0.12	0.99	-1.47	25.78
1983	25.81	0.04	0.67	4.67	29.85
1984	30.40	0.58	1.05	-0.20	29.74
1985	28.44	0.58	1.12	1.16	29.06
1986	24.92	0.33	1.00	0.49	24.73
1987	26.30	0.92	0.57	1.00	27.65
1988	28.95	2.69	1.09	-0.52	30.02
1989	28.05	2.31	1.09	-0.34	28.93
1990	27.62	0.77	0.57	(s)	27.81
1991	24.05	1.10	0.74	-0.19	24.22
1992	23.41	1.74	0.64	0.22	24.73
1993	23.18	1.53	0.84	0.42	24.30
1994	22.69	1.61	0.66	0.53	24.16
1995	23.75	1.82	0.75	-0.37	24.45
1996	23.08	1.11	1.12	0.02	23.09

<sup>1</sup> Producer and distributor stocks at end of year. Negative numbers denote a net addition to stocks or a reduction in supply. Positive numbers denote a net withdrawal from stocks or an addition to supply.

<sup>2</sup> Consumption is the sum of production, imports, and stock change minus exports.

(s)=Less than 0.005 million short tons.

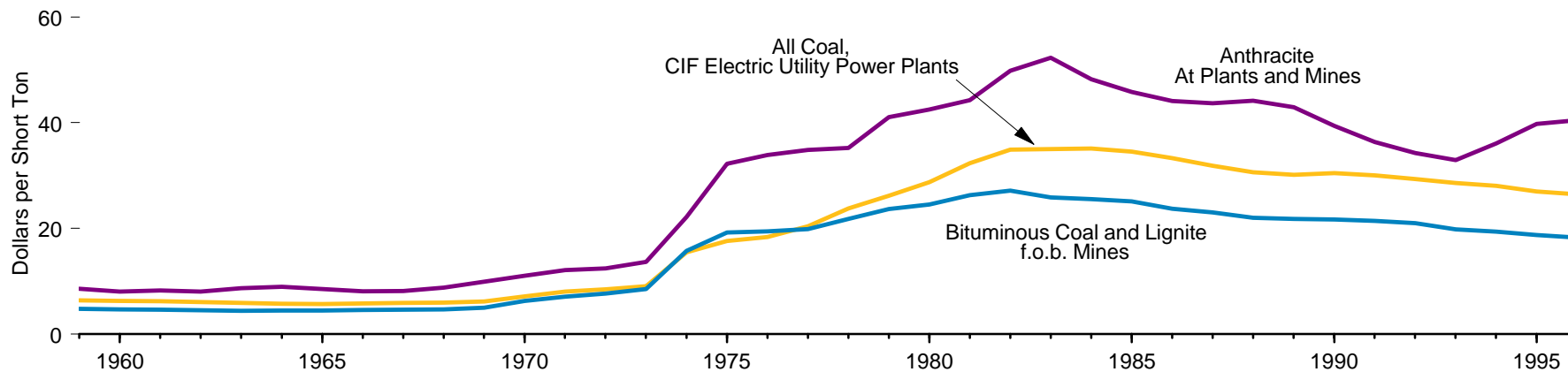
Note: Totals may not equal sum of components due to independent rounding.

Sources: • 1949-1975—Bureau of Mines, *Minerals Yearbook*, "Coke and Coal Chemicals" chapter.  
• 1976-1980—Energy Information Administration (EIA), *Energy Data Report, Coke and Coal Chemicals*,

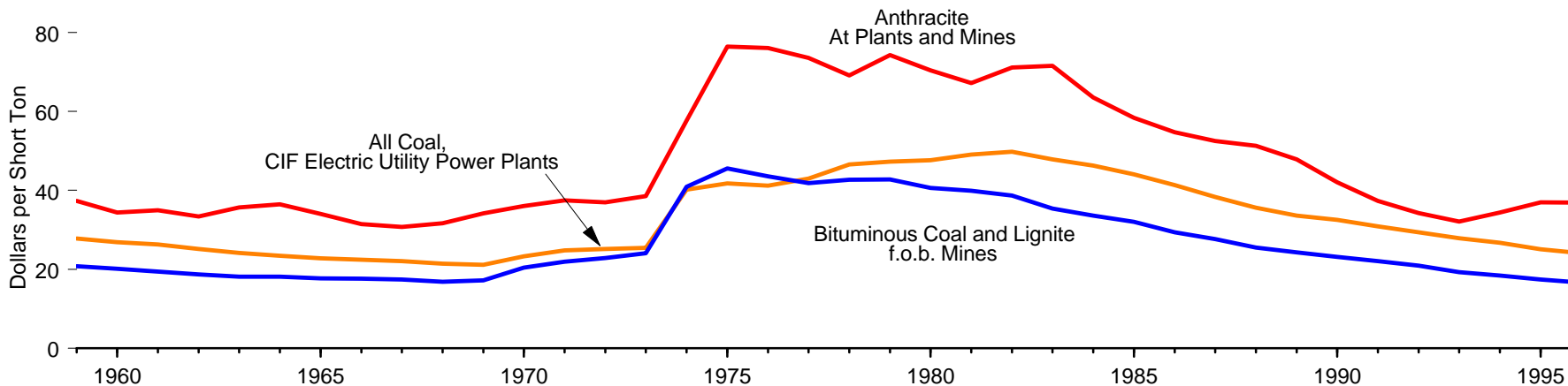
annual. • 1981—EIA, *Energy Data Report, Coke Plant Report*, quarterly. • 1982—EIA, *Quarterly Coal Report October-December 1990* (May 1991), Table A1. • 1983—EIA, *Quarterly Coal Report October-December 1991* (May 1992), Table A1. • 1984—EIA, *Quarterly Coal Report October-December 1992* (May 1993), Table 2. • 1985-1987—EIA, *Quarterly Coal Report October-December 1993* (May 1994), Table 2. • 1988 forward—EIA, *Quarterly Coal Report October-December 1996* (May 1997), Table 2.

**Figure 7.8 Coal Prices, 1959-1996**

**Nominal**



**Real<sup>1</sup>**



<sup>1</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

Notes: • Bituminous coal includes subbituminous coal. • CIF=Cost, Insurance, and

Freight. • f.o.b.=Free on board. See Glossary. • Because vertical scales differ, graphs should not be compared.

Source: Table 7.8.

**Table 7.8 Coal Prices, 1949-1996**  
(Dollars per Short Ton)

Year	Bituminous Coal <sup>1</sup> and Lignite		Anthracite		All Coal	
	F.O.B. <sup>2</sup> Mines		At Plants and Mines <sup>3</sup>		CIF <sup>4</sup> Electric Utility Power Plants	
	Nominal	Real <sup>5</sup>	Nominal	Real <sup>5</sup>	Nominal	Real <sup>5</sup>
1949	4.88	( <sup>6</sup> )	8.90	( <sup>6</sup> )	NA	NA
1950	4.84	( <sup>6</sup> )	9.34	( <sup>6</sup> )	NA	NA
1951	4.92	( <sup>6</sup> )	9.94	( <sup>6</sup> )	NA	NA
1952	4.90	( <sup>6</sup> )	9.58	( <sup>6</sup> )	6.61	( <sup>6</sup> )
1953	4.92	( <sup>6</sup> )	9.87	( <sup>6</sup> )	6.61	( <sup>6</sup> )
1954	4.52	( <sup>6</sup> )	8.76	( <sup>6</sup> )	6.31	( <sup>6</sup> )
1955	4.50	( <sup>6</sup> )	8.00	( <sup>6</sup> )	6.07	( <sup>6</sup> )
1956	4.82	( <sup>6</sup> )	8.33	( <sup>6</sup> )	6.32	( <sup>6</sup> )
1957	5.08	( <sup>6</sup> )	9.11	( <sup>6</sup> )	6.64	( <sup>6</sup> )
1958	4.86	( <sup>6</sup> )	9.14	( <sup>6</sup> )	6.58	( <sup>6</sup> )
1959	4.77	20.83	8.55	37.34	6.37	27.82
1960	4.69	20.13	8.01	34.38	6.26	26.87
1961	4.58	19.41	8.26	35.00	6.20	26.27
1962	4.48	18.74	7.99	33.43	6.02	25.19
1963	4.39	18.14	8.64	35.70	5.86	24.21
1964	4.45	18.16	8.93	36.45	5.74	23.43
1965	4.44	17.76	8.51	34.04	5.71	22.84
1966	4.54	17.67	8.08	31.44	5.76	22.41
1967	4.62	17.43	8.15	30.75	5.85	22.08
1968	4.67	16.86	8.78	31.70	5.93	21.41
1969	4.99	17.21	9.91	34.17	6.13	21.14
1970	6.26	20.46	11.03	36.05	7.13	23.30
1971	7.07	21.96	12.08	37.52	8.00	24.84
1972	7.66	22.87	12.40	37.01	8.44	25.19
1973	8.53	24.10	13.65	38.56	9.01	25.45
1974	15.75	40.91	22.19	57.64	15.46	40.16
1975	19.23	45.57	32.26	76.45	17.63	41.78
1976	19.43	43.57	33.92	76.05	18.38	41.21
1977	19.82	41.81	34.86	73.54	20.37	42.97
1978	21.78	42.71	35.25	69.12	23.75	46.57
1979	23.65	42.77	41.06	74.25	26.15	47.29
1980	24.52	40.60	42.51	70.38	28.76	47.62
1981	26.29	39.89	44.28	67.19	32.32	49.04
1982	27.14	38.72	49.85	71.11	34.91	49.80
1983	25.85	35.36	52.29	71.53	34.99	47.87
1984	25.51	33.61	48.22	63.53	35.12	46.27
1985	25.10	32.02	45.80	58.42	34.53	44.04
1986	23.70	29.40	44.12	54.74	33.30	41.32
1987	23.00	27.68	43.65	52.53	31.83	38.30
1988	22.00	25.55	44.16	51.29	30.64	35.59
1989	21.76	24.26	42.93	47.86	30.15	33.61
1990	21.71	23.19	39.40	42.09	30.45	32.53
1991	21.45	22.05	36.34	37.35	30.02	30.85
1992	20.98	20.98	34.24	34.24	29.36	29.36
1993	19.79	19.29	<sup>R</sup> 32.94	<sup>R</sup> 32.11	28.58	27.86
1994	19.35	<sup>R</sup> 18.45	36.07	<sup>R</sup> 34.39	28.03	<sup>R</sup> 26.72
1995	<sup>R</sup> 18.74	<sup>R</sup> 17.42	<sup>R</sup> 39.78	<sup>R</sup> 36.97	<sup>R</sup> 27.01	<sup>R</sup> 25.10
1996 <sup>E</sup>	18.24	16.63	40.51	36.93	26.45	24.11

<sup>1</sup> Includes subbituminous coal.

<sup>2</sup> Free on board. See Glossary.

<sup>3</sup> For 1949-1978, prices are f.o.b. preparation plants. For 1979 forward, prices are f.o.b. mines.

<sup>4</sup> Cost, Insurance, and Freight. See Glossary.

<sup>5</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>6</sup> For 1949-1958, the gross domestic product implicit price deflators, which are used to convert nominal dollars to real (inflation-adjusted) values, were not available in time to use in this report.

<sup>R</sup>=Revised data. <sup>E</sup>=Estimate. NA=Not available.

Sources: **Bituminous Coal and Lignite, F.O.B. Mines:** • 1949-1975—Bureau of Mines, *Minerals Yearbook*, "Coal-Bituminous and Lignite" chapter. • 1976—Energy Information Administration (EIA), *Energy Data Report, Coal-Bituminous and Lignite in 1976*. • 1977 and 1978—EIA, *Energy Data Report,*

*Bituminous Coal and Lignite Production and Mine Operations-1977; 1978*. • 1979-1992—EIA, *Coal Production*, (annual). • 1993—EIA, *Coal Industry Annual 1993* (December 1994). • 1994—EIA, *Coal Industry Annual 1994* (December 1995). • 1995—EIA estimates. **Anthracite:** • 1949-1976—Bureau of Mines, *Minerals Yearbook*, "Coal-Pennsylvania Anthracite" chapter. • 1977 and 1978—EIA, *Energy Data Report, Coal-Pennsylvania Anthracite 1977; 1978*. • 1979—EIA, *Energy Data Report, Coal Production-1979*. • 1980-1993—EIA, *Coal Production*, (annual). • 1994—EIA, *Coal Industry Annual 1994* (December 1995). • 1995—EIA estimates. **All Coal, CIF Electric Utility Power Plants:** • 1949-1972—National Coal Association, *Steam Electric Plant Factors*. • 1973-1982—Federal Power Commission, Form FPC-423, "Monthly Report of Cost and Quality of Fuels for Electric Plants." • 1983 forward—Federal Energy Regulatory Commission, Form FERC-423, "Monthly Report of Cost and Quality of Fuel for Electric Utilities."

## Coal Note

Data in this report on the consumption of bituminous coal (including subbituminous coal), lignite, and anthracite are generated primarily from consumption data reported in surveys. Included are data reported by all electric utility companies and coke plant companies. Data on coal consumption by all industrial and manufacturing establishments and by the residential and commercial sector are based on distribution data obtained quarterly from coal companies. Included in

each sector's data are the following: Electric Power Industry—consumption by privately and publicly owned establishments engaged in the generation and/or distribution of electric power primarily for sale or resale; Industrial and Miscellaneous Sector—consumption at manufacturing plants, large commercial establishments, coking plants, and by agriculture, mining (other than coal mining), and construction industries; Transportation Sector—sales to railroads and vessel bunker fuel; Residential and Commercial Sector—retail dealer sales to households and small commercial establishments.

## 8. Electricity

### Electricity Generation

Net generation by the U.S. electric power industry (electric utilities and nonutility power producers) totaled 3.5 trillion kilowatthours in 1996, an increase of 3.7 percent over the 1995 level (8.2).<sup>\*</sup> As has been the case for many years, coal accounted for the largest share of generation: 1.8 trillion kilowatthours (52 percent of the total) in 1996, compared with 1.7 trillion kilowatthours (51 percent) in 1995. Nuclear power generation rose to a record high of 675 billion kilowatthours; however, its share of 19 percent of the total was down slightly from the 1995 level. Natural gas accounted for 478 billion kilowatthours and hydroelectric power for 345 billion kilowatthours in 1996.

Of the 3.5-trillion-kilowatthour total for 1996, electric utilities generated 3.1 trillion kilowatthours and nonutility power producers (NPP's) generated 404 billion kilowatthours. Manufacturers accounted for 71 percent of NPP gross generation in 1995 (8.13). The NPP sector is growing rapidly: electric utility net generation increased 10 percent from 1992 through 1996, while NPP net generation rose 41 percent during the period. Although natural gas accounted for 53 percent of NPP generation in 1996, the rising NPP share of total generation is reflected in increases in the use of several fuels. NPP use of natural gas rose 39 percent from 1992 through 1996, while use of coal, waste, petroleum, and hydroelectric power rose 35 percent, 34 percent, 87 percent, and 76 percent respectively.

### Net Summer Capability

Net summer capability is a common measure of generating capacity and is defined as the steady hourly output that generating equipment is expected to supply to the system load (exclusive of auxiliary power) as demonstrated by testing at the time of summer peak demand. The net summer capability of the electric power industry reached 776 million kilowatts in 1996, up 4 percent from the 1992 level (8.2). Again, elec-

*\*Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications. Percentages and numbers in text are calculated by using data in the tables.*

tric utilities accounted for most of the total (710 million kilowatts, or 91 percent), but the much smaller NPP share of 66 million kilowatts in 1996 grew far more rapidly, rising 28 percent during the period, versus a 2-percent increase in the electric utility share.

At electric utilities, conventional steam plants burning fossil fuels, wood, and waste accounted for more than 70 percent of net summer capability in 1996 (8.2). Coal-fired plants alone contributed 43 percent and dual-fired (petroleum and natural gas) plants another 20 percent. Nuclear power plants and hydroelectric plants (conventional and pumped-storage) each accounted for 14 percent. Among NPP's, natural gas was the dominant fuel, accounting for 39 percent of net summer capability. Coal and dual-fired plants accounted for 15 percent and 14 percent respectively. NPP's operate no nuclear power plants, but wind plants accounted for 3 percent of NPP net summer capability.

### Energy Consumption

During the 1949-to-1996 period, consumption of coal at electric utilities grew at a faster rate than did consumption of natural gas and petroleum (8.5). On a Btu basis, coal accounted for 67 percent of total fossil fuel consumption in 1949 and 83 percent of the total in 1996. Electric utilities consumed 18 quadrillion Btu of coal in 1996.

Electric utility consumption of both petroleum and natural gas increased during much of the period, but growth in the use of both fuels began to slow during the 1970's. During the first half of the 1980's, consumption actually decreased. Changes in petroleum and natural gas consumption at electric utilities from 1986 through 1988 illustrated the utilities' fuel-switching capabilities and their use to respond to fluctuations in fuel prices. After 1988, however, electric utility consumption of petroleum fell from 1.7 quadrillion Btu in 1989 to 0.7 quadrillion Btu in 1996. Electric utility consumption of cleaner-burning natural gas, on the other hand, remained near the 1988 level for 4 years and then increased in 1994 and again in 1995 to 3.3 quadrillion Btu, as electric utilities sought to comply with environmental regulations. However, natural gas consumption dropped 15 percent in 1996.

## Sales of Electricity to Consumers

During the 1949-to-1995 period, electricity sales increased at an average annual rate of 5.3 percent (8.6). Annual sales declined only two times, in 1974 and 1982. In 1974, the decline in sales spanned all sectors, whereas in 1982, lower sales to the industrial sector alone accounted for the decline.

From 1949 through 1990, sales of electricity to the industrial sector exceeded sales to other sectors. In 1991, 1993, 1995, and 1996, however, sales to the residential sector accounted for the largest share. In 1996, sales to the residential sector rose 3.4 percent to the record level of 1,078 billion kilowatthours, while sales to the industrial sector rose 0.4 percent to 1,017 billion kilowatthours. Sales to the commercial sector of 888 billion kilowatthours were 2.9 percent above the 1995 level.

## Retail Prices of Electricity

The weighted average real price<sup>1</sup> of electricity to all sectors in 1996 was 6.3 cents per kilowatthour, 18 percent below the price in 1960 (8.11). However, the period was marked by fluctuations and by variations in prices paid by consumers in different end-use sectors. And, because generation, transmission, and distribution losses account for roughly two-thirds of the energy input for electricity generation, electricity remained by far the most expensive source of energy on a Btu basis. The average real price of electricity sold to the residential sector, where prices have usually been the highest, was 7.7 cents per kilowatthour in 1996, down 1.3 percent from the price in 1995. The commercial sector price of 6.9 cents per kilowatthour in 1996 was down 4.2 percent. Industrial customers continued to pay prices that compared favorably with prices in other sectors. In 1996, the real price of electricity sold to industrial users was 4.2 cents per kilowatthour, down 4.5 percent from the price in 1995.

<sup>1</sup>Real (inflation-adjusted) prices are expressed in chained (1992) dollars.

## The Electric Power Industry Restructures

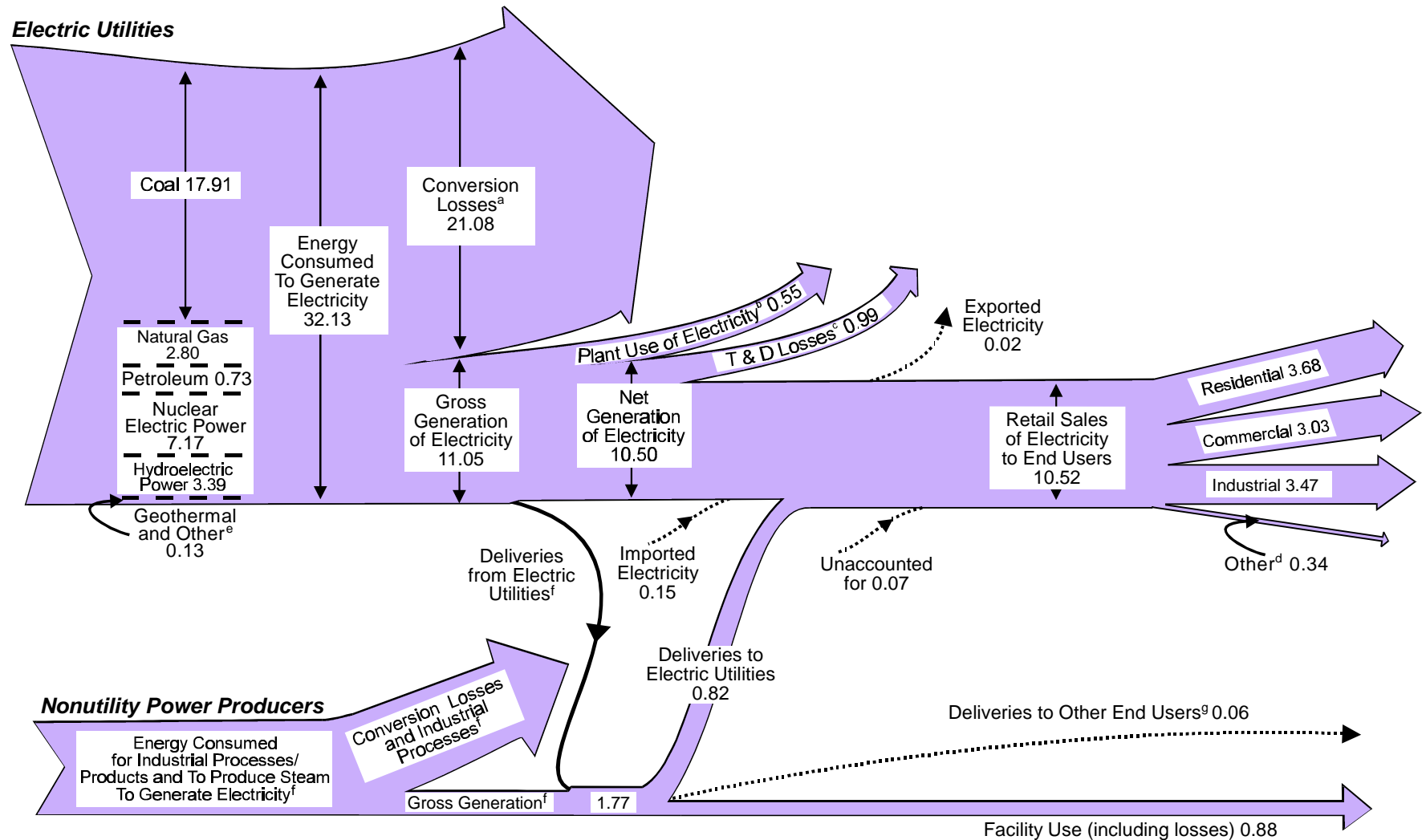
The U.S. electric power industry is undergoing the second major realignment in its history. Sixty years ago, Federal laws inaugurated an era of firm regulation designed to curb the excesses of public utility holding companies. Today, the prospect of competition has emerged as that regulatory grip relaxes, driven by three primary forces:

- evolving philosophies of government and success in deregulating other industries;
- new technologies that have spawned a host of nonregulated power producers; and
- wide regional differences in unit revenues from electric power sales, which have prompted calls to allow more competition in the hopes of lowering costs.

The new environment is triggering many changes and adaptations. Investor-owned utilities are reorganizing and reducing staff; some are also expanding their business investments and/or pursuing mergers and acquisitions. Publicly owned utilities and rural electric cooperatives are looking for ways to cut costs. Power marketers, which buy energy and related services from utilities for resale, are a growing sector of the industry. Independent system operators—seen by many as necessary for the fair and efficient operation of transmission grids—seem likely to emerge.

Further information on these important developments can be found in Energy Information Administration, *The Changing Structure of the Electric Power Industry: An Update*, DOE/EIA-0562(96), December 1996.

**Diagram 5. Electricity Flow, 1996**  
(Quadrillion Btu)



<sup>a</sup>Approximately two-thirds of the energy consumed at electric utilities to generate electricity. See Note 1 at end of section.

<sup>b</sup>Estimated as 5 percent of gross generation of electricity by utilities. See Note 1 at end of section.

<sup>c</sup>Estimated as 9 percent of gross generation of electricity by utilities. See Note 1 at end of section.

<sup>d</sup>"Other" is public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

<sup>e</sup>"Other" is wood, waste, wind, photovoltaic, and solar thermal energy used to generate electricity for

distribution. See Table 10.10.

<sup>f</sup>Data not available.

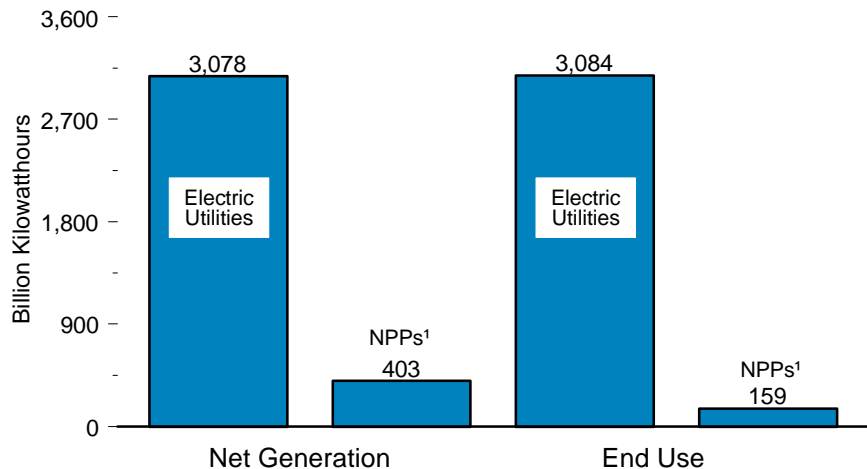
<sup>g</sup>Includes sales, interchanges, and exchanges of electric energy with other nonutilities.

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

Sources: Tables 8.1, 8.3, 8.5, 8.6, 8.12, 10.10, and A7.

**Figure 8.1 Electricity Overview**

**Net Generation and End Use, 1996**

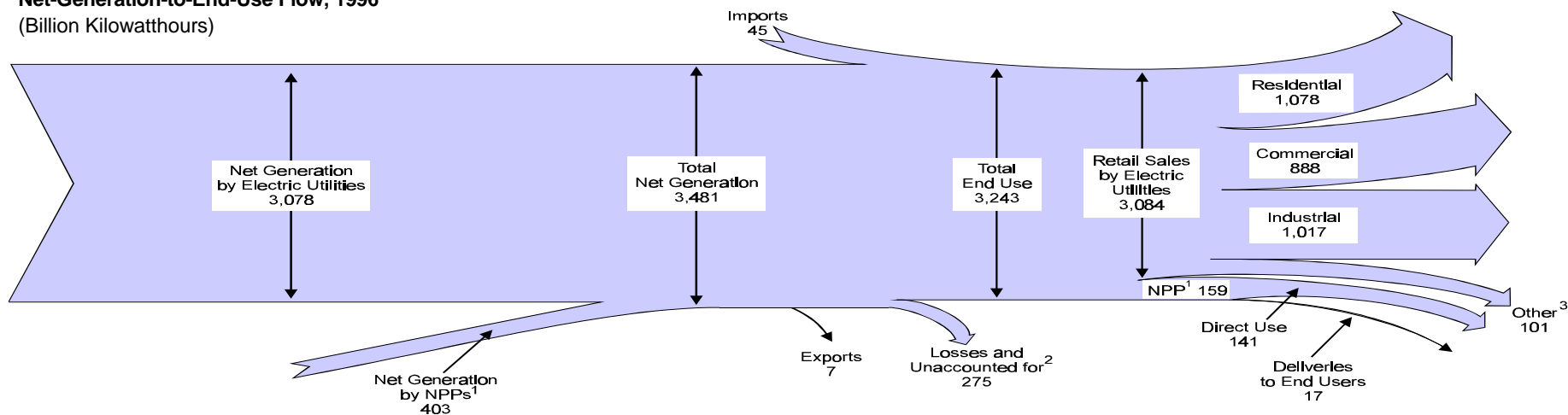


**International Electricity Trade, 1949-1996**



**Net-Generation-to-End-Use Flow, 1996**

(Billion Kilowatt-hours)



<sup>1</sup> Nonutility power producers. See Glossary.

<sup>2</sup> Energy losses that occur between the point of generation and delivery to the customer, and data collection frame differences and nonsampling error.

<sup>3</sup> "Other" is public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

Sources: Tables 8.1 and 8.6.



**Table 8.1 Electricity Overview, 1949-1996**  
(Billion Kilowatthours)

Year	Net Generation <sup>1</sup>			Imports <sup>2</sup>	Exports <sup>2</sup>	Losses and Unaccounted for <sup>3</sup>	End Use			
	Electric Utilities	Nonutility Power Producers	Total				Electric Utility Retail Sales	Nonutility Power Producers		Total
								Direct Use <sup>4</sup>	Deliveries to End Users	
1949	291	NA	NA	2	(s)	NA	255	NA	NA	NA
1950	329	NA	NA	2	(s)	NA	291	NA	NA	NA
1951	371	NA	NA	2	(s)	NA	330	NA	NA	NA
1952	399	NA	NA	3	(s)	NA	356	NA	NA	NA
1953	443	NA	NA	2	(s)	NA	396	NA	NA	NA
1954	472	NA	NA	3	(s)	NA	424	NA	NA	NA
1955	547	NA	NA	5	(s)	NA	497	NA	NA	NA
1956	601	NA	NA	5	1	NA	546	NA	NA	NA
1957	632	NA	NA	5	1	NA	576	NA	NA	NA
1958	645	NA	NA	4	1	NA	588	NA	NA	NA
1959	710	NA	NA	4	1	NA	647	NA	NA	NA
1960	756	NA	NA	5	1	NA	688	NA	NA	NA
1961	794	NA	NA	3	1	NA	722	NA	NA	NA
1962	855	NA	NA	2	2	NA	778	NA	NA	NA
1963	917	NA	NA	2	2	NA	833	NA	NA	NA
1964	984	NA	NA	6	4	NA	896	NA	NA	NA
1965	1,055	NA	NA	4	4	NA	954	NA	NA	NA
1966	1,144	NA	NA	4	3	NA	1,035	NA	NA	NA
1967	1,214	NA	NA	4	4	NA	1,099	NA	NA	NA
1968	1,329	NA	NA	4	4	NA	1,203	NA	NA	NA
1969	1,442	NA	NA	5	4	NA	1,314	NA	NA	NA
1970	1,532	NA	NA	6	4	NA	1,392	NA	NA	NA
1971	1,613	NA	NA	7	4	NA	1,470	NA	NA	NA
1972	1,750	NA	NA	10	3	NA	1,595	NA	NA	NA
1973	1,861	NA	NA	17	3	NA	1,713	NA	NA	NA
1974	1,867	NA	NA	15	3	NA	1,706	NA	NA	NA
1975	1,918	NA	NA	11	5	NA	1,747	NA	NA	NA
1976	2,038	NA	NA	11	2	NA	1,855	NA	NA	NA
1977	2,124	NA	NA	20	3	NA	1,948	NA	NA	NA
1978	2,206	NA	NA	21	1	NA	2,018	NA	NA	NA
1979	2,247	NA	NA	23	2	NA	2,071	NA	NA	NA
1980	2,286	NA	NA	25	4	NA	2,094	NA	NA	NA
1981	2,295	NA	NA	36	3	NA	2,147	NA	NA	NA
1982	2,241	NA	NA	33	4	NA	2,086	NA	NA	NA
1983	2,310	NA	NA	39	3	NA	2,151	NA	NA	NA
1984	2,416	NA	NA	42	3	NA	2,286	NA	NA	NA
1985	2,470	NA	NA	46	5	NA	2,324	NA	NA	NA
1986	2,487	NA	NA	41	5	NA	2,369	NA	NA	NA
1987	2,572	NA	NA	52	6	NA	2,457	NA	NA	NA
1988	2,704	NA	NA	39	7	NA	2,578	NA	NA	NA
1989	2,784	42	NA	26	15	NA	2,647	NA	NA	NA
1990	2,808	50	NA	23	21	NA	2,713	NA	NA	NA
1991	2,825	57	NA	31	9	NA	2,762	NA	NA	NA
1992	2,797	286	3,083	37	9	227	2,763	111	11	2,885
1993	2,883	314	3,197	39	11	237	2,861	111	R16	2,988
1994	2,911	343	3,254	52	8	223	2,935	123	R18	3,075
1995	2,995	362	3,356	R47	R9	232	R3,013	134	R16	3,162
1996	P3,078	E403	E3,481	P45	P7	E277	P3,084	E141	E17	E3,243

<sup>1</sup> See Note 1 at end of section.

<sup>2</sup> Electricity transmitted across U.S. borders with Canada and Mexico.

<sup>3</sup> Energy losses that occur between the point of generation and delivery to the customer, and data collection frame differences and nonsampling error. See Note 2 at end of section.

<sup>4</sup> Power generated and consumed onsite. Differs from Table 8.12's "Facility Use," which also includes purchases from other producers.

R=Revised data. P=Preliminary data. E=Estimate. NA=Not available. (s)=Less than 0.5 billion kilowatthours.

Notes: • See Note 3 at end of section. • Totals may not equal sum of components due to independent rounding.

Sources: **Net Generation, Electric Utilities:** See Table 8.3. **Net Generation, Nonutility Power**

**Producers:** See Table 8.2. **Imports and Exports:** • 1949-September 1977—unpublished Federal Power Commission data. • October 1977-1980—unpublished Economic Regulatory Administration (ERA) data.

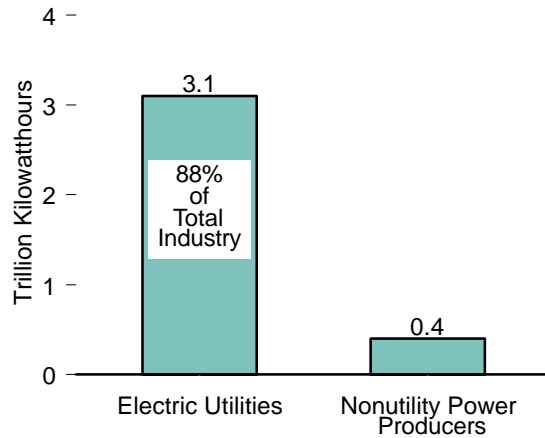
• 1981—Office of Energy Emergency Operations, "Report on Electric Energy Exchanges with Canada and Mexico for Calendar Year 1981," April 1982 (revised June 1982). • 1982 and 1983—ERA, *Electricity Exchanges Across International Borders*. • 1984-1986—ERA, *Electricity Transactions Across International Borders*. • 1987 and 1988—ERA, Form ERA-781R, "Annual Report of International Electrical Export/Import Data."

• 1989-1995—Fossil Energy, Form FE-781R, "Annual Report of International Electrical Export/Import Data." • 1996—EIA estimates based on preliminary data from the National Energy Board of Canada and Department of Energy, Fossil Energy.

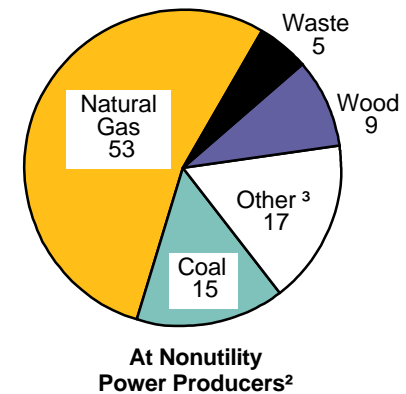
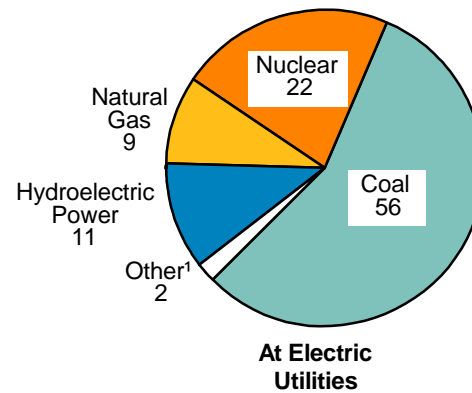
**Losses and Unaccounted For:** Estimated as Total End Use and Exports minus Net Generation and Imports. **End Use, Electric Utility Retail Sales:** See Table 8.6. **End Use, Nonutility Power Producers:** See Table 8.12.

**Figure 8.2 Electric Power Industry Net Generation and Net Summer Capability, 1996**

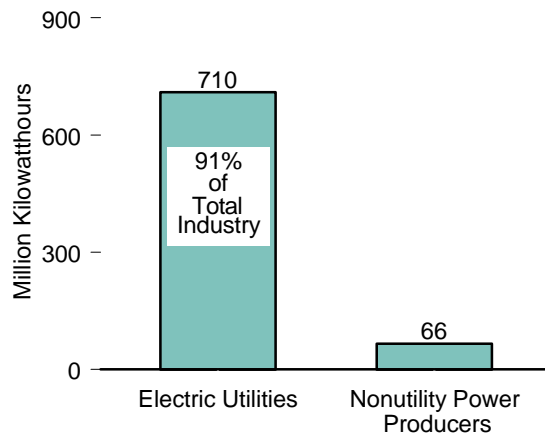
**Net Generation**



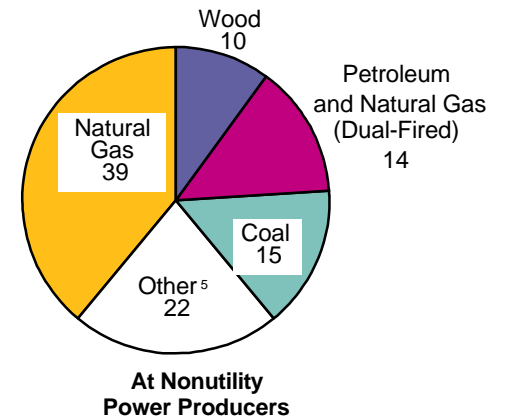
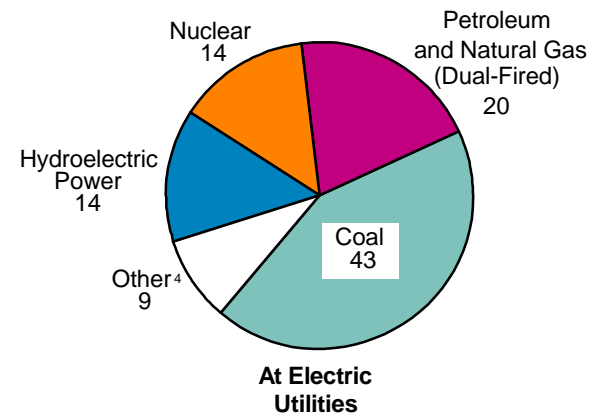
**Net Generation Shares by Source of Power (Percent of Total)**



**Net Summer Capability**



**Net Summer Capability Shares by Type of Capacity (Percent of Total)**



<sup>1</sup> "Other" is petroleum, geothermal energy, wood, waste, solar, and wind.

<sup>2</sup> Shares do not add exactly to 100 percent due to rounding of components.

<sup>3</sup> "Other" is petroleum, hydroelectric power, geothermal energy, wind, solar, nuclear, butane, ethane, propane, hydrogen, sulfur, batteries, chemicals, fish oil, and spent sulfite liquor.

<sup>4</sup> "Other" is petroleum, natural gas, geothermal energy, wood, waste, solar, and wind.

<sup>5</sup> "Other" is waste, hydroelectric power, petroleum, wind, geothermal energy, solar, nuclear, butane, ethane, propane, hydrogen, sulfur, batteries, chemicals, fish oil, and spent sulfite liquor.

Source: Table 8.2.

**Table 8.2 Electric Power Industry Net Generation and Net Summer Capability, 1992-1996**

Year	Net Generation (billion kilowatthours)												Total
	Coal <sup>1</sup>	Natural Gas	Petroleum <sup>2</sup>	Dual-Fired <sup>3</sup>	Hydroelectric Power <sup>4</sup>	Geothermal Energy	Wood <sup>5</sup>	Waste <sup>6</sup>	Solar	Wind	Nuclear <sup>7</sup>	Other <sup>8</sup>	
<b>Electric Utilities</b>													
1992 .....	1,575.9	263.9	88.9	—	239.6	8.1	0.8	1.3	(s)	(s)	618.8	0.0	2,797.2
1993 .....	1,639.2	258.9	99.5	—	265.1	7.6	0.9	1.1	(s)	(s)	610.3	0.0	2,882.5
1994 .....	1,635.5	291.1	91.0	—	243.7	6.9	0.8	1.2	(s)	(s)	640.4	0.0	2,910.7
1995 .....	1,652.9	307.3	60.8	—	293.7	4.7	0.6	1.0	(s)	(s)	673.4	0.0	2,994.5
1996 <sup>P</sup> .....	1,735.9	263.3	67.9	—	328.8	5.2	0.8	1.2	(s)	(s)	674.8	0.0	3,077.9
<b>Nonutility Power Producers</b>													
1992 .....	45.2	154.4	10.5	—	9.4	8.3	34.8	16.5	0.7	2.9	0.1	3.4	286.1
1993 .....	50.9	169.5	12.8	—	11.4	9.5	35.9	17.4	0.9	3.0	0.1	3.1	314.4
1994 .....	56.2	174.8	14.5	—	13.1	9.8	37.0	17.9	0.8	3.4	0.1	15.5	343.1
1995 .....	54.8	191.1	16.3	—	14.6	<sup>R</sup> 9.6	35.5	19.0	0.8	<sup>R</sup> 3.2	0.0	17.1	361.9
1996 <sup>E</sup> .....	60.8	214.2	19.6	—	16.5	10.7	37.2	22.1	0.9	3.5	0.0	17.9	403.5
<b>Total</b>													
1992 .....	1,621.1	418.3	99.4	—	248.9	16.4	35.6	17.8	0.7	2.9	618.8	3.4	3,083.4
1993 .....	1,690.0	428.4	112.4	—	276.5	17.0	36.8	18.5	0.9	3.0	610.4	3.1	3,196.9
1994 .....	1,691.7	465.9	105.5	—	256.8	16.8	37.8	19.1	0.8	3.4	640.5	15.5	3,253.8
1995 .....	1,707.7	498.4	77.1	—	308.3	14.4	36.1	20.0	0.8	3.2	673.4	17.1	3,356.4
1996 <sup>E</sup> .....	1,796.7	477.5	87.5	—	345.4	15.9	38.0	23.3	0.9	3.5	674.8	17.9	3,481.4
<b>Net Summer Capability (million kilowatts)</b>													
<b>Electric Utilities</b>													
1992 .....	300.5	16.4	49.9	133.7	<sup>R</sup> 93.4	1.7	0.2	0.2	(s)	(s)	<sup>R</sup> 99.0	0.0	<sup>R</sup> 695.1
1993 .....	300.8	17.0	47.8	137.2	<sup>R</sup> 95.9	1.7	0.2	0.2	(s)	(s)	<sup>R</sup> 99.0	0.0	<sup>R</sup> 700.0
1994 .....	301.1	19.8	45.5	138.4	<sup>R</sup> 96.0	1.7	0.3	0.3	(s)	(s)	<sup>R</sup> 99.1	0.0	<sup>R</sup> 702.2
1995 .....	300.6	17.7	46.1	143.2	<sup>R</sup> 96.7	1.7	0.3	0.3	(s)	(s)	<sup>R</sup> 99.5	0.0	<sup>R</sup> 706.1
1996 <sup>P</sup> .....	302.2	17.9	46.1	144.2	96.3	1.6	0.3	0.3	(s)	(s)	100.7	0.0	709.6
<b>Nonutility Power Producers</b>													
1992 .....	7.9	18.7	1.6	7.5	2.6	1.2	6.4	2.8	0.3	1.8	(s)	0.6	51.5
1993 .....	9.1	20.3	1.9	7.5	2.6	1.2	6.7	2.9	0.3	1.8	(s)	0.5	55.0
1994 .....	9.7	23.2	2.1	8.6	3.3	1.3	7.0	2.9	0.3	1.7	0.0	1.6	61.8
1995 .....	9.8	24.3	2.2	9.2	3.3	1.2	6.6	3.2	0.3	1.7	0.0	1.7	63.4
1996 <sup>E</sup> .....	10.0	25.7	3.0	9.2	3.3	1.2	6.6	3.3	0.3	1.8	0.0	1.7	66.1
<b>Total</b>													
1992 .....	308.5	35.1	51.5	141.2	96.0	2.9	6.7	3.0	0.3	1.8	99.0	0.6	746.6
1993 .....	309.9	37.4	49.7	144.7	98.6	3.0	6.9	3.2	0.3	1.8	99.1	0.5	755.0
1994 .....	310.8	43.1	47.6	147.0	99.2	3.0	7.3	3.2	0.3	1.7	99.1	1.6	764.0
1995 .....	310.4	42.0	48.3	152.4	99.9	3.0	6.9	3.4	0.3	1.7	99.5	1.7	769.5
1996 <sup>E</sup> .....	312.2	43.6	49.1	153.4	99.6	2.8	6.9	3.5	0.3	1.8	100.7	1.7	775.7

<sup>1</sup> Includes coal, anthracite culm, and coal waste.

<sup>2</sup> Includes petroleum, petroleum coke, diesel, kerosene, and petroleum sludge and tar.

<sup>3</sup> Petroleum and natural gas.

<sup>4</sup> In the nonutility sector, conventional hydroelectric power only; there are no pumped-storage projects.

<sup>5</sup> Includes wood, wood waste, peat, wood liquors, railroad ties, pitch, and wood sludge.

<sup>6</sup> Includes municipal solid waste, agricultural waste, straw, tires, landfill gases, and other waste.

<sup>7</sup> Nuclear reactor and generator at Argonne National Laboratory used primarily for research and development in testing reactor fuels as well as for training. The generation from the unit is used for internal consumption.

<sup>8</sup> Includes other gases (butane, ethane, propane) and all other (hydrogen, sulfur, batteries, chemicals, fish oil, and spent sulfite liquor). See Table 8.12.

R=Revised data. P=Preliminary. E=Estimate. (s)=Less than 0.01 billion kilowatthours or less than 0.01 million kilowatts. — = Not appropriate.

Notes: • Nonutility electric generating facilities with a total generator capacity of 1 megawatt or greater.

• For gross-to-net generation conversion methodology for nonutility power producers, refer to Energy Information Administration (EIA), *Electric Power Annual 1994, Volume II* (November 1995), p. 108.

• Totals may not equal sum of components due to independent rounding.

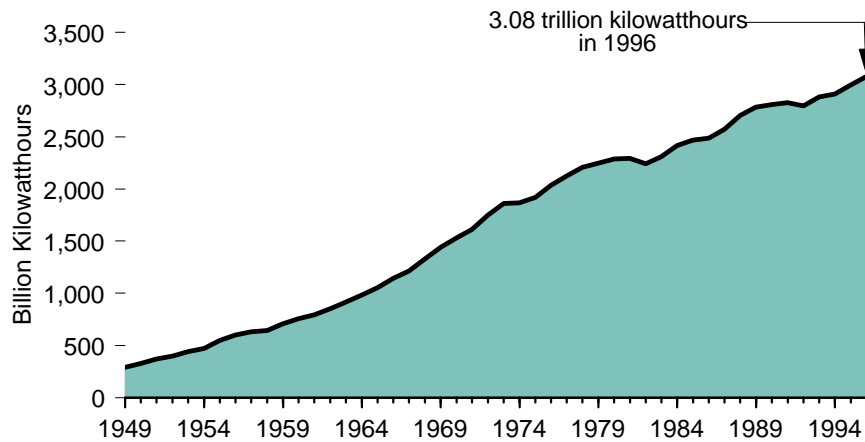
Sources: **Electric Utilities Net Generation:** EIA, Form EIA-759, "Monthly Power Plant Report."

**Electric Utilities Net Summer Capability:** EIA, Form EIA-860, "Annual Electric Generator Report."

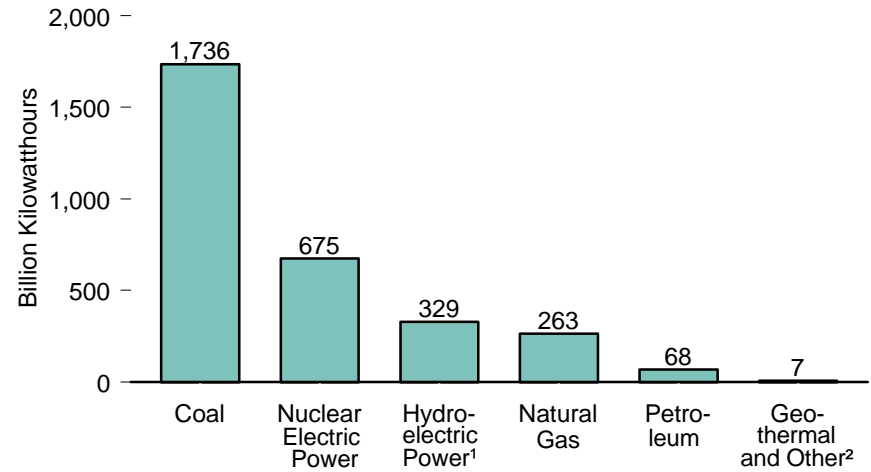
**Nonutility Power Producers:** EIA estimated data using Form EIA-867, "Annual Nonutility Power Producer Report."

**Figure 8.3 Electric Utility Net Generation of Electricity by Energy Source**

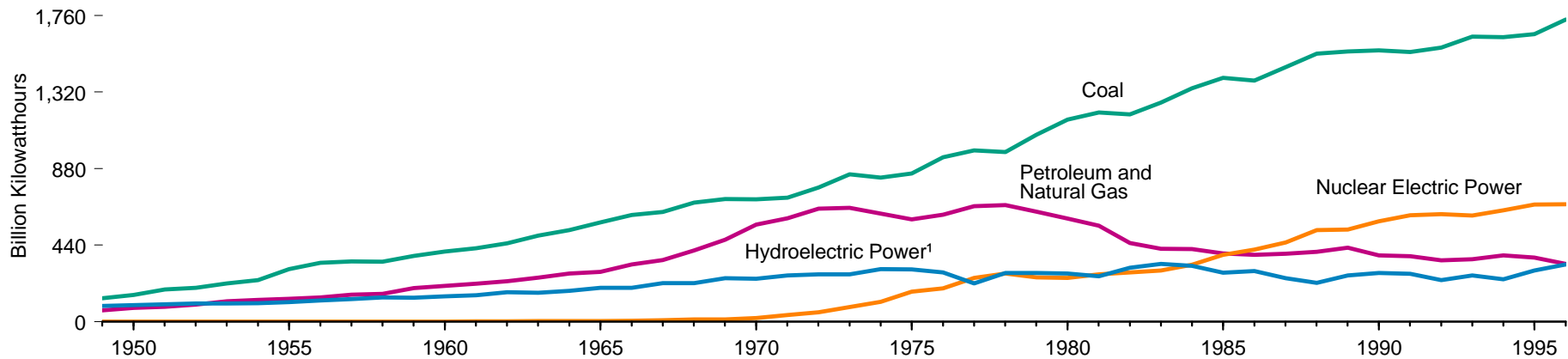
**Total, 1949-1996**



**By Major Energy Source, 1996**



**Total, 1949-1996**



<sup>1</sup> Conventional and pumped-storage hydroelectric power.

<sup>2</sup> "Other" is wood, waste, wind, photovoltaic, and solar thermal energy used to generate electricity for distribution.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 8.3.

**Table 8.3 Electric Utility Net Generation of Electricity by Energy Source, 1949-1996**  
(Billion Kilowatthours)

Year	Fossil Fuels				Nuclear Electric Power	Hydroelectric Pumped Storage <sup>2</sup>	Renewable Energy			Total
	Coal	Natural Gas	Petroleum <sup>1</sup>	Total			Conventional Hydroelectric Power	Geothermal Energy and Other <sup>3</sup>	Total	
1949	135	37	29	201	0	( <sup>4</sup> )	90	(s)	90	291
1950	155	45	34	233	0	( <sup>4</sup> )	96	(s)	96	329
1951	185	57	29	271	0	( <sup>4</sup> )	100	(s)	100	371
1952	195	68	30	294	0	( <sup>4</sup> )	105	(s)	106	399
1953	219	80	38	337	0	( <sup>4</sup> )	105	(s)	106	443
1954	239	94	32	364	0	( <sup>4</sup> )	107	(s)	107	472
1955	301	95	37	434	0	( <sup>4</sup> )	113	(s)	113	547
1956	339	104	36	478	0	( <sup>4</sup> )	122	(s)	122	601
1957	346	114	40	501	(s)	( <sup>4</sup> )	130	(s)	130	632
1958	344	120	40	504	(s)	( <sup>4</sup> )	140	(s)	140	645
1959	378	147	47	572	(s)	( <sup>4</sup> )	138	(s)	138	710
1960	403	158	48	609	1	( <sup>4</sup> )	146	(s)	146	756
1961	422	169	49	640	2	( <sup>4</sup> )	152	(s)	152	794
1962	450	184	49	683	2	( <sup>4</sup> )	169	(s)	169	855
1963	494	202	52	748	3	( <sup>4</sup> )	166	(s)	166	917
1964	526	220	57	803	3	( <sup>4</sup> )	177	(s)	177	984
1965	571	222	65	857	4	( <sup>4</sup> )	194	(s)	194	1,055
1966	613	251	79	944	6	( <sup>4</sup> )	195	1	195	1,144
1967	630	265	89	985	8	( <sup>4</sup> )	222	1	222	1,214
1968	685	304	104	1,094	13	( <sup>4</sup> )	222	1	223	1,329
1969	706	333	138	1,177	14	( <sup>4</sup> )	250	1	251	1,442
1970	704	373	184	1,261	22	( <sup>4</sup> )	248	1	249	1,532
1971	713	374	220	1,307	38	( <sup>4</sup> )	266	1	267	1,613
1972	771	376	274	1,421	54	( <sup>4</sup> )	273	2	274	1,750
1973	848	341	314	1,503	83	( <sup>4</sup> )	272	2	274	1,861
1974	828	320	301	1,449	114	( <sup>4</sup> )	301	3	304	1,867
1975	853	300	289	1,442	173	( <sup>4</sup> )	300	3	303	1,918
1976	944	295	320	1,559	191	( <sup>4</sup> )	284	4	288	2,038
1977	985	306	358	1,649	251	( <sup>4</sup> )	220	4	225	2,124
1978	976	305	365	1,646	276	( <sup>4</sup> )	280	3	284	2,206
1979	1,075	329	304	1,708	255	( <sup>4</sup> )	280	4	284	2,247
1980	1,162	346	246	1,754	251	( <sup>4</sup> )	276	6	282	2,286
1981	1,203	346	206	1,755	273	( <sup>4</sup> )	261	6	267	2,295
1982	1,192	305	147	1,644	283	( <sup>4</sup> )	309	5	314	2,241
1983	1,259	274	144	1,678	294	( <sup>4</sup> )	332	6	339	2,310
1984	1,342	297	120	1,759	328	( <sup>4</sup> )	321	9	330	2,416
1985	1,402	292	100	1,794	384	( <sup>4</sup> )	281	11	292	2,470
1986	1,386	249	137	1,771	414	( <sup>4</sup> )	291	12	302	2,487
1987	1,464	273	118	1,855	455	( <sup>4</sup> )	250	12	262	2,572
1988	1,541	253	149	1,942	527	( <sup>4</sup> )	223	12	235	2,704
1989	1,554	267	158	1,979	529	( <sup>4</sup> )	265	11	276	2,784
1990	1,560	264	117	1,941	577	-4	283	11	294	2,808
1991	1,551	264	111	1,927	613	-5	280	10	290	2,825
1992	1,576	264	89	1,929	619	-4	244	10	254	2,797
1993	1,639	259	100	1,998	610	-4	269	10	279	2,883
1994	1,635	291	91	2,018	640	-3	247	9	256	2,911
1995	1,653	307	61	2,021	673	-3	296	6	303	2,995
1996 <sup>P</sup>	1,736	263	68	2,067	675	-3	332	7	339	3,078

<sup>1</sup> Distillate fuel oil, residual fuel oil (including crude oil burned as fuel), jet fuel, and petroleum coke.

<sup>2</sup> Represents total pumped storage facility production minus energy used for pumping.

<sup>3</sup> "Other" is wood, waste, wind, photovoltaic, and solar thermal energy used to generate electricity for distribution. See Table 10.9 for components of this column.

<sup>4</sup> Included in conventional hydroelectric power.

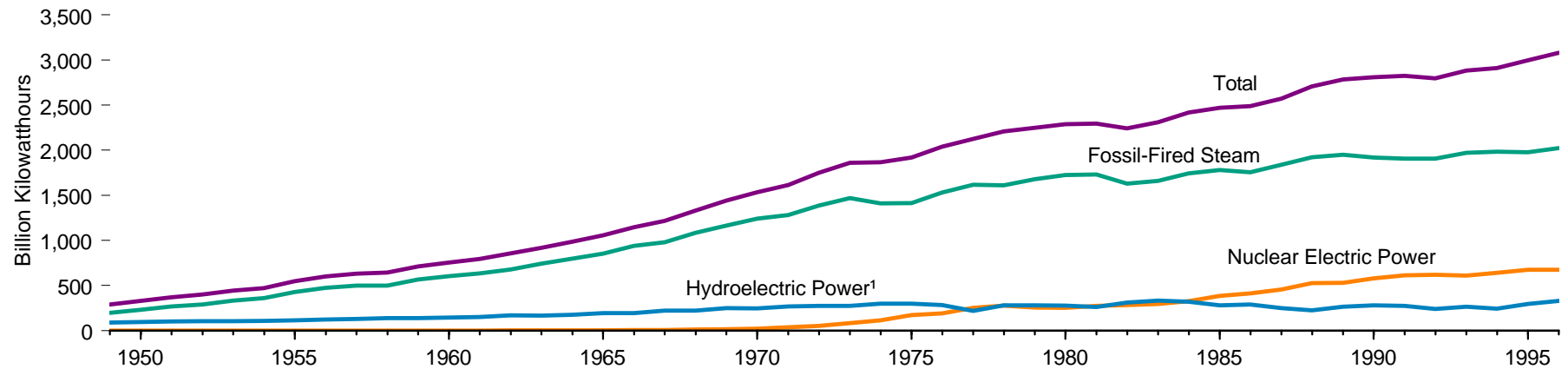
P=Preliminary data. (s)=Less than 0.5 billion kilowatthours.

Notes: • See Notes 1 and 3 at end of section. • Totals may not equal sum of components due to independent rounding.

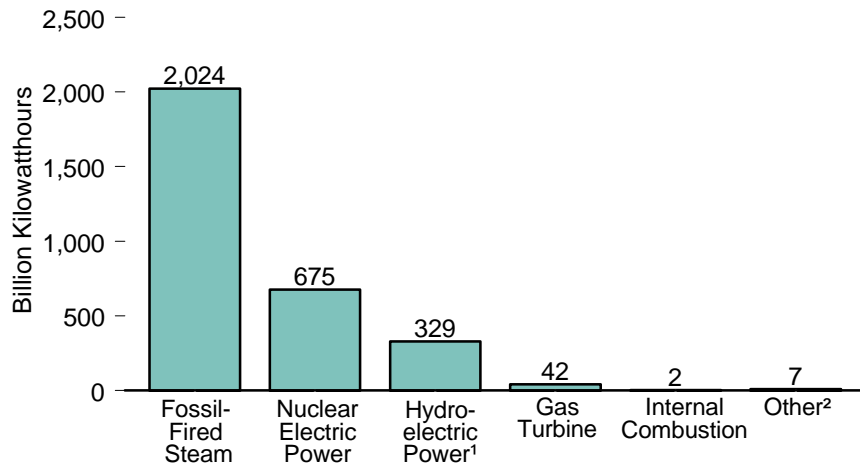
Sources: • 1949-September 1977—Federal Power Commission, Form FPC-4, "Monthly Power Plant Report." • October 1977-1981—Federal Energy Regulatory Commission, Form FPC-4, "Monthly Power Plant Report." • 1982 forward—Energy Information Administration, Form EIA-759, "Monthly Power Plant Report."

**Figure 8.4 Electric Utility Net Generation of Electricity by Prime Mover**

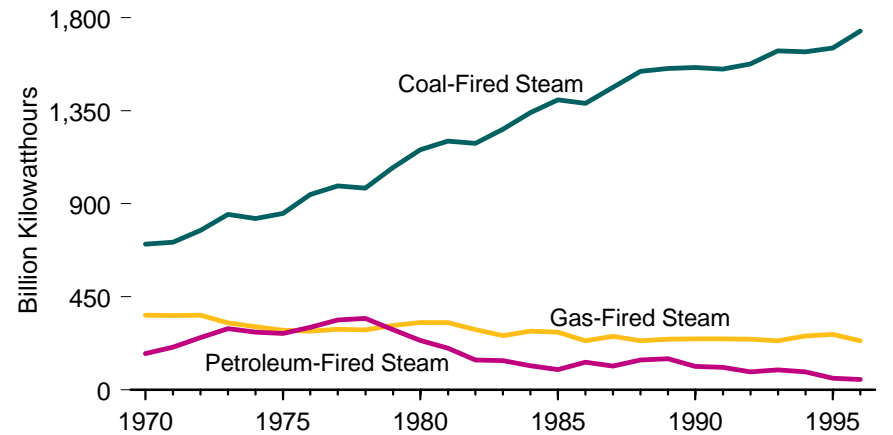
**Total, 1949-1996**



**Total by Prime Mover, 1996**



**Fossil-Fired Steam by Fuel, 1970-1996**



<sup>1</sup> Conventional and pumped-storage hydroelectric power.  
<sup>2</sup> "Other" is geothermal, wood, waste, wind, photovoltaic, and solar thermal energy used to generate electricity for distribution.

Note: Because vertical scales differ, graphs should not be compared.  
 Source: Table 8.4.

**Table 8.4 Electric Utility Net Generation of Electricity by Prime Mover, 1949-1996**  
(Billion Kilowatthours)

Year	Fossil-Fired Steam				Internal Combustion	Gas Turbine	Nuclear Electric Power	Hydroelectric Power			Other <sup>1</sup>	Total
	Coal-Fired	Petroleum-Fired	Gas-Fired	Total				Conventional	Pumped Storage	Total		
1949	135	NA	NA	197	3	( <sup>2</sup> )	0	90	( <sup>3</sup> )	90	(s)	291
1950	155	NA	NA	229	4	( <sup>2</sup> )	0	96	( <sup>3</sup> )	96	(s)	329
1951	185	NA	NA	267	4	( <sup>2</sup> )	0	100	( <sup>3</sup> )	100	(s)	371
1952	195	NA	NA	290	4	( <sup>2</sup> )	0	105	( <sup>3</sup> )	105	(s)	399
1953	219	NA	NA	333	4	( <sup>2</sup> )	0	105	( <sup>3</sup> )	105	(s)	443
1954	239	NA	NA	361	4	( <sup>2</sup> )	0	107	( <sup>3</sup> )	107	(s)	472
1955	301	NA	NA	430	4	( <sup>2</sup> )	0	113	( <sup>3</sup> )	113	(s)	547
1956	339	NA	NA	474	4	( <sup>2</sup> )	0	122	( <sup>3</sup> )	122	(s)	601
1957	346	NA	NA	497	4	( <sup>2</sup> )	(s)	130	( <sup>3</sup> )	130	(s)	632
1958	344	NA	NA	500	4	( <sup>2</sup> )	(s)	140	( <sup>3</sup> )	140	(s)	645
1959	378	NA	NA	567	4	( <sup>2</sup> )	(s)	138	( <sup>3</sup> )	138	(s)	710
1960	403	NA	NA	603	4	( <sup>2</sup> )	1	146	( <sup>3</sup> )	146	(s)	756
1961	422	NA	NA	634	5	( <sup>2</sup> )	2	152	( <sup>3</sup> )	152	(s)	794
1962	450	NA	NA	677	5	( <sup>2</sup> )	2	169	( <sup>3</sup> )	169	(s)	855
1963	494	NA	NA	742	5	( <sup>2</sup> )	3	166	( <sup>3</sup> )	166	(s)	917
1964	526	NA	NA	798	6	( <sup>2</sup> )	3	177	( <sup>3</sup> )	177	(s)	984
1965	571	NA	NA	851	6	( <sup>2</sup> )	4	194	( <sup>3</sup> )	194	(s)	1,055
1966	613	NA	NA	938	5	( <sup>2</sup> )	6	195	( <sup>3</sup> )	195	1	1,144
1967	630	NA	NA	980	5	( <sup>2</sup> )	8	222	( <sup>3</sup> )	222	1	1,214
1968	685	NA	NA	1,084	9	( <sup>2</sup> )	13	222	( <sup>3</sup> )	222	1	1,329
1969	706	NA	NA	1,163	14	( <sup>2</sup> )	14	250	( <sup>3</sup> )	250	1	1,442
1970	704	174	361	1,240	6	16	22	248	( <sup>3</sup> )	248	1	1,532
1971	713	206	360	1,279	6	22	38	266	( <sup>3</sup> )	266	1	1,613
1972	771	253	361	1,385	7	29	54	273	( <sup>3</sup> )	273	2	1,750
1973	848	296	323	1,467	7	30	83	272	( <sup>3</sup> )	272	2	1,861
1974	828	279	304	1,411	6	32	114	301	( <sup>3</sup> )	301	3	1,867
1975	853	273	288	1,414	6	22	173	300	( <sup>3</sup> )	300	3	1,918
1976	944	302	284	1,530	5	24	191	284	( <sup>3</sup> )	284	4	2,038
1977	985	338	292	1,615	5	29	251	220	( <sup>3</sup> )	220	4	2,124
1978	976	345	290	1,610	5	31	276	280	( <sup>3</sup> )	280	3	2,206
1979	1,075	290	311	1,676	4	28	255	280	( <sup>3</sup> )	280	4	2,247
1980	1,162	238	326	1,726	4	24	251	276	( <sup>3</sup> )	276	6	2,286
1981	1,203	202	325	1,730	3	22	273	261	( <sup>3</sup> )	261	6	2,295
1982	1,192	144	291	1,628	2	14	283	309	( <sup>3</sup> )	309	5	2,241
1983	1,259	141	261	1,661	2	14	294	332	( <sup>3</sup> )	332	6	2,310
1984	1,342	117	284	1,742	2	15	328	321	( <sup>3</sup> )	321	9	2,416
1985	1,402	97	279	1,778	2	14	384	281	( <sup>3</sup> )	281	11	2,470
1986	1,386	133	236	1,756	2	14	414	291	( <sup>3</sup> )	291	12	2,487
1987	1,464	115	258	1,837	2	16	455	250	( <sup>3</sup> )	250	12	2,572
1988	1,541	144	236	1,921	2	20	527	223	( <sup>3</sup> )	223	12	2,704
1989	1,554	151	245	1,950	2	27	529	265	( <sup>3</sup> )	265	11	2,784
1990	1,560	113	246	1,919	2	12	577	283	-4	280	11	2,808
1991	1,551	108	246	1,905	2	20	613	280	-5	276	10	2,825
1992	1,576	86	246	1,908	2	19	619	244	-4	240	10	2,797
1993	1,639	96	<sup>R</sup> 237	<sup>R</sup> 1,973	2	23	610	269	-4	265	10	2,883
1994	1,635	86	260	1,982	2	34	640	247	-3	244	9	2,911
1995	1,653	56	268	1,977	2	42	673	296	-3	294	6	2,995
1996 <sup>P</sup>	1,736	50	238	2,024	2	42	675	332	-3	329	7	3,078

<sup>1</sup> "Other" is geothermal, wood, waste, wind, photovoltaic, and solar thermal energy used to generate electricity for distribution.

<sup>2</sup> Included in internal combustion.

<sup>3</sup> Included in conventional hydroelectric power.

R=Revised data. P=Preliminary data. NA=Not available. (s)=Less than 0.5 billion kilowatthours.

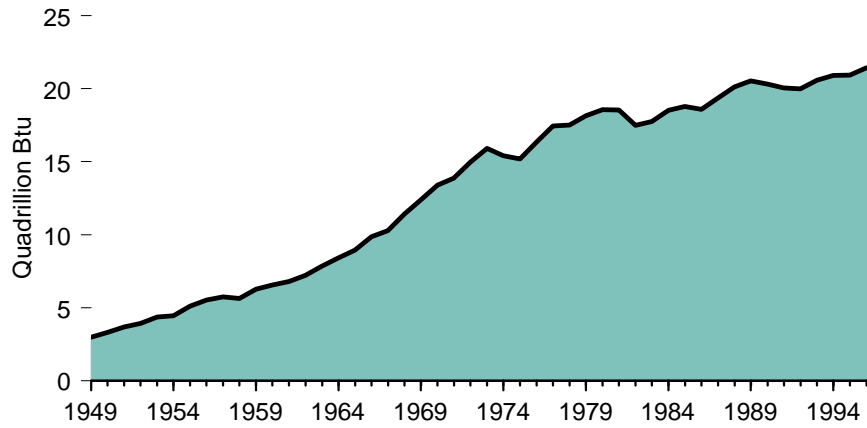
Notes: • See Notes 2 and 3 at end of section. • Totals may not equal sum of components due to

independent rounding.

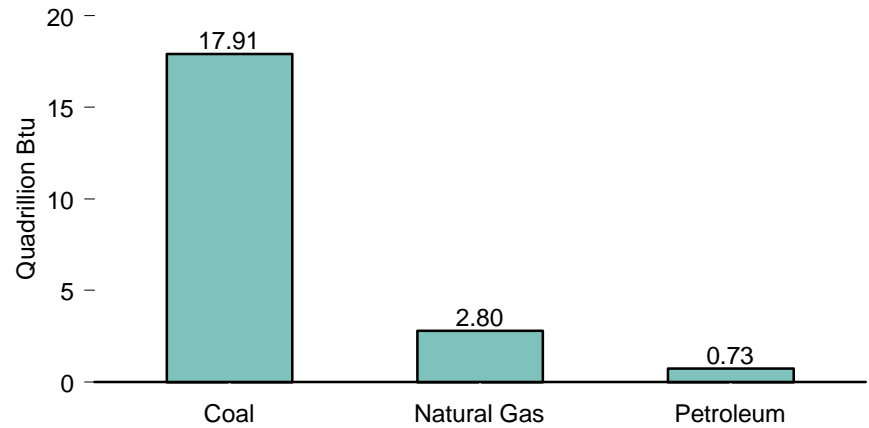
Sources: • 1949-September 1977—Federal Power Commission, Form FPC-4, "Monthly Power Plant Report." • October 1977-1981—Federal Energy Regulatory Commission, Form FPC-4, "Monthly Power Plant Report." • 1982 forward—Energy Information Administration, Form EIA-759, "Monthly Power Plant Report."

**Figure 8.5 Electric Utility Consumption of Fossil Fuels To Generate Electricity**

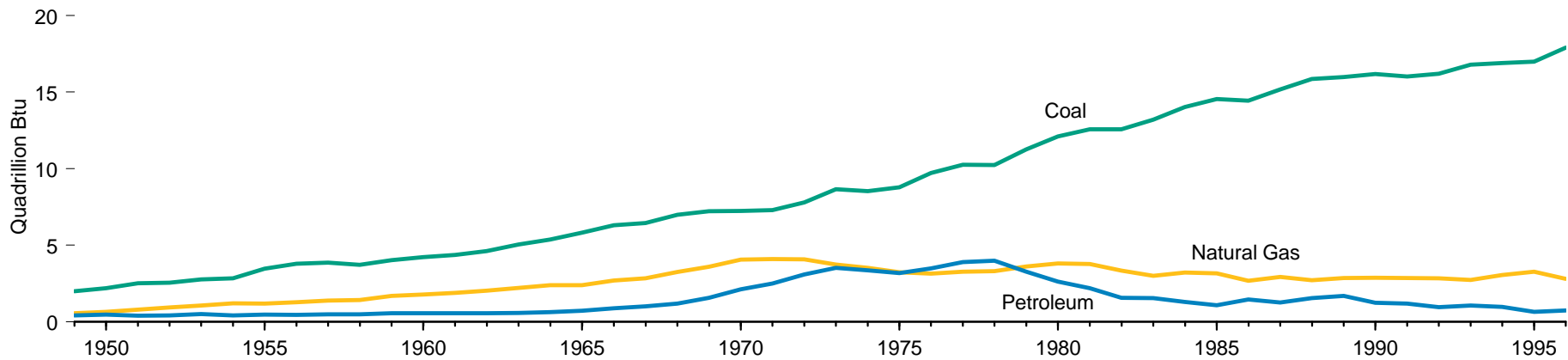
**Total, 1949-1996**



**By Energy Source, 1996**



**By Energy Source, 1949-1996**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 8.5



**Table 8.5 Electric Utility Consumption of Fossil Fuels To Generate Electricity, 1949-1996**

Year	Coal		Natural Gas		Petroleum <sup>1</sup>		Total
	Million Short Tons	Quadrillion Btu	Billion Cubic Feet	Quadrillion Btu	Million Barrels	Quadrillion Btu	Quadrillion Btu
1949	84.0	2.00	550.1	0.57	66.3	0.41	2.98
1950	91.9	2.20	628.9	0.65	75.4	0.47	3.32
1951	105.8	2.51	763.9	0.79	63.9	0.40	3.70
1952	107.1	2.56	910.1	0.94	67.2	0.42	3.92
1953	115.9	2.78	1,034.3	1.07	82.2	0.51	4.36
1954	118.4	2.84	1,165.5	1.21	66.7	0.42	4.46
1955	143.8	3.46	1,153.3	1.19	75.3	0.47	5.12
1956	158.3	3.79	1,239.3	1.28	72.7	0.45	5.53
1957	160.8	3.86	1,336.1	1.38	79.7	0.50	5.74
1958	155.7	3.72	1,372.9	1.42	77.7	0.49	5.63
1959	168.4	4.03	1,628.5	1.69	88.3	0.55	6.27
1960	176.7	4.23	1,724.8	1.79	88.2	0.55	6.57
1961	182.2	4.35	1,825.1	1.89	88.9	0.56	6.80
1962	193.3	4.62	1,966.0	2.03	89.3	0.56	7.22
1963	211.3	5.05	2,144.5	2.21	93.3	0.58	7.85
1964	225.4	5.38	2,322.9	2.40	101.1	0.63	8.41
1965	244.8	5.82	2,321.1	2.40	115.2	0.72	8.94
1966	266.5	6.30	2,609.9	2.70	140.9	0.88	9.88
1967	274.2	6.44	2,746.4	2.83	161.3	1.01	10.29
1968	297.8	6.99	3,147.9	3.25	188.6	1.18	11.42
1969	310.6	7.22	3,487.6	3.60	251.0	1.57	12.39
1970	320.2	7.23	3,931.9	4.05	338.7	2.12	13.40
1971	327.3	7.30	3,976.0	4.10	399.5	2.49	13.89
1972	351.8	7.81	3,976.9	4.08	496.9	3.10	14.99
1973	389.2	8.66	3,660.2	3.75	562.8	3.51	15.92
1974	391.8	8.53	3,443.4	3.52	539.4	3.36	15.42
1975	406.0	8.79	3,157.7	3.24	506.5	3.17	15.19
1976	448.4	9.72	3,080.9	3.15	556.3	3.48	16.35
1977	477.1	10.26	3,191.2	3.28	624.2	3.90	17.45
1978	481.2	10.24	3,188.4	3.30	637.8	3.99	17.52
1979	527.1	11.26	3,490.5	3.61	524.6	3.28	18.16
1980	569.3	12.12	3,681.6	3.81	421.1	2.63	18.57
1981	596.8	12.58	3,640.2	3.77	351.8	2.20	18.55
1982	593.7	12.58	3,225.5	3.34	250.5	1.57	17.49
1983	625.2	13.21	2,910.8	3.00	246.8	1.54	17.75
1984	664.4	14.02	3,111.3	3.22	205.7	1.29	18.53
1985	693.8	14.54	3,044.1	3.16	174.6	1.09	18.79
1986	685.1	14.44	2,602.4	2.69	232.0	1.45	18.59
1987	717.9	15.17	2,844.1	2.94	201.1	1.26	19.37
1988	758.4	15.85	2,635.6	2.71	250.1	1.56	20.12
1989	766.9	15.99	2,787.0	2.87	270.0	1.69	20.54
1990	773.5	16.19	2,787.3	2.88	200.2	1.25	20.32
1991	772.3	16.03	2,789.0	2.86	188.5	1.18	20.06
1992	779.9	16.21	2,765.6	2.83	152.3	0.95	19.99
1993	813.5	16.79	2,682.4	2.74	168.6	1.05	20.58
1994	817.3	16.90	2,987.1	3.05	155.4	0.97	20.92
1995	<sup>R</sup> 829.0	<sup>R</sup> 16.99	<sup>R</sup> 3,196.5	<sup>R</sup> 3.28	106.0	0.66	20.92
1996 <sup>P</sup>	873.7	17.91	2,736.6	2.80	118.2	0.73	21.44

<sup>1</sup> These data show petroleum consumed by electric utilities and do not equate to petroleum supplied to (or delivered to) electric utilities. Included are residual fuel oil (including crude oil burned as fuel), distillate fuel oil, jet fuel, and petroleum coke. Petroleum coke is reported in short tons and has been converted to barrels at a rate of 5 barrels per short ton.

R=Revised data. P=Preliminary data.

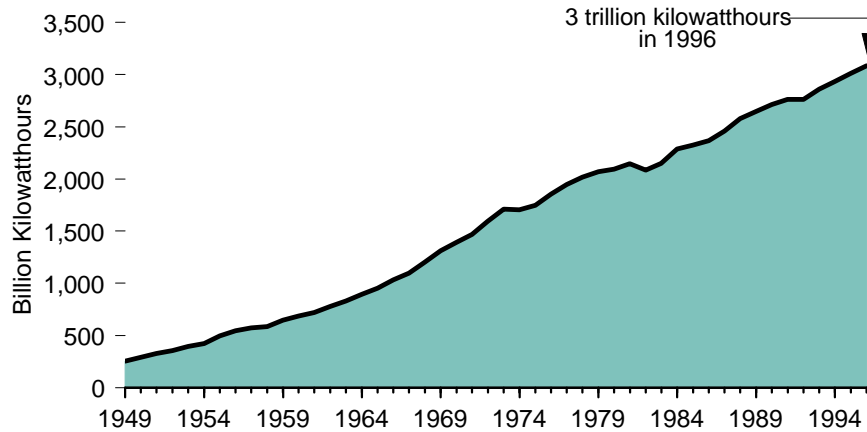
Notes: • See Note 3 at end of section. • Totals may not equal sum of components due to independent

rounding.

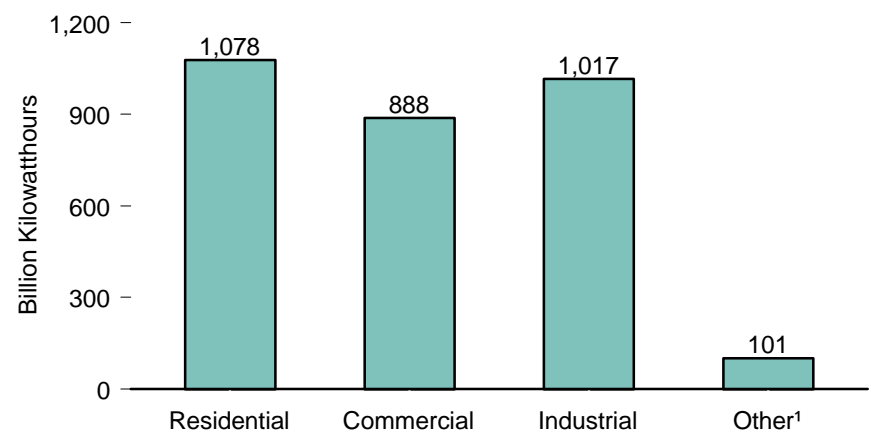
Sources: • 1949-September 1977—Federal Power Commission, Form FPC-4, "Monthly Power Plant Report." • October 1977-1981—Federal Energy Regulatory Commission, Form FPC-4, "Monthly Power Plant Report." • 1982 forward—Energy Information Administration, Form EIA-759, "Monthly Power Plant Report."

**Figure 8.6 Electric Utility Retail Sales of Electricity by End-Use Sector**

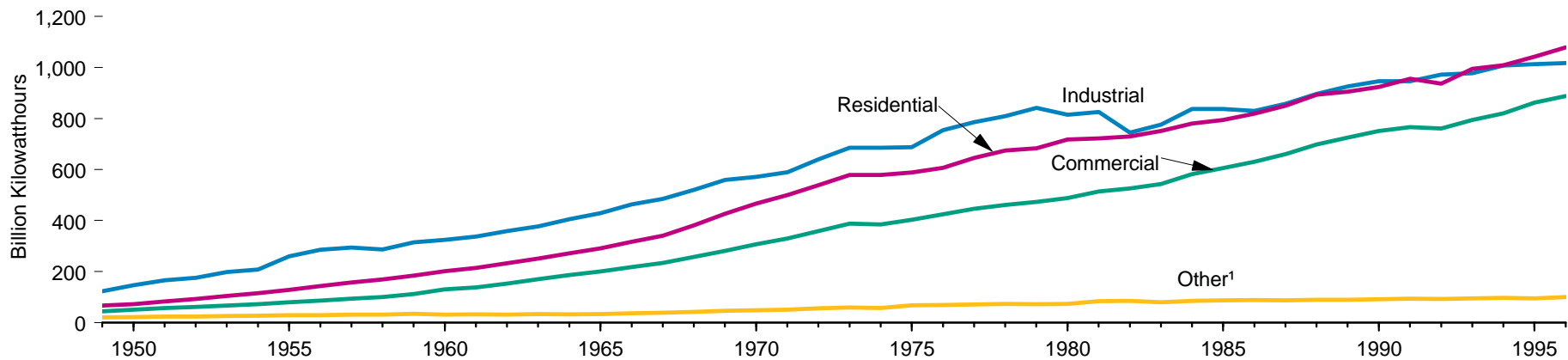
**Total, 1949-1996**



**By End-Use Sector, 1996**



**By End-Use Sector, 1949-1996**



<sup>1</sup> "Other" is public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

Note: Because vertical scales differ, graphs should not be compared.  
Source: Table 8.6.

**Table 8.6 Electric Utility Retail Sales of Electricity by End-Use Sector, 1949-1996**  
(Billion Kilowatthours)

Year	Residential	Commercial	Industrial	Other <sup>1</sup>	Total
1949	67	45	123	20	255
1950	72	51	146	22	291
1951	83	57	166	24	330
1952	94	62	176	24	356
1953	104	67	199	26	396
1954	116	72	208	27	424
1955	128	79	260	29	497
1956	143	87	286	30	546
1957	157	94	294	31	576
1958	169	100	287	32	588
1959	185	112	315	36	647
1960	201	131	324	32	688
1961	214	138	337	32	722
1962	233	153	360	32	778
1963	251	171	377	34	833
1964	272	187	405	32	896
1965	291	200	429	34	954
1966	317	218	464	37	1,035
1967	340	234	485	40	1,099
1968	382	258	521	42	1,203
1969	427	282	559	46	1,314
1970	466	307	571	48	1,392
1971	500	329	589	51	1,470
1972	539	359	641	56	1,595
1973	579	388	686	59	1,713
1974	578	385	685	58	1,706
1975	588	403	688	68	1,747
1976	606	425	754	70	1,855
1977	645	447	786	71	1,948
1978	674	461	809	73	2,018
1979	683	473	842	73	2,071
1980	717	488	815	74	2,094
1981	722	514	826	85	2,147
1982	730	526	745	86	2,086
1983	751	544	776	80	2,151
1984	780	583	838	85	2,286
1985	794	606	837	87	2,324
1986	819	631	831	89	2,369
1987	850	660	858	88	2,457
1988	893	699	896	90	2,578
1989	906	726	926	90	2,647
1990	924	751	946	92	2,713
1991	955	766	947	94	2,762
1992	936	761	973	93	2,763
1993	995	795	977	95	2,861
1994	1,008	820	1,008	98	2,935
1995	1,043	<sup>R</sup> 863	<sup>R</sup> 1,013	<sup>R</sup> 95	<sup>R</sup> 3,013
1996 <sup>P</sup>	1,078	888	1,017	101	3,084

<sup>1</sup> "Other" is public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

R=Revised data. P=Preliminary data.

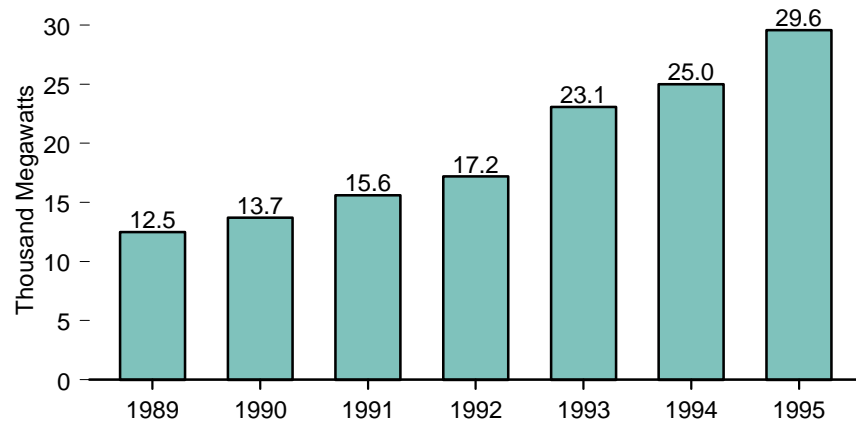
Notes: • See Note 4 at end of section. • Totals may not equal sum of components due to independent rounding.

Sources: • 1949-September 1977—Federal Power Commission, Form FPC-5, "Monthly Statement of

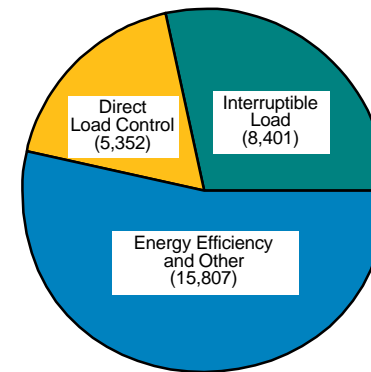
Electric Operating Revenue and Income." • October 1977-February 1980—Federal Energy Regulatory Commission (FERC), Form FPC-5, "Monthly Statement of Electric Operating Revenue and Income." • March 1980-1982—FERC, Form FPC-5, "Electric Utility Company Monthly Statement." • 1983—Energy Information Administration (EIA), Form EIA-826, "Electric Utility Company Monthly Statement." • 1984-1995—EIA, Form EIA-861, "Annual Electric Utility Report." • 1996—EIA, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions."

**Figure 8.7 Electric Utility Demand-Side Management Programs: Peakload Reductions, Energy Savings, and Costs**

**Actual Peakload Reductions, Total of All Programs, 1989-1995**

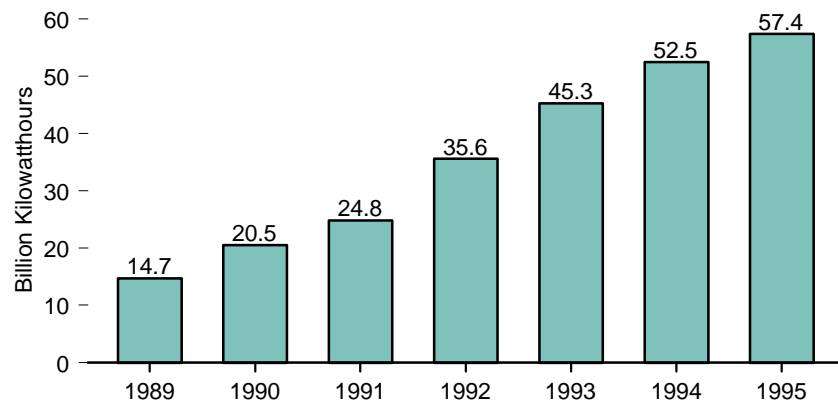


**Actual Peakload Reductions by Program, 1995**

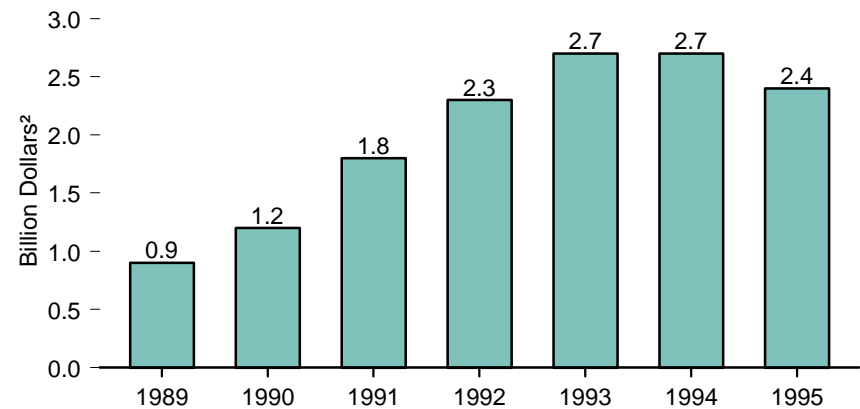


**Total: 29,561 Megawatts<sup>1</sup>**

**Energy Savings, 1989-1995**



**Costs, 1989-1995**



<sup>1</sup>Does not equal sum of components due to rounding.

<sup>2</sup>Nominal dollars.

Source: Table 8.7

**Table 8.7 Electric Utility Demand-Side Management Programs: Peakload Reductions, Energy Savings, and Costs, 1989-1995**

Year	Actual Peakload Reductions (megawatts)				Energy Savings (million kilowatthours)	Costs (thousand dollars <sup>6</sup> )
	Direct Load Control <sup>1,2</sup>	Interruptible Load <sup>1,3</sup>	Energy Efficiency <sup>4</sup> and Other <sup>5</sup>	Total		
1989	NA	NA	NA	12,463	14,672	872,935
1990	3,692	4,219	5,793	13,704	20,458	1,177,457
1991	5,093	3,674	6,852	15,619	24,848	1,803,773
1992	3,779	3,579	9,847	17,204	35,563	2,348,094
1993	3,955	6,628	12,486	23,069	45,294	2,743,533
1994	4,179	6,743	<sup>R</sup> 14,079	25,001	52,483	2,715,657
1995	5,352	8,401	15,807	29,561	57,421	2,421,261

<sup>1</sup> The actual reduction in peak load reflects the change in demand for electricity that results from a utility demand-side management program that is in effect at the time that the utility experiences its actual peak load as opposed to the potential installed peakload reduction capability. Differences between actual and potential peak reduction result from changes in weather, economic activity, and other variable conditions.

<sup>2</sup> Direct load control refers to program activities that can interrupt consumer load at the time of annual peak load by direct control of the utility system operator by interrupting power supply to individual appliances or equipment on consumer premises. This type of control usually involves residential consumers.

<sup>3</sup> Interruptible load refers to program activities that, in accordance with contractual arrangements, can interrupt consumer load at times of seasonal peak load by direct control of the utility system operator or by action of the consumer at the direct request of the system operator. It usually involves commercial and industrial consumers. In some instances, the load reduction may be affected by direct action of the system operator (remote tripping) after notice to the consumer in accordance with contractual provisions.

<sup>4</sup> Energy efficiency refers to programs that are aimed at reducing the energy used by specific end-use devices and systems, typically without affecting the services provided. These programs reduce overall electricity consumption, often without explicit consideration for the timing of program-induced savings. Such savings are generally achieved by substituting technically more advanced equipment to produce the

same level of end-use services (e.g., lighting, heating, motor drive) with less electricity. Examples include high-efficiency appliances, efficient lighting programs, high-efficiency heating, ventilating and air conditioning systems or control modifications, efficient building design, advanced electric motor drives, and heat recovery systems.

<sup>5</sup> For example, programs that promote consumer's substitution of electricity by other energy types and programs that limit or shift peak load from on-peak to off-peak time periods, such as space heating and water heating storage systems, cool storage systems, and load limiting devices in energy management systems.

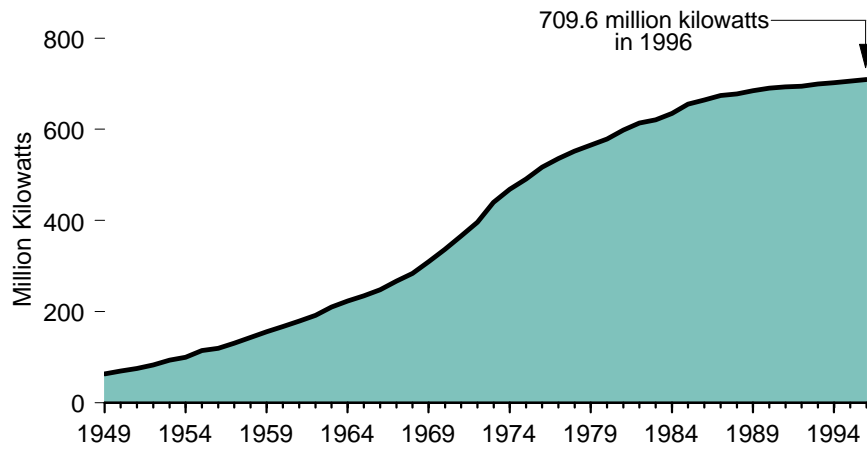
<sup>6</sup> Nominal dollars.

R=Revised data. NA=Not available.

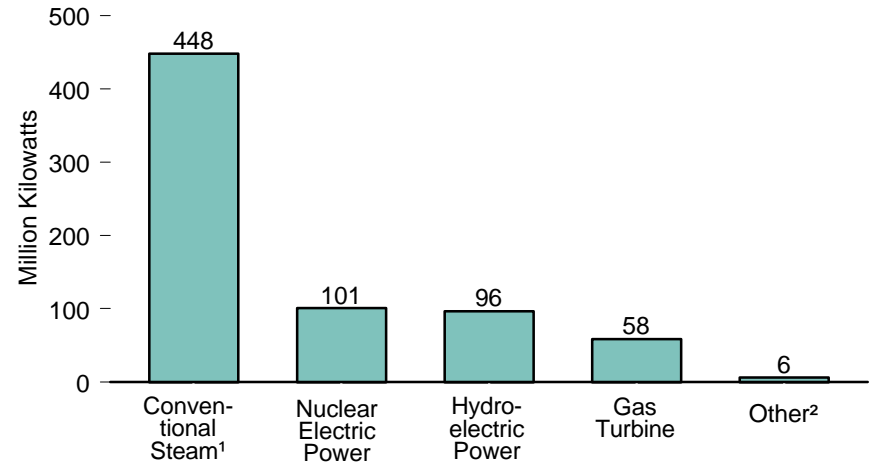
Sources: **Actual Peakload Reductions:** • 1989—Energy Information Administration (EIA), *Electric Power Annual 1993* (December 1994), Table 65. • 1990 and 1991—EIA, *Electric Power Annual 1994, Volume II* (November 1995), Table 44. • 1992—EIA, *U.S. Electric Utility Demand-Side Management 1993* (July 1995), Table 13. • 1993-1995—EIA, *U.S. Electric Utility Demand-Side Management 1995* (January 1997), Table 13. **Energy Savings and Costs:** • 1989—EIA, *U.S. Electric Utility Demand-Side Management 1993* (July 1995), Table 1. • 1990-1995—EIA, *U.S. Electric Utility Demand-Side Management 1995* (January 1997), Table 1.

**Figure 8.8 Electric Utility Net Summer Capability, End of Year**

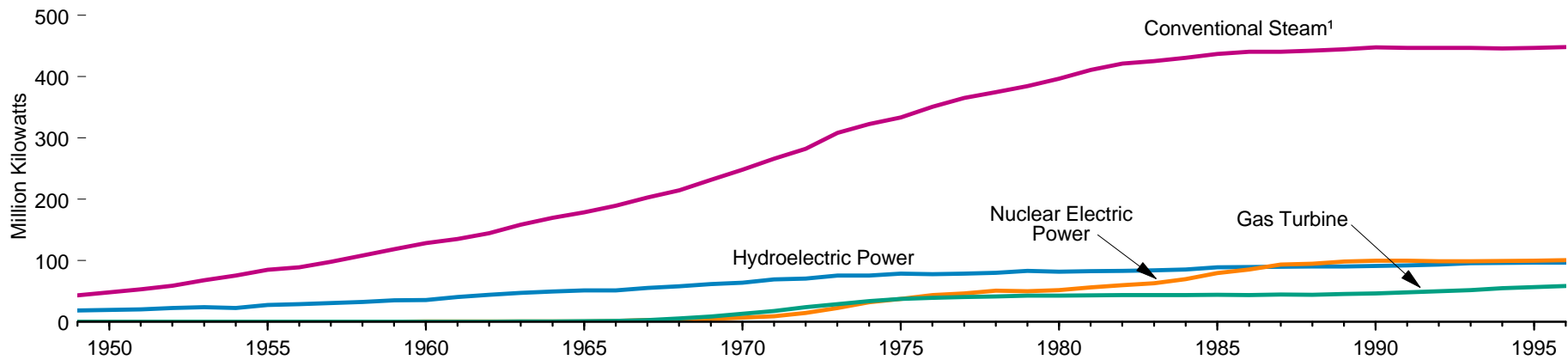
**Total, 1949-1996**



**By Prime Mover, 1996**



**By Prime Mover, 1949-1996**



<sup>1</sup> Includes fossil steam, wood, and waste.

<sup>2</sup> "Other" is internal combustion, geothermal, wind, photovoltaic, and solar thermal energy.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 8.8.

**Table 8.8 Electric Utility Net Summer Capability, End of Year 1949-1996**  
(Million Kilowatts)

Year	Conventional Steam <sup>1</sup>	Internal Combustion	Gas Turbine	Nuclear Electric Power	Hydroelectric Power			Geothermal Energy and Other <sup>2</sup>	Total
					Conventional	Pumped Storage	Total		
1949	43.2	1.7	0.0	0.0	18.5	( <sup>3</sup> )	18.5	(s)	63.4
1950	48.2	1.8	0.0	0.0	19.2	( <sup>3</sup> )	19.2	(s)	69.2
1951	53.1	1.9	0.0	0.0	20.5	( <sup>3</sup> )	20.5	(s)	75.5
1952	58.8	2.0	0.0	0.0	22.4	( <sup>3</sup> )	22.4	(s)	83.2
1953	67.5	2.1	0.0	0.0	23.8	( <sup>3</sup> )	23.8	(s)	93.3
1954	75.4	2.2	0.0	0.0	22.5	( <sup>3</sup> )	22.5	(s)	100.0
1955	84.6	2.3	0.0	0.0	27.4	( <sup>3</sup> )	27.4	(s)	114.2
1956	88.8	2.4	0.0	0.0	28.5	( <sup>3</sup> )	28.5	(s)	119.7
1957	97.9	2.3	0.0	0.1	30.7	( <sup>3</sup> )	30.7	(s)	131.1
1958	108.2	2.4	0.0	0.1	32.5	( <sup>3</sup> )	32.5	(s)	143.3
1959	118.5	2.5	0.0	0.1	34.8	( <sup>3</sup> )	34.8	(s)	155.9
1960	128.3	2.6	0.0	0.4	35.8	( <sup>3</sup> )	35.8	(s)	167.1
1961	135.1	2.8	0.0	0.4	40.7	( <sup>3</sup> )	40.7	(s)	179.0
1962	144.6	2.8	0.0	0.7	44.0	( <sup>3</sup> )	44.0	(s)	192.1
1963	158.4	3.0	0.5	0.8	47.0	( <sup>3</sup> )	47.0	(s)	209.7
1964	169.6	3.1	0.8	0.8	49.4	( <sup>3</sup> )	49.4	(s)	223.7
1965	178.7	3.2	1.1	0.8	51.0	( <sup>3</sup> )	51.0	(s)	234.8
1966	189.6	3.3	1.6	1.7	51.2	( <sup>3</sup> )	51.2	(s)	247.5
1967	202.5	3.6	2.8	2.7	55.0	( <sup>3</sup> )	55.0	0.1	266.7
1968	214.3	3.8	5.3	2.7	57.9	( <sup>3</sup> )	57.9	0.1	284.0
1969	231.4	4.0	8.4	4.4	61.6	( <sup>3</sup> )	61.6	0.1	309.8
1970	248.0	4.1	13.3	7.0	63.8	( <sup>3</sup> )	63.8	0.1	336.4
1971	266.0	4.2	17.9	9.0	69.1	( <sup>3</sup> )	69.1	0.2	366.4
1972	282.3	4.5	23.9	14.5	70.5	( <sup>3</sup> )	70.5	0.3	396.0
1973	307.9	4.7	28.8	22.7	75.4	( <sup>3</sup> )	75.4	0.4	439.8
1974	322.4	4.7	33.7	31.9	75.5	( <sup>3</sup> )	75.5	0.4	468.5
1975	333.3	4.8	37.1	37.3	78.4	( <sup>3</sup> )	78.4	0.5	491.3
1976	350.9	5.0	39.1	43.8	78.0	( <sup>3</sup> )	78.0	0.5	517.2
1977	365.3	5.0	40.3	46.3	78.6	( <sup>3</sup> )	78.6	0.5	535.9
1978	374.5	5.2	41.2	50.8	79.9	( <sup>3</sup> )	79.9	0.5	552.1
1979	384.6	5.2	42.5	49.7	82.9	( <sup>3</sup> )	82.9	0.7	565.5
1980	396.6	5.2	42.5	51.8	81.7	( <sup>3</sup> )	81.7	0.9	578.6
1981	410.7	5.3	43.2	56.0	82.4	( <sup>3</sup> )	82.4	0.9	598.3
1982	421.4	4.8	43.5	60.0	83.0	( <sup>3</sup> )	83.0	1.1	613.7
1983	424.9	4.7	43.3	63.0	83.9	( <sup>3</sup> )	83.9	1.2	621.1
1984	430.8	4.5	43.5	69.7	85.3	( <sup>3</sup> )	85.3	1.3	635.1
1985	436.8	4.7	43.9	79.4	88.9	( <sup>3</sup> )	88.9	1.6	655.2
1986	440.6	4.6	43.4	85.2	89.3	( <sup>3</sup> )	89.3	1.6	664.8
1987	440.3	4.8	44.2	93.6	89.7	( <sup>3</sup> )	89.7	1.5	674.1
1988	442.4	4.7	43.9	94.7	90.3	( <sup>3</sup> )	90.3	1.7	677.7
1989	444.4	4.6	45.4	98.2	90.5	( <sup>3</sup> )	90.5	1.6	684.6
1990	447.5	4.6	46.3	99.6	73.6	17.3	90.9	1.6	690.5
1991	447.0	4.5	48.3	99.6	73.6	18.4	92.0	1.6	693.0
1992	446.7	4.5	49.8	99.0	74.3	19.0	93.4	1.7	695.1
1993	446.8	4.8	51.7	99.0	74.8	21.1	95.9	1.7	700.0
1994	445.8	4.7	54.9	99.1	74.8	21.2	96.0	1.8	<sup>4</sup> 702.2
1995	<sup>R</sup> 446.7	<sup>R</sup> 4.6	<sup>R</sup> 56.8	99.5	<sup>R</sup> 75.3	<sup>R</sup> 21.4	96.7	1.8	<sup>4</sup> 706.1
1996 <sup>P</sup>	447.9	4.7	58.3	100.7	75.2	21.1	96.3	1.6	<sup>4</sup> 709.6

<sup>1</sup> Includes fossil steam, wood, and waste.

<sup>2</sup> "Other" is wind, photovoltaic, and solar thermal energy. (See Table 10.9 for more information.)  
Beginning with 1994, fuel cell units are also included.

<sup>3</sup> Included in conventional hydroelectric power.

<sup>4</sup> Includes two fuel cell units, totalling less than 0.05 million kilowatts.

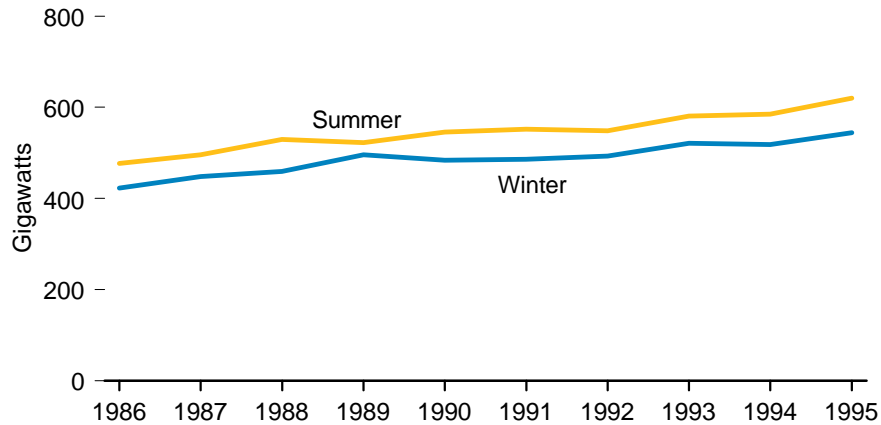
R=Revised data. P=Preliminary data. (s)=Less than 0.05 million kilowatts.

Notes: • See Glossary and Note 5 at end of section. • Totals may not equal sum of components due to independent rounding.

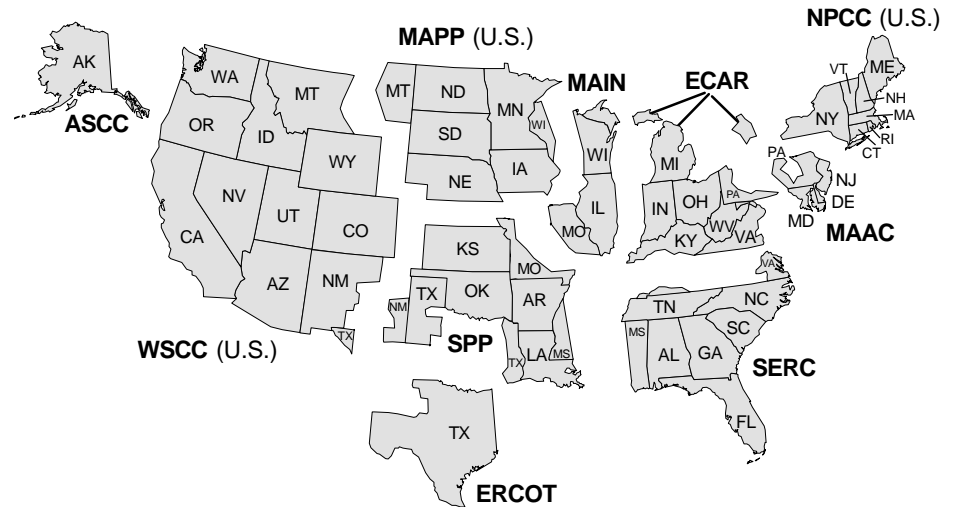
Sources: • 1949-1984—Energy Information Administration (EIA) estimates. • 1985 forward—EIA, Form EIA-860, "Annual Electric Generator Report."

**Figure 8.9 Electric Utility Noncoincidental Peak Load**

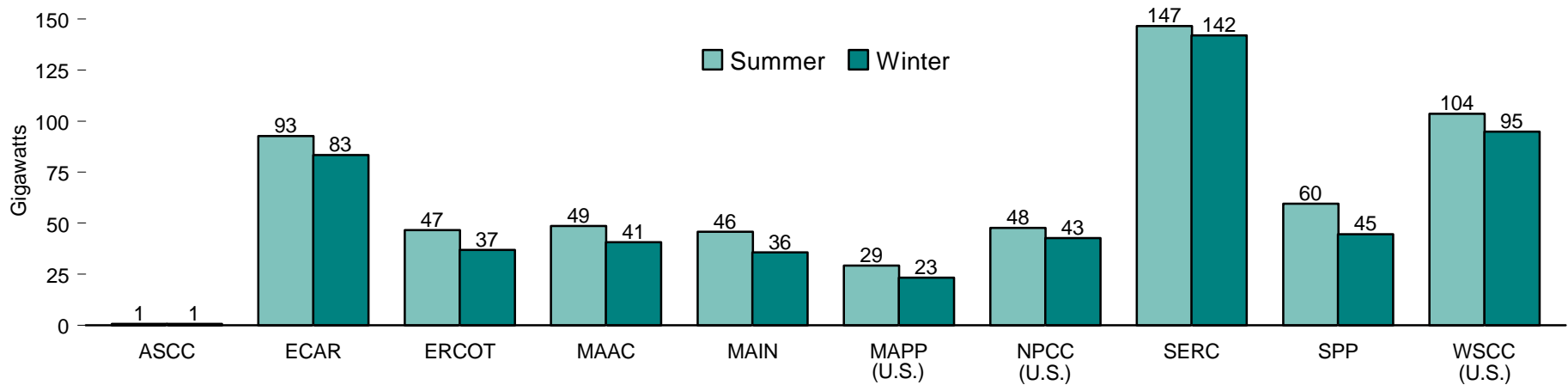
**In the Contiguous United States, 1986-1995**



**North American Electric Reliability Council Map for the United States**



**By NERC Regions, 1995**



Notes: • Noncoincidental peak load is the sum of two or more peak loads on individual systems that do not occur at the same time interval. See Glossary for information on North American Electric Reliability Council (NERC). • Because vertical scales differ, graphs

should not be compared.  
Source: Table 8.9.



**Table 8.9 Electric Utility Noncoincidental Peak Load by Region, 1986-1995**  
(Megawatts)

Year	North American Electric Reliability Council Regions <sup>1</sup>									Contiguous United States	ASCC (Alaska)
	ECAR	ERCOT	MAAC	MAIN	MAPP (U.S.)	NPCC (U.S.)	SERC	SPP	WSCC (U.S.)		
Summer											
1986	69,606	39,335	37,564	35,943	21,029	39,026	105,570	47,123	81,787	476,983	( <sup>2</sup> )
1987	72,561	39,339	40,526	37,446	23,162	42,651	109,798	47,723	82,967	496,173	( <sup>2</sup> )
1988	79,149	40,843	43,110	41,139	24,899	45,245	115,168	49,356	90,551	529,460	( <sup>2</sup> )
1989	75,442	40,402	41,614	39,460	23,531	45,031	117,051	49,439	90,657	522,627	455
1990	79,258	42,737	42,613	40,740	24,994	44,116	121,149	52,541	97,389	545,537	463
1991	81,539	41,870	45,937	41,598	25,498	46,594	124,688	51,885	92,096	551,705	471
1992	78,550	42,619	43,658	38,819	22,638	43,658	128,236	51,324	99,205	548,707	504
1993	85,930	44,255	46,494	41,956	24,396	46,706	136,101	57,106	97,809	580,753	511
1994	87,165	44,162	46,019	42,562	27,000	47,581	132,584	56,035	102,212	585,320	524
1995	92,619	46,618	48,577	45,782	29,192	47,705	146,569	59,595	103,592	620,249	622
Winter											
1986	64,561	28,730	32,807	28,036	18,850	37,976	101,849	33,877	76,171	422,857	( <sup>2</sup> )
1987	68,118	31,399	35,775	30,606	19,335	41,902	105,476	34,472	81,182	448,265	( <sup>2</sup> )
1988	67,771	34,621	36,363	30,631	20,162	42,951	108,649	35,649	82,937	459,734	( <sup>2</sup> )
1989	73,080	38,388	38,161	33,770	20,699	42,588	121,995	42,268	84,768	495,717	626
1990	67,097	35,815	36,551	32,461	21,113	40,545	117,231	38,949	94,252	484,014	613
1991	71,181	35,448	37,983	33,420	21,432	41,786	119,575	38,759	86,097	485,681	622
1992	72,885	35,055	37,915	31,289	21,866	41,125	121,250	39,912	91,686	492,983	635
1993	81,846	35,407	41,406	34,966	21,955	42,063	133,635	41,644	88,811	521,733	632
1994	75,638	36,180	40,653	33,999	23,033	42,547	132,661	42,505	91,037	518,253	641
1995	83,465	36,965	40,790	35,734	23,429	42,755	142,032	44,626	94,890	544,686	676

<sup>1</sup> See Glossary for information on the North American Electric Reliability Council (NERC). This table includes the U.S. portion of NERC only and does not cover Hawaii, Puerto Rico, and U.S. Trust Territories. See Figure 8.9 for an illustration of NERC regions.

<sup>2</sup> Data submission for ASCC (Alaska) began in 1989.

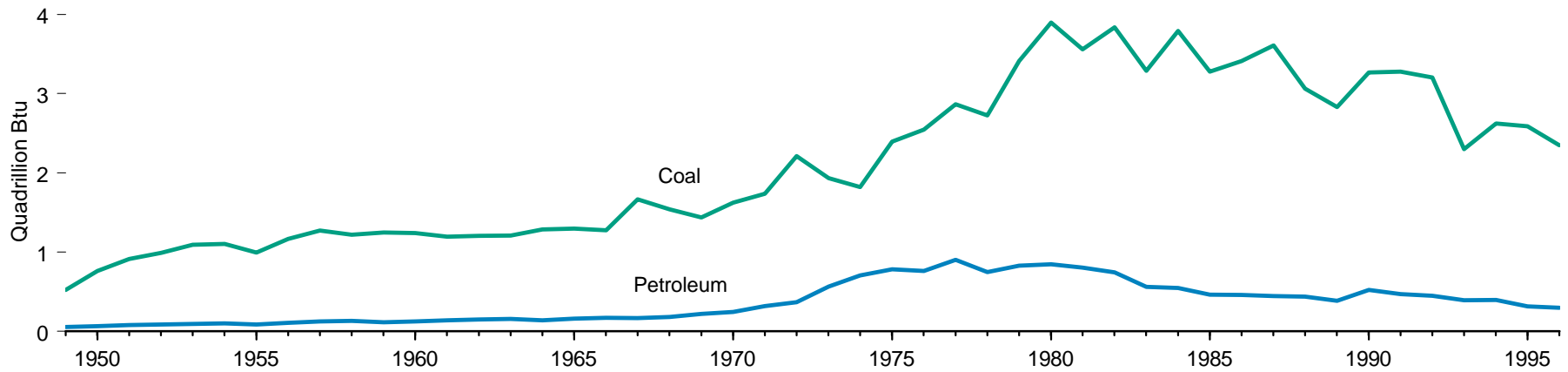
Note: Noncoincidental peak load is the sum of two or more peak loads on individual systems that do not

occur at the same time interval.

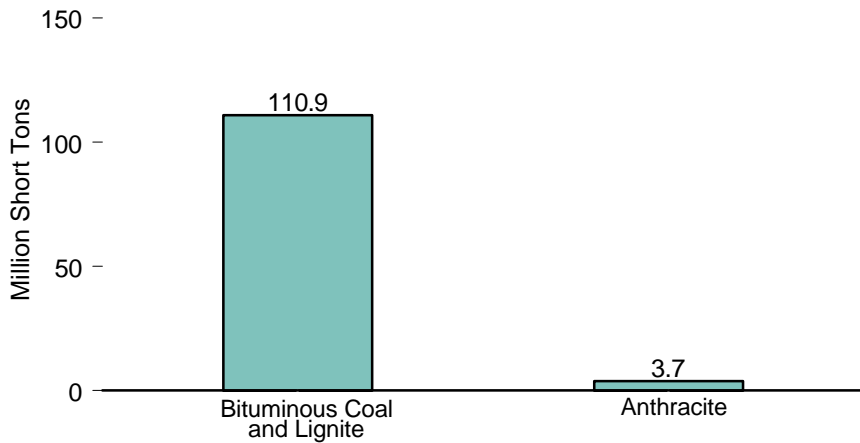
Sources: • 1986—Energy Information Administration (EIA), *Electric Power Annual 1990* (January 1992), Table 53. • 1987—EIA, *Electric Power Annual 1991* (February 1993), Table 52. • 1988—EIA, *Electric Power Annual 1992* (January 1994), Table 57. • 1989—EIA, *Electric Power Annual 1993* (December 1994), Table 57. • 1990 forward—EIA, *Electric Power Annual 1995, Volume II* (December 1996), Table 35.

**Figure 8.10 Electric Utility Stocks of Coal and Petroleum, End of Year**

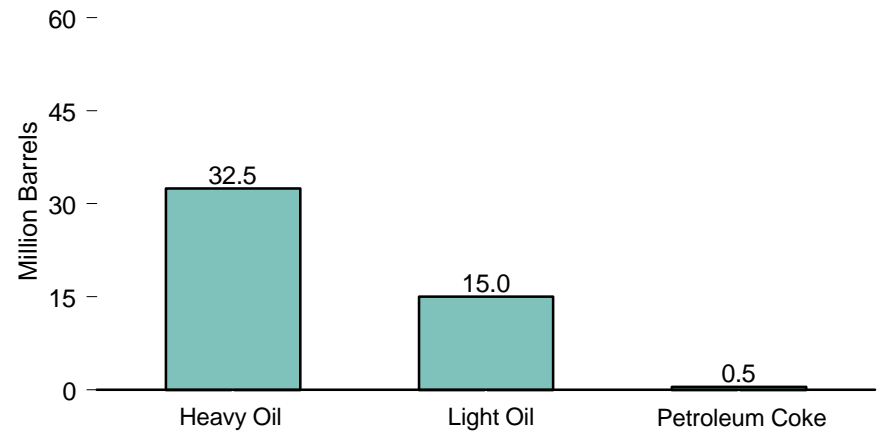
**Coal and Petroleum, 1949-1996**



**Coal, 1996**



**Petroleum, 1996**



Source: Table 8.10.

**Table 8.10 Electric Utility Stocks of Coal and Petroleum, End of Year 1949-1996**

Year	Coal				Petroleum					
	Anthracite <sup>1</sup>	Bituminous Coal <sup>2</sup> and Lignite	Total		Heavy Oil <sup>3</sup>	Light Oil <sup>4</sup>	Total Liquids	Petroleum Coke <sup>5</sup>	Total	
	Million Short Tons	Million Short Tons	Trillion Btu	Trillion Btu	Million Barrels				Million Barrels	Trillion Btu
1949	4.3	17.8	22.1	524	NA	NA	8.6	NA	8.6	54
1950	4.7	27.1	31.8	762	NA	NA	10.2	NA	10.2	64
1951	5.1	33.4	38.5	913	NA	NA	12.8	NA	12.8	80
1952	5.6	35.9	41.5	991	NA	NA	13.7	NA	13.7	86
1953	5.9	39.8	45.6	1,094	NA	NA	15.0	NA	15.0	94
1954	6.4	39.7	46.1	1,106	NA	NA	15.9	NA	15.9	99
1955	3.2	38.2	41.4	996	NA	NA	13.7	NA	13.7	85
1956	2.8	46.0	48.8	1,168	NA	NA	17.3	NA	17.3	108
1957	2.8	50.3	53.1	1,273	NA	NA	20.1	NA	20.1	126
1958	2.2	48.8	51.0	1,218	NA	NA	20.8	NA	20.8	130
1959	2.0	50.1	52.1	1,247	NA	NA	18.5	NA	18.5	116
1960	1.8	49.9	51.7	1,238	NA	NA	19.6	NA	19.6	123
1961	1.5	48.6	50.1	1,197	NA	NA	22.0	NA	22.0	138
1962	1.4	49.0	50.4	1,205	NA	NA	23.8	NA	23.8	149
1963	1.3	49.3	50.6	1,209	NA	NA	24.9	NA	24.9	156
1964	1.2	52.7	53.9	1,286	NA	NA	22.4	NA	22.4	140
1965	1.1	53.4	54.5	1,297	NA	NA	25.6	NA	25.6	161
1966	1.0	52.9	53.9	1,274	NA	NA	27.4	NA	27.4	172
1967	1.3	69.7	71.0	1,669	NA	NA	26.7	NA	26.7	167
1968	1.3	64.2	65.5	1,538	NA	NA	28.7	NA	28.7	180
1969	1.3	60.6	61.9	1,438	NA	NA	35.3	NA	35.3	221
1970	1.1	70.8	71.9	1,623	NA	NA	38.0	1.2	39.2	245
1971	1.1	76.7	77.8	1,735	NA	NA	49.6	1.5	51.1	319
1972	0.9	98.8	99.7	2,214	NA	NA	57.7	1.4	59.1	368
1973	1.1	85.9	87.0	1,935	NA	NA	89.2	1.6	90.8	567
1974	0.9	82.6	83.5	1,819	NA	NA	112.9	0.2	113.1	705
1975	1.0	109.7	110.7	2,396	NA	NA	125.3	0.2	125.4	784
1976	1.0	116.4	117.4	2,546	NA	NA	121.7	0.2	121.9	762
1977	2.3	130.9	133.2	2,865	NA	NA	144.0	0.2	144.3	901
1978	2.2	126.0	128.2	2,728	NA	NA	118.8	1.0	119.8	749
1979	3.3	156.4	159.7	3,412	NA	NA	131.4	0.9	132.3	828
1980	4.7	178.3	183.0	3,897	105.4	30.0	135.4	0.3	135.6	848
1981	5.5	163.4	168.9	3,561	102.0	26.1	128.1	0.2	128.3	803
1982	6.1	175.1	181.1	3,839	95.5	23.4	118.9	0.2	119.1	745
1983	6.5	149.1	155.6	3,288	70.6	18.8	89.4	0.3	89.7	561
1984	6.7	173.0	179.7	3,792	68.5	19.1	87.6	0.3	87.9	549
1985	7.2	149.2	156.4	3,277	57.3	16.4	73.7	0.2	73.9	462
1986	7.1	154.7	161.8	3,412	56.8	16.3	73.1	0.2	73.3	459
1987	6.9	163.9	170.8	3,610	55.1	15.8	70.8	0.3	71.1	444
1988	6.6	139.9	146.5	3,062	54.2	15.1	69.3	0.4	69.7	436
1989	6.4	129.5	135.9	2,832	47.4	13.8	61.3	0.5	61.8	386
1990	6.5	149.7	156.2	3,268	67.0	16.5	83.5	0.5	84.0	525
1991	6.5	151.4	157.9	3,277	58.6	16.4	75.0	0.4	75.3	471
1992	6.2	147.9	154.1	3,204	56.1	15.7	71.8	0.3	72.2	451
1993	5.6	105.7	111.3	2,298	46.8	15.7	62.4	0.4	62.9	392
1994	4.9	122.0	126.9	2,623	46.3	16.6	63.0	0.3	63.3	395
1995	4.3	<sup>R</sup> 122.0	<sup>R</sup> 126.3	<sup>R</sup> 2,589	35.1	<sup>R</sup> 15.4	<sup>R</sup> 50.5	0.3	<sup>R</sup> 50.8	316
1996 <sup>P</sup>	3.7	110.9	114.6	2,349	32.5	15.0	47.5	0.5	48.0	298

<sup>1</sup> Includes anthracite silt stored off-site.

<sup>2</sup> Includes subbituminous coal.

<sup>3</sup> Includes Grade Nos. 4, 5, and 6, and residual fuel oils.

<sup>4</sup> Includes Grade No. 2 heating oil, kerosene, and jet fuel.

<sup>5</sup> Petroleum coke, which is reported in short tons, has been converted to barrels at a rate of 5 barrels per short ton.

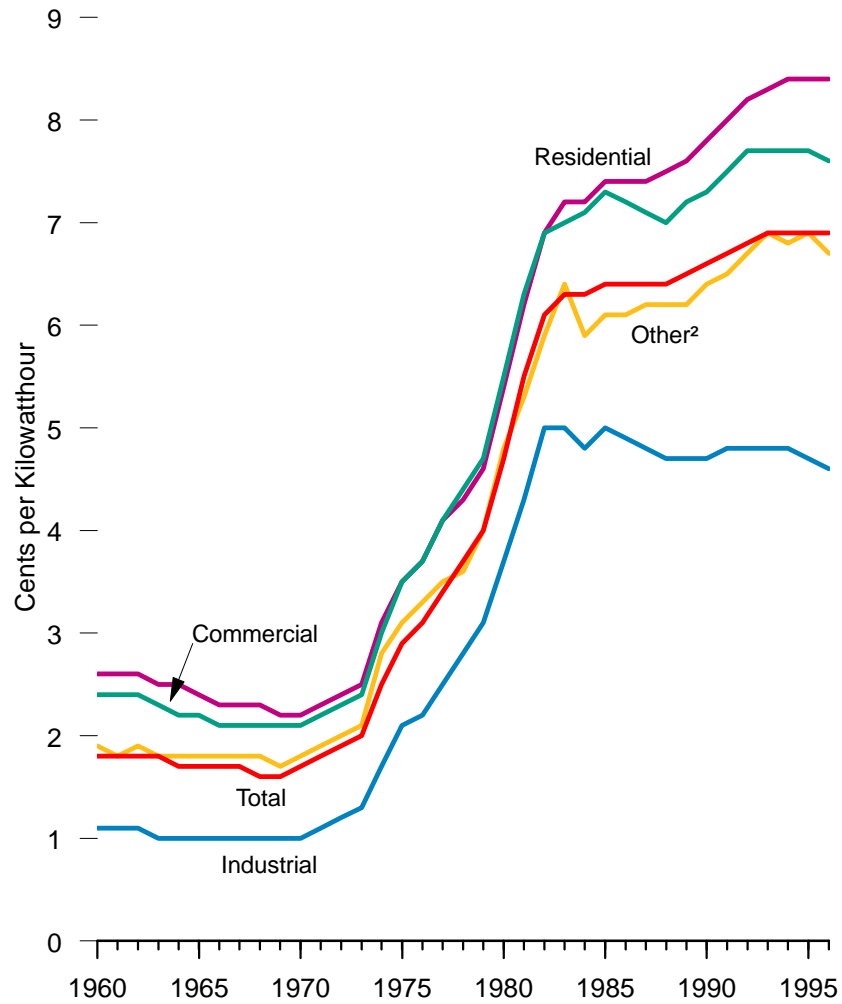
R=Revised data. P=Preliminary data. NA=Not available.

Notes: • See Note 3 at end of section. • Totals may not equal sum of components due to independent rounding.

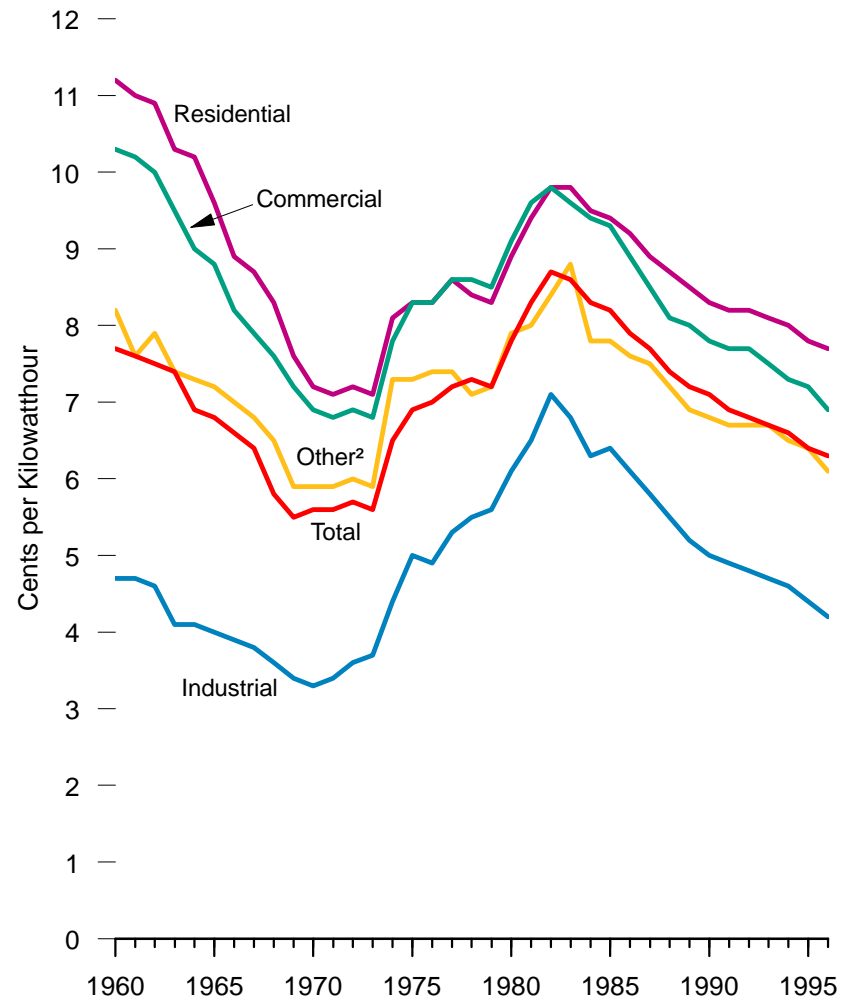
Sources: • 1949-September 1977—Federal Power Commission, Form FPC-4, "Monthly Power Plant Report." • October 1977-1981—Federal Energy Regulatory Commission, Form FPC-4, "Monthly Power Plant Report." • 1982 forward—Energy Information Administration, Form EIA-759, "Monthly Power Plant Report."

**Figure 8.11 Retail Prices of Electricity Sold by Electric Utilities, 1960-1996**

**Nominal Prices**



**Real<sup>1</sup> Prices**



<sup>1</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>2</sup> "Other" is public street and highway lighting, other sales to public authorities, sales to

railroads and railways, and interdepartmental sales.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 8.11.

**Table 8.11 Retail Prices of Electricity Sold by Electric Utilities, 1960-1996**  
(Cents per Kilowatthour)

Year	Residential		Commercial		Industrial		Other <sup>1</sup>		Total	
	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>	Nominal	Real <sup>2</sup>
1960	2.6	11.2	2.4	10.3	1.1	4.7	1.9	8.2	1.8	7.7
1961	2.6	11.0	2.4	10.2	1.1	4.7	1.8	7.6	1.8	7.6
1962	2.6	10.9	2.4	10.0	1.1	4.6	1.9	7.9	1.8	7.5
1963	2.5	10.3	2.3	9.5	1.0	4.1	1.8	7.4	1.8	7.4
1964	2.5	10.2	2.2	9.0	1.0	4.1	1.8	7.3	1.7	6.9
1965	2.4	9.6	2.2	8.8	1.0	4.0	1.8	7.2	1.7	6.8
1966	2.3	8.9	2.1	8.2	1.0	3.9	1.8	7.0	1.7	6.6
1967	2.3	8.7	2.1	7.9	1.0	3.8	1.8	6.8	1.7	6.4
1968	2.3	8.3	2.1	7.6	1.0	3.6	1.8	6.5	1.6	5.8
1969	2.2	7.6	2.1	7.2	1.0	3.4	1.7	5.9	1.6	5.5
1970	2.2	7.2	2.1	6.9	1.0	3.3	1.8	5.9	1.7	5.6
1971	2.3	7.1	2.2	6.8	1.1	3.4	1.9	5.9	1.8	5.6
1972	2.4	7.2	2.3	6.9	1.2	3.6	2.0	6.0	1.9	5.7
1973	2.5	7.1	2.4	6.8	1.3	3.7	2.1	5.9	2.0	5.6
1974	3.1	8.1	3.0	7.8	1.7	4.4	2.8	7.3	2.5	6.5
1975	3.5	8.3	3.5	8.3	2.1	5.0	3.1	7.3	2.9	6.9
1976	3.7	8.3	3.7	8.3	2.2	4.9	3.3	7.4	3.1	7.0
1977	4.1	8.6	4.1	8.6	2.5	5.3	3.5	7.4	3.4	7.2
1978	4.3	8.4	4.4	8.6	2.8	5.5	3.6	7.1	3.7	7.3
1979	4.6	8.3	4.7	8.5	3.1	5.6	4.0	7.2	4.0	7.2
1980	5.4	8.9	5.5	9.1	3.7	6.1	4.8	7.9	4.7	7.8
1981	6.2	9.4	6.3	9.6	4.3	6.5	5.3	8.0	5.5	8.3
1982	6.9	9.8	6.9	9.8	5.0	7.1	5.9	8.4	6.1	8.7
1983	7.2	9.8	7.0	9.6	5.0	6.8	6.4	8.8	6.3	8.6
1984 <sup>3</sup>	7.2	9.5	7.1	9.4	4.8	6.3	5.9	7.8	6.3	8.3
1985 <sup>3</sup>	7.4	9.4	7.3	9.3	5.0	6.4	6.1	7.8	6.4	8.2
1986 <sup>3</sup>	7.4	9.2	7.2	8.9	4.9	6.1	6.1	7.6	6.4	7.9
1987 <sup>3</sup>	7.4	8.9	7.1	8.5	4.8	5.8	6.2	7.5	6.4	7.7
1988	7.5	8.7	7.0	8.1	4.7	5.5	6.2	7.2	6.4	7.4
1989	7.6	8.5	7.2	8.0	4.7	5.2	6.2	6.9	6.5	7.2
1990	7.8	8.3	7.3	7.8	4.7	5.0	6.4	6.8	6.6	7.1
1991	8.0	8.2	7.5	7.7	4.8	4.9	6.5	6.7	6.7	6.9
1992	8.2	8.2	7.7	7.7	4.8	4.8	6.7	6.7	6.8	6.8
1993	8.3	8.1	7.7	7.5	4.8	4.7	6.9	6.7	6.9	6.7
1994	8.4	8.0	7.7	7.3	4.8	4.6	6.8	6.5	6.9	6.6
1995	8.4	7.8	7.7	7.2	4.7	4.4	<sup>R</sup> 6.9	<sup>R</sup> 6.4	6.9	6.4
1996 <sup>P</sup>	8.4	7.7	7.6	6.9	4.6	4.2	6.7	6.1	6.9	6.3

<sup>1</sup> "Other" is public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

<sup>2</sup> In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix D.

<sup>3</sup> These data were taken from Form EIA-861, "Annual Electric Utility Report," and differ from the Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions," data published in previous issues of this publication.

R=Revised data. P=Preliminary data.

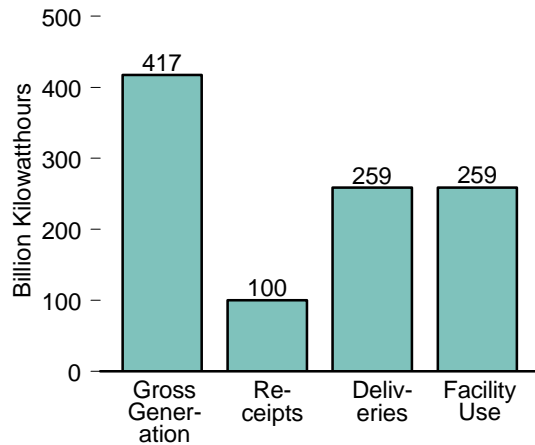
Note: Data for 1979 and earlier data are for Classes A and B privately owned electric utilities only. Data

for 1980 forward are for selected Class A utilities whose electric operating revenues were \$100 million or more during the previous year.

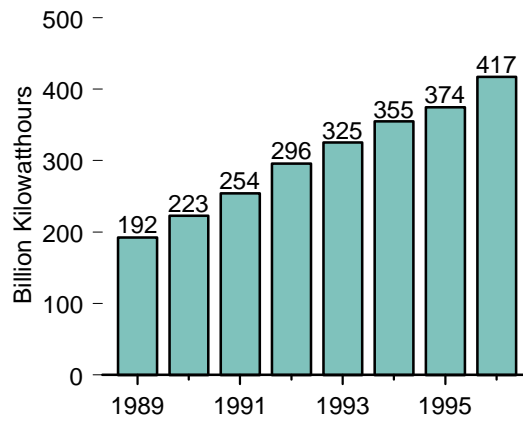
Sources: • 1960 through September 1977—Federal Power Commission, Form FPC-5, "Monthly Statement of Electric Operating Revenues and Income." • October 1977 through February 1980—Federal Energy Regulatory Commission (FERC), Form FPC-5, "Monthly Statement of Electric Operating Revenues and Income." • March 1980 through 1982—FERC, Form FERC-5, "Electric Utility Company Monthly Statement." • 1983—Energy Information Administration (EIA), Form EIA-826, "Electric Utility Company Monthly Statement." • 1984-1995—EIA, Form EIA-861, "Annual Electric Utility Report." • 1996—EIA, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions."

**Figure 8.12 Nonutility Power Overview**

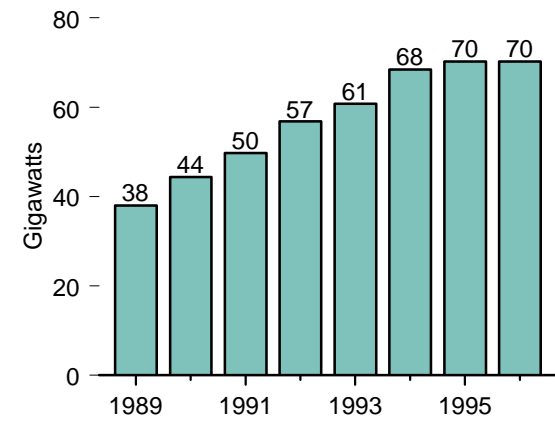
**Supply and Disposition, 1996**



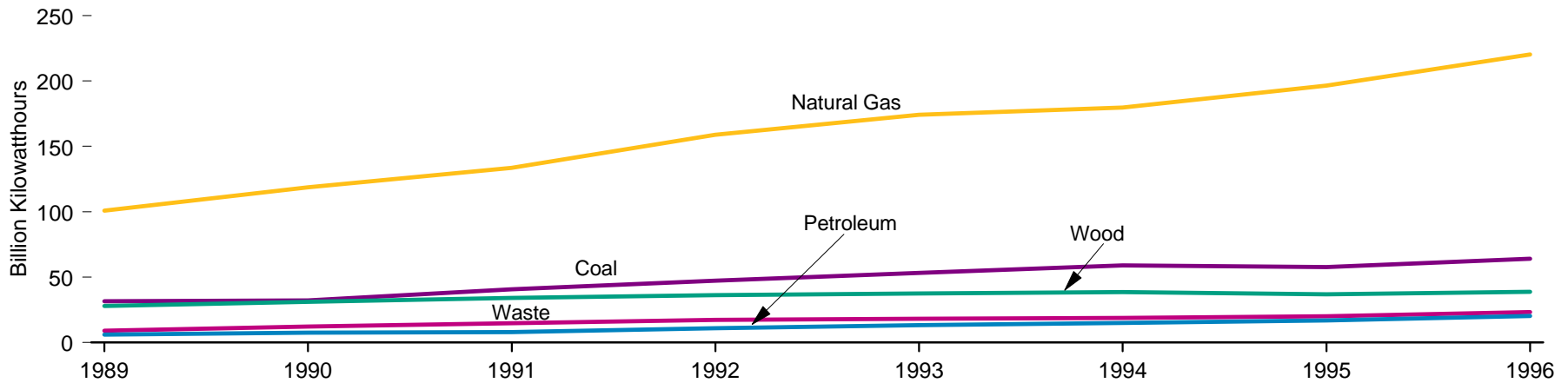
**Gross Generation, 1989-1996**



**Installed Nameplate Capacity, 1989-1996**



**Gross Generation by Major Sources, 1989-1996**



Notes: • Nonutility electric generating facilities with a total generator capacity of 1 megawatt or greater. See Table 8.12 for description of fuels. • Because vertical scales

differ, graphs should not be compared.  
Source: Table: 8.12.

**Table 8.12 Nonutility Power Overview, 1989-1996**

Item	1989	1990	1991	1992	1993	1994	1995	1996 <sup>E</sup>
<b>Supply and Disposition</b> (million kilowatthours)								
Gross Generation .....	192,327	222,721	254,255	296,001	325,226	354,925	374,438	417,480
Receipts <sup>1</sup> .....	63,249	70,154	73,583	83,421	85,323	94,166	89,919	100,256
Deliveries to Utilities <sup>2</sup> .....	NA	NA	NA	<sup>R</sup> 164,374	187,466	204,688	216,502	241,389
Deliveries to Other End Users <sup>3</sup> .....	NA	NA	NA	<sup>R</sup> 10,786	15,569	17,626	15,548	17,335
Facility Use .....	152,354	163,946	183,698	204,261	207,514	226,777	232,308	259,012
<b>Consumption</b>								
Coal (thousand short tons) .....	NA	NA	NA	<sup>R</sup> 44,607	48,343	52,261	47,849	49,130
Petroleum <sup>4</sup> (thousand barrels) .....	NA	NA	NA	<sup>R</sup> 31,539	36,768	40,460	39,075	42,096
Natural Gas (million cubic feet) .....	NA	NA	NA	<sup>R</sup> 1,844,857	2,013,788	2,149,246	2,311,187	2,491,599
Other Gas <sup>5</sup> (million cubic feet) .....	NA	NA	NA	<sup>R</sup> 1,584,467	1,678,166	1,586,185	1,604,427	1,612,891
<b>Gross Generation</b> (million kilowatthours) .....	<b>192,327</b>	<b>222,721</b>	<b>254,255</b>	<b>296,001</b>	<b>325,226</b>	<b>354,925</b>	<b>374,438</b>	<b>417,480</b>
Coal <sup>6</sup> .....	31,703	32,323	40,773	47,363	53,367	59,035	57,668	64,008
Petroleum <sup>7</sup> .....	5,972	7,584	8,083	10,963	13,364	15,069	16,987	20,439
Natural Gas .....	100,813	118,844	133,670	158,798	174,282	179,735	196,465	220,287
Other Gas <sup>5</sup> .....	NA	NA	NA	NA	NA	12,480	13,867	14,124
Hydroelectric Power <sup>8</sup> .....	7,504	7,960	8,007	9,446	11,511	13,227	14,774	16,712
Geothermal Energy .....	5,091	6,916	7,695	8,578	9,749	10,122	9,912	11,015
Wood <sup>9</sup> .....	28,051	31,038	34,011	36,255	37,421	38,595	36,961	38,795
Waste <sup>10</sup> .....	9,015	12,259	14,886	17,352	18,325	18,797	20,014	23,312
Solar .....	489	663	779	746	897	824	824	908
Wind .....	1,877	2,295	2,650	2,916	3,052	3,482	3,185	3,507
Nuclear <sup>11</sup> .....	49	116	80	67	78	54	NA	NA
Other <sup>12</sup> .....	1,763	2,723	3,621	3,516	3,181	3,507	3,780	4,373
<b>Installed Nameplate Capacity</b> <sup>13</sup> (megawatts) .....	<b>37,984</b>	<b>44,352</b>	<b>49,736</b>	<b>56,814</b>	<b>60,778</b>	<b>68,461</b>	<b>70,254</b>	<b>70,254</b>
Coal <sup>6</sup> .....	6,284	6,768	7,349	8,503	9,772	10,372	10,454	10,454
Petroleum <sup>7</sup> .....	1,030	946	1,351	1,730	2,043	2,262	2,358	2,358
Natural Gas .....	14,349	17,063	20,669	21,542	23,463	26,925	28,055	28,055
Other Gas <sup>5</sup> .....	NA	NA	NA	NA	NA	1,130	1,217	1,217
Petroleum and Natural Gas (dual fired) .....	4,541	6,279	5,168	8,478	8,505	9,820	10,479	10,479
Hydroelectric Power <sup>8</sup> .....	1,848	1,991	2,118	2,684	2,741	3,364	3,399	3,399
Geothermal Energy .....	956	1,043	1,060	1,254	1,318	1,335	1,295	1,295
Wood <sup>9</sup> .....	5,321	5,854	6,648	6,805	7,046	7,416	6,945	6,945
Waste <sup>10</sup> .....	1,875	2,392	2,806	3,006	3,131	3,150	3,402	3,402
Solar .....	200	360	360	360	360	354	354	354
Wind .....	1,376	1,441	1,688	1,822	1,813	1,737	1,723	1,723
Nuclear <sup>11</sup> .....	20	20	20	20	20	0	0	0
Other <sup>12</sup> .....	184	195	499	611	566	597	574	574

<sup>1</sup> Purchases, interchanges, and exchanges of electric energy with utilities and other nonutilities.

<sup>2</sup> Sales, interchanges, and exchanges of electric energy with utilities.

<sup>3</sup> Sales, interchanges, and exchanges of electric energy with other nonutilities. The disparity in these data and data reported on other EIA surveys occurs due to differences in the respondent universe. The Form EIA-867 is filed by nonutilities reporting the energy delivered, while other data sources are filed by electric utilities reporting energy received. Differences in terminology and accounting procedures contribute to the disparity. In addition, because the frame for the Form EIA-867 is derived from utility surveys, the Form EIA-867 universe lags 1 year.

<sup>4</sup> Does not include petroleum coke consumption of 4,740 thousand short tons for 1994.

<sup>5</sup> Butane, ethane, propane, and other gases only for 1994-1996. Data for other gas and natural gas are combined for 1991-1993.

<sup>6</sup> Coal, anthracite culm, and coal waste.

<sup>7</sup> Petroleum, petroleum coke, diesel, kerosene, petroleum sludge, and tar.

<sup>8</sup> Conventional hydroelectric power only; there are no pumped-storage projects in the nonutility sector.

<sup>9</sup> Wood, wood waste, peat, wood liquors, railroad ties, pitch, and wood sludge.

<sup>10</sup> Municipal solid waste, agricultural waste, straw, tires, landfill gases, and other waste.

<sup>11</sup> Nuclear reactor and generator at Argonne National Laboratory used primarily for research and

development in testing reactor fuels as well as for training. The generation from the unit is used for internal consumption.

<sup>12</sup> Hydrogen, sulfur, batteries, chemicals, fish oil, and spent sulfite liquor. Data previously published for other energy sources in 1989 and 1990 have been reclassified and are included in the category that best reflects their characteristics.

<sup>13</sup> Installed nameplate capacity is the full-load continuous rating of a generator, prime mover, or other electrical equipment under specified conditions as designated by the manufacturer. It is usually indicated on a nameplate attached physically to the equipment. Installed station capacity does not include auxiliary or house units.

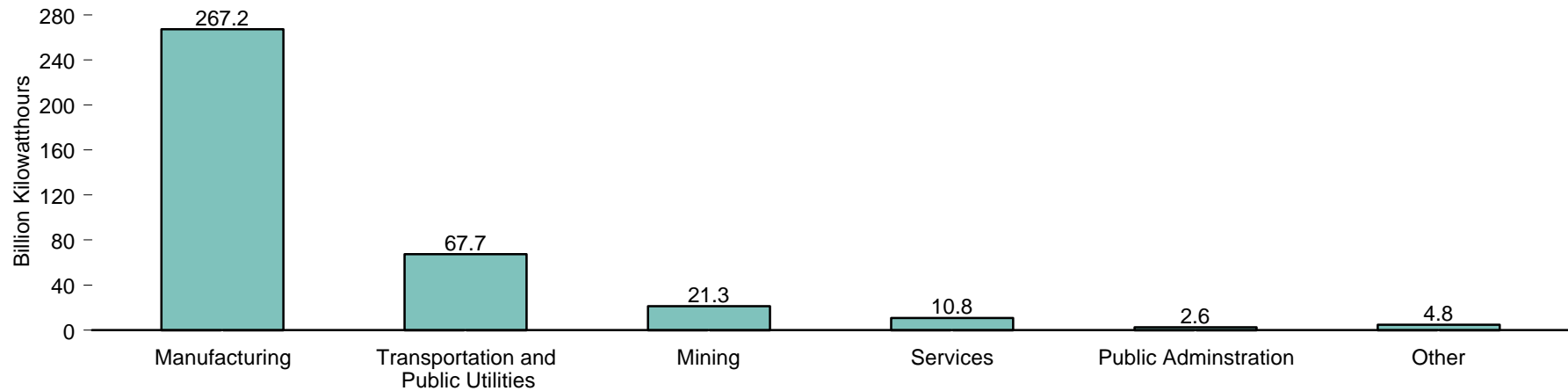
R=Revised data. E=Estimate. NA=Not available.

Notes: • Nonutility electric generating facilities with a total generator capacity of 1 megawatt or greater. • Totals may not equal sum of components due to independent rounding.

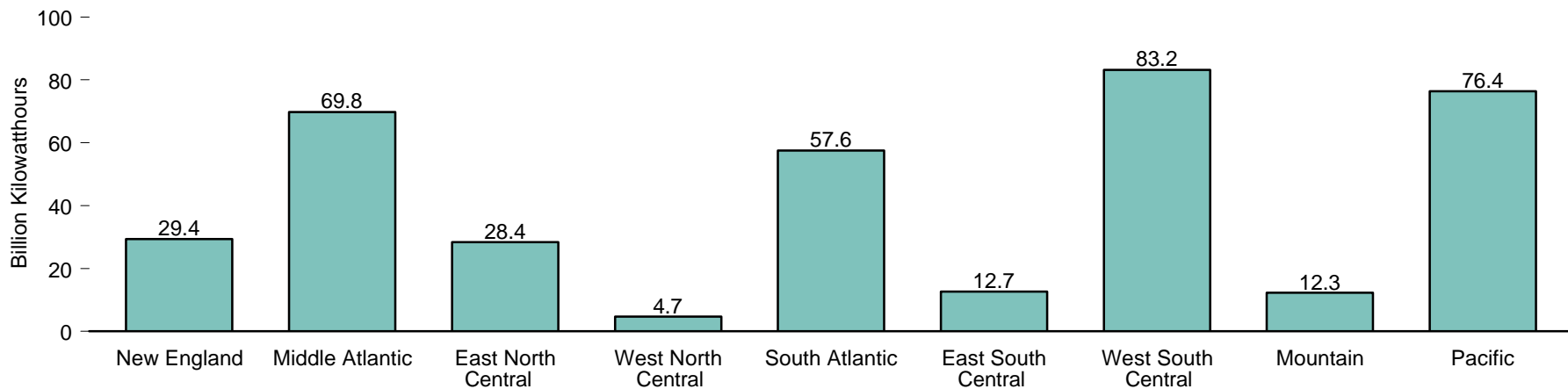
Sources: • 1989-1991—Estimated on the basis of data collected from Form EIA-867, "Annual Nonutility Power Producer Report." See Note 6 at end of section for additional information. • 1992—Energy Information Administration (EIA), *Electric Power Annual 1993* (December 1994), Table 74. • 1993-1995—EIA, *Electric Power Annual 1995, Volume II* (December 1996), Table 52. • 1996—EIA estimated data using Form EIA-867, "Annual Nonutility Power Producer Report."

**Figure 8.13 Nonutility Power Gross Generation, 1995**

**By Producing Energy Group**



**By Census Division**



Notes: • Data are preliminary. • See Appendix E for Census divisions. • Because vertical scales differ, graphs should not be compared.

Source: Table 8.13.



**Table 8.13 Nonutility Power Gross Generation, 1995**  
(Million Kilowatthours)

Division/Region	Manufacturing	Transportation and Public Utilities	Services	Mining	Public Administration	Other Industry Groups	Total
Census Divisions							
New England .....	13,334	15,422	W	—	—	W	29,350
Middle Atlantic .....	51,375	10,749	3,668	W	968	W	69,768
East North Central .....	24,716	1,994	1,345	W	W	W	28,436
West North Central .....	3,025	W	403	W	W	W	4,702
South Atlantic .....	45,772	10,998	657	W	W	168	57,624
East South Central .....	12,448	70	W	125	W	—	12,708
West South Central .....	80,971	W	614	492	—	W	83,172
Mountain .....	4,976	3,603	890	482	—	2,311	12,263
Pacific .....	30,630	23,352	2,606	17,730	1,528	569	76,415
<b>Total .....</b>	<b>267,248</b>	<b>67,695</b>	<b>10,775</b>	<b>21,277</b>	<b>2,617</b>	<b>4,826</b>	<b>374,438</b>
North American Electric Reliability Council Regions <sup>1</sup>							
ECAR .....	24,553	2,699	1,314	0	15	28	28,609
ERCOT .....	48,422	35	462	231	0	0	49,150
MAAC .....	18,988	6,990	1,461	1,445	439	1,126	30,449
MAIN .....	7,071	411	568	228	20	90	8,388
MAPP (U.S.) .....	2,943	484	265	751	19	—	4,462
NPCC (U.S.) .....	44,467	19,581	2,792	0	543	573	67,957
SERC .....	51,988	9,557	236	130	53	168	62,131
SPP .....	33,204	983	160	233	0	91	34,671
WSCC (U.S.) .....	31,805	26,169	3,455	17,751	1,345	2,677	83,201
<b>Contiguous United States .....</b>	<b>263,441</b>	<b>66,909</b>	<b>10,713</b>	<b>20,769</b>	<b>2,434</b>	<b>4,753</b>	<b>369,018</b>
ASCC (Alaska) .....	461	4	62	508	183	13	1,232
Hawaii .....	3,347	782	0	0	0	59	4,187
<b>Total .....</b>	<b>267,248</b>	<b>67,695</b>	<b>10,775</b>	<b>21,277</b>	<b>2,617</b>	<b>4,826</b>	<b>374,438</b>

<sup>1</sup> See Glossary for information on the North American Electric Reliability Council (NERC). This table includes the U.S. portion of NERC only and does not cover Puerto Rico and U.S. Trust Territories. See Figure 8.9 for an illustration of NERC regions. See Appendix E for Census Divisions

— = Not applicable. W=Withheld to avoid disclosure of individual company data.

Notes: • Nonutility electric generating facilities with a total generator capacity of 1 megawatt or greater.

• Data are based on facilities' consumption. • Totals may not equal sum of components due to independent rounding.

Sources: **Census Divisions:** Energy Information Administration (EIA), *Electric Power Annual 1995*, Volume II, (December 1996), Table 61. **NERC Regions:** EIA, Form EIA-867, "Annual Nonutility Power Producer Report."

## Electricity Notes

1. Data on the generation of electricity in Table 8.1 represent net generation, which is gross output of electricity (measured at the generator terminals) minus power plant use. Nuclear electricity generation data identified by individual countries in Section 11 are gross output of electricity.
2. Electrical system energy losses are estimated as the difference between total energy input at electric utilities and the total energy content of electricity sold to end-use consumers. Most of these losses occur at steam-electric power plants (conventional and nuclear) in the conversion of heat energy into mechanical energy to turn electric generators. This loss is a thermodynamically necessary feature of the steam-electric cycle. Part of the energy input-to-output losses are a result of imputing fossil energy equivalent inputs for hydroelectric and other energy sources, since there is no generally accepted practice for measuring these thermal conversion rates. In addition to conversion losses, other losses include power plant use of electricity, transmission and distribution of electricity from power plants to end-use consumers (also called “line-losses”), and unaccounted-for electricity. Total losses are allocated to the end-use sectors in proportion to each sector’s share of total electricity sales. Overall, approximately 67 percent of total energy input is lost in conversion; of electricity generated, approximately 5 percent is lost in plant use and 9 percent is lost in transmission and distribution. Calculated electrical energy system losses may be less than actual losses, because primary consumption does not include the energy equivalent of utility purchases of electricity from non-electric utilities and from Canada and Mexico, although they are included in electricity sales.
3. Prior to 1985, electric utility supply and distribution statistics included data reported by institutions (such as universities) and military facilities that generated electricity primarily for their own use. Beginning in 1985, electricity statistics exclude data for these facilities and include data only for those organizations that generate electricity primarily for public use. In 1989, data for nonutility power producers (cogenerators, small power producers, and independent power producers) are provided.
4. Data on the sales of electric utility electricity represent gross output of electricity (measured at the generator terminals) minus power plant use and transmission and distribution losses. Included in each end-use sector are the following: Commercial Sector—sales of electricity to businesses that generally require less than 1,000 kilowatts of service; Industrial Sector—sales of electricity to businesses that generally require more than 1,000 kilowatts of service; Residential Sector—sales

of electricity to residences for household purposes; “Other” Sector—sales of electricity for public street and highway lighting, to public authorities, railways, and railroads, and interdepartmental sales.

5. Net summer capabilities were first collected on Form EIA-860 for 1984. Units not assigned a net summer capability rating by the utility were given an estimated rating by use of a statistical relationship between installed nameplate capacity and net summer capability for each prime mover. To estimate net summer capability for the years 1949 through 1984, two methods were used. For each prime mover except nuclear and “other,” net summer capability estimates were calculated in two steps. First, the unit capacity values reported on Form EIA-860 and the unit start dates contained in the 1984 Generating Unit Reference File (GURF) were used to compute preliminary aggregate estimates of annual net summer capability and installed nameplate capacity. These preliminary estimates were obtained by aggregating unit capacity values for all units in service during a given year. Next, the ratio of the preliminary capability to nameplate estimate was computed for each year and multiplied by the previously published installed nameplate capacity values to produce the final estimates of net summer capability. The net summer capability data for nuclear and “other” units were used directly from the 1984 GURF for all years. Historical aggregates were then developed by using the unit start dates on the GURF.

Historical capacity has also been modified to estimate capability based upon the operable definition. This was accomplished by assuming that nonnuclear generating units became operable between 1 and 4 months prior to their commercial operation dates, depending upon the prime mover and time period. The actual operable dates for nuclear units were used. It should be noted that net summer capabilities are not currently collected for nonutilities.

6. Year-to-year changes in data from the Form EIA-867, “Annual Nonutility Power Plant Report,” can result from correcting misreported data and modifying the frame to account for new or retired facilities, among other improvements. Data for 1989, 1990, and 1991 were collected for facilities of 5 megawatts or more. In 1992, the threshold was lowered to include facilities with capacities of 1 megawatt or more. Estimates of the 1-to-5-megawatt range for prior years were derived from historical data. The estimation did not include retirements that occurred prior to 1992 and included only the capacity of facilities that came on line before 1992.

# 9. Nuclear Energy

## Status of Nuclear Generating Units

At the end of 1996, there were 110 licensed operable nuclear generating units in the United States (9.1).<sup>\*</sup> Most of the units were located east of the Mississippi River. In addition to the operable units, six units possessed construction permits; however, construction on all six units had been halted or canceled. Thus, the total number of units in all categories (licensed, permitted, ordered, and announced) in 1996 was 116, well below the peak total of 226 in 1974. After 1974, many planned units were canceled; after 1977, no orders for new units were announced.

The Three Mile Island accident in 1979 greatly increased concerns about the safety of nuclear power plants. The regulatory reaction to those concerns contributed to the decline in the number of planned nuclear units. Longer leadtimes for licensing and construction, coupled with higher financing expenses, increased the cost of nuclear power plants. In addition, growth in electricity demand was slower than expected. The uncertain economic environment diminished electric utilities' willingness to commission new plants.

## Nuclear Power Plant Performance

Nuclear electric power's contribution to electricity net generation in the United States increased almost every year from the late 1950's through 1995, then declined slightly to 21.9 percent in 1996 (9.2). Nuclear electric power production in 1996 totaled 675 billion kilowatt-hours, up less than 1 percent from the 1995 level. Net summer capability (the steady hourly output that primary generating equipment is expected to supply, as shown by testing at the time of summer peak demand) reached a record high in 1996 of 100.7 million kilowatts. The capacity factor<sup>1</sup> fell one percentage point from the 1995 level to 76.4 percent in 1996.

<sup>1</sup>The actual generation in a given time period divided by the maximum possible generation in that time period.

*\*Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications. Percentages and numbers in text are calculated by using data in the tables.*

## The Uranium Industry

From 1949 through 1967, the Atomic Energy Commission (AEC) was the major purchaser of uranium. The AEC's demand for uranium for military purposes was strong during the 1950's and domestic production, spurred by AEC incentives, grew from 0.4 million pounds of uranium oxide ( $U_3O_8$ ) in 1949 to 35 million pounds in 1960 (9.3). As the AEC began to accumulate stockpiles, its purchases declined and U.S. production fell to 21 million pounds in 1965. From 1966 through 1976, production fluctuated between 21 and 26 million pounds. Subsequently, orders for new nuclear plants led to strong growth, and production peaked at 44 million pounds in 1980.

However, plant cancellations and postponements during the late 1970's led to a decline in projected demand and, coupled with foreign competition and buildups of inventories at electric utilities, caused the second major decline in domestic uranium production, which fell to 11 million pounds in 1985. Many domestic uranium-producing facilities closed permanently. In the early 1990's, low uranium prices, excess world supply, and continuing low expectations for future uranium demand brought domestic uranium production to a 40-year low of 3.1 million pounds in 1993. In 1996, however, uranium production rose to 6.3 million pounds, partly as a result of higher uranium prices and the need among electric utilities and fuel suppliers to bolster inventories.

Historically, domestic producers have faced competition from low-cost uranium imports. From 1949 through 1960, net imports actually exceeded domestic production (9.3). In 1966, the AEC effectively suspended imports by curtailing enrichment services for foreign uranium intended for use in domestic facilities, and no uranium was imported from 1967 through 1974. With the gradual removal of the AEC restrictions during the 1977-to-1983 period, foreign uranium deliveries to the United States began to increase. In 1990 through 1996, net imports totaled an estimated 33.9 million pounds, compared with domestic production of 6.3 million pounds. The price of purchased imports averaged \$13.15 per pound of  $U_3O_8$ , and the price of purchased domestic uranium averaged \$13.81 per pound of  $U_3O_8$ .



**Table 9.1 Nuclear Generating Units, End of Year 1973-1996**

Year	Licensed for Operation		Construction Permits		On Order	Announced	Total	Total Design Capacity <sup>3</sup>
	Operable <sup>1</sup>	In Startup <sup>2</sup>	Granted	Pending				
Number of Units								Million Kilowatts
1973	39	2	57	52	49	9	208	198
1974	48	5	62	75	30	6	226	223
1975	54	2	69	69	14	5	213	212
1976	61	1	71	63	16	2	214	211
1977	65	2	78	49	13	2	209	203
1978	70	0	88	32	5	0	195	191
1979	68	0	90	24	3	0	185	180
1980	70	1	82	12	3	0	168	162
1981	74	0	76	11	2	0	163	157
1982	77	2	60	3	2	0	144	134
1983	80	3	53	0	2	0	138	129
1984	86	6	38	0	2	0	132	123
1985	95	3	30	0	2	0	130	121
1986	100	7	19	0	2	0	128	119
1987	107	4	14	0	2	0	127	119
1988	108	3	12	0	0	0	123	115
1989	110	1	10	0	0	0	121	113
1990	111	0	8	0	0	0	119	111
1991	111	0	8	0	0	0	119	111
1992	109	0	8	0	0	0	117	111
1993	109	0	7	0	0	0	116	110
1994	109	0	7	0	0	0	116	110
1995	109	1	6	0	0	0	116	110
1996	110	0	6	0	0	0	116	110

<sup>1</sup> Nuclear generating units that have been issued a full-power license by the Nuclear Regulatory Commission (NRC). See Note 1 at end of section.

<sup>2</sup> The period of time between a nuclear generating unit's initial fuel loading date and the issuance of its full-power license. During that period, the unit is undergoing low-power testing and the maximum level of operation is 5 percent of the unit's design thermal rating.

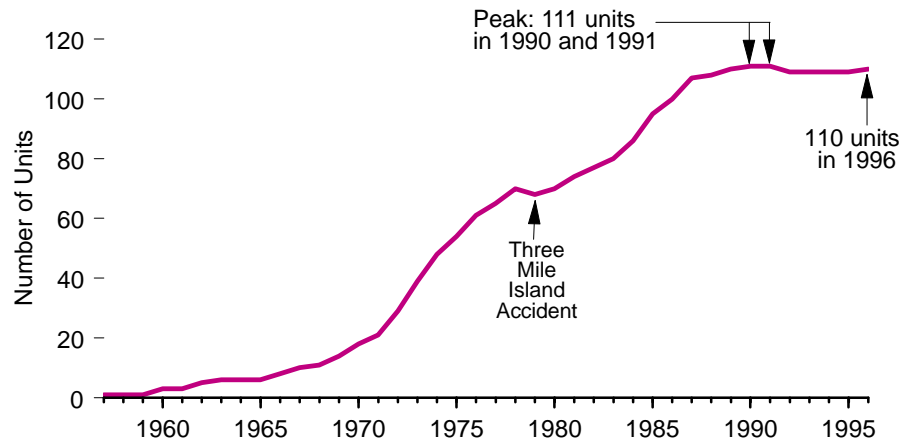
<sup>3</sup> Net design electrical rating (DER) is used because many of the units were canceled prior to being assigned a net summer capability. Nuclear generating units may have more than one type of net capacity rating, including the following: Net Summer Capability - The steady hourly output that generating equipment is expected to supply to system load, exclusive of auxiliary power, as demonstrated by test at the time of summer peak demand. Auxiliary power of a typical nuclear power plant is about 5 percent of gross generation. Net Design Capacity or DER: The nominal net electrical output of a unit, specified by the utility and used for plant design.

Sources: **Licensed for Operation:** • 1973-1982—U.S. Department of Energy (DOE), Office of Nuclear Programs, "U.S. Central Station Nuclear Electric Generating Units: Significant Milestones." • 1983 forward—NRC, "Licensed Operating Reactors" (NUREG-0020). **Construction Permits, On Order, and**

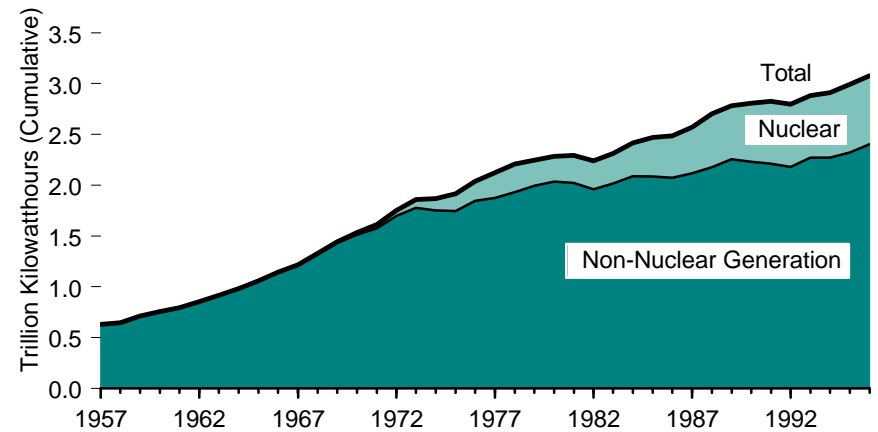
**Announced:** • 1973-1982—Compiled from various sources, primarily DOE, Office of Nuclear Reactor Programs, "U.S. Central Station Nuclear Electric Generating Units: Significant Milestones"; Energy Information Administration (EIA), Office of Coal, Nuclear, Electric and Alternate Fuels (CNEAF), "Nuclear Steam-Electric Units That Have Been in Operation as of 1957-1989"; EIA, CNEAF, "Nuclear Plant Cancellations: Causes, Costs, and Consequences"; and Utility Data Institute, Inc., "U.S. Nuclear Plant Statistics, 1987." • 1983 forward—NRC, "Summary Information Report" (NUREG-0871); NRC, "Licensed Operating Reactors" (NUREG-0020); and various journals. **Total Design Capacity:** • 1973-1982—Compiled from various sources, primarily DOE, Office of Nuclear Reactor Programs, "U.S. Central Station Nuclear Electric Generating Units: Significant Milestones"; EIA, CNEAF, "Nuclear Steam-Electric Units That Have Been in Operation as of 1957-1987"; EIA, CNEAF, "Monthly Report for Electric Utilities-Power Generation"; EIA, CNEAF, "Nuclear Plant Cancellations: Causes, Costs, and Consequences"; and Utility Data Institute, Inc., "U.S. Nuclear Plant Statistics, 1987." • 1983 forward—NRC, "Summary Information Report" (NUREG-0871); NRC, "Licensed Operating Reactors" (NUREG-0020); and EIA, Form EIA-860, "Annual Electric Generator Report."

**Figure 9.2 Nuclear Power Plant Operations**

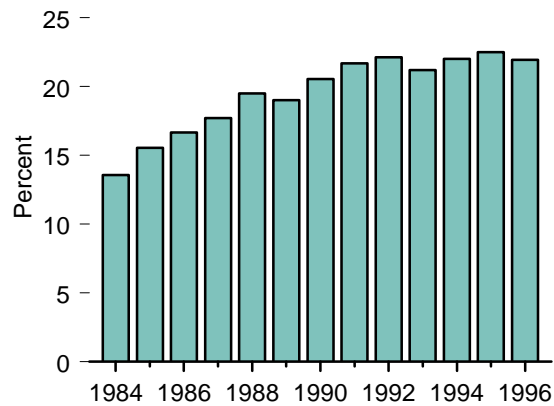
**Operable Units, 1957-1996**



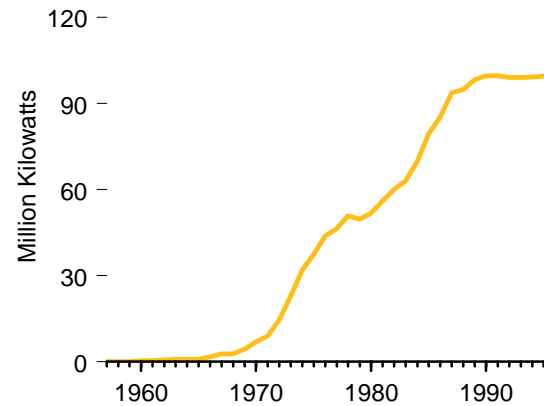
**Nuclear and Total Net Generation of Electricity, 1957-1996**



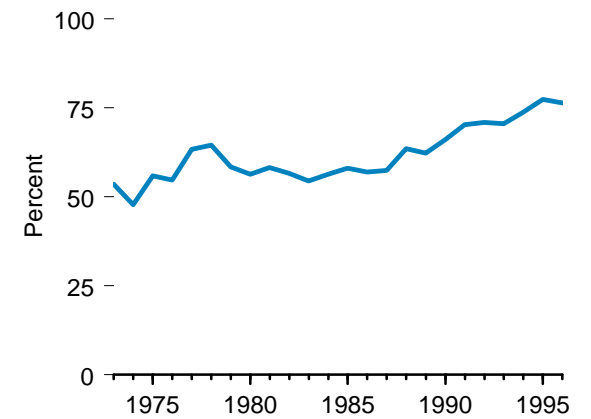
**Nuclear Portion of Domestic Electricity Net Generation, 1984-1996**



**Net Summer Capability of Operable Units, 1957-1996**



**Capacity Factor, 1973-1996**



Sources: Tables 8.3 and 9.2.

**Table 9.2 Nuclear Power Plant Operations, 1957-1996**

Year	Operable Units <sup>1</sup>	Nuclear Electricity Net Generation	Nuclear Portion of Domestic Electricity Net Generation	Net Summer Capability of Operable Units <sup>1,2</sup>	Capacity Factor <sup>2</sup>
	Number	Billion Kilowatthours	Percent	Million Kilowatts	Percent
1957	1	(s)	(s)	0.1	NA
1958	1	0.2	(s)	0.1	NA
1959	1	0.2	(s)	0.1	NA
1960	3	0.5	0.1	0.4	NA
1961	3	1.7	0.2	0.4	NA
1962	5	2.3	0.3	0.7	NA
1963	6	3.2	0.4	0.8	NA
1964	6	3.3	0.3	0.8	NA
1965	6	3.7	0.3	0.8	NA
1966	8	5.5	0.5	1.7	NA
1967	10	7.7	0.6	2.7	NA
1968	11	12.5	0.9	2.7	NA
1969	14	13.9	1.0	4.4	NA
1970	18	21.8	1.4	7.0	NA
1971	21	38.1	2.4	9.0	NA
1972	<sup>2</sup> 29	54.1	3.1	<sup>2</sup> 14.5	NA
1973	<sup>2</sup> 39	83.5	4.5	<sup>2</sup> 22.7	53.5
1974	48	114.0	6.1	31.9	47.8
1975	54	172.5	9.0	37.3	55.9
1976	61	191.1	9.4	43.8	54.7
1977	65	250.9	11.8	46.3	63.3
1978	70	276.4	12.5	50.8	64.5
1979	68	255.2	11.4	49.7	58.4
1980	70	251.1	11.0	51.8	56.3
1981	74	272.7	11.9	56.0	58.2
1982	77	282.8	12.6	60.0	56.6
1983	80	293.7	12.7	63.0	54.4
1984	86	327.6	13.6	69.7	56.3
1985	95	383.7	15.5	79.4	58.0
1986	100	414.0	16.6	85.2	56.9
1987	107	455.3	17.7	93.6	57.4
1988	108	527.0	19.5	94.7	63.5
1989	110	529.4	19.0	98.2	62.2
1990	111	576.9	20.5	99.6	66.0
1991	111	612.6	21.7	99.6	70.2
1992	109	618.8	22.1	99.0	70.9
1993	109	610.3	21.2	99.0	70.5
1994	109	640.4	22.0	99.1	73.8
1995	109	673.4	22.5	99.5	<sup>R</sup> 77.4
1996 <sup>P</sup>	110	674.8	21.9	100.7	76.4

<sup>1</sup> At end of year.

<sup>2</sup> See Note 3 at end of section.

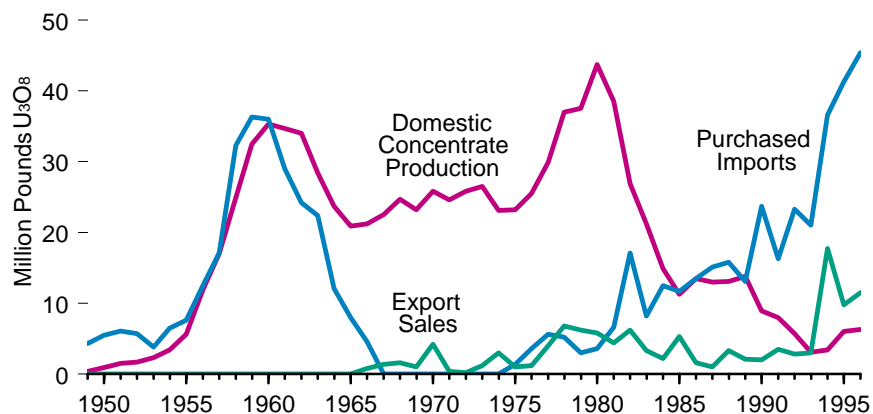
R=Revised data. P=Preliminary data. NA=Not available. (s)=Less than 0.05 billion kilowatthours or less than 0.05 percent.

Sources: **Operable Units:** • 1957-1972—Federal Power Commission (FPC), Form FPC-4, "Monthly Power Plant Report." • 1973 forward—Nuclear Regulatory Commission, *Licensed Operating Reactors*,

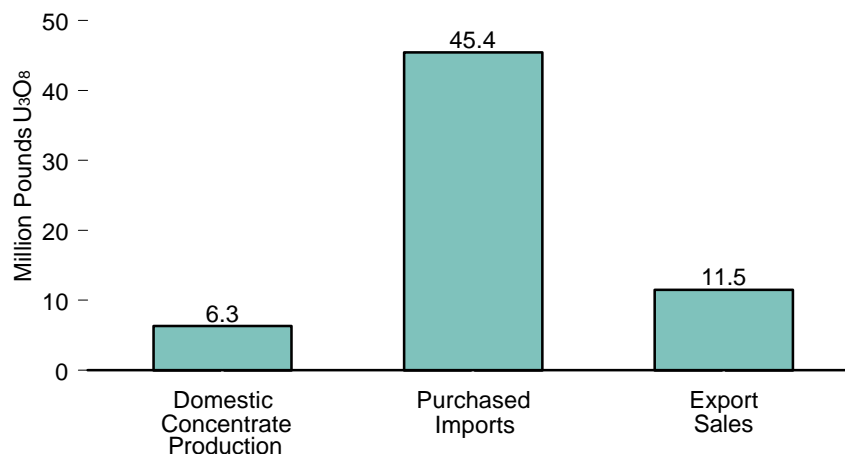
(NUREG-0020), monthly. **Electricity Generation:** • 1957-September 1977—FPC, Form FPC-4, "Monthly Power Plant Report." • October 1977-1981—Federal Energy Regulatory Commission, Form FPC-4, "Monthly Power Plant Report." • 1982 forward—Energy Information Administration (EIA), Form EIA-759, "Monthly Power Plant Report." **Net Summer Capability of Operable Units:** • 1957-1983—See Note 2 at end of section. • 1984 forward—EIA, Form EIA-860, "Annual Electric Generator Report."

**Figure 9.3 Uranium Overview**

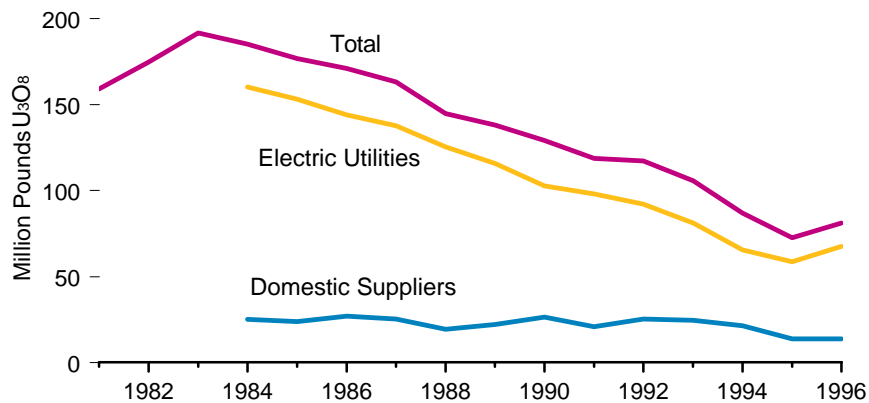
**Production and Trade, 1949-1996**



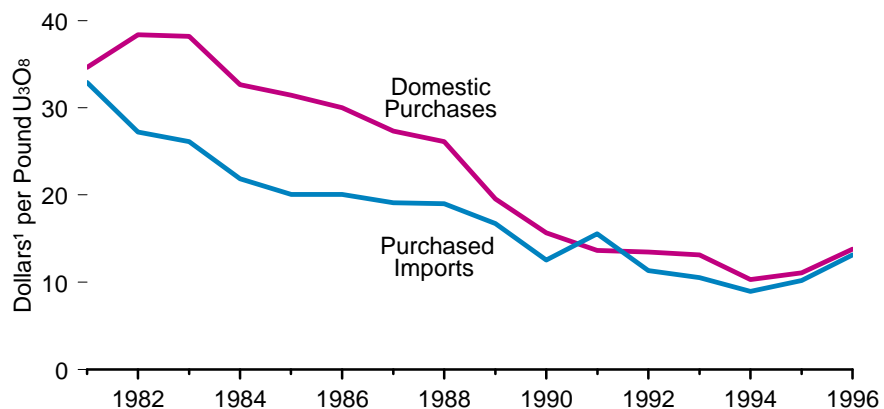
**Production and Trade, 1996**



**Inventories, End of Year 1981-1996**



**Average Prices, 1981-1996**



<sup>1</sup> Nominal dollars.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 9.3.



**Table 9.3 Uranium Overview, 1949-1996**

Year	Domestic Concentrate Production	Purchased Imports <sup>1</sup>	Export Sales <sup>1</sup>	Utility Purchases from Domestic Suppliers	Loaded into U.S. Nuclear Reactors <sup>2</sup>	Inventories			Average Price	
						Domestic Suppliers	Electric Utilities	Total	Purchased Imports	Domestic Purchases
Million Pounds U <sub>3</sub> O <sub>8</sub>						U.S. Dollars <sup>3</sup> per Pound U <sub>3</sub> O <sub>8</sub>				
1949	0.36	4.3	0.0	NA	NA	NA	NA	NA	NA	NA
1950	0.92	5.5	0.0	NA	NA	NA	NA	NA	NA	NA
1951	1.54	6.1	0.0	NA	NA	NA	NA	NA	NA	NA
1952	1.74	5.7	0.0	NA	NA	NA	NA	NA	NA	NA
1953	2.32	3.8	0.0	NA	NA	NA	NA	NA	NA	NA
1954	3.40	6.5	0.0	NA	NA	NA	NA	NA	NA	NA
1955	5.56	7.6	0.0	NA	NA	NA	NA	NA	NA	NA
1956	11.92	12.5	0.0	NA	NA	NA	NA	NA	NA	NA
1957	16.96	17.1	0.0	NA	NA	NA	NA	NA	NA	NA
1958	24.88	32.3	0.0	NA	NA	NA	NA	NA	NA	NA
1959	32.48	36.3	0.0	NA	NA	NA	NA	NA	NA	NA
1960	35.28	36.0	0.0	NA	NA	NA	NA	NA	NA	NA
1961	34.70	29.0	0.0	NA	NA	NA	NA	NA	NA	NA
1962	34.02	24.2	0.0	NA	NA	NA	NA	NA	NA	NA
1963	28.44	22.4	0.0	NA	NA	NA	NA	NA	NA	NA
1964	23.70	12.1	0.0	NA	NA	NA	NA	NA	NA	NA
1965	20.88	8.0	0.0	NA	NA	NA	NA	NA	NA	NA
1966	21.18	4.6	0.8	NA	NA	NA	NA	NA	NA	NA
1967	22.51	0.0	1.4	NA	NA	NA	NA	NA	—	NA
1968	24.74	0.0	1.6	NA	NA	NA	NA	NA	—	NA
1969	23.22	0.0	1.0	NA	NA	NA	NA	NA	—	NA
1970	25.81	0.0	4.2	NA	NA	NA	NA	NA	—	NA
1971	24.55	0.0	0.4	NA	NA	NA	NA	NA	—	NA
1972	25.80	0.0	0.2	NA	NA	NA	NA	NA	—	NA
1973	26.47	0.0	1.2	NA	NA	NA	NA	NA	—	NA
1974	23.06	0.0	3.0	NA	NA	NA	NA	NA	—	NA
1975	23.20	1.4	1.0	NA	NA	NA	NA	NA	NA	NA
1976	25.49	3.6	1.2	NA	NA	NA	NA	NA	NA	NA
1977	29.88	5.6	4.0	NA	NA	NA	NA	NA	NA	NA
1978	36.97	5.2	6.8	NA	NA	NA	NA	NA	NA	NA
1979	37.47	3.0	6.2	NA	NA	NA	NA	NA	NA	NA
1980	43.70	3.6	5.8	NA	NA	NA	NA	NA	NA	NA
1981	38.47	6.6	4.4	32.6	NA	NA	NA	159.2	32.90	34.65
1982	26.87	17.1	6.2	27.1	NA	NA	NA	174.8	27.23	38.37
1983	21.16	8.2	3.3	24.2	NA	NA	NA	191.8	26.16	38.21
1984	14.88	12.5	2.2	22.5	NA	25.0	160.2	185.2	21.86	32.65
1985	11.31	11.7	5.3	21.7	NA	23.7	153.2	176.9	20.08	31.43
1986	13.51	13.5	1.6	18.9	NA	27.0	144.1	171.1	20.07	30.01
1987	12.99	15.1	1.0	20.8	NA	25.4	137.8	163.2	19.14	27.37
1988	13.13	15.8	3.3	17.6	NA	19.3	125.5	144.8	19.03	26.15
1989	13.84	13.1	2.1	18.4	NA	22.2	115.8	138.1	16.75	19.56
1990	8.89	23.7	2.0	20.5	NA	26.4	102.7	129.1	12.55	15.70
1991	7.95	16.3	3.5	26.8	34.6	20.7	98.0	118.7	15.55	13.66
1992	5.65	23.3	2.8	23.4	43.0	25.2	92.1	117.3	11.34	13.45
1993	3.06	21.0	3.0	15.5	45.1	24.5	81.2	105.7	10.53	13.14
1994	3.35	36.6	17.7	22.7	40.4	21.5	65.4	86.9	8.95	10.30
1995	6.04	41.3	9.8	22.3	51.1	<sup>R</sup> 13.7	<sup>R</sup> 58.7	<sup>R</sup> 72.5	10.20	11.11
1996 <sup>P</sup>	6.32	45.4	11.5	22.9	45.5	13.7	67.5	81.2	13.15	13.81

<sup>1</sup> Import quantities through 1970 are reported for fiscal years. Prior to 1968, the Atomic Energy Commission was the sole purchaser of all imported U<sub>3</sub>O<sub>8</sub>. Trade data prior to 1982 were for transactions conducted by uranium suppliers only. For 1982 forward, transactions by uranium buyers (consumers) have been included. Buyer imports and exports prior to 1982 are believed to be small.

<sup>2</sup> Does not include any fuel rods removed from reactors and later reloaded into the reactor.

<sup>3</sup> Nominal dollars.

R=Revised data. P=Preliminary data. NA=Not available. — = Not applicable.

Sources: • 1949-1966—U.S. Department of Energy, Grand Junction Office, *Statistical Data of the Uranium Industry*, Report No. GJO-100, annual. • 1967-1995—Energy Information Administration (EIA), *Uranium Industry Annual*, annual reports. • 1996—EIA, *Uranium Industry Annual* (April 1997), Tables H1, H2, H3, 5, 14, 27, 28, and 31.

## Nuclear Energy Notes

1. Nine units have been retired and therefore removed from the operable category. Those units are: Peach Bottom 1 (40 MW) and Indian Point 1 (265 MW), both retired in 1974; Humboldt Bay (65 MW), officially retired in 1976; Dresden 1 (200 MW), retired in October 1979; LaCrosse (51 MW), retired in May 1987; Fort Saint Vrain (217 MW), retired in October 1989; Yankee Rowe 1 (185 MW), retired in February 1992; San Onofre 1 (436 MW), retired in December 1992; and Trojan (1,104 MW), retired in January 1993.

Detailed information on the criteria for operable units can be found in the current edition of Energy Information Administration, *Monthly Energy Review* (DOE/EIA-0035), Section 8, Nuclear Energy Notes.

2. Net summer capabilities were first collected on Form EIA-860 for 1984. Units not assigned a net summer capability rating by the utility were given an estimated rating by use of a statistical relationship between installed nameplate capacity and net summer capability for each prime mover. To estimate net summer capability for 1949-1984, two

methods were used. For each prime mover except nuclear and "other," net summer capability estimates were calculated in two steps. First, the unit capacity values reported on Form EIA-860 and the unit start dates contained in the 1984 Generating Unit Reference File (GURF) were used to compute preliminary aggregate estimates of annual net summer capability and installed nameplate capacity. These preliminary estimates were obtained by aggregating unit capacity values for all units in service during a given year. Next, the ratio of the preliminary capability to nameplate estimate was computed for each year and multiplied by the previously published installed nameplate capacity values to produce the final estimates of net summer capability. The net summer capability data for nuclear and "other" units were used directly from the 1984 GURF for all years. Historical aggregates were then developed by use of the unit start dates on the GURF.

Historical capacity has also been modified to estimate capability based upon the operable definition, by assuming that nonnuclear generating units became operable between 1 and 4 months prior to their commercial operation dates, depending upon the prime mover and time period. The actual operable dates for nuclear units were used.

# 10. Renewable Energy

## Renewable Energy Consumption

In 1996, the United States consumed an estimated 7.4 quadrillion Btu of renewable energy (10.1).<sup>\*</sup> Conventional hydroelectric power and biofuels accounted for the largest shares (53 percent and 41 percent, respectively). Geothermal, solar, and wind energy accounted for the remainder.

Over the 7-year period of 1990 through 1996 (the only years for which these data are available) renewable energy consumption rose 20 percent. Among the five major renewable energy sources, wind energy showed the greatest percentage increase (57 percent). However, wind energy's share of total renewable energy consumption was less than one-half of 1 percent in 1996.

The types and amounts of renewable energy consumed varied by sector (10.2). Electric utilities and the industrial sector (the primary source of nonutility electric power) were the biggest consumers throughout the 1990-through-1996 period.

**Conventional Hydroelectric Power.** Almost all of the 3.9 quadrillion Btu of conventional hydroelectric power generation in 1996 occurred at electric utilities (10.1 and 10.2). The industrial sector which includes nonutility power producers (cogenerators, independent power producers, and small power producers), accounted for 172 trillion Btu.

**Biofuels.** Biofuels consist of *nonfossil biomass energy sources* (such as fuelwood, waste wood, garbage, and crop waste), which are burned or gasified as received to produce heat or electricity, and *biomass-derived fuels* (including wood byproducts, refuse-derived fuel, ethanol, and methanol), which result from the processing of biomass energy sources. Biomass-derived fuels may be byproducts of industrial or agricultural processes or fuels made from biomass feedstocks.

In 1996, biofuel consumption totaled an estimated 3.0 quadrillion Btu, most of which (2.4 quadrillion Btu) was wood energy (10.3). Some

industries, such as the paper and lumber industries, have ready access to wood and wood byproducts and rely heavily on wood as an energy source. Consumption of municipal solid waste and other wastes totaled 503 trillion Btu in 1996. Consumption of alcohol fuels (ethanol) fell 29 percent to 74 trillion Btu, due to sharply higher prices for corn, the primary ethanol feedstock.

**Geothermal Energy.** The third biggest source of renewable energy in 1996 was geothermal energy, which can be used directly for purposes such as space heating or converted to electricity. In 1960, The Geysers in California became the first U.S. power plant to generate electricity from geothermal steam. In 1996, geothermal energy consumption reached 354 trillion Btu (10.1), 123 trillion Btu at electric utilities and 231 trillion Btu by the industrial sector (which includes nonutilities) (10.2).

**Solar Energy.** Of the 75 trillion Btu of potential solar energy supplied in 1996 (10.1), most (65 trillion Btu) was used in the residential and commercial sector (10.2). The industrial sector accounted for 9 trillion Btu and electric utilities accounted for less than 0.5 trillion Btu.

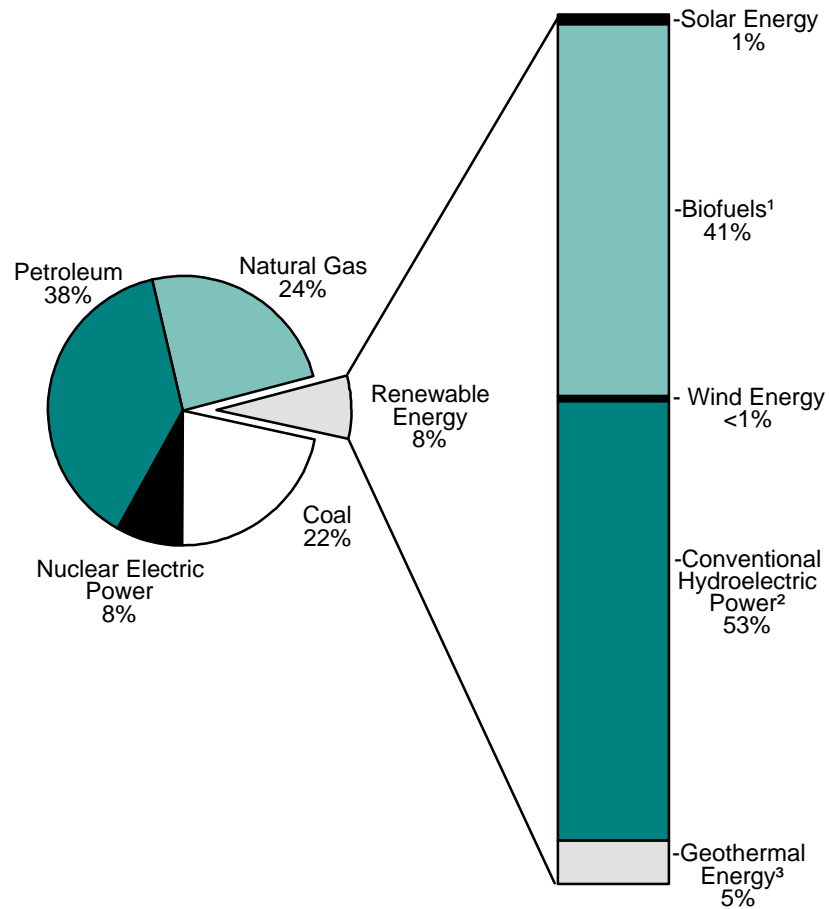
Because it is difficult to measure solar energy use directly, producer shipments of equipment are used as an indicator. Shipments of low-temperature collectors, used primarily for heating swimming pools, totaled 6.8 million square feet in 1995 (10.5). Shipments of medium-temperature collectors, used mainly for domestic hot water, peaked at 12 million square feet in 1983 and 1984 but, following the expiration of the Federal energy tax credit in 1985, totaled only 0.8 million square feet in 1995. Shipments of high-temperature collectors, used for electricity generation, reached 5.2 million square feet in 1990 but fell to near zero in 1991 through 1995, when Luz International Ltd. ceased operating. In 1995, shipments of photovoltaic cells and modules, which have a wide variety of applications, rose for the tenth consecutive year, to 31 thousand peak kilowatts (10.7).

**Wind Energy.** An estimated 36 trillion Btu of wind energy was consumed in 1996, virtually all in the industrial sector (10.2). Very small amounts (less than 0.5 trillion Btu) were consumed at electric utilities.

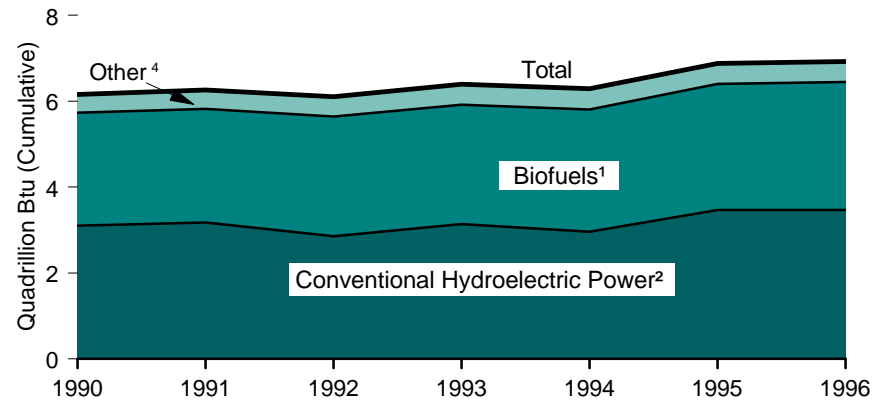
<sup>\*</sup>*Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications. Percentages and numbers in text are calculated by using data in the tables.*

# Figure 10.1 Renewable Energy Consumption by Source

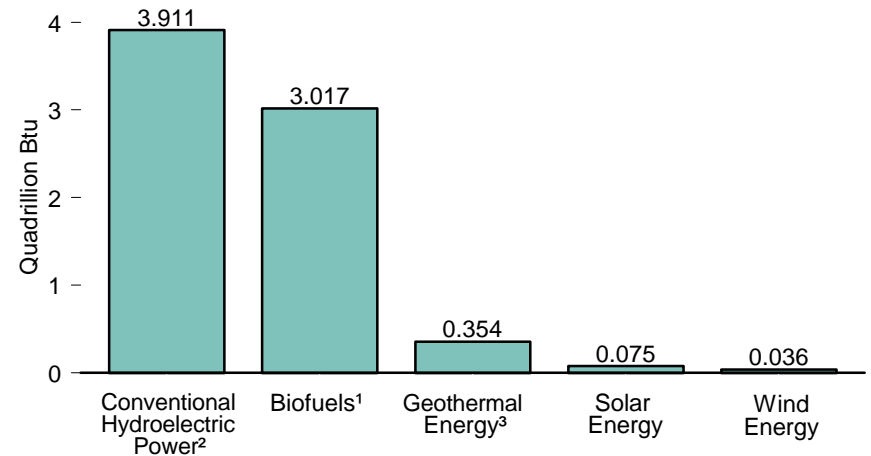
Renewable Energy as Share of Total Energy, 1996



Renewable Energy Consumption by Source, 1990-1996



Renewable Energy Consumption by Source, 1996



<sup>1</sup> Wood, wood waste, peat, wood sludge, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oils, and/or other waste.

<sup>2</sup> Includes electricity net imports from Canada that are derived from hydroelectric power.

<sup>3</sup> Includes electricity imports from Mexico that are derived from geothermal energy.

<sup>4</sup> Geothermal, solar, and wind energy.

Note: Because vertical scales differ, graphs should not be compared.

Sources: Tables 1.3 and 10.1.

**Table 10.1 Renewable Energy Consumption by Source, 1990-1996**  
(Quadrillion Btu)

Year	Biofuels <sup>1</sup>	Geothermal Energy <sup>2</sup>	Conventional Hydroelectric Power <sup>3,4</sup>	Solar Energy <sup>5</sup>	Wind Energy <sup>6</sup>	Total
1990	2.632	<sup>R</sup> 0.345	<sup>R</sup> 3.104	0.067	<sup>R</sup> 0.023	<sup>R</sup> 6.171
1991	2.642	<sup>R</sup> 0.354	<sup>R</sup> 3.182	0.068	0.027	<sup>R</sup> 6.273
1992	2.788	0.367	2.852	0.068	0.030	6.106
1993	2.784	0.381	3.138	0.069	0.031	6.403
1994	<sup>R</sup> 2.838	0.381	2.958	<sup>R</sup> 0.069	0.036	<sup>R</sup> 6.282
1995	<sup>R</sup> 2.946	<sup>R</sup> 0.325	<sup>R</sup> 3.471	<sup>R</sup> 0.072	<sup>R</sup> 0.033	<sup>R</sup> 6.847
1996 <sup>E</sup>	3.017	0.354	3.911	0.075	0.036	7.393

<sup>1</sup> Biofuels are wood, wood waste, peat, wood sludge, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oils, and/or other waste, and ethanol blended into motor gasoline.

<sup>2</sup> Includes electricity imports from Mexico that are derived from geothermal energy. Includes only grid-connected electricity. Excludes shaft power and remote electrical power.

<sup>3</sup> Hydroelectricity generated by pumped storage is not included in renewable energy.

<sup>4</sup> Includes electricity net imports from Canada that are derived from hydroelectric power.

<sup>5</sup> Includes solar thermal and photovoltaic energy.

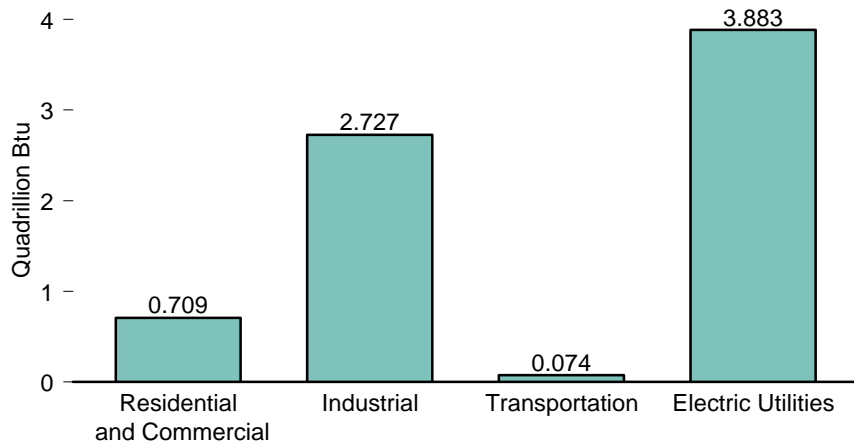
<sup>6</sup> Includes only grid-connected electricity. Excludes direct heat applications.

R=Revised data. E=Estimate.

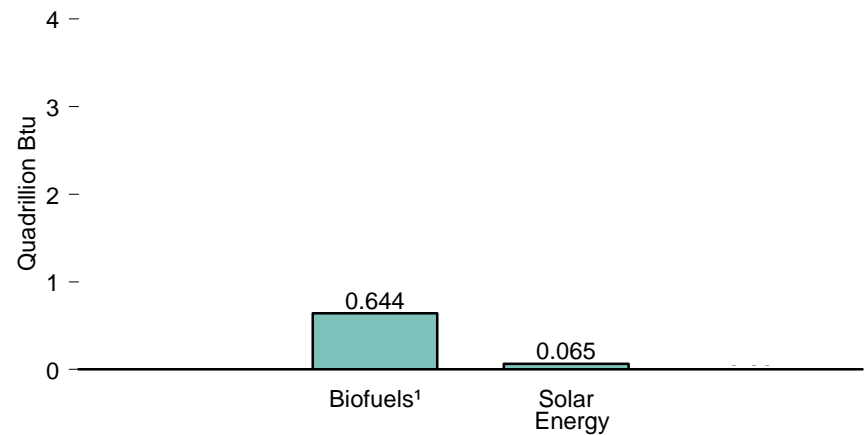
Source: Energy Information Administration (EIA), Office of Coal, Nuclear, Electric and Alternative Fuels estimates. For more information about renewable energy, see EIA, *Renewable Energy Annual 1996* (March 1997).

**Figure 10.2 Renewable Energy Consumption by Sector, 1996**

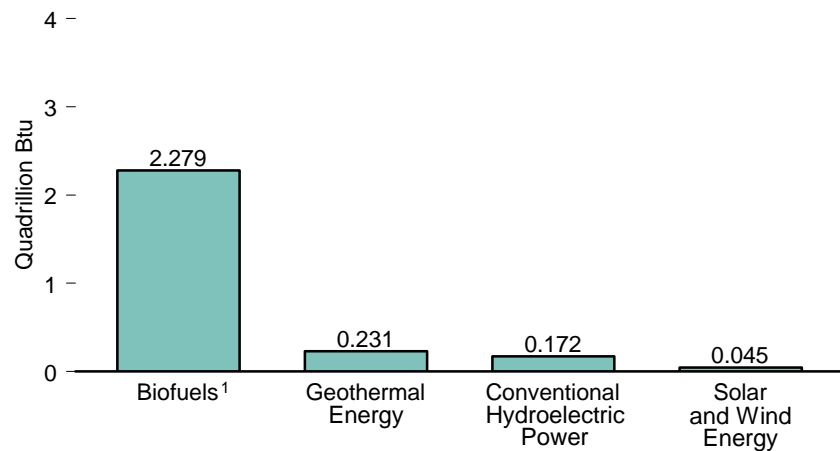
**By Sector**



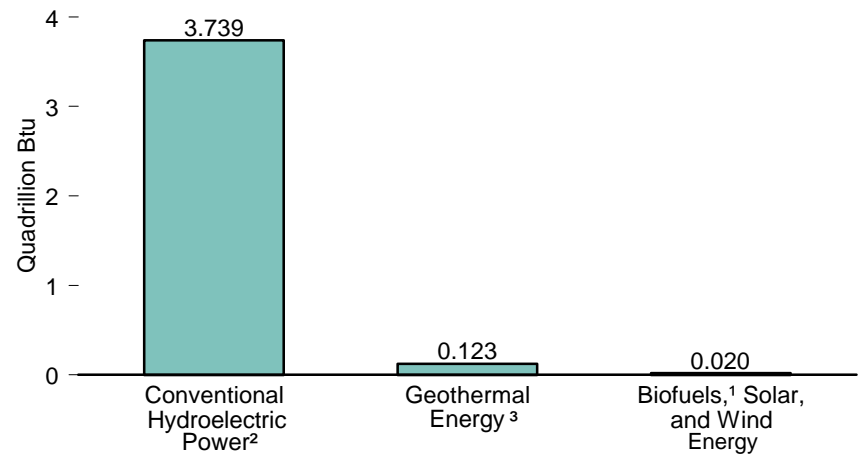
**Residential and Commercial Sector**



**Industrial Sector**



**Electric Utilities**



¹Wood, wood waste, peat, wood sludge, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oils, and/or other waste.

²Includes electricity net imports from Canada that are derived from hydroelectric power.

³Includes electricity imports from Mexico that are derived from geothermal energy.

Source: Table 10.2

**Table 10.2 Renewable Energy Consumption by Sector, 1990-1996**  
(Quadrillion Btu)

Year	Residential and Commercial			Industrial <sup>1</sup>						Transportation	Electric Utility <sup>1</sup>					Total
	Biofuels <sup>2</sup>	Solar Energy <sup>3</sup>	Total	Biofuels	Geo-thermal Energy	Conventional Hydro-electric Power <sup>4</sup>	Solar Energy	Wind Energy	Total	Biofuels <sup>2,5</sup>	Biofuels <sup>2</sup>	Geo-thermal Energy <sup>6</sup>	Conventional Hydro-electric Power <sup>4,7</sup>	Solar and Wind Energy	Total	
1990	0.581	0.060	0.641	1.948	<sup>R</sup> 0.153	<sup>R</sup> 0.084	0.007	<sup>R</sup> 0.023	<sup>R</sup> 2.215	0.082	0.021	0.192	3.020	(s)	3.234	<sup>R</sup> 6.171
1991	0.613	0.060	0.673	1.943	<sup>R</sup> 0.168	<sup>R</sup> 0.085	0.008	0.027	<sup>R</sup> 2.231	0.065	0.021	0.185	3.098	(s)	3.304	<sup>R</sup> 6.273
1992	0.645	0.060	0.705	2.042	0.179	0.097	0.008	0.030	2.357	0.079	0.022	0.188	2.755	(s)	2.965	6.106
1993	0.592	0.060	0.652	2.084	0.204	0.118	0.009	0.031	2.446	0.088	0.020	0.177	3.019	(s)	3.217	6.403
1994	0.582	0.060	0.642	<sup>R</sup> 2.138	0.212	0.136	0.008	0.036	<sup>R</sup> 2.530	<sup>R</sup> 0.097	0.020	0.170	2.822	(s)	3.012	<sup>R</sup> 6.282
1995	0.641	0.064	0.705	<sup>R</sup> 2.184	<sup>R</sup> 0.207	<sup>R</sup> 0.152	<sup>R</sup> 0.008	<sup>R</sup> 0.033	<sup>R</sup> 2.584	<sup>R</sup> 0.104	0.017	0.118	<sup>R</sup> 3.318	(s)	<sup>R</sup> 3.453	<sup>R</sup> 6.847
1996 <sup>E</sup>	0.644	0.065	0.709	2.279	0.231	0.172	0.009	0.036	2.727	0.074	0.020	0.123	3.739	(s)	3.883	7.393

<sup>1</sup> Generation of electricity by cogenerators, independent power producers, and small power producers is included in the industrial sector, not the electric utility sector. Covers facilities of 1 megawatt or greater capacity.

<sup>2</sup> Wood, wood waste, peat, wood sludge, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oils, and/or other waste.

<sup>3</sup> The solar energy number of 0.06 quadrillion Btu for residential and commercial use is calculated by presuming an overall efficiency of 50 percent for all three categories of solar thermal collectors (low temperature, medium temperature, and high temperature), a 1,500-Btu per square foot average daily insolation, and the potential thermal energy production from the 233 million square feet of solar thermal collectors produced between 1976 and 1995. This is a simplified approach since low-temperature and high-temperature collectors have been rated at more than 50 percent efficient and medium-temperature

collectors are generally less than 50 percent efficient.

<sup>4</sup> Hydroelectricity generated by pumped storage is not included in renewable energy.

<sup>5</sup> Ethanol blended into motor gasoline.

<sup>6</sup> Includes electricity imports from Mexico that are derived from geothermal energy.

<sup>7</sup> Includes electricity net imports from Canada that are derived from hydroelectric power.

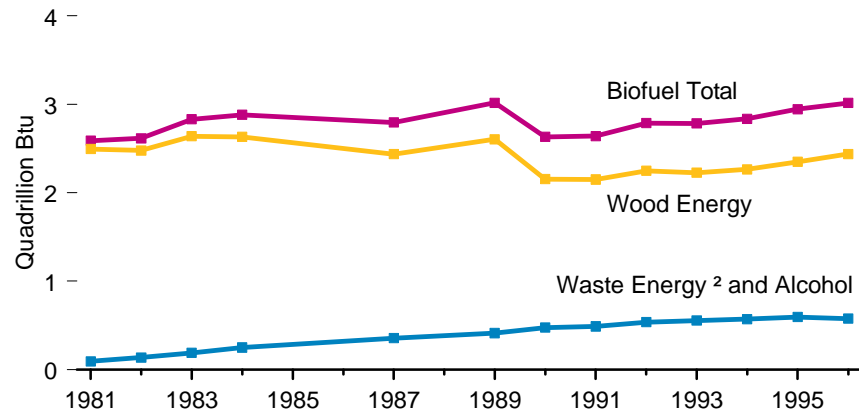
R=Revised data. E=Estimate. (s)=Less than 0.5 trillion Btu.

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

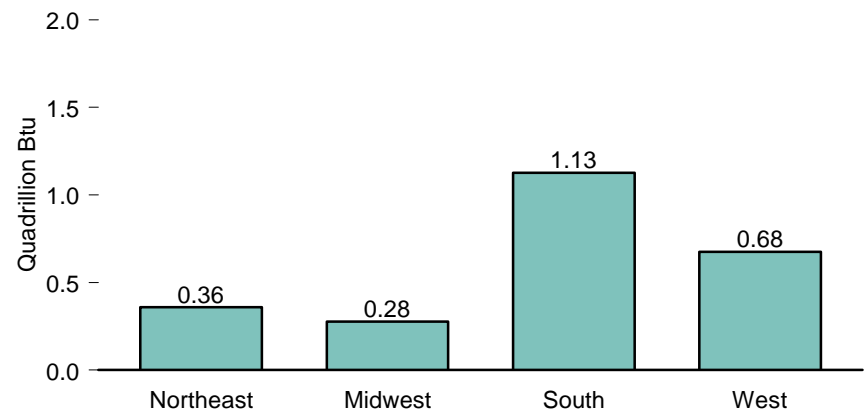
Source: Energy Information Administration (EIA), Office of Coal, Nuclear, Electric and Alternative Fuels estimates. For more information about renewable energy, see EIA, *Renewable Energy Annual 1996* (March 1997).

**Figure 10.3 Wood and Waste Energy and Alcohol Fuels Consumption Estimates**

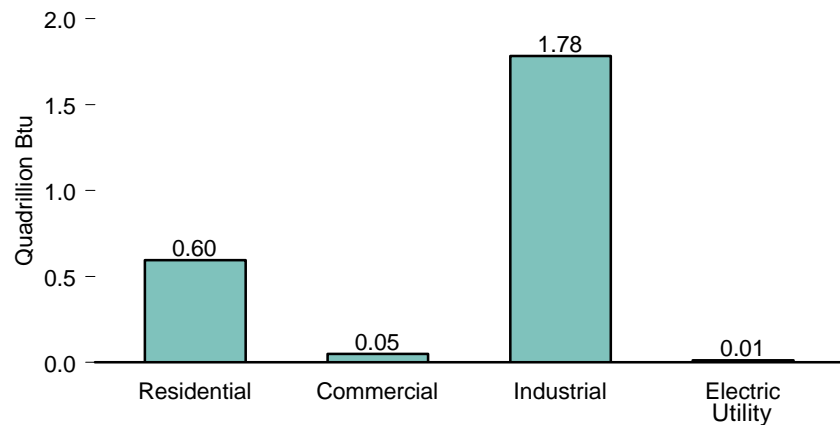
**Biofuel Total, 1981-1984, 1987, and 1989-1996<sup>1</sup>**



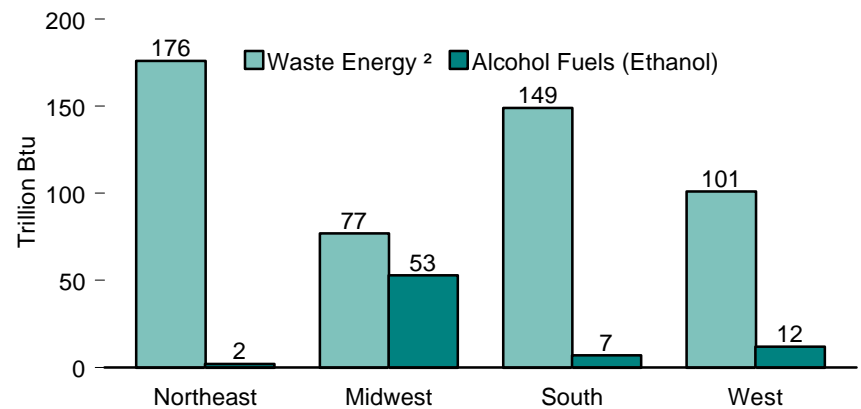
**Wood Energy by Census Region, 1996**



**Wood Energy by Sector, 1996**



**Waste Energy and Alcohol Fuels by Census Region, 1996**



<sup>1</sup> No data are available for 1985, 1986, and 1988.  
<sup>2</sup> Municipal solid waste, manufacturing waste, refuse-derived fuel, and methane recovered from landfills.

Notes: • See Appendix E for Census regions. • Because vertical scales differ, graphs should not be compared.  
 Source: Table 10.3.



**Table 10.3 Wood and Waste Energy and Alcohol Fuels Consumption Estimates by Sector and Census Region, Selected Years, 1990-1996**  
(Trillion Btu)

Energy Source	1981	1982	1983	1984	1987	1989	1990	1991	1992	1993	1994	1995	1996
<b>Wood Energy</b> .....	<b>2,495</b>	<b>2,478</b>	<b>2,640</b>	<b>2,633</b>	<b>2,437</b>	<b>2,604</b>	<b>2,155</b>	<b>2,151</b>	<b>2,249</b>	<b>2,228</b>	<b>2,266</b>	<b>2,350</b>	<b>2,440</b>
Sector													
Residential .....	869	937	925	923	852	918	581	613	645	548	537	596	595
Commercial .....	21	22	22	22	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	44	45	45	49
Industrial .....	1,602	1,516	1,690	1,679	1,576	1,673	1,562	1,528	1,593	1,625	1,673	1,698	1,784
Electric Utility .....	3	2	3	9	9	13	12	10	11	11	11	11	12
Census Region													
Northeast .....	395	358	380	349	350	432	256	224	264	277	278	354	359
Midwest .....	335	343	323	341	474	552	330	290	286	222	223	277	278
South .....	1,349	1,392	1,526	1,482	1,147	1,161	1,064	1,167	1,234	1,405	1,437	1,075	1,128
West .....	416	385	411	461	467	459	505	469	466	324	328	644	675
<b>Waste Energy</b> <sup>2</sup> .....	<b>88</b>	<b>120</b>	<b>157</b>	<b>208</b>	<b>289</b>	<b>344</b>	<b>395</b>	<b>426</b>	<b>460</b>	<b>468</b>	<b>R475</b>	<b>R492</b>	<b>503</b>
Census Region													
Northeast .....	16	20	36	39	60	84	119	134	148	151	R171	R173	176
Midwest .....	5	13	17	21	47	64	89	99	84	85	R76	88	77
South .....	37	50	56	57	108	145	114	109	128	130	R134	134	149
West .....	30	36	48	91	74	51	73	87	100	102	R95	R96	101
<b>Alcohol Fuels (Ethanol)</b> .....	<b>7</b>	<b>19</b>	<b>35</b>	<b>43</b>	<b>69</b>	<b>71</b>	<b>82</b>	<b>65</b>	<b>79</b>	<b>88</b>	<b>R97</b>	<b>R104</b>	<b>74</b>
Census Region													
Northeast .....	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)	3	2
Midwest .....	4	11	22	25	38	38	55	45	55	61	68	74	53
South .....	1	4	8	13	26	26	17	11	13	R14	16	10	7
West .....	2	4	5	5	4	7	10	9	10	11	12	17	12
<b>Biofuel Total</b> .....	<b>2,590</b>	<b>2,617</b>	<b>2,832</b>	<b>2,884</b>	<b>R2,795</b>	<b>3,019</b>	<b>2,632</b>	<b>2,642</b>	<b>2,788</b>	<b>2,784</b>	<b>R2,838</b>	<b>R2,946</b>	<b>3,017</b>

<sup>1</sup> Commercial wood energy use is not included because there are no accurate data sources to provide reliable estimates.

<sup>2</sup> Municipal solid waste, manufacturing waste, refuse-derived fuel, and methane recovered from landfills. R=Revised data. (s)=Less than 0.5 trillion Btu.

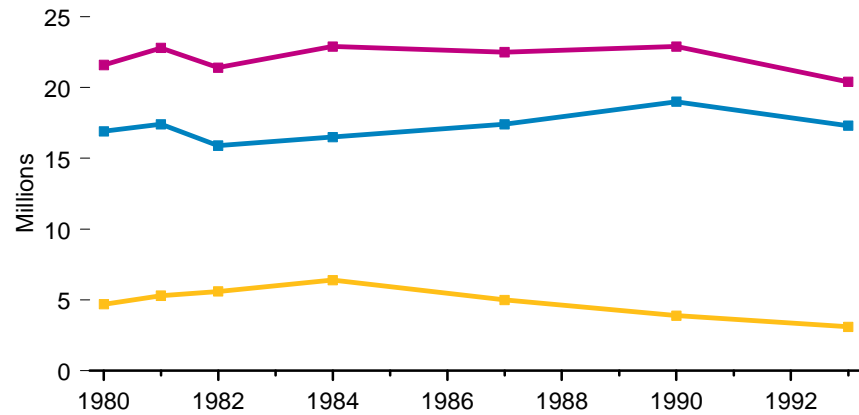
Notes: • No data are available for years not shown. • See Appendix E for Census regions. • Totals may not equal sum of components due to independent rounding.

Sources: • **1981-1983, Wood Energy**—EIA, *Estimates of U.S. Wood Energy Consumption, 1980-1983* (November 1984), Tables ES1 and ES2. • **1981-1983 Waste Energy and Alcohol Fuels, and 1984 Data**—EIA, Office of Coal, Nuclear, Electric and Alternate Fuels, unpublished data. • **1987**—EIA, *Estimates of Biofuels Consumption in the United States During 1987*, Tables ES1 and ES2. • **1989—Wood Energy, Industrial Sector**: American Paper Institute, *Fact Sheet on 1990 Energy Use in the U.S. Pulp and Paper Industry* (July 31, 1991). **All Other Data**: EIA, *Estimates of U.S. Biofuels Consumption 1989* (April 1991), Table ES1. • **1990—Wood Energy, Industrial Sector**: American Paper Institute, *Fact Sheet on 1990 Energy Use in the U.S. Pulp and Paper Industry* (July 1991). **Wood Energy, Residential Sector**: EIA, 1990 Residential Energy Consumption Survey. **Waste Energy**: EIA, *Estimates*

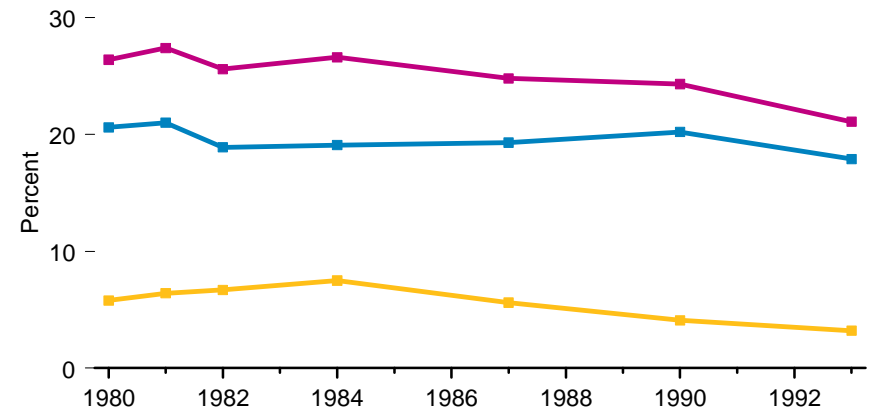
*of U.S. Biofuels Consumption 1990* (October 1991), Table ES1. **Alcohol Fuels**: U.S. Department of Transportation, *Monthly Motor Fuel Reported by States*, FHWA-PL-92-011 (September 1991), and U.S. Department of Treasury, Bureau of Alcohol, Tobacco, and Firearms, *Monthly Distilled Spirits Report*, Report Symbol 76 (June 1991) and *Alcohol Fuels Report*, internal quarterly report (September 1991). • **1991 and 1992**: EIA, *Estimates of U.S. Biomass Energy Consumption 1992* (May 1994). **1993-1996—Wood Energy, Residential Sector**: EIA, Form EIA-457, "1993 Residential Energy Consumption Survey," and extrapolations from "1993 Residential Energy Consumption Survey" for 1994 through 1996 estimates. **Wood Energy, Commercial and Industrial Sectors**: EIA, Office of Coal, Nuclear, Electric and Alternate Fuels (CNEAF), estimates derived from information from other government agencies, trade journals, industry association reports, and Form EIA-846, "1991 Manufacturing Energy Consumption Survey." **Wood Energy, Electric Utility**: EIA, Form EIA-861, "Annual Electric Utility Report," and Form EIA-759, "Monthly Power Plant Report." **Waste Energy**: Government Advisory Associates, *Resource Recovery Yearbook*, and *Methane Recovery Yearbook*, and CNEAF estimates. **Alcohol**: EIA, Form EIA-819M, "Monthly Oxygenate Telephone Report."

**Figure 10.4 Households That Burn Wood, Selected Years, 1980-1993**

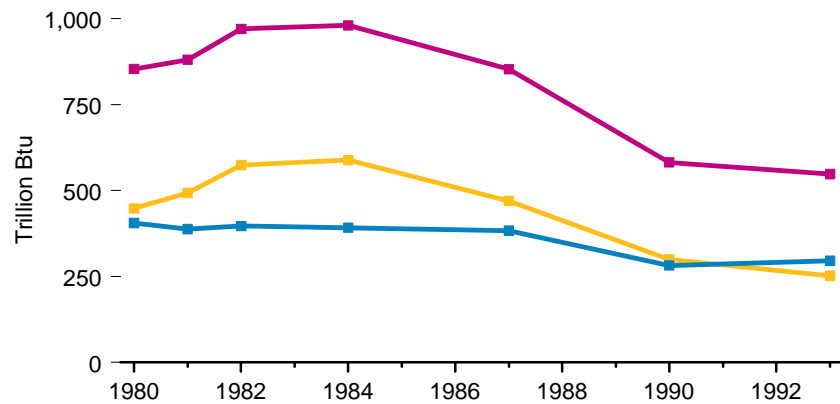
**Number of Households**



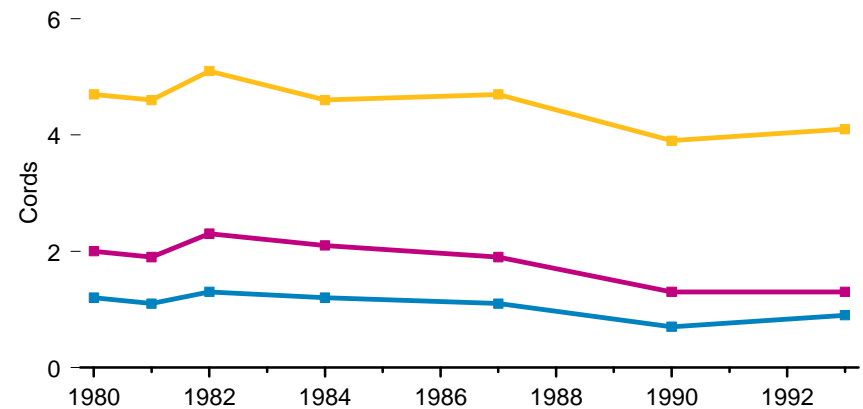
**Share of All Households**



**Wood Energy Consumed**

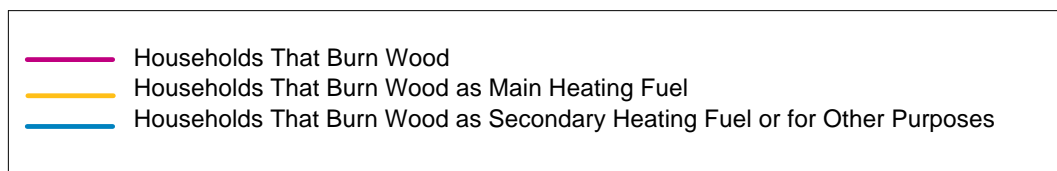


**Average Burned per Household (Mean)**



Note: No data are available for 1983, 1985, 1986, 1988, 1989, 1991, and 1992.

Source: Table 10.4.



**Table 10.4 Households That Burn Wood, Selected Years, 1980-1993**

Year	Number of Households	Share of All U.S. Households	Number of Cords Burned	Average Number of Cords Burned per Household		Wood Energy Consumed
	Millions	Percent	Millions	Mean	Median	Trillion Btu
Households That Burn Wood						
1980	21.6	26.4	42.7	2.0	0.7	854
1981	22.8	27.4	44.0	1.9	1.0	881
1982	21.4	25.6	48.6	2.3	1.0	971
1984	22.9	26.6	49.0	2.1	1.0	981
1987	22.5	24.8	42.6	1.9	0.7	853
1990	22.9	24.3	29.1	1.3	0.5	582
1993	20.4	21.1	27.4	1.3	0.5	548
Households That Burn Wood as the Main Heating Fuel						
1980	4.7	5.8	22.4	4.7	3.3	448
1981	5.3	6.4	24.7	4.6	3.0	493
1982	5.6	6.7	28.7	5.1	4.0	574
1984	6.4	7.5	29.4	4.6	4.0	589
1987	5.0	5.6	23.5	4.7	4.0	470
1990	3.9	4.1	15.0	3.9	3.3	300
1993	3.1	3.2	12.6	4.1	3.0	252
Households That Burn Wood as a Secondary Heating Fuel <sup>1</sup>						
1980	16.9	20.6	20.3	1.2	0.3	406
1981	17.4	21.0	19.4	1.1	0.5	388
1982	15.9	18.9	19.9	1.3	0.5	397
1984	16.5	19.1	19.6	1.2	0.5	392
1987	17.4	19.3	19.2	1.1	0.5	383
1990	19.0	20.2	14.1	0.7	0.3	282
1993	17.3	17.9	14.8	0.9	0.3	296

<sup>1</sup> Or for other purposes.

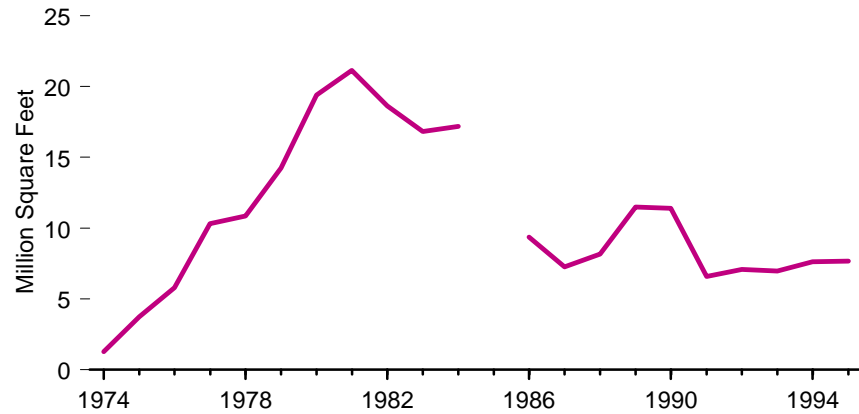
Notes: • Data are for the heating season beginning with the latter part of the previous year shown.  
• Consumption estimates are based on respondent reports and may be subject to reporting biases.

• No data are available for years not shown.

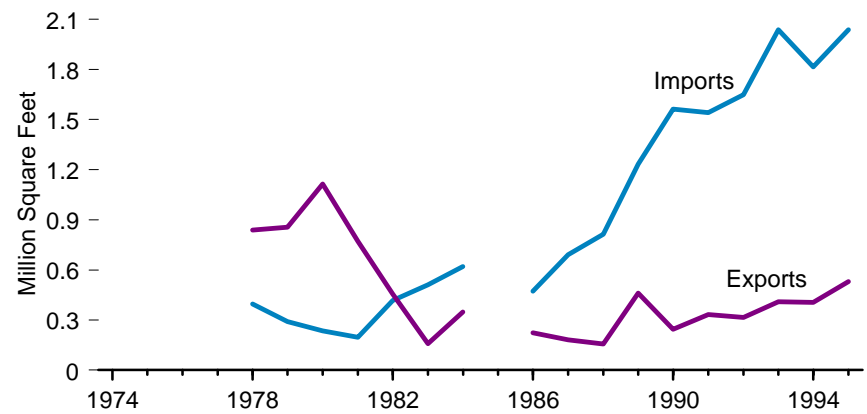
Source: Energy Information Administration, Form EIA-457, "Residential Energy Consumption Survey."

**Figure 10.5 Solar Thermal Collector Shipments by Type and Trade, 1974-1984 and 1986-1995**

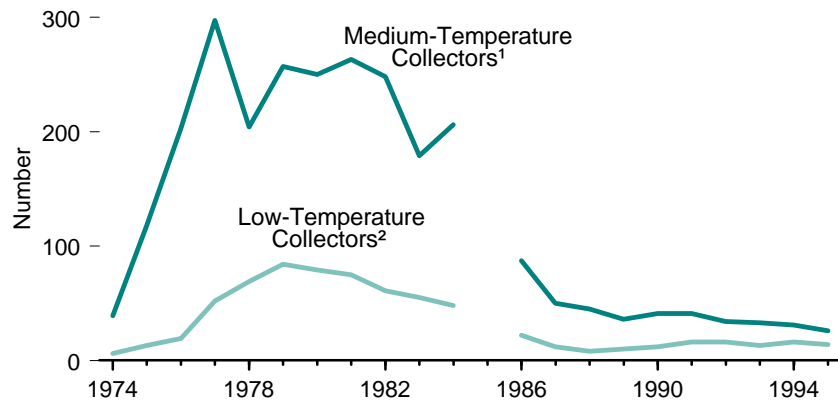
**Total Shipments**



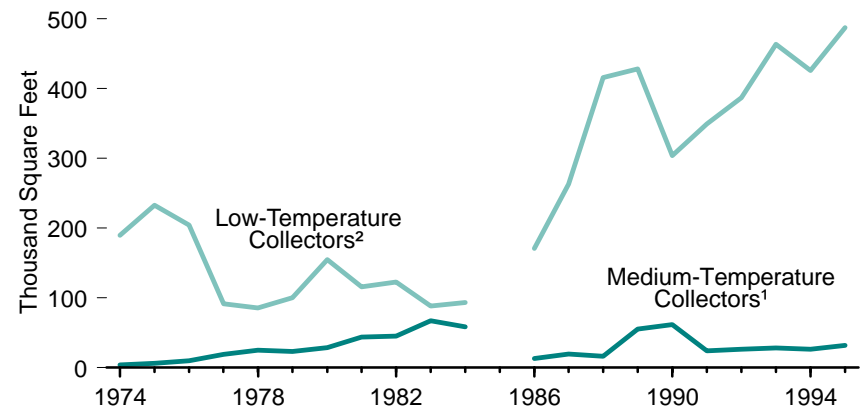
**Trade**



**Number of U.S. Manufacturers**



**Average Annual Shipments per Manufacturer**



<sup>1</sup> Collectors that generally operate in the temperature range of 140 degrees Fahrenheit to 180 degrees Fahrenheit but can also operate at temperatures as low as 110 degrees Fahrenheit.

<sup>2</sup> Collectors that generally operate at temperatures below 110 degrees Fahrenheit.

Notes: • Data were not collected for 1985. • Medium-temperature collectors include special collectors. • Because vertical scales differ, graphs should not be compared.  
Source: Table 10.5.

**Table 10.5 Solar Thermal Collector Shipments by Type and Trade, 1974-1995**

Year	Low-Temperature Collectors <sup>1</sup>			Medium-Temperature Collectors <sup>2</sup>			High-Temperature Collector <sup>3</sup> Shipments (million square feet)	Total Shipments <sup>4</sup>	Imports	Exports
	Number of U.S. Manufacturers	Quantity Shipped (million square feet)	Average Annual Shipments per Manufacturer (thousand square feet)	Number of U.S. Manufacturers	Quantity Shipped (million square feet)	Average Annual Shipments per Manufacturer (thousand square feet)				
								Thousand Square Feet		
1974	6	1.14	189.5	39	0.14	3.5	NA	1,274	NA	NA
1975	13	3.03	232.8	118	0.72	6.1	NA	3,743	NA	NA
1976	19	3.88	204.0	203	1.93	9.5	NA	5,801	NA	NA
1977	52	4.74	91.2	297	5.57	18.8	NA	10,312	NA	NA
1978	69	5.87	85.1	204	4.99	24.5	NA	10,860	396	840
1979	84	8.39	100.0	257	5.86	22.8	NA	14,251	290	855
1980	79	12.23	154.8	250	7.17	28.7	NA	19,398	235	1,115
1981	75	8.68	115.7	263	11.46	43.6	NA	<sup>R</sup> 21,133	196	771
1982	61	7.48	122.6	248	11.15	44.9	NA	18,621	418	455
1983	55	4.85	88.2	179	11.98	66.9	NA	16,828	511	159
1984	48	4.48	93.3	206	11.94	58.0	0.77	17,191	621	348
1985	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1986	22	3.75	170.5	87	1.11	12.8	4.50	9,360	473	224
1987	12	3.16	263.1	50	0.96	19.1	3.16	7,269	691	182
1988	8	3.33	415.8	45	0.73	16.2	4.12	8,174	814	158
1989	10	4.28	428.3	36	1.99	55.3	5.21	11,482	1,233	461
1990	12	3.65	303.8	41	2.53	61.6	5.24	11,409	1,562	245
1991	16	5.59	349.0	41	0.99	24.1	(s)	6,574	1,543	332
1992	16	6.19	386.7	34	0.90	26.4	(s)	7,086	1,650	316
1993	13	6.03	463.5	33	0.93	28.2	0.01	6,968	2,039	411
1994	16	6.82	426.0	31	0.80	26.0	(s)	7,627	1,815	405
1995	14	6.81	487.0	26	0.84	32.0	0.01	7,666	2,037	530

<sup>1</sup> Low-temperature collectors are solar thermal collectors that generally operate at temperatures below 110 degrees Fahrenheit.

<sup>2</sup> Medium-temperature collectors are solar thermal collectors that generally operate in the temperature range of 140 degrees Fahrenheit to 180 degrees Fahrenheit but can also operate at temperatures as low as 110 degrees Fahrenheit. Special collectors are included in this category. Special collectors are evacuated tube collectors or concentrating (focusing) collectors. They operate in the temperature range from just above ambient temperature (low concentration for pool heating) to several hundred degrees Fahrenheit (high concentration for air conditioning and specialized industrial processes).

<sup>3</sup> High-temperature collectors are solar thermal collectors that generally operate at temperatures above 180 degrees Fahrenheit.

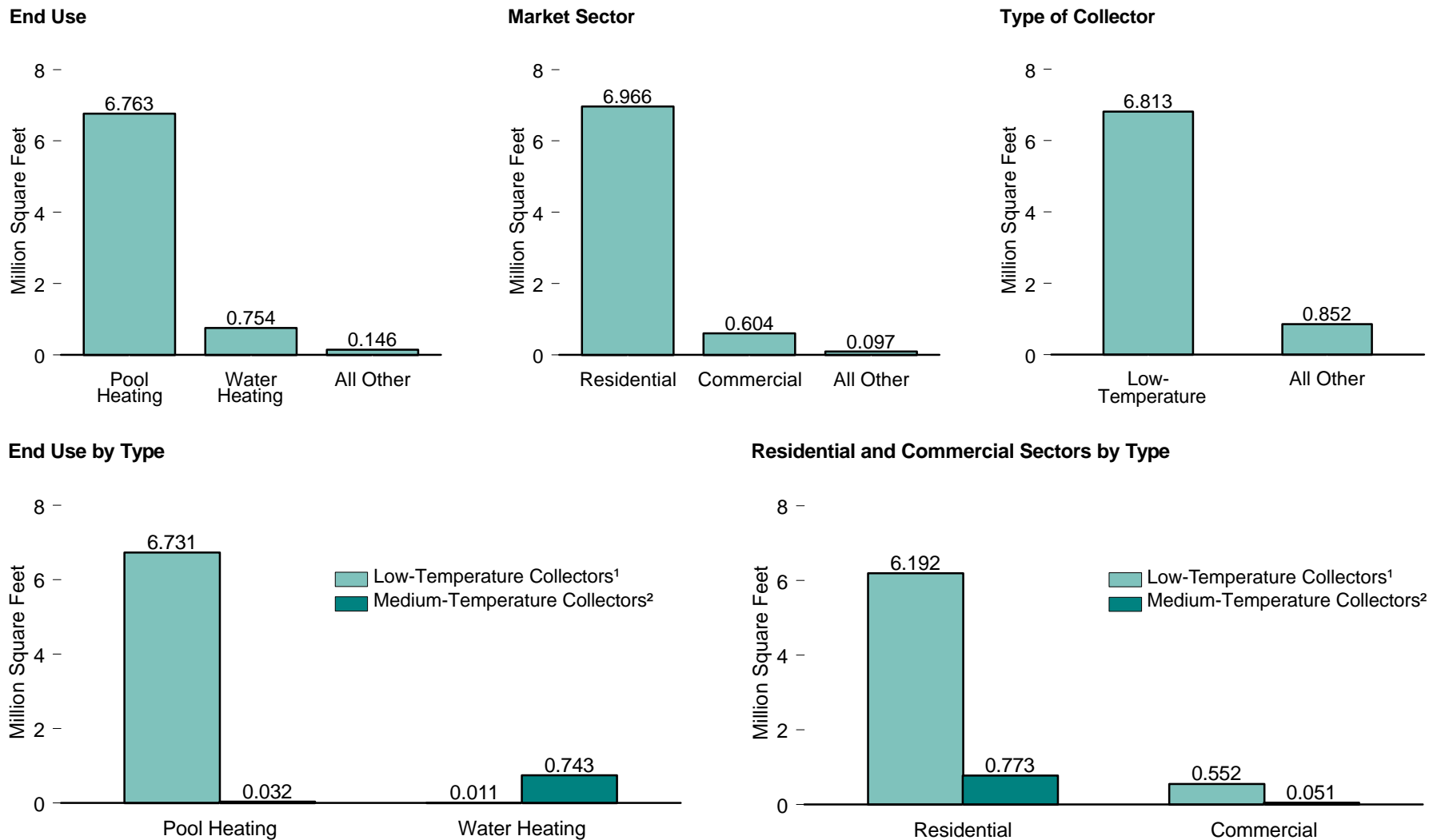
<sup>4</sup> Total shipments as reported by respondents include all domestic and export shipments and may include imports that subsequently were shipped to domestic or to foreign customers.

NA=Not available. (s)=Less than 0.005 million square feet.

Notes: • Manufacturers producing more than one type of collector are accounted for in both groups. • No data are available for 1985. • High-temperature collector shipments were dominated by one manufacturer.

Sources: **Number of U.S. Manufacturers:** Energy Information Administration (EIA), Form CE-63A, "Annual Solar Thermal Collector Manufacturers Survey," and prior form, Form EIA-63, "Annual Solar Thermal Collector and Photovoltaic Module Manufacturing Survey." **Shipments Data by Type:** • 1974-1976—Federal Energy Administration, *Solar Collector Manufacturing Activity*, semi-annual. • 1977—EIA, *Solar Collector Manufacturing Activity, July through December, 1981* (March 1982). • 1978 and 1979—EIA, *Solar Collector Manufacturing Activity*, annual. • 1980-1985—EIA, *Solar Collector Manufacturing Activity 1993* (August 1994), Table 6. • 1986 forward—EIA, *Renewable Energy Annual 1996* (March 1997), Tables 16 and F5.

**Figure 10.6 Solar Thermal Collector Shipments by End Use, Market Sector, and Type, 1995**



<sup>1</sup> Collectors that generally operate at temperatures below 110 degrees Fahrenheit.

<sup>2</sup> Collectors that generally operate in the temperature range of 140 degrees Fahrenheit to 180 degrees Fahrenheit but can also operate at temperatures as low as 110 degrees Fahrenheit.

Source: Table 10.6.

**Table 10.6 Solar Thermal Collector Shipments by End Use, Market Sector, and Type, 1995**  
(Thousand Square Feet)

End Use	Low-Temperature Collectors <sup>1</sup>	Medium-Temperature Collectors <sup>2</sup>	High-Temperature Collectors <sup>3</sup>	Total
<b>End-Use Total</b> .....	6,813	839	13	7,666
Pool Heating .....	6,731	32	0	6,763
Water Heating .....	11	743	0	754
Space Heating .....	70	62	0	132
Space Cooling .....	0	(s)	1	1
Combined Space and Water Heating .....	(s)	2	0	2
Process Heating .....	0	(s)	0	0
Electricity Generation .....	0	(s)	9	9
Other <sup>4</sup> .....	0	0	2	2
<b>Market Sector Total</b> .....	6,813	839	13	7,666
Residential .....	6,192	773	0	6,966
Commercial .....	552	51	1	604
Industrial .....	69	12	0	82
Electric Utility .....	0	0	9	9
Other <sup>5</sup> .....	0	3	3	6

<sup>1</sup> Low-temperature collectors are solar thermal collectors that generally operate at temperatures below 110 degrees Fahrenheit.

<sup>2</sup> Medium-temperature collectors are solar thermal collectors that generally operate in the temperature range of 140 degrees Fahrenheit to 180 degrees Fahrenheit but can also operate at temperatures as low as 110 degrees Fahrenheit. Special collectors are included in this category. Special collectors are evacuated tube collectors or concentrating (focusing) collectors. They operate in the temperature range from just above ambient temperature (low concentration for pool heating) to several hundred degrees Fahrenheit (high concentration for air conditioning and specialized industrial processes).

<sup>3</sup> Parabolic dish/trough collectors used primarily by independent power producers to generate electricity for the electric grid. High-temperature collectors are solar thermal collectors that generally operate at

temperatures above 180 degrees Fahrenheit.

<sup>4</sup> "Other" includes shipments of solar thermal collectors for other uses, such as cooking foods, water pumping, water purification, desalinization, distilling, etc.

<sup>5</sup> "Other" includes shipments of solar thermal collectors to other sectors, such as government, including the military but excluding space applications.

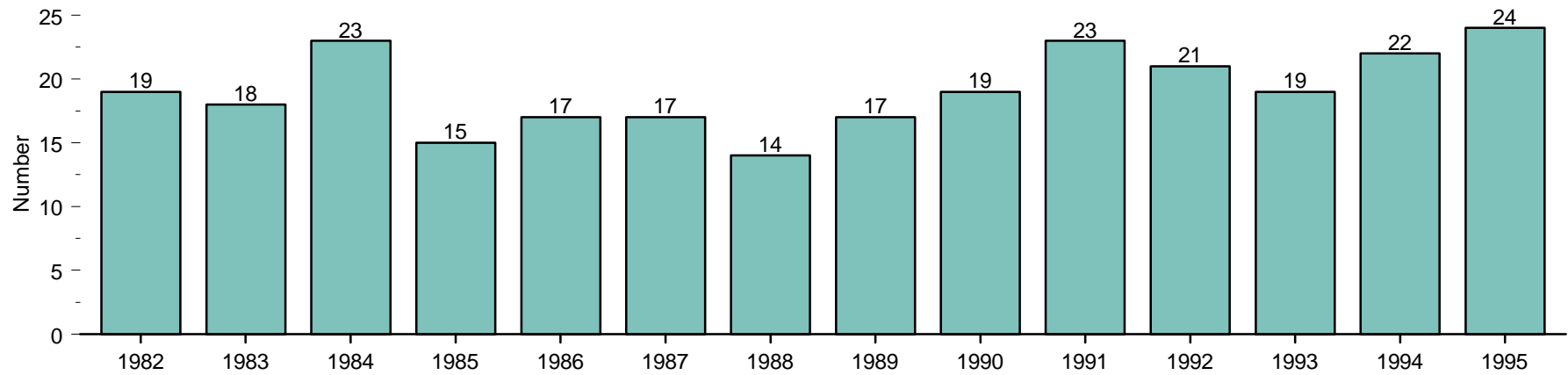
(s)=Less than 0.5 thousand square feet.

Notes: • Data represent shipments from U.S. manufacturers only. • Totals may not equal sum of components due to independent rounding.

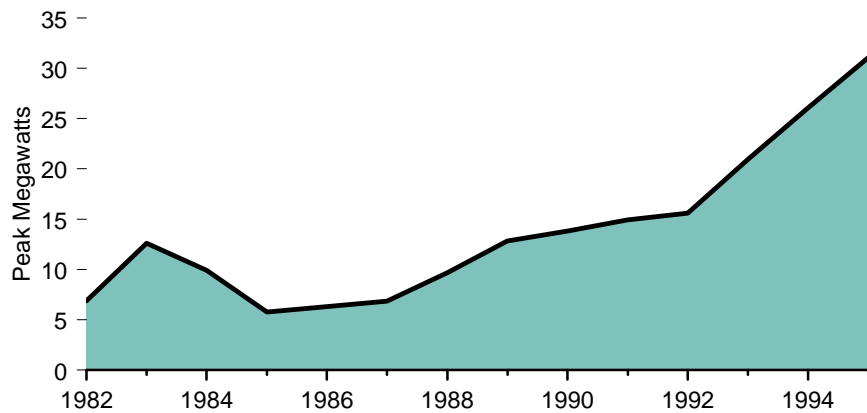
Source: Energy Information Administration, *Renewable Energy Annual 1996* (March 1997), Table F9.

**Figure 10.7 Photovoltaic Cell and Module Shipments and Trade**

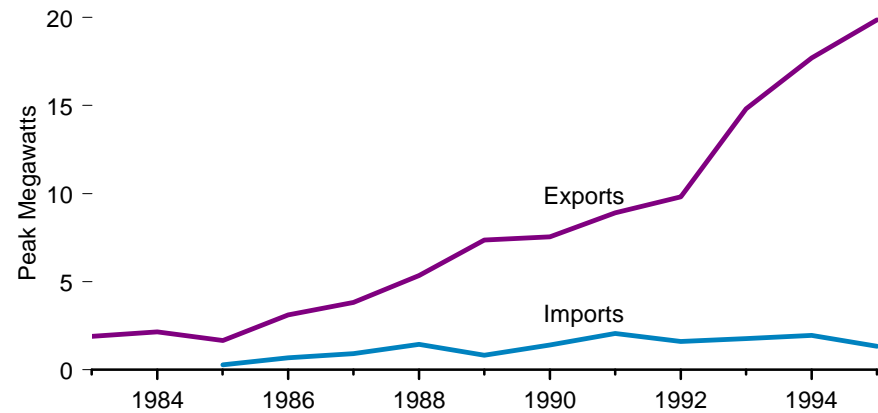
**Number of U.S. Companies Reporting Shipments, 1982-1995**



**Total Shipments, 1982-1995**



**Trade, 1983-1995**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 10.7.



**Table 10.7 Photovoltaic Cell and Module Shipments and Trade, 1982-1995**

Year	Number of U.S. Companies Reporting Shipments	Total Shipments <sup>1</sup>	Imports	Exports
		Peak Kilowatts		
1982	19	6,897	NA	NA
1983	18	12,620	NA	1,903
1984	23	9,912	NA	2,153
1985 <sup>2</sup>	15	5,769	285	1,670
1986 <sup>2</sup>	17	6,333	678	3,109
1987 <sup>2</sup>	17	6,850	921	3,821
1988 <sup>2</sup>	14	9,676	1,453	5,358
1989 <sup>2</sup>	17	12,825	826	7,363
1990 <sup>2</sup>	<sup>3</sup> 19	<sup>3</sup> 13,837	1,398	7,544
1991 <sup>2</sup>	23	14,939	2,059	8,905
1992 <sup>2</sup>	21	15,583	1,602	9,823
1993 <sup>2</sup>	19	20,951	1,767	14,814
1994 <sup>2</sup>	22	26,077	1,960	17,714
1995 <sup>2</sup>	24	31,059	1,337	19,871

<sup>1</sup> Total shipments include all types of photovoltaic cells and modules (single-crystal silicon, cast silicon, ribbon silicon, thin-film silicon, and concentrator silicon) and internationally traded cells and modules.

<sup>2</sup> Shipments of cells and modules for space and satellite applications are not included.

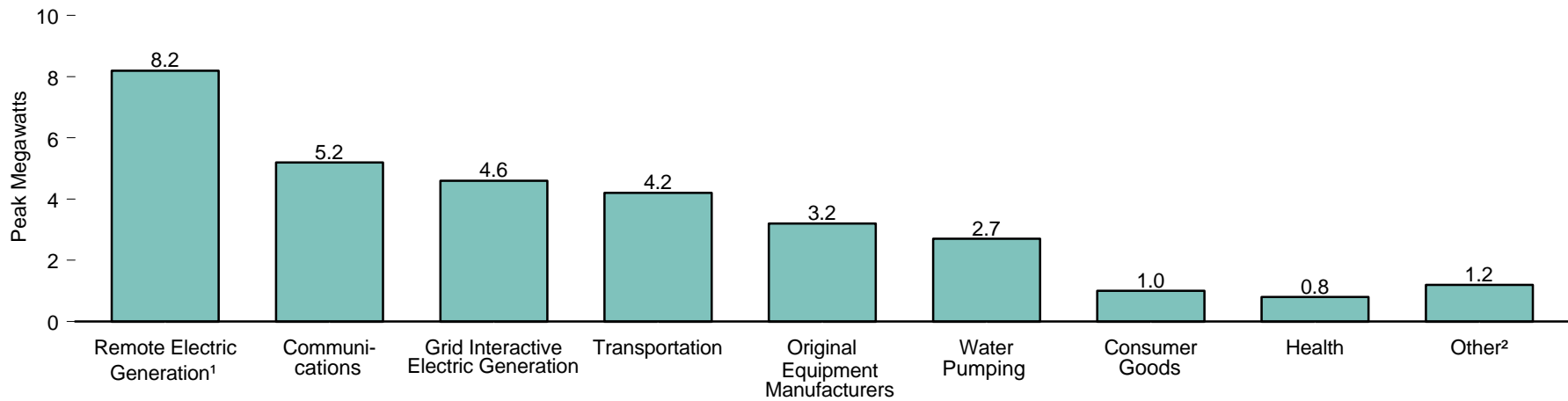
<sup>3</sup> Data were imputed for one nonrespondent who exited the industry during 1990.

NA=Not available.

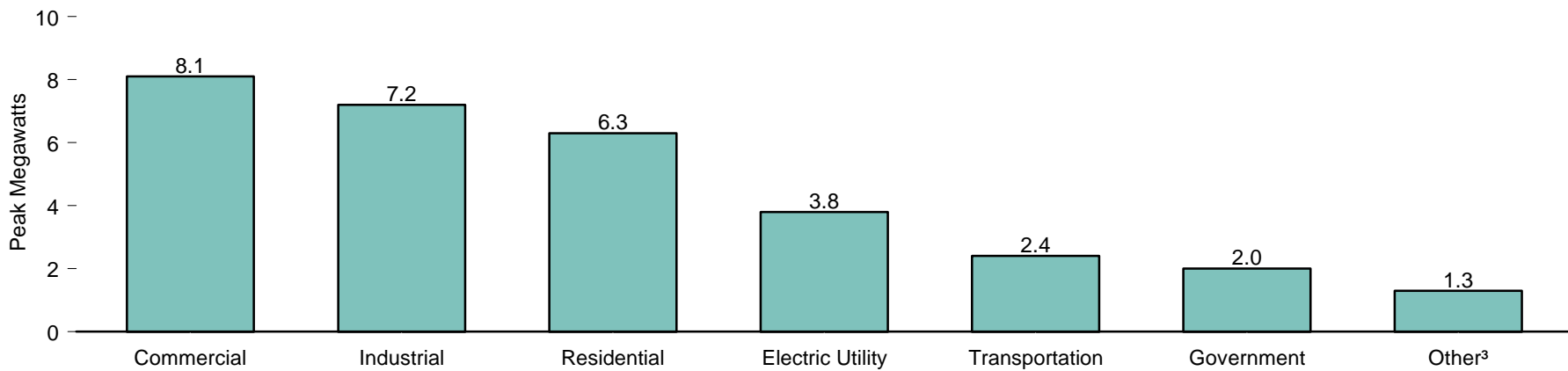
Sources: • 1982-1984—Energy Information Administration (EIA), *Solar Collector Manufacturing Activity 1993* (August 1994), Table 16. • 1985 forward—EIA, *Renewable Energy Annual 1996* (March 1997), Table 17.

**Figure 10.8 Photovoltaic Cell and Module Shipments by End Use, 1995**

**By End Use**



**By Market Sector**



<sup>1</sup> Units designed for installations that are not grid-interactive.

<sup>2</sup> Represents such applications as cooking food, desalinization, and distilling.

<sup>3</sup> Shipments to foreign governments and for specialty purposes.

Source: Table 10.8.

**Table 10.8 Photovoltaic Cell and Module Shipments by End Use, 1989-1995**

Year	End Use									Market Sector							Total
	Health	Water Pumping	Transportation	Communications	Consumer Goods	Electric Generation		OEM <sup>2</sup>	Other <sup>3</sup>	Residential	Commercial	Government	Industrial	Transportation	Electric Utility	Other <sup>4</sup>	
						Grid Inter-active	Remote <sup>1</sup>										
Amount Shipped (peak kilowatts)																	
1989	5	711	1,196	2,590	2,788	1,251	2,620	1,595	69	1,439	3,850	1,077	3,993	1,130	785	551	12,825
1990	5	1,014	1,069	4,340	2,484	469	3,097	1,119	240	1,701	6,086	1,002	2,817	974	826	432	13,837
1991	61	729	1,523	3,538	3,312	856	3,594	1,315	13	3,624	3,345	815	3,947	1,555	1,275	377	14,939
1992	67	809	1,602	3,717	2,566	1,227	4,238	828	530	4,154	2,386	1,063	4,279	1,673	1,553	477	15,583
1993	674	2,294	4,238	3,846	946	1,096	5,761	2,023	74	5,237	4,115	1,325	5,352	2,564	1,503	856	20,951
1994	79	1,410	2,128	5,570	3,239	2,296	9,253	1,849	254	6,632	5,429	2,114	6,855	2,174	2,364	510	26,077
1995	776	2,727	4,203	5,154	1,025	4,585	8,233	3,188	1,170	6,272	8,100	2,000	7,198	2,383	3,759	1,347	31,059
Percent of Total																	
1989	(s)	5.5	9.3	20.2	21.7	9.8	20.4	12.4	0.5	11.2	30.0	8.4	31.1	8.8	6.1	4.3	100.0
1990	(s)	7.3	7.7	31.4	18.0	3.4	22.4	8.1	1.7	12.3	44.0	7.2	20.4	7.0	6.0	3.1	100.0
1991	0.4	4.9	10.2	23.7	22.2	5.7	24.1	8.8	0.1	24.3	22.4	5.5	26.4	10.4	8.5	2.5	100.0
1992	0.4	5.2	10.3	23.9	16.5	7.9	27.2	5.3	3.4	26.7	15.3	6.8	27.5	10.7	10.0	3.1	100.0
1993	3.2	10.9	20.2	18.4	4.5	5.2	27.5	9.7	0.4	25.0	19.6	6.3	25.5	12.2	7.2	4.1	100.0
1994	0.3	5.4	8.2	21.4	12.4	8.8	35.5	7.1	1.0	25.4	20.8	8.1	26.3	8.3	9.1	2.0	100.0
1995	2.5	8.8	13.5	16.6	3.3	14.8	26.5	10.3	3.8	20.2	26.1	6.4	23.2	7.7	12.1	4.3	100.0

<sup>1</sup> Electric power generation photovoltaic units designed for installations that are not grid-interactive.

<sup>2</sup> Original equipment manufacturers are non-photovoltaic manufacturers that combine photovoltaic technology into existing or newly developed product lines.

<sup>3</sup> Represents such applications as cooking food, desalinization, and distilling.

<sup>4</sup> Shipments to foreign governments and for specialty purposes.

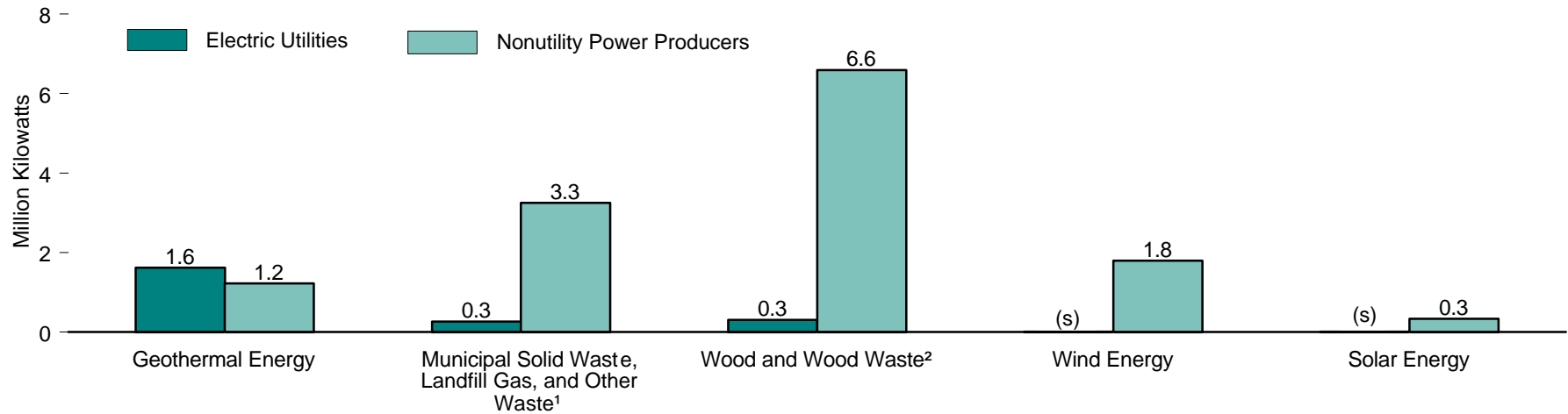
(s)=Less than 0.05 percent.

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

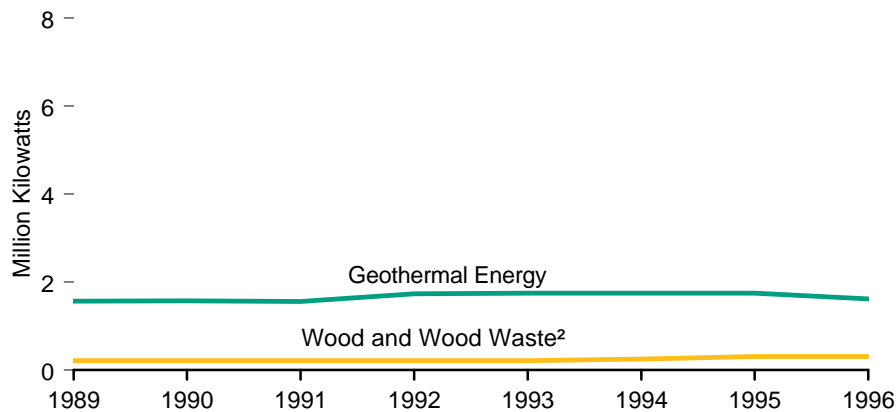
Sources: • 1989—Energy Information Administration (EIA), *Solar Collector Manufacturing Activity 1989* (March 1991), Tables 17 and 18. • 1990—EIA, *Solar Collector Manufacturing Activity 1991* (December 1992), Tables 22 and 23. • 1991—EIA, *Solar Collector Manufacturing Activity 1992* (November 1993), Tables 25 and 26. 1992—EIA, *Solar Collector Manufacturing Activity 1993* (August 1994), Tables 23 and 24. • 1993—EIA, *Renewable Energy Annual 1995* (December 1995), Table 38. • 1994 and 1995—EIA, *Renewable Energy Annual 1996* (March 1997), Table F19.

**Figure 10.9 Electric Power Industry Net Summer Capability by Selected Renewable Energy Resources**

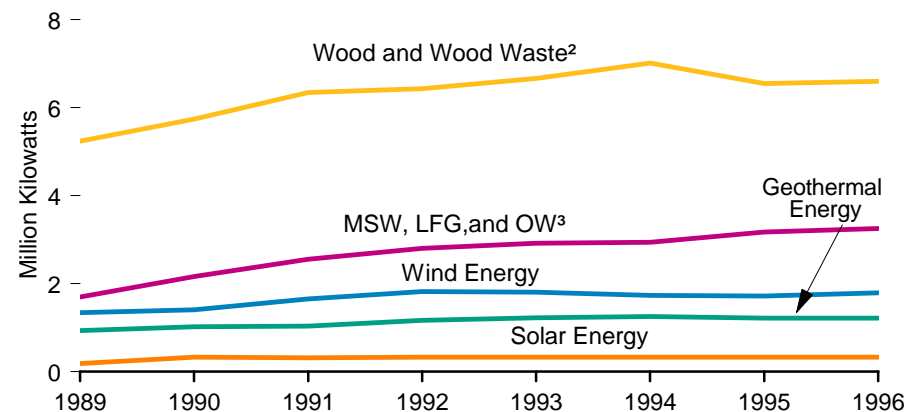
**Electric Utilities and Nonutility Power Producers, 1996**



**Electric Utilities, 1989-1996**



**Nonutility Power Producers, 1989-1996**



(s)=Less than 500 thousand kilowatts.

<sup>1</sup> Agricultural waste, straw, tires, fish oils, and other waste.

<sup>2</sup> Wood, wood waste, peat, wood liquors, railroad ties, pitch, and wood sludge.

<sup>3</sup> Municipal solid waste, landfill gas, and other waste.

Note: Conventional hydroelectric power is another important source of renewable energy. See Table 8.2 for hydroelectric power data.

Source: Table 10.9.

**Table 10.9 Electric Power Industry Net Summer Capability by Selected Renewable Energy Resources, 1949-1996**  
(Thousand Kilowatts)

Year	Geothermal Energy		Municipal Solid Waste, Landfill Gas, and Other Waste <sup>1</sup>		Wood and Wood Waste <sup>2</sup>		Wind Energy		Solar Energy	
	Electric Utilities	Nonutility Power Producers <sup>3</sup>	Electric Utilities	Nonutility Power Producers <sup>3</sup>	Electric Utilities	Nonutility Power Producers <sup>3</sup>	Electric Utilities	Nonutility Power Producers <sup>3</sup>	Electric Utilities	Nonutility Power Producers <sup>3</sup>
1949	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 13	NA	0	NA	0	NA
1950	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 13	NA	0	NA	0	NA
1951	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 13	NA	0	NA	0	NA
1952	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 37	NA	0	NA	0	NA
1953	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 37	NA	0	NA	0	NA
1954	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 37	NA	0	NA	0	NA
1955	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 37	NA	0	NA	0	NA
1956	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 37	NA	0	NA	0	NA
1957	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 64	NA	0	NA	0	NA
1958	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 64	NA	0	NA	0	NA
1959	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 64	NA	0	NA	0	NA
1960	11	NA	( <sup>4</sup> )	NA	<sup>5</sup> 64	NA	NA	NA	0	NA
1961	11	NA	( <sup>4</sup> )	NA	<sup>5</sup> 64	NA	NA	NA	0	NA
1962	11	NA	( <sup>4</sup> )	NA	<sup>5</sup> 64	NA	NA	NA	0	NA
1963	24	NA	( <sup>4</sup> )	NA	<sup>5</sup> 64	NA	NA	NA	0	NA
1964	24	NA	( <sup>4</sup> )	NA	<sup>5</sup> 64	NA	NA	NA	0	NA
1965	24	NA	( <sup>4</sup> )	NA	<sup>5</sup> 64	NA	NA	NA	0	NA
1966	24	NA	( <sup>4</sup> )	NA	<sup>5</sup> 72	NA	NA	NA	0	NA
1967	51	NA	( <sup>4</sup> )	NA	<sup>5</sup> 72	NA	NA	NA	0	NA
1968	78	NA	( <sup>4</sup> )	NA	<sup>5</sup> 72	NA	NA	NA	0	NA
1969	78	NA	( <sup>4</sup> )	NA	<sup>5</sup> 72	NA	NA	NA	0	NA
1970	78	NA	( <sup>4</sup> )	NA	<sup>5</sup> 72	NA	NA	NA	0	NA
1971	184	NA	( <sup>4</sup> )	NA	<sup>5</sup> 72	NA	NA	NA	0	NA
1972	290	NA	( <sup>4</sup> )	NA	<sup>5</sup> 77	NA	NA	NA	0	NA
1973	396	NA	( <sup>4</sup> )	NA	<sup>5</sup> 77	NA	NA	NA	0	NA
1974	396	NA	( <sup>4</sup> )	NA	<sup>5</sup> 77	NA	NA	NA	0	NA
1975	502	NA	( <sup>4</sup> )	NA	<sup>5</sup> 77	NA	NA	NA	0	NA
1976	502	NA	( <sup>4</sup> )	NA	<sup>5</sup> 77	NA	NA	NA	0	NA
1977	502	NA	( <sup>4</sup> )	NA	<sup>5</sup> 77	NA	NA	NA	0	NA
1978	502	NA	( <sup>4</sup> )	NA	<sup>5</sup> 77	NA	NA	NA	0	NA
1979	667	NA	( <sup>4</sup> )	NA	<sup>5</sup> 78	NA	NA	NA	0	NA
1980	909	NA	( <sup>4</sup> )	NA	<sup>5</sup> 78	NA	NA	NA	0	NA
1981	909	NA	( <sup>4</sup> )	NA	<sup>5</sup> 78	NA	(s)	NA	0	NA
1982	1,022	NA	( <sup>4</sup> )	NA	<sup>5</sup> 79	NA	6	NA	0	NA
1983	1,207	NA	( <sup>4</sup> )	NA	<sup>5</sup> 212	NA	6	NA	0	NA
1984	1,231	NA	( <sup>4</sup> )	NA	<sup>5</sup> 321	NA	17	NA	0	NA
1985	1,580	NA	151	NA	200	NA	18	NA	0	NA
1986	1,558	NA	151	NA	193	NA	19	NA	0	NA
1987	1,549	NA	200	NA	201	NA	25	NA	0	NA
1988	1,667	NA	200	NA	221	NA	7	NA	0	NA
1989	<sup>R</sup> 1,566	<sup>R</sup> 938	244	1,695	221	5,239	(s)	1,339	<sup>R</sup> 2	187
1990	<sup>R</sup> 1,574	<sup>R</sup> 1,020	244	2,162	221	5,735	(s)	1,405	<sup>R</sup> 2	335
1991	1,563	<sup>R</sup> 1,038	244	2,553	221	6,345	(s)	1,652	3	319
1992	1,739	1,171	244	2,803	221	6,434	(s)	1,822	3	335
1993	1,747	1,231	241	2,922	219	6,664	1	1,813	4	335
1994	1,747	1,259	264	2,941	252	7,009	8	1,737	4	329
1995	1,747	<sup>R</sup> 1,220	261	3,174	307	6,551	8	<sup>R</sup> 1,723	4	<sup>R</sup> 329
1996	<sup>P</sup> 1,622	<sup>E</sup> 1,220	<sup>P</sup> 261	<sup>E</sup> 3,255	<sup>P</sup> 307	<sup>E</sup> 6,596	<sup>P</sup> 8	<sup>E</sup> 1,793	<sup>P</sup> 4	<sup>E</sup> 329

<sup>1</sup> "Other Waste" is agricultural waste, straw, tires, fish oils, and other waste.

<sup>2</sup> Wood, wood waste, peat, wood liquors, railroad ties, pitch, and wood sludge.

<sup>3</sup> Cogenerators, independent power producers, and small power producers of 1 megawatt or greater capacity.

<sup>4</sup> Included in "Wood and Wood Waste."

<sup>5</sup> Includes "Municipal Solid Waste, Landfill Gas, and Other Waste."

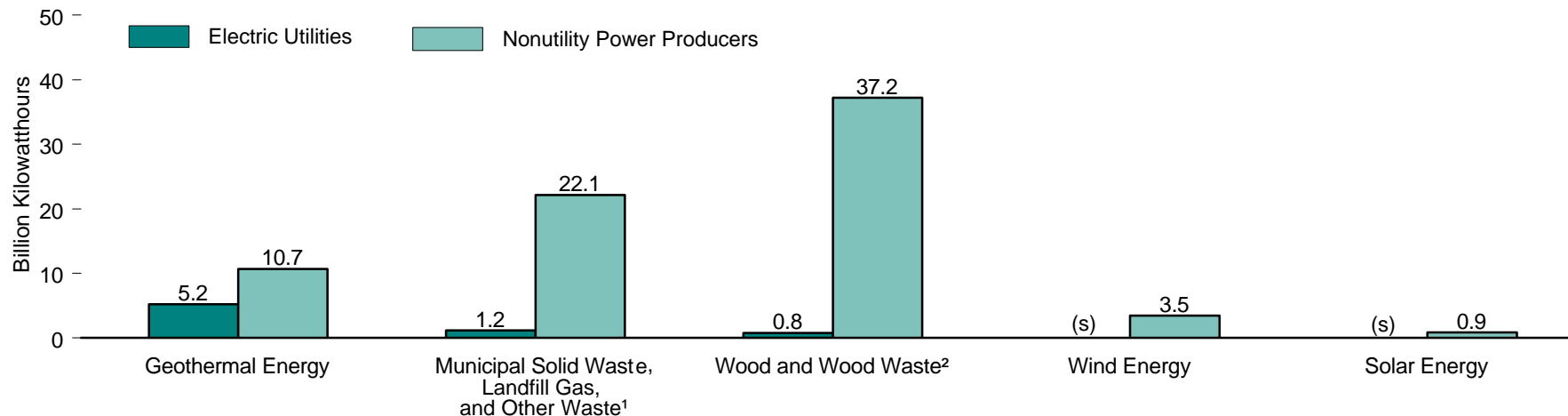
R=Revised data. P=Preliminary data. E=Estimate. NA=Not available. (s)=Less than 500 kilowatts.

Notes: • Data are as of end of year. • For definition of net summer capability, see Glossary. • Conventional hydroelectric power is another source of renewable energy. See Tables 8.2 and 8.3 for hydroelectric power data.

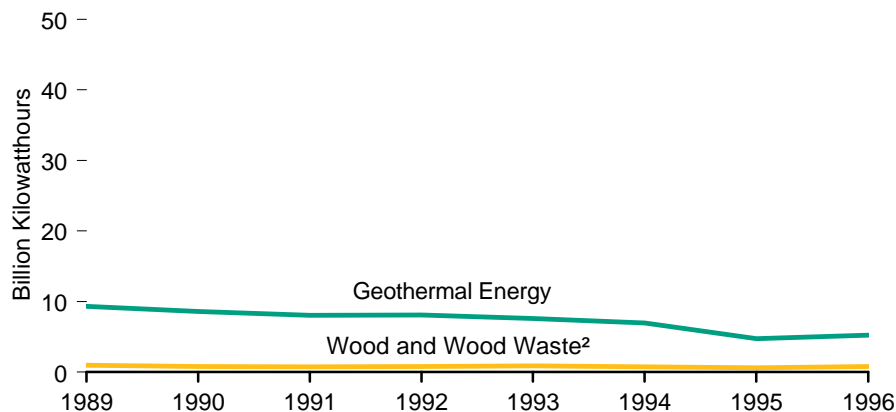
Sources: **Electric Utilities:** • 1960-1984—Energy Information Administration (EIA) estimates. • 1985 forward—EIA, Form EIA-860, "Annual Electric Generator Report" and EIA, Form EIA-759, "Monthly Power Plant Report." **Nonutility Power Producers:** Estimated by EIA, based on Form EIA-867, "Annual Nonutility Power Producer Report."

**Figure 10.10 Electric Power Industry Net Generation by Selected Renewable Energy Resources**

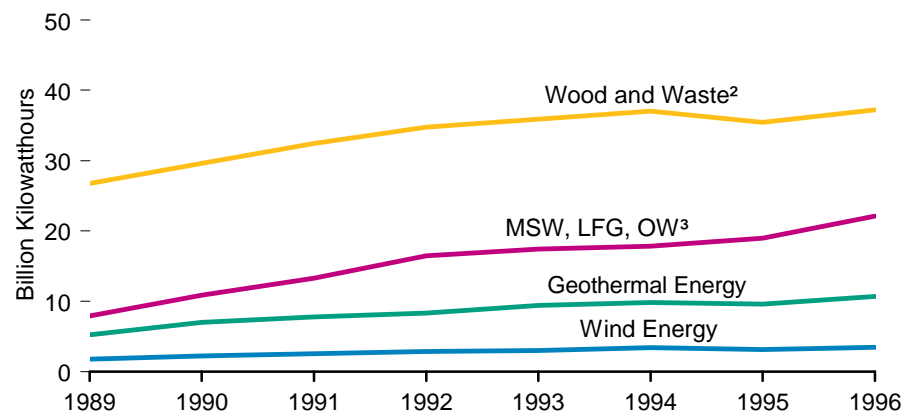
**Electric Utilities and Nonutility Power Producers, 1996**



**Electric Utilities, 1989-1996**



**Nonutility Power Producers, 1989-1996**



(s)=Less than 500 million kilowatthours.

<sup>1</sup> Agricultural waste, straw, tires, fish oils, and other waste.

<sup>2</sup> Wood, wood waste, peat, wood liquors, railroad ties, pitch, and wood sludge.

<sup>3</sup> Municipal solid waste, landfill gas, and other waste.

Note: Conventional hydroelectric power is another important source of renewable energy. See Tables 8.2 and 8.3 for hydroelectric power data.

Source: Table 10.10.

**Table 10.10 Electric Power Industry Net Generation by Selected Renewable Energy Resources, 1949-1996**  
(Million Kilowatthours)

Year	Geothermal Energy		Municipal Solid Waste, Landfill Gas, and Other Waste <sup>1</sup>		Wood and Wood Waste <sup>2</sup>		Wind Energy		Solar Energy	
	Electric Utilities	Nonutility Power Producers <sup>3</sup>	Electric Utilities	Nonutility Power Producers <sup>3</sup>	Electric Utilities	Nonutility Power Producers <sup>3</sup>	Electric Utilities	Nonutility Power Producers <sup>3</sup>	Electric Utilities	Nonutility Power Producers <sup>3</sup>
1949	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 386	NA	0	NA	0	NA
1950	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 390	NA	0	NA	0	NA
1951	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 391	NA	0	NA	0	NA
1952	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 482	NA	0	NA	0	NA
1953	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 389	NA	0	NA	0	NA
1954	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 263	NA	0	NA	0	NA
1955	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 276	NA	0	NA	0	NA
1956	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 152	NA	0	NA	0	NA
1957	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 177	NA	0	NA	0	NA
1958	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 175	NA	0	NA	0	NA
1959	0	NA	( <sup>4</sup> )	NA	<sup>5</sup> 153	NA	0	NA	0	NA
1960	33	NA	( <sup>4</sup> )	NA	<sup>5</sup> 140	NA	NA	NA	0	NA
1961	94	NA	( <sup>4</sup> )	NA	<sup>5</sup> 126	NA	NA	NA	0	NA
1962	100	NA	( <sup>4</sup> )	NA	<sup>5</sup> 128	NA	NA	NA	0	NA
1963	168	NA	( <sup>4</sup> )	NA	<sup>5</sup> 128	NA	NA	NA	0	NA
1964	204	NA	( <sup>4</sup> )	NA	<sup>5</sup> 148	NA	NA	NA	0	NA
1965	189	NA	( <sup>4</sup> )	NA	<sup>5</sup> 269	NA	NA	NA	0	NA
1966	188	NA	( <sup>4</sup> )	NA	<sup>5</sup> 334	NA	NA	NA	0	NA
1967	316	NA	( <sup>4</sup> )	NA	<sup>5</sup> 316	NA	NA	NA	0	NA
1968	436	NA	( <sup>4</sup> )	NA	<sup>5</sup> 375	NA	NA	NA	0	NA
1969	615	NA	( <sup>4</sup> )	NA	<sup>5</sup> 320	NA	NA	NA	0	NA
1970	525	NA	220	NA	136	NA	NA	NA	0	NA
1971	548	NA	200	NA	111	NA	NA	NA	0	NA
1972	1,453	NA	200	NA	131	NA	NA	NA	0	NA
1973	1,966	NA	198	NA	130	NA	NA	NA	0	NA
1974	2,453	NA	182	NA	68	NA	NA	NA	0	NA
1975	3,246	NA	174	NA	18	NA	NA	NA	0	NA
1976	3,616	NA	182	NA	84	NA	NA	NA	0	NA
1977	3,582	NA	173	NA	308	NA	NA	NA	0	NA
1978	2,978	NA	140	NA	197	NA	NA	NA	0	NA
1979	3,889	NA	198	NA	300	NA	NA	NA	0	NA
1980	5,073	NA	158	NA	275	NA	NA	NA	0	NA
1981	5,686	NA	123	NA	245	NA	NA	NA	0	NA
1982	4,843	NA	125	NA	196	NA	NA	NA	0	NA
1983	6,075	NA	163	NA	216	NA	3	NA	0	NA
1984	7,741	NA	425	NA	461	NA	12	NA	0	NA
1985	9,325	NA	640	NA	743	NA	16	NA	0	NA
1986	10,308	NA	685	NA	492	NA	18	NA	0	NA
1987	10,775	NA	694	NA	783	NA	14	NA	0	NA
1988	10,300	NA	738	NA	936	NA	10	NA	0	NA
1989	9,342	<sup>R</sup> 5,254	993	7,938	972	26,756	(s)	1,814	<sup>R</sup> 3	474
1990	8,581	<sup>R</sup> 7,018	1,257	10,890	810	29,603	(s)	2,228	2	644
1991	8,087	<sup>R</sup> 7,773	1,314	13,291	732	32,433	(s)	2,579	3	756
1992	8,104	8,318	1,276	16,500	816	34,764	(s)	2,887	3	724
1993	7,571	9,454	1,100	17,420	890	35,898	(s)	3,022	4	870
1994	6,941	9,816	1,224	17,859	765	37,039	(s)	3,447	3	799
1995	4,745	<sup>R</sup> 9,614	1,016	18,991	633	35,454	11	<sup>R</sup> 3,153	4	<sup>R</sup> 799
1996	<sup>P</sup> 5,234	<sup>E</sup> 10,684	<sup>P</sup> 1,179	<sup>E</sup> 22,120	<sup>P</sup> 788	<sup>E</sup> 37,214	<sup>P</sup> 10	<sup>E</sup> 3,472	<sup>P</sup> 3	<sup>E</sup> 881

<sup>1</sup> "Other Waste" is agricultural waste, straw, tires, fish oils, and other waste.

<sup>2</sup> Wood, wood waste, peat, wood liquors, railroad ties, pitch, and wood sludge.

<sup>3</sup> Cogenerators, independent power producers, and small power producers of 1 megawatt or greater capacity.

<sup>4</sup> Included in "Wood and Wood Waste."

<sup>5</sup> Includes "Municipal Solid Waste, Landfill Gas, and Other Waste."

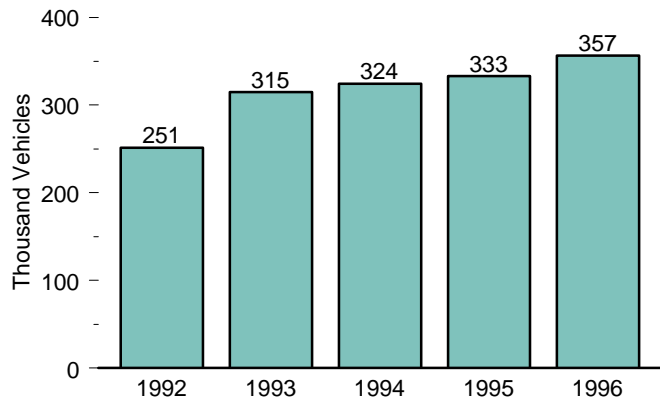
R=Revised data. P=Preliminary data. E=Estimate. NA=Not available. (s)=Less than 500 thousand kilowatthours.

Note: Conventional hydroelectric power is another source of renewable energy. See Tables 8.2 and 8.3 for hydroelectric power data.

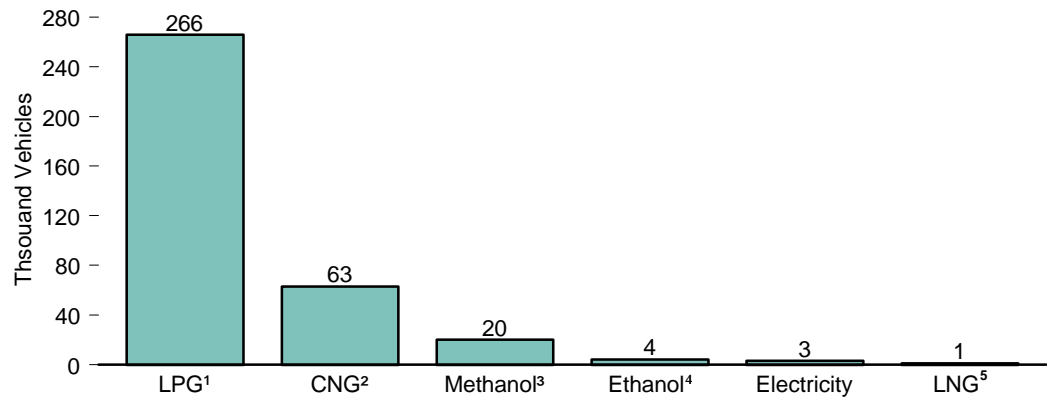
Sources: **Electric Utilities:** • 1949-September 1977—Federal Power Commission, Form FPC-4, "Monthly Power Plant Report." • October 1977-1981—Federal Energy Regulatory Commission, Form FPC-4, "Monthly Power Plant Report." • 1982 forward—Energy Information Administration (EIA), Form EIA-759, "Monthly Power Plant Report." **Nonutility Power Producers:** Estimated by EIA, based on Form EIA-867, "Annual Nonutility Power Producer Report."

**Figure 10.11 Alternative-Fueled Vehicles and Fuel Consumption by Type**

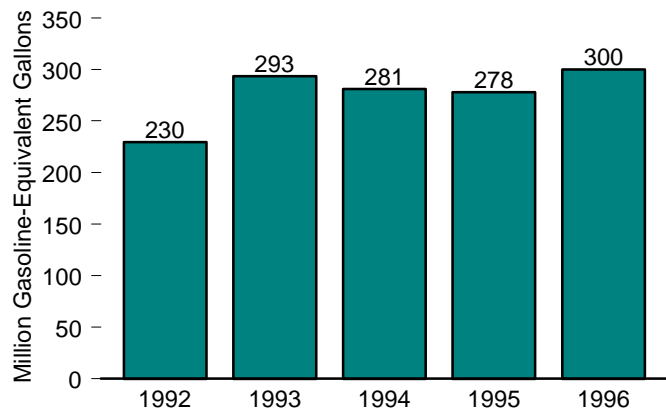
**Vehicles in Use, 1992-1996**



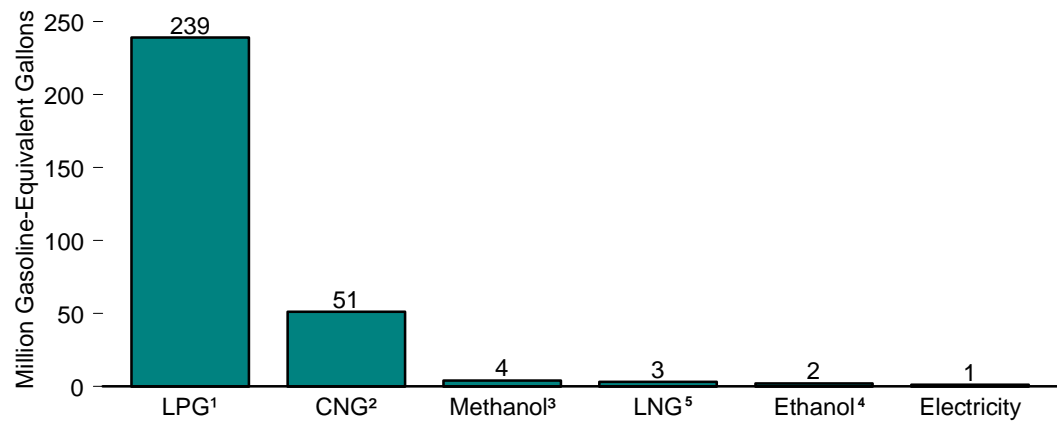
**Vehicles in Use by Fuel Type, 1996**



**Fuel Consumption, 1992-1996**



**Fuel Consumption by Type, 1996**



<sup>1</sup>Liquefied petroleum gas.

<sup>2</sup>Compressed natural gas.

<sup>3</sup>Methanol, 85 percent, and methanol, neat.

<sup>4</sup>Ethanol, 85 percent, and ethanol, 95 percent.

<sup>5</sup>Liquefied natural gas.

Source: Table 10.11.



**Table 10.11 Alternative-Fueled Vehicles and Fuel Consumption by Type, 1992-1996**

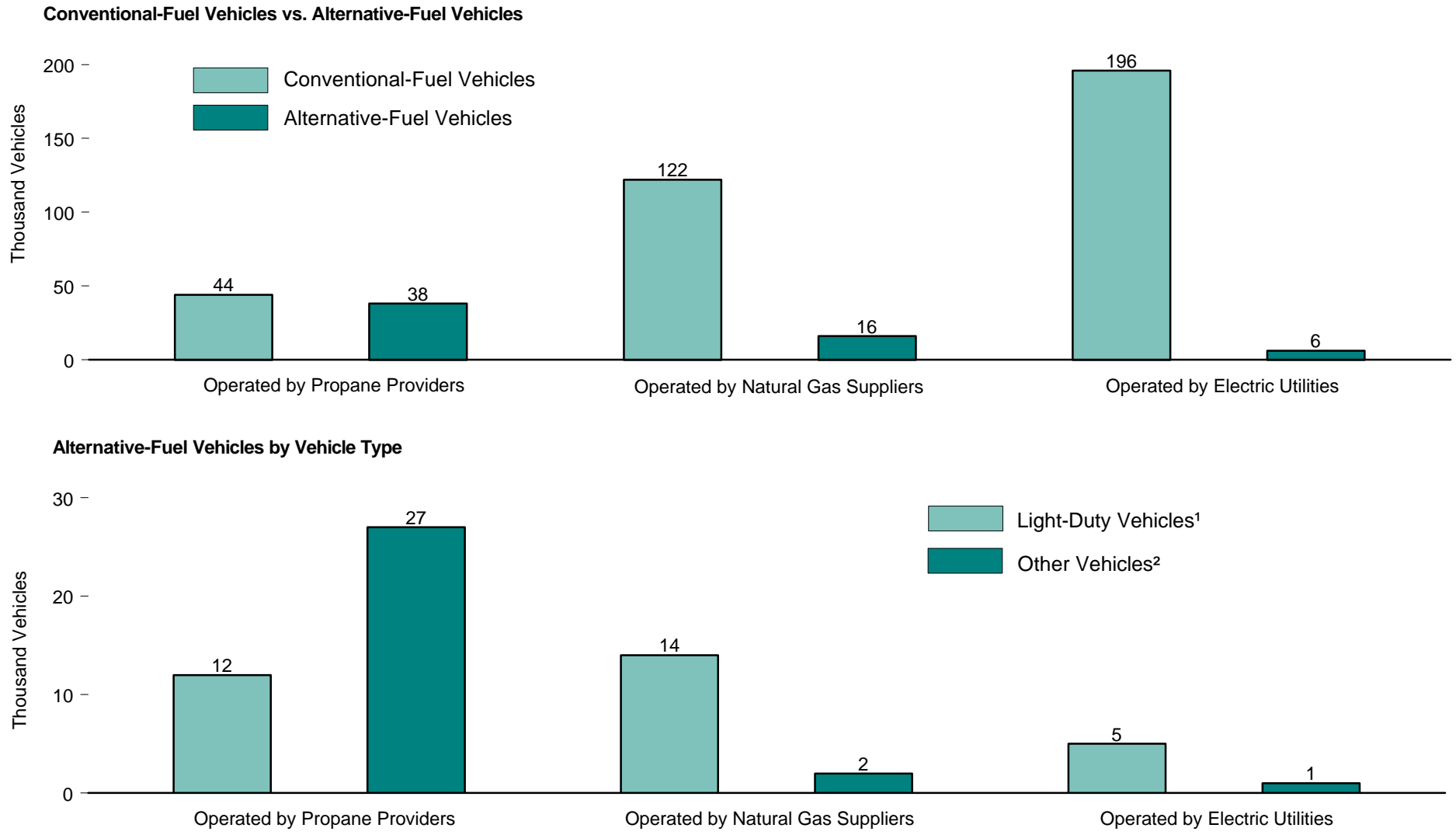
Year	Liquefied Petroleum Gases <sup>1</sup>	Compressed Natural Gas	Liquefied Natural Gas	Methanol, 85 Percent <sup>2</sup>	Methanol, Neat	Ethanol, 85 Percent <sup>2</sup>	Ethanol, 95 Percent <sup>2</sup>	Electricity	Total
Estimated Number of Vehicles in Use									
1992	221,000	23,191	90	4,850	404	172	38	1,607	251,352
1993	269,000	32,714	299	10,263	414	441	27	1,690	314,848
1994	264,000	41,227	484	15,484	415	605	33	2,224	324,472
1995	259,000	50,218	603	18,319	386	1,527	136	2,860	333,049
1996	266,000	62,805	715	19,636	155	3,575	341	3,306	356,533
Estimated Fuel Consumption (Thousand Gasoline-Equivalent Gallons)									
1992	208,142	16,823	585	1,069	2,547	21	85	359	229,631
1993	264,655	21,603	1,901	1,593	3,166	48	80	288	293,334
1994	248,467	24,160	2,345	2,340	3,190	80	140	430	281,152
1995	232,701	35,162	2,759	3,575	2,150	190	709	663	277,909
1996	238,681	50,884	3,233	3,832	360	436	1,803	815	300,044

<sup>1</sup> Vehicles in use represent lower bound estimates, rounded to the nearest thousand.

<sup>2</sup> Remaining portion is motor gasoline.

Sources: Energy Information Administration, *Alternatives to Traditional Transportation Fuels 1995* (December 1996), Tables 1 and 7.

**Figure 10.12 Fleet Vehicles Operated by Suppliers of Alternative Motor Fuels, 1993**



<sup>1</sup>Vehicles with gross vehicle weight of 8,500 pounds or less.

<sup>2</sup>Vehicles that weigh more than 8,500 pounds.

Source: Table 10.12.

**Table 10.12 Fleet Vehicles Operated by Suppliers of Alternative Motor Fuels, 1993**  
(Number of Vehicles)

Fuel	Propane Providers			Natural Gas Suppliers			Electric Utilities		
	Light-Duty Vehicles	Other Vehicles	Total	Light-Duty Vehicles	Other Vehicles	Total	Light-Duty Vehicles	Other Vehicles	Total
<b>Conventional-Fuel Vehicles</b> .....	<b>16,059</b>	<b>27,640</b>	<b>43,699</b>	<b>88,204</b>	<b>34,072</b>	<b>122,276</b>	<b>126,742</b>	<b>69,499</b>	<b>196,241</b>
Motor Gasoline .....	14,347	9,941	24,288	86,412	18,022	104,434	122,483	32,587	155,070
Diesel Fuel .....	Q	17,700	19,412	1,792	16,050	17,842	4,259	36,912	41,171
<b>Alternative-Fuel Vehicles</b> .....	<b>11,728</b>	<b>26,540</b>	<b>38,267</b>	<b>13,641</b>	<b>2,408</b>	<b>16,049</b>	<b>4,646</b>	<b>949</b>	<b>5,595</b>
Compressed Natural Gas									
Dedicated Vehicles .....	Q	NC	Q	2,127	96	2,223	795	26	821
Multifuel Vehicles .....	Q	Q	Q	10,245	1,565	11,809	2,534	401	2,935
Propane									
Dedicated Vehicles .....	8,698	25,102	33,800	414	591	1,005	171	318	489
Multifuel Vehicles .....	2,940	1,434	4,374	810	138	948	150	19	169
Electricity									
Dedicated Vehicles .....	NC	NC	NC	36	1	37	201	36	237
Multifuel Vehicles .....	NC	NC	NC	NC	NC	NC	NC	NC	NC
Other Alternative Fuels									
Dedicated Vehicles .....	NC	NC	NC	9	17	26	409	122	532
Multifuel Vehicles .....	NC	NC	NC	NC	NC	NC	386	26	412
<b>Total</b> .....	<b>27,787</b>	<b>54,180</b>	<b>81,967</b>	<b>101,845</b>	<b>36,480</b>	<b>138,324</b>	<b>131,388</b>	<b>70,448</b>	<b>201,836</b>

NC=No case in sample. Q=Withheld because relative standard errors are greater than 50 percent or fewer than three companies are represented.

Notes: • Total may not equal sum of components due to independent rounding. • "Light-Duty Vehicles" are vehicles with gross vehicle weight of 8,500 pounds or less. • "Other Vehicles" include medium- and heavy-duty vehicles that weigh more than 8,500 pounds. • "Multifuel Vehicles" are alternative-fuel vehicles

that are capable of operating on more than one fuel (i.e., bi-fuel, flex-fuel, hybrid, and dual-fuel vehicles).

• "Dedicated Vehicles" are vehicles that operate solely on one fuel.

Source: Energy Information Administration, *Describing Current and Potential Markets for Alternative-Fuel Vehicles* (March 1996), Tables 3.6.1, 3.6.17, and 3.6.20.

# 11. International Energy

## World Leaders in Energy Production

Worldwide energy production of 363 quadrillion Btu in 1995 was 49 quadrillion Btu greater than in 1986 (11.1).<sup>\*</sup> The relative contributions of the four leading energy producers changed markedly over the 10-year period.

In 1986, the former U.S.S.R. was the leading producer of energy. Its production of 65 quadrillion Btu exceeded U.S. production and accounted for 20.8 percent of the world total. The United States, the second leading producer, accounted for 64 quadrillion Btu, a 20.5 percent share. The former U.S.S.R.'s production remained higher than U.S. production through 1989. In 1990, however, former U.S.S.R. production of 69 quadrillion Btu was lower than U.S. production of 71 quadrillion Btu.

As of December 31, 1991, the U.S.S.R. ceased to exist as a political entity. Three of the U.S.S.R.'s constituent republics (Russia, Ukraine, and Kazakstan) together produced 46 quadrillion Btu of energy in 1995. That year the United States produced 71 quadrillion Btu.

Energy production in China, the third largest producer of energy in 1986, increased throughout the 10-year period. In 1986, China produced 25 quadrillion Btu of energy, much of which was coal. By 1995, Chinese production had reached 35 quadrillion Btu.

At 12 quadrillion Btu, Saudi Arabia was the fourth largest producer of energy in 1986. During the remainder of the 10-year period, Saudi Arabia energy production expanded nearly 70 percent. By 1995, it had risen to 20 quadrillion Btu.

## Crude Oil Production (1996)

World production of crude oil totaled 64.0 million barrels per day in 1996, the highest production since 1979 and up 2.5 percent from the 1995 level (11.5). The most noticeable production increases occurred in Norway (up 12 percent), Venezuela (up 11 percent), and Nigeria (up

*<sup>\*</sup>Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications. Percentages and numbers in text are calculated by using data in the tables.*

10 percent). Production declined 1.4 percent in the United States to 6.5 million barrels per day, and 2.0 percent in Russia to 5.9 million barrels per day. In Saudi Arabia, the largest producer of crude oil in 1996, production was essentially unchanged at 8.2 million barrels per day. Crude oil production by all members of the Organization of Petroleum Exporting Countries combined rose to 26.8 million barrels per day and accounted for 42 percent of the world total in 1996.

## Natural Gas Production (1995)

World production of dry natural gas totaled 78 trillion cubic feet (11.11) and, on a Btu basis, equaled 21 percent of world energy production in 1995 (11.2). Natural gas production in 1995 was 1.7 percent above the 1994 level (11.11). Russia was the largest producer of natural gas in 1995 and accounted for 21 trillion cubic feet, a 27-percent share of the world total. The United States was the second largest producer and accounted for 19 trillion cubic feet, a 24-percent share.

## Coal Production (1995)

World production of coal totaled 5.1 billion short tons (11.15) and, on a Btu basis, equaled 25 percent of world energy production in 1995 (11.2). That level of coal production was 1.0 percent above the 1994 level (11.15). China, the leading producer, accounted for 1.5 billion short tons in 1995. Coal production in the United States, the second leading producer, totaled 1.0 billion short tons. India accounted for 311 million short tons and Russia for 310 million short tons.

## Installed Capacity and Electricity Generation

As of January 1, 1994, world electricity installed capacity at all sites (including nonutility power producers) totaled 2.9 billion kilowatts (11.18). Most of the capacity (65 percent) was fossil fuel-fired. Hydroelectric generating capacity accounted for 22 percent and nuclear electric generating capacity accounted for 12 percent. Renewable sources, such as biofuels and geothermal, solar, and wind energy, accounted for less than 1 percent of the world total.

World net electricity generation totaled 12.1 trillion kilowatthours in 1994 (11.17). Fossil fuel-fired net generation totaled 7.6 trillion kilowatthours. The United States, with 2.3 trillion kilowatthours, was by far the largest producer of fossil fuel-fired net generation. China's net generation totaled 684 billion kilowatthours and Japan's totaled 580 billion kilowatthours. World hydroelectric power net generation in 1995 totaled 2.5 trillion kilowatthours, up 5 percent from the 1994 level (11.19). The top five countries in hydroelectric power net generation (Canada, the United States, Brazil, Russia, and China) together accounted for half of the world total. In 1995, nuclear-based electricity gross generation totaled 2.4 trillion kilowatthours (11.20). The U.S. share of the world total was 30 percent. France accounted for 17 percent and Japan for 12 percent of the world total.

## Fluctuations in Petroleum Prices and Demand

In 1973, the expanding post-World War II petroleum market reached 57 million barrels per day (11.9). At that point, oil-producing nations became able, for the first time, to exploit the relative inelasticity of petroleum demand in the short term by raising prices substantially. In response, petroleum consumption dipped for 2 years before resuming its climb to 65 million barrels per day in 1979.

A steep price hike in 1979 and 1980, combined with the longer-term effects of fuel switching and increased efficiency, began to curb consumption, even as the higher prices stimulated new sources of production. World petroleum consumption had fallen to 59 million barrels per day in 1983 when lowered demand and excess production began to erode the price of oil (11.9). In 1986, the price of crude oil plunged 46 percent to \$14.55 per barrel (5.19). Prices stayed low in the second half of the 1980's and petroleum consumption reached 66 million barrels per day, a record level at the time, in 1989.

Following Iraq's invasion of Kuwait in August 1990, the average price of crude oil rose to \$22.22 per barrel, the highest in 5 years (5.19), and year-to-year growth in world petroleum consumption of only 0.1 percent was the lowest in 5 years (11.9). In 1991, following the resolution of the war in the Persian Gulf, the average price of crude oil fell to \$19.06 per barrel. World consumption of petroleum rose 0.9 percent to 67 million barrels per day. In 1992 through 1994, the average price of crude oil fell further, reaching \$15.59 per barrel. In real terms, the 1994 price was the lowest in 21 years. In 1995, the price rose 11 percent to

\$17.23 per barrel, while world consumption increased to 70 million barrels per day.

From 1960 through 1995, the United States consumed more petroleum by far than any other country (11.9). In 1995, U.S. consumption accounted for 42 percent of the 42 million barrels per day consumed by the Organization for Economic Cooperation and Development (OECD) countries. Japan consumed 5.7 million barrels per day. Of the non-OECD countries, China and Russia were the biggest consumers, accounting for 3.3 million barrels per day and 2.9 million barrels per day, respectively.

## Dry Natural Gas Consumption (1995)

Although natural gas can be transported across borders in pipelines and some natural gas is shipped as liquefied natural gas, in general, natural gas tends to be consumed closer to its site of production than does petroleum. Not surprisingly, the two top producers of dry natural gas in 1995 were also the top consumers (11.11 and 11.13).

### World Carbon Dioxide Emissions

Carbon dioxide is a greenhouse gas (see Section 12) and human-caused emissions of carbon dioxide are increasing its atmospheric concentration. Most of those emissions are due to the combustion of fossil fuels. Worldwide emissions of carbon<sup>1</sup> totaled 6.0 billion metric tons in 1995 (11.21), an increase of 10 percent since 1986.

The United States emits by far the largest amounts of carbon (1.4 billion metric tons in 1995). U.S. emissions, together with those of Western Europe (973 million metric tons), China (798 million metric tons), Russia (425 million metric tons), and Japan (326 million metric tons) accounted for 65 percent of the world total in 1995. However, industrialization in Asia is creating rapid emissions growth there. While U.S. emissions increased 13 percent from 1986 through 1995 and those of Russia and Western Europe declined, emissions from China, India, and South Korea rose 48 percent, 63 percent, and 118 percent respectively.

<sup>1</sup>One ton of carbon = 3.667 tons of carbon dioxide gas.

U.S. consumption of dry natural gas totaled 22 trillion cubic feet, equal to 116 percent of its production. Russia consumed 15 trillion cubic feet, an amount equal to 69 percent of its production of dry natural gas. Germany, the third largest consumer of natural gas, consumed 3.2 trillion cubic feet and Ukraine consumed 3.0 trillion cubic feet.

## Coal Consumption (1995)

World coal consumption in 1995 totaled 5.1 billion short tons, up for the fifth year in a row (11.16). China, the United States, and India, the leading producers of coal (11.15), were also the leading consumers. China consumed 1.5 billion short tons, the United States consumed 962 million short tons, India consumed 327 million short tons, and Russia consumed 306 million short tons of coal in 1995.

## Energy Reserves

As of January 1, 1996, world crude oil reserves were estimated to equal about 1,007 billion barrels (11.3).<sup>1</sup> Almost two-thirds of the reserves were located in the Middle East, especially in Saudi Arabia, where about 40 percent of the region's reserves were estimated to be. Iraq, the United Arab Emirates, Kuwait, and Iran each were estimated to have more crude oil reserves than entire regions in the rest of the world. Outside of the Middle East, three countries were estimated to

<sup>1</sup>*Oil and Gas Journal* data.

have very large reserves: the former U.S.S.R., 57 billion barrels; Venezuela, 65 billion barrels; and Mexico, 50 billion barrels. The United States, at 22 billion barrels, ranked eleventh in the world in amount of crude oil reserves.

The distribution of the world's 4.9 quadrillion cubic feet of natural gas reserves was different from the distribution of crude oil reserves (11.3).<sup>2</sup> Former U.S.S.R. reserves of 2.0 quadrillion cubic feet made the Eastern Europe and Former U.S.S.R. region first in the world in amount of natural gas reserves. The Middle East was estimated to have reserves of 1.6 quadrillion cubic feet, primarily in Iran, as well as in Qatar, the United Arab Emirates, Saudi Arabia, and Iraq. The United States, at 165 trillion cubic feet, ranked sixth in the world in amount of natural gas reserves.

As of the end of 1993, recoverable reserves of coal were estimated to be 1.1 trillion short tons (11.14).<sup>3</sup> The three countries with the most plentiful coal reserves were the United States, with 272 billion short tons<sup>4</sup>; the Former U.S.S.R., with 265 billion short tons; and China, with 126 billion short tons.

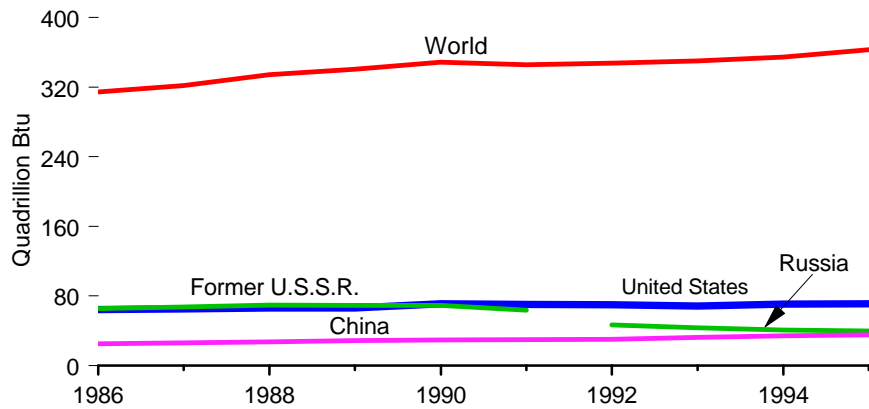
<sup>2</sup>*Oil and Gas Journal* data.

<sup>3</sup>World Energy Council data, with the exception of U.S. data, which are estimated by the Energy Information Administration. Data for the Former U.S.S.R. and China are as of December 31, 1993, the most recent period for which they are available.

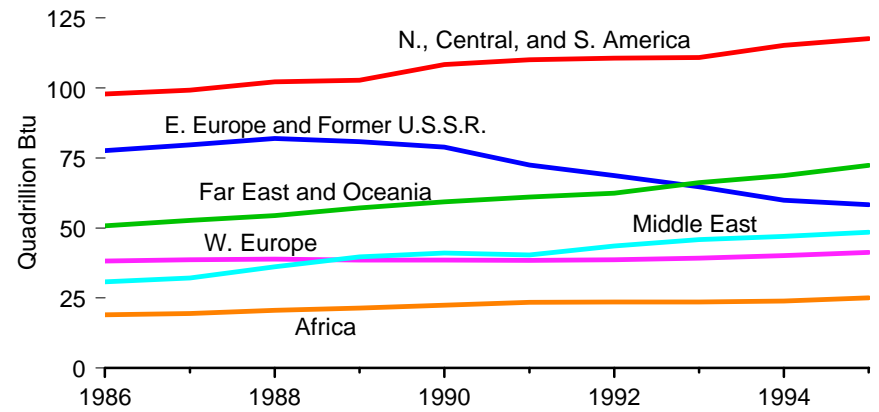
<sup>4</sup>U.S. data are more current; they represent recoverable reserves as of January 1, 1996.

**Figure 11.1 World Primary Energy Production**

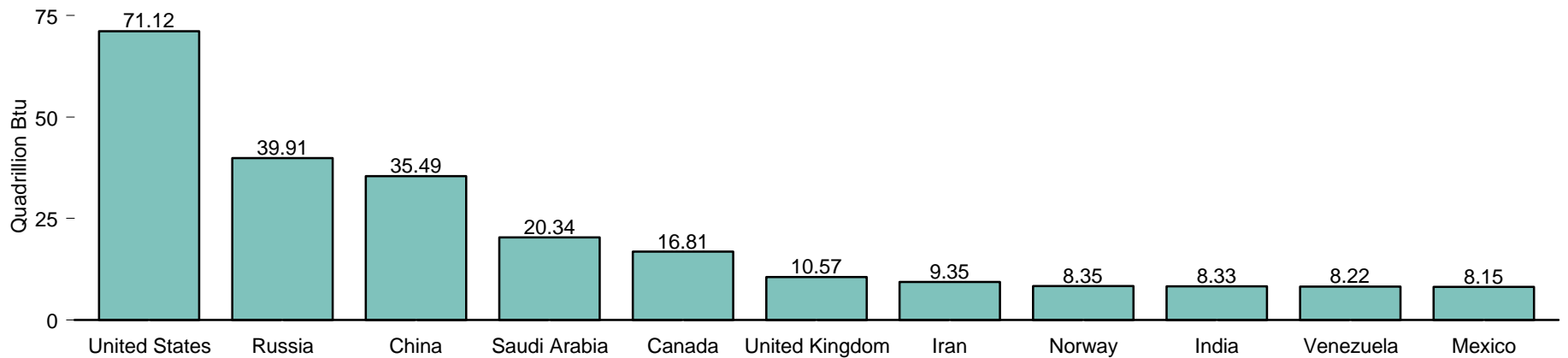
**World and Leading Producers, 1986-1995**



**World Areas, 1986-1995**



**Top Producing Countries, 1995**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 11.1.

**Table 11.1 World Primary Energy Production, 1986-1995**  
(Quadrillion Btu)

Region and Country	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 P
<b>North, Central, and South America</b>	<b>R97.87</b>	<b>R99.23</b>	<b>R102.20</b>	<b>R102.80</b>	<b>R108.45</b>	<b>R110.11</b>	<b>110.60</b>	<b>R110.87</b>	<b>R115.21</b>	<b>117.64</b>
Brazil	R3.53	R3.55	R3.65	R3.82	R3.85	R4.01	R4.08	R4.27	R4.40	4.55
Canada	11.91	12.54	13.41	13.36	R13.36	R13.90	R14.43	R15.34	R16.26	16.81
Mexico	R7.15	R7.36	R7.43	R7.49	R7.63	R8.12	R8.16	8.14	R8.16	8.15
United States <sup>1</sup>	64.35	64.95	66.10	66.13	R170.76	R70.42	69.96	68.32	R70.68	71.12
Venezuela	5.18	5.14	5.55	5.73	6.31	6.97	6.96	7.29	R7.74	8.22
Other	5.74	R5.68	6.05	R6.28	6.54	6.69	R7.02	R7.51	R7.95	8.79
<b>Western Europe</b>	<b>R38.17</b>	<b>R38.60</b>	<b>R38.84</b>	<b>R38.48</b>	<b>R38.51</b>	<b>R38.40</b>	<b>R38.72</b>	<b>R39.21</b>	<b>R40.07</b>	<b>41.22</b>
France	R3.84	R4.01	4.07	4.05	R4.24	R4.45	R4.61	R4.82	R4.85	4.92
Germany <sup>2</sup>	R8.02	R8.03	R8.10	R7.89	R7.51	R6.29	6.11	R5.78	R5.49	5.42
Netherlands	2.74	2.73	2.42	2.60	2.62	2.94	2.92	2.96	R2.89	2.89
Norway	3.94	4.40	4.77	5.71	5.94	R6.22	7.08	R7.28	7.66	8.35
United Kingdom	10.64	10.32	9.99	9.02	R9.11	R9.29	R9.05	R9.33	R10.09	10.57
Other	R8.99	R9.11	R9.49	R9.21	R9.09	R9.21	R8.96	R9.05	R9.09	9.06
<b>Eastern Europe and Former U.S.S.R.</b>	<b>77.63</b>	<b>79.67</b>	<b>R82.03</b>	<b>R80.84</b>	<b>78.93</b>	<b>72.53</b>	<b>R68.72</b>	<b>R64.70</b>	<b>R59.89</b>	<b>58.39</b>
Kazakstan	—	—	—	—	—	—	R3.73	R3.36	R2.54	2.26
Poland	4.98	5.04	5.04	4.67	3.89	3.75	3.69	3.71	R3.75	3.74
Former U.S.S.R.	65.41	67.33	R69.73	69.25	69.15	63.54	—	—	—	—
Russia	—	—	—	—	—	—	R46.77	R43.41	R40.74	39.91
Ukraine	—	—	—	—	—	—	4.27	R4.13	R3.59	3.34
Other	7.25	7.30	7.26	R6.92	5.89	5.24	R10.26	R10.09	R9.26	9.14
<b>Middle East</b>	<b>30.75</b>	<b>32.21</b>	<b>R36.13</b>	<b>R39.73</b>	<b>41.04</b>	<b>R40.34</b>	<b>R43.60</b>	<b>R45.79</b>	<b>R46.97</b>	<b>48.40</b>
Iran	5.06	5.67	5.71	R7.01	7.68	8.28	8.54	R8.85	R9.17	9.35
Iraq	3.66	4.58	5.97	6.47	4.54	0.69	1.02	1.21	1.33	1.35
Kuwait	3.36	3.77	3.63	4.32	2.83	0.43	2.44	4.28	R4.73	4.81
Saudi Arabia	12.04	10.84	R12.86	12.81	15.92	19.75	20.39	20.11	R20.00	20.34
United Arab Emirates	3.68	4.21	4.22	4.99	5.51	6.24	6.11	5.78	R5.84	6.19
Other	2.95	3.14	R3.75	4.12	4.56	4.95	5.09	5.55	R5.91	6.35
<b>Africa</b>	<b>19.08</b>	<b>19.45</b>	<b>R20.58</b>	<b>R21.42</b>	<b>R22.43</b>	<b>R23.43</b>	<b>R23.51</b>	<b>R23.55</b>	<b>R23.91</b>	<b>25.04</b>
Algeria	3.55	4.01	4.07	4.28	4.52	4.81	4.82	4.65	R4.57	4.89
Libya	2.43	2.29	2.73	2.70	3.18	3.43	3.34	3.17	3.21	3.23
Nigeria	3.31	3.05	R3.30	R3.90	R4.07	R4.30	R4.42	R4.45	R4.37	4.50
South Africa	5.14	5.11	5.31	5.17	R5.09	5.19	R5.07	R5.40	5.77	6.08
Other	4.64	4.99	5.15	5.37	R5.57	R5.71	5.86	5.87	R5.98	6.35
<b>Far East and Oceania</b>	<b>R50.85</b>	<b>R52.68</b>	<b>R54.45</b>	<b>R57.24</b>	<b>R59.34</b>	<b>R61.04</b>	<b>R62.41</b>	<b>R66.17</b>	<b>R68.74</b>	<b>72.35</b>
Australia	5.15	5.60	5.33	5.58	6.14	6.28	R6.57	R6.60	R6.74	7.29
China	R25.02	R25.92	R27.14	R28.75	R29.37	R29.66	R30.35	R32.32	R34.13	35.49
India	5.65	5.60	R5.92	R6.21	6.53	R6.81	6.97	7.46	7.73	8.33
Indonesia	R4.41	R4.46	R4.56	R4.96	R5.12	R5.67	R5.78	R6.14	R6.43	6.65
Japan	2.98	3.22	3.21	R3.20	3.17	R3.44	R3.36	R3.73	R3.63	3.98
Other	R7.63	R7.88	R8.29	R8.53	R9.02	R9.19	R9.37	R9.91	R10.08	10.61
<b>World</b>	<b>R314.35</b>	<b>R321.84</b>	<b>R334.23</b>	<b>R340.49</b>	<b>R348.70</b>	<b>R345.85</b>	<b>R347.56</b>	<b>R350.28</b>	<b>R354.77</b>	<b>363.04</b>

<sup>1</sup> There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of renewable energy beginning in 1990.

<sup>2</sup> Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.

R=Revised data. P=Preliminary data. — = Not applicable.

Notes: • See Note 1 at end of section. • World primary energy production includes crude oil and lease

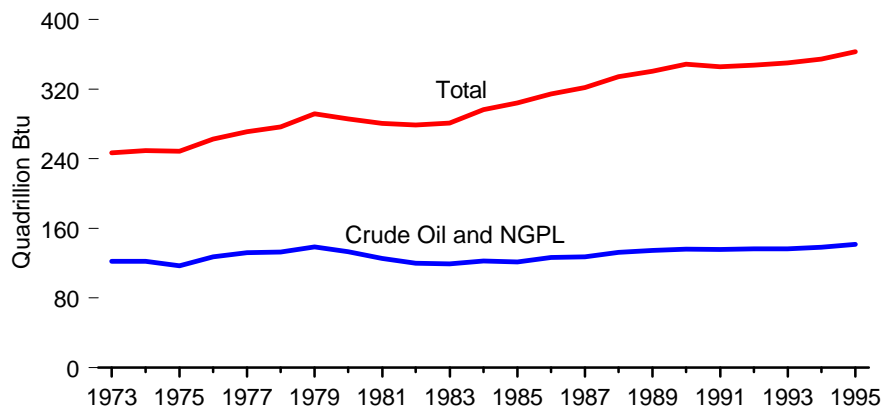
condensate, natural gas plant liquids, dry natural gas, coal, and net hydroelectric power, nuclear electric power, geothermal, photovoltaic, solar, wind, and some biofuel electric power. Data for the United States include biofuels. • Totals may not equal sum of components due to independent rounding.

Sources: **United States:** Table 1.2. **All Other Data:** Energy Information Administration, *International Energy Annual 1995* (December 1996), Table F1, and the International Energy Database, May 1997.

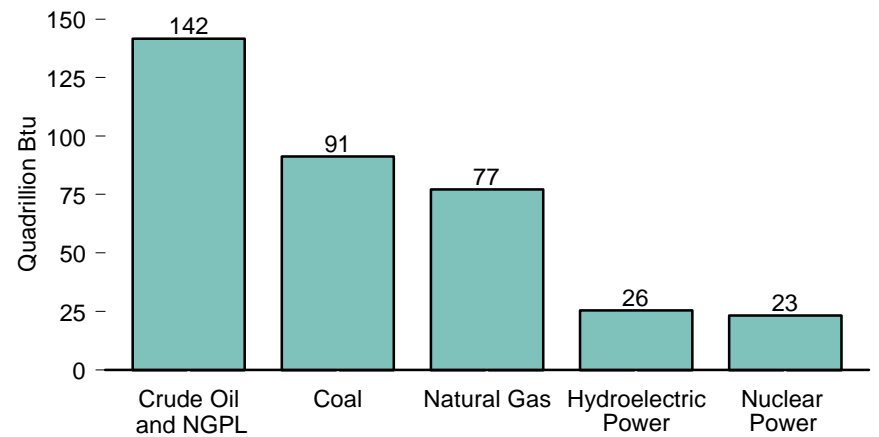


**Figure 11.2 World Primary Energy Production by Source**

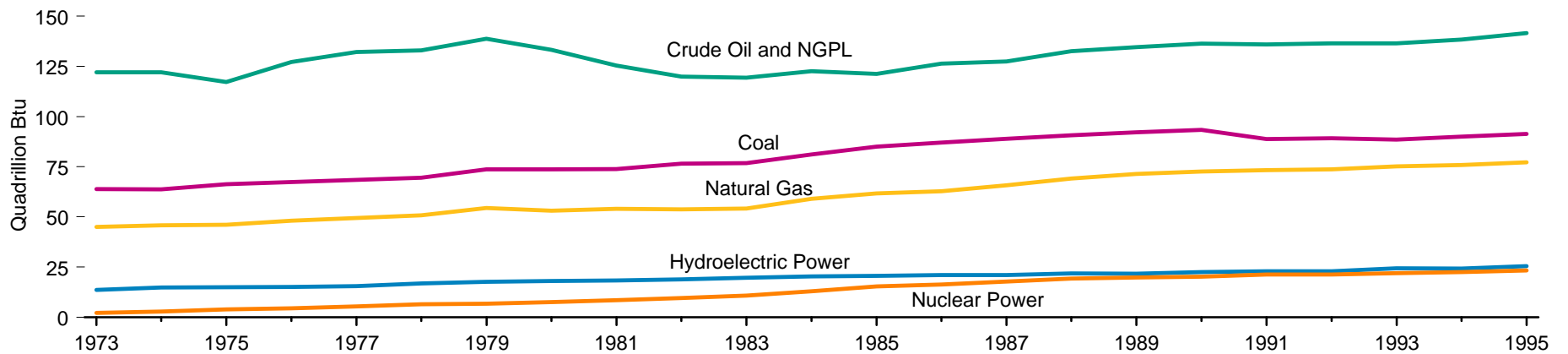
**Total and Crude Oil and NGPL, 1973-1995**



**By Source, 1995**



**By Source, 1973-1995**



Notes: • Crude oil includes lease condensate. • NGPL is natural gas plant liquids.  
 • Because vertical scales differ, graphs should not be compared.

Source: Table 11.2.

**Table 11.2 World Primary Energy Production by Source, 1973-1995**  
(Quadrillion Btu)

Year	Coal	Natural Gas <sup>1</sup>	Crude Oil <sup>2</sup>	Natural Gas Plant Liquids	Nuclear Power <sup>3</sup>	Hydroelectric Power <sup>3</sup>	Geothermal Energy <sup>3</sup> and Other <sup>4</sup>	Total
1973	63.87	45.00	117.88	4.23	2.15	13.52	0.21	246.86
1974	63.79	45.82	117.82	4.22	2.87	14.84	0.22	249.57
1975	66.20	46.17	113.09	4.12	3.85	15.04	0.24	248.70
1976	67.33	48.14	122.92	4.24	4.52	15.08	0.26	262.49
1977	68.47	49.35	127.75	4.40	5.41	15.56	0.27	271.21
1978	69.55	50.79	128.51	4.55	6.43	16.80	0.28	276.91
1979	73.80	54.44	133.87	4.87	6.69	17.69	0.34	291.70
1980	R73.65	R53.14	128.12	R5.10	7.58	18.04	0.40	R286.03
1981	R73.88	R54.08	120.16	5.36	8.53	18.34	0.43	R280.77
1982	R76.51	R53.77	114.51	5.34	9.51	18.82	0.44	R278.90
1983	R76.79	R54.21	113.97	5.34	10.72	19.73	0.49	R281.26
1984	R81.10	R58.99	116.86	R5.71	R12.99	20.34	0.56	R296.55
1985	R84.98	R61.66	115.40	5.82	15.37	20.55	R0.59	R304.36
1986	R87.13	R62.85	120.24	6.12	16.34	R20.97	R0.71	R314.35
1987	R88.96	R65.84	121.16	6.32	17.80	21.03	R0.73	R321.84
1988	R90.70	R69.08	125.93	R6.63	19.30	R21.85	R0.73	R334.23
1989	R92.14	R71.49	127.98	R6.67	R19.81	R21.66	R0.73	R340.49
1990	R93.43	R72.53	129.50	6.85	R20.25	R22.54	R53.59	R348.70
1991	R88.83	R73.29	128.77	7.13	R21.28	R22.91	R3.64	R345.85
1992	R89.28	R73.70	129.13	R7.37	R21.34	R22.91	R3.82	R347.56
1993	R88.43	R75.18	R128.88	7.65	R21.99	R24.31	R3.86	R350.28
1994	R90.00	R75.88	R130.48	R7.82	R22.43	R24.22	R3.93	R354.77
1995 <sup>P</sup>	91.32	77.19	133.56	8.13	23.31	25.51	4.03	363.04

<sup>1</sup> Dry production.

<sup>2</sup> Includes lease condensate.

<sup>3</sup> Net generation, i.e., gross generation less plant use.

<sup>4</sup> Includes net photovoltaic, solar, wind, and some biofuel electric power. Data for the United States include biofuels.

<sup>5</sup> There is a discontinuity in the series between 1989 and 1990 due to the expanded coverage of U.S.

renewable energy beginning in 1990. See Table 1.2.

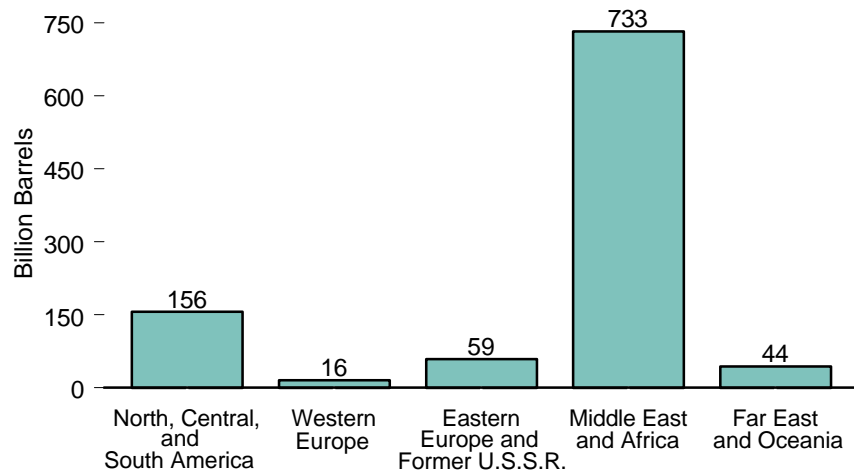
R=Revised data. P=Preliminary data.

Notes: • See Note 1 at end of section. • Totals may not equal sum of components due to independent rounding.

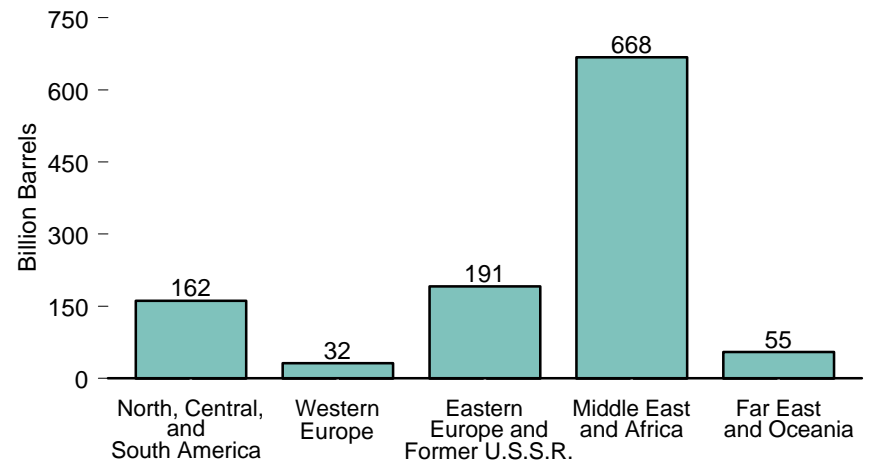
Source: Energy Information Administration, International Energy Database, May 1997.

**Figure 11.3 World Crude Oil and Natural Gas Reserves, January 1, 1996**

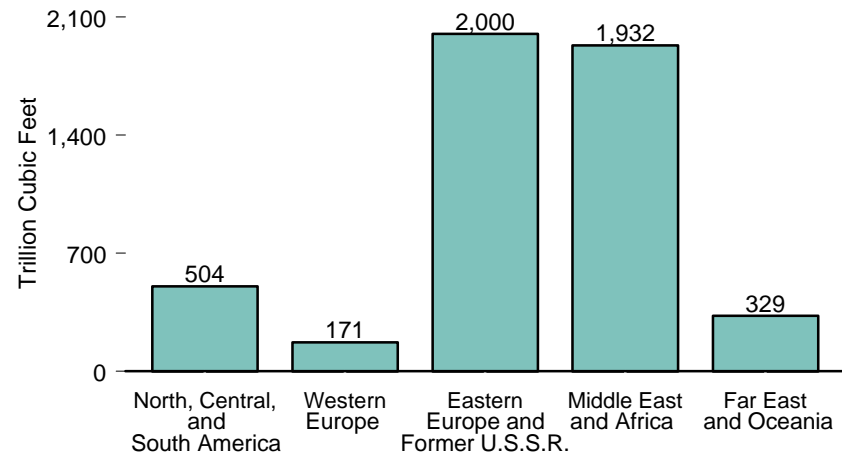
**Oil Reserves: *Oil and Gas Journal***



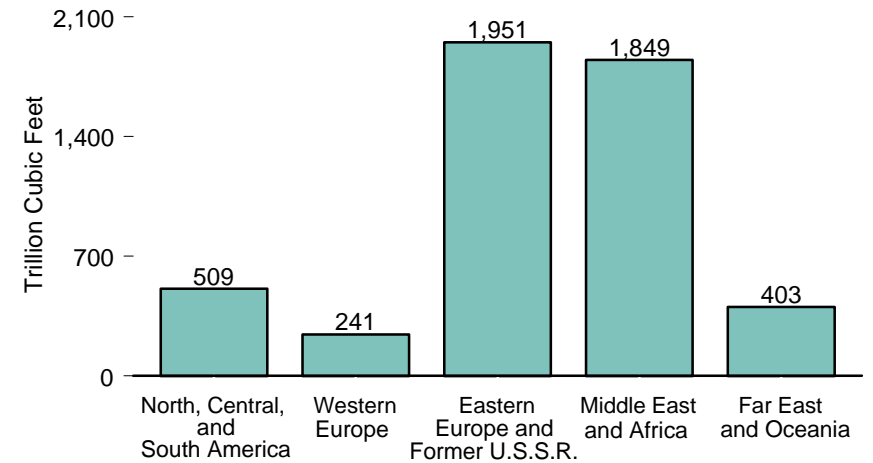
**Oil Reserves: *World Oil***



**Natural Gas Reserves: *Oil and Gas Journal***



**Natural Gas Reserves: *World Oil***



Source: Table 11.3.

**Table 11.3 World Crude Oil and Natural Gas Reserves, January 1, 1996**

Region and Country	Crude Oil (billion barrels)		Natural Gas (trillion cubic feet)		Region and Country	Crude Oil (billion barrels)		Natural Gas (trillion cubic feet)	
	<i>Oil and Gas Journal</i>	<i>World Oil</i>	<i>Oil and Gas Journal</i>	<i>World Oil</i>		<i>Oil and Gas Journal</i>	<i>World Oil</i>	<i>Oil and Gas Journal</i>	<i>World Oil</i>
<b>North America</b> .....	<b>77.0</b>	<b>76.7</b>	<b>300.6</b>	<b>298.6</b>	<b>Middle East</b> .....	<b>659.6</b>	<b>589.4</b>	<b>1,597.2</b>	<b>1,491.0</b>
Canada .....	4.9	5.6	67.0	65.8	Bahrain .....	0.2	0.0	5.3	5.4
Mexico .....	49.8	48.8	68.4	67.7	Iran .....	88.2	57.7	741.6	634.8
United States .....	22.4	22.4	165.1	165.1	Iraq .....	100.0	99.2	109.5	108.0
<b>Central and South America</b> .....	<b>78.9</b>	<b>85.0</b>	<b>203.5</b>	<b>210.7</b>	Kuwait .....	96.5	95.0	52.9	56.7
Argentina .....	2.2	2.4	18.6	21.9	Oman .....	5.1	3.3	25.2	20.1
Bolivia .....	0.1	0.1	4.5	0.0	Qatar .....	3.7	3.9	250.0	244.8
Brazil .....	4.2	6.2	5.2	7.3	Saudi Arabia .....	261.2	261.3	185.9	194.1
Colombia .....	3.5	5.5	10.0	12.0	Syria .....	2.5	2.6	7.0	7.9
Ecuador .....	2.1	3.4	3.8	4.0	United Arab Emirates .....	98.1	63.5	204.6	201.1
Peru .....	0.8	0.7	7.0	7.0	Yemen .....	4.0	3.0	15.0	17.0
Trinidad and Tobago .....	0.5	0.6	10.6	12.2	Other .....	0.0	0.0	0.2	1.1
Venezuela .....	64.5	65.6	139.9	142.8	<b>Africa</b> .....	<b>73.2</b>	<b>78.7</b>	<b>334.6</b>	<b>357.7</b>
Other .....	1.0	0.6	4.0	3.5	Algeria .....	9.2	10.0	128.0	131.3
<b>Western Europe</b> .....	<b>15.8</b>	<b>31.6</b>	<b>170.9</b>	<b>241.4</b>	Angola .....	5.4	3.1	1.8	1.8
Denmark .....	1.0	1.0	4.0	3.9	Cameroon .....	0.4	0.0	3.9	3.9
Germany .....	0.3	0.4	11.3	11.6	Congo .....	1.5	1.3	4.3	4.3
Italy .....	0.6	0.7	13.2	10.5	Egypt .....	3.9	3.8	22.1	19.1
Netherlands .....	0.1	0.1	65.2	64.1	Libya .....	29.5	34.7	45.8	46.2
Norway .....	8.4	24.2	47.5	121.9	Nigeria .....	20.8	21.3	109.7	124.4
United Kingdom .....	4.3	4.5	23.3	24.7	Tunisia .....	0.4	0.4	2.6	2.7
Other .....	1.0	0.8	6.4	4.7	Other .....	2.0	4.0	16.4	24.0
<b>Eastern Europe and Former U.S.S.R.</b> .....	<b>59.0</b>	<b>191.0</b>	<b>1,999.5</b>	<b>1,951.2</b>	<b>Far East and Oceania</b> .....	<b>44.0</b>	<b>54.8</b>	<b>328.5</b>	<b>403.4</b>
Hungary .....	0.1	0.1	3.4	3.4	Australia .....	1.6	3.4	20.1	94.8
Romania .....	1.6	1.0	13.0	4.7	Brunei .....	1.4	1.1	14.0	13.9
Former U.S.S.R. .....	57.0	189.7	1,977.0	1,936.6	China .....	24.0	31.0	59.0	46.3
Other <sup>1</sup> .....	0.2	0.2	6.2	6.6	India .....	5.8	5.3	25.0	25.5
					Indonesia .....	5.2	5.9	68.9	72.3
					Malaysia .....	4.3	5.2	68.0	80.2
					New Zealand .....	0.1	0.1	2.8	2.3
					Pakistan .....	0.2	0.2	27.0	17.5
					Papua New Guinea .....	0.4	0.6	3.0	14.6
					Thailand .....	0.2	0.3	5.9	5.7
					Other .....	0.8	1.7	34.8	30.4
					<b>World</b> .....	<b>1,007.4</b>	<b>1,107.3</b>	<b>4,934.9</b>	<b>4,954.0</b>

<sup>1</sup> Albania, Bulgaria, former Czechoslovakia, and Poland.

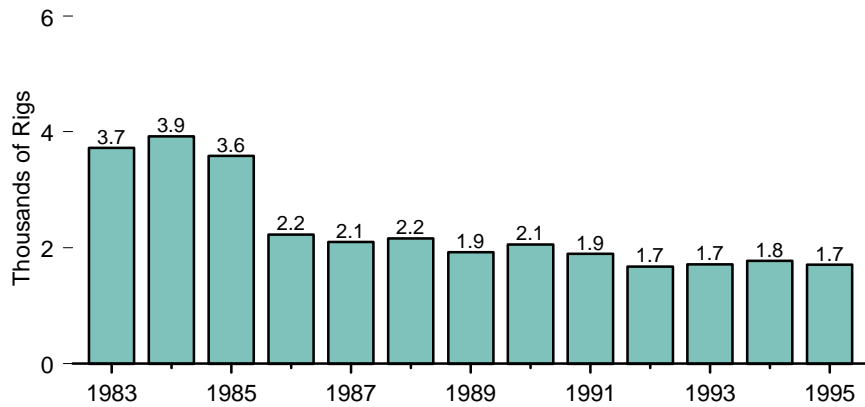
Notes: • Data for Kuwait and Saudi Arabia include one-half of the reserves in the Neutral Zone between Kuwait and Saudi Arabia. • All reserve figures except those for the former U.S.S.R. and natural gas reserves in Canada are proved reserves recoverable with present technology and prices. Former U.S.S.R. figures are "explored reserves," which include proved, probable, and some partially possible. The Canadian natural gas figure includes proved and some probable. The latest Energy Information

Administration data for the United States are for December 31, 1995. See Table 4.8. • Totals may not equal sum of components due to independent rounding.

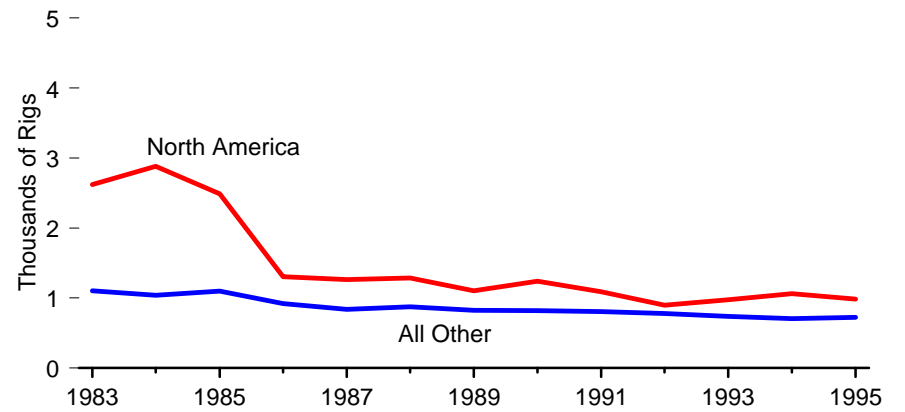
Sources: **United States:** Energy Information Administration (EIA), *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, Annual Report 1995* (November 1996). **All Other Data:** PennWell Publishing Company, *Oil and Gas Journal*, December 25, 1995. Gulf Publishing Company, *World Oil*, August 1996.

**Figure 11.4 World Rotary Rigs in Operation**

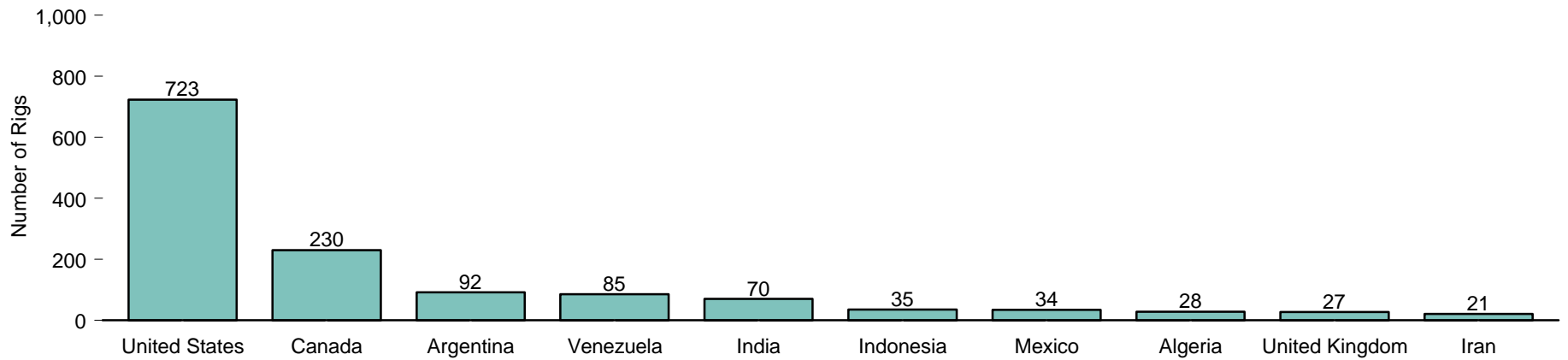
**World Total, 1983-1995**



**World Areas, 1983-1995**



**Selected Countries, 1995**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 11.4.

**Table 11.4 World Rotary Rigs in Operation, 1983-1995**

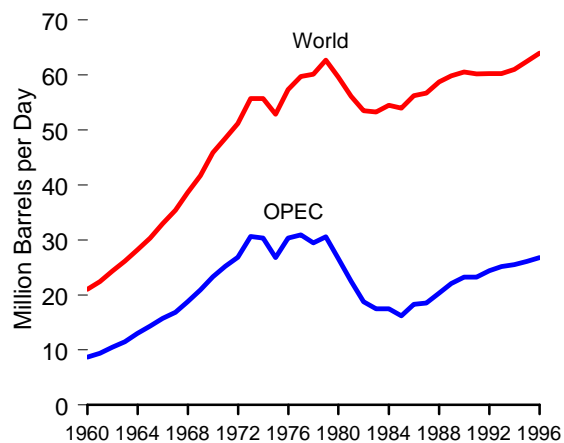
Region and Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
<b>North America</b> .....	<b>2,620</b>	<b>2,883</b>	<b>2,487</b>	<b>1,305</b>	<b>1,260</b>	<b>1,287</b>	<b>1,102</b>	<b>1,238</b>	<b>1,090</b>	<b>897</b>	<b>974</b>	<b>1,064</b>	<b>987</b>
Canada .....	201	259	311	178	181	196	130	138	121	96	184	261	230
Mexico .....	187	196	196	163	143	155	103	90	109	80	36	28	34
United States .....	2,232	2,428	1,980	964	936	936	869	1,010	860	721	754	775	723
<b>Central and South America</b> .....	<b>264</b>	<b>243</b>	<b>247</b>	<b>208</b>	<b>195</b>	<b>180</b>	<b>158</b>	<b>158</b>	<b>167</b>	<b>170</b>	<b>167</b>	<b>206</b>	<b>238</b>
Argentina .....	73	82	81	47	61	63	55	64	60	49	42	71	92
Bolivia .....	8	6	5	4	6	5	6	6	10	16	11	10	8
Brazil .....	83	70	76	77	60	39	28	23	21	26	25	23	20
Colombia .....	18	16	21	17	14	19	15	11	9	12	13	15	16
Venezuela .....	41	30	33	29	18	25	28	32	45	50	58	69	85
Other .....	41	39	31	34	36	29	26	22	22	17	18	18	17
<b>Western Europe</b> .....	<b>211</b>	<b>227</b>	<b>258</b>	<b>211</b>	<b>181</b>	<b>190</b>	<b>167</b>	<b>162</b>	<b>142</b>	<b>112</b>	<b>89</b>	<b>83</b>	<b>89</b>
Italy .....	26	26	40	33	26	24	22	21	25	23	14	11	11
Norway .....	10	10	13	12	12	15	12	12	16	15	13	14	13
Turkey .....	26	24	25	27	26	21	20	17	19	15	16	16	15
United Kingdom .....	42	60	63	43	44	57	46	48	39	33	24	23	27
Other .....	107	107	117	96	73	73	67	64	43	26	22	19	23
<b>Eastern Europe and Former U.S.S.R.</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>26</b>	<b>21</b>	<b>24</b>	<b>24</b>	<b>24</b>
Poland .....	NA	NA	NA	NA	NA	NA	NA	NA	22	18	18	18	18
Russia .....	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Other .....	NA	NA	NA	NA	NA	NA	NA	NA	4	3	6	6	6
<b>Middle East</b> .....	<b>142</b>	<b>136</b>	<b>139</b>	<b>118</b>	<b>90</b>	<b>102</b>	<b>110</b>	<b>108</b>	<b>92</b>	<b>128</b>	<b>135</b>	<b>102</b>	<b>100</b>
Iran .....	13	20	20	18	18	18	20	19	21	39	45	21	21
Iraq .....	23	19	28	21	10	23	26	123	NA	NA	NA	NA	NA
Oman .....	11	12	13	13	10	9	13	17	14	12	16	16	17
Saudi Arabia .....	26	16	11	6	5	4	5	10	16	22	21	17	17
Syria .....	15	23	26	27	22	24	24	17	14	17	15	12	13
United Arab Emirates .....	45	36	26	18	11	10	9	12	16	18	18	17	17
Other .....	9	10	15	15	14	14	13	10	11	20	20	19	15
<b>Africa</b> .....	<b>181</b>	<b>140</b>	<b>155</b>	<b>130</b>	<b>113</b>	<b>112</b>	<b>101</b>	<b>107</b>	<b>106</b>	<b>94</b>	<b>83</b>	<b>78</b>	<b>84</b>
Algeria .....	54	27	35	41	40	32	24	35	31	30	29	28	28
Egypt .....	35	36	37	33	23	21	18	15	17	16	13	14	17
Libya .....	24	26	30	20	12	16	17	15	15	15	15	13	11
Nigeria .....	17	11	10	10	11	13	14	18	21	16	10	7	9
Other .....	51	40	43	26	27	30	28	24	22	17	16	16	19
<b>Far East and Oceania</b> .....	<b>303</b>	<b>295</b>	<b>298</b>	<b>254</b>	<b>259</b>	<b>287</b>	<b>286</b>	<b>284</b>	<b>273</b>	<b>254</b>	<b>240</b>	<b>214</b>	<b>190</b>
Australia .....	25	34	31	15	16	19	14	14	12	10	11	12	12
Burma .....	36	33	33	33	29	26	23	19	22	18	15	10	10
India .....	56	57	62	70	116	131	135	137	136	124	105	82	70
Indonesia .....	88	82	80	62	37	44	46	52	53	50	40	38	35
Malaysia .....	10	9	8	8	8	9	12	13	13	10	10	10	8
Pakistan .....	17	17	18	17	14	13	13	11	10	11	9	10	11
Philippines .....	8	3	2	1	2	4	7	6	5	7	9	10	7
Other .....	63	60	64	48	37	41	36	32	22	24	41	42	37
<b>World</b> .....	<b>3,721</b>	<b>3,924</b>	<b>3,584</b>	<b>2,226</b>	<b>2,098</b>	<b>2,158</b>	<b>1,924</b>	<b>2,057</b>	<b>1,896</b>	<b>1,676</b>	<b>1,712</b>	<b>1,771</b>	<b>1,712</b>

<sup>1</sup> For Iraq in 1990, average rigs January through August.  
NA=Not available.

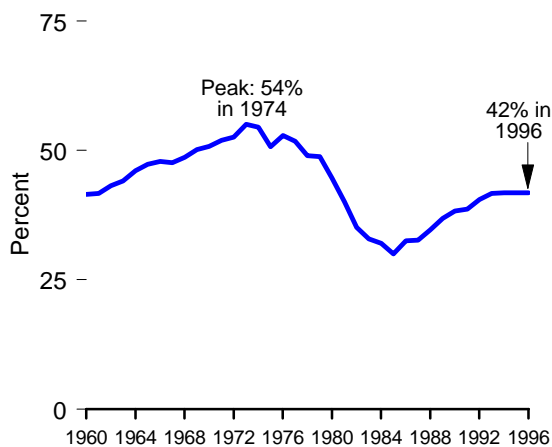
Source: Baker Hughes, Inc., as published by PennWell Publishing Company, *International Petroleum Encyclopedia 1996*.

**Figure 11.5 World Crude Oil Production**

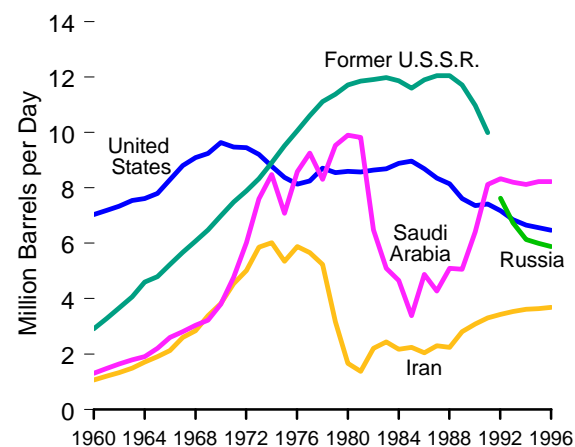
**World and OPEC, 1960-1996**



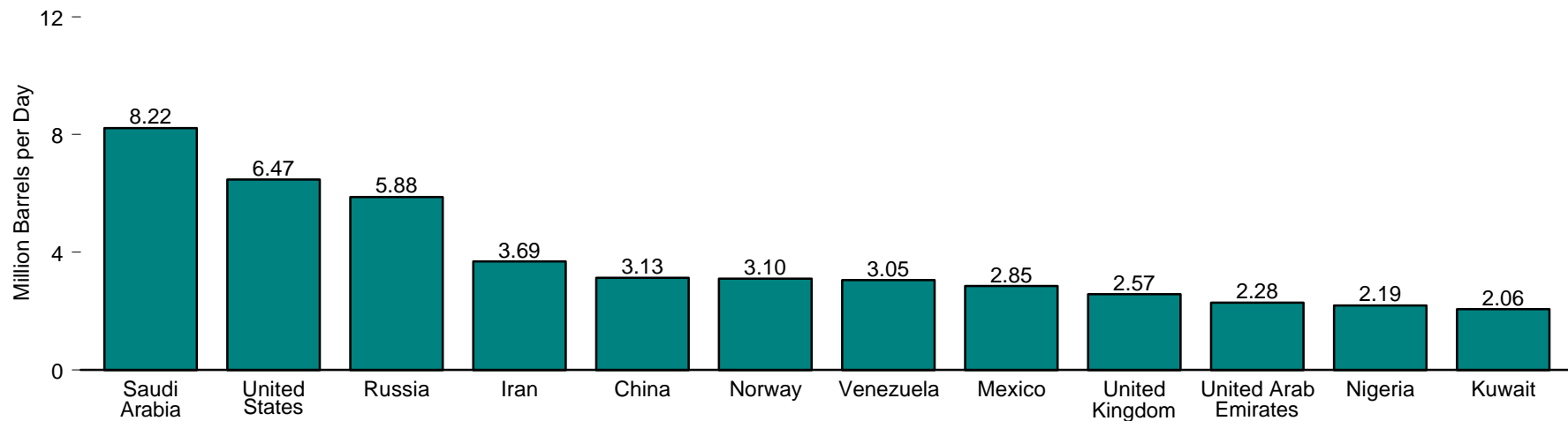
**OPEC's Share of World, 1960-1996**



**Leading Producers, 1960-1996**



**Selected Producing Countries, 1996**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 11.5.

**Table 11.5 World Crude Oil Production, 1960-1996**  
(Million Barrels per Day)

Year	Persian Gulf Nations <sup>2</sup>	Selected OPEC <sup>1</sup> Producers								Selected Non-OPEC Producers								World	
		Iran	Iraq	Kuwait <sup>3</sup>	Nigeria	Saudi Arabia <sup>3</sup>	United Arab Emirates	Venezuela	Total OPEC	Canada	China	Mexico	Norway	Former U.S.S.R.	Russia	United Kingdom	United States		Total Non-OPEC <sup>4</sup>
1960	5.27	1.07	0.97	1.69	0.02	1.31	0.00	2.85	R8.70	0.52	0.10	0.27	0.00	2.91	—	(s)	7.04	12.29	R20.99
1961	5.65	1.20	1.01	1.74	0.05	1.48	0.00	2.92	9.36	0.61	0.11	0.29	0.00	3.28	—	(s)	7.18	13.09	R22.45
1962	6.19	R1.33	1.01	1.96	0.07	1.64	0.01	3.20	R10.51	0.67	0.12	0.31	0.00	3.67	—	(s)	7.33	13.84	R24.35
1963	6.82	1.49	1.16	2.10	0.08	1.79	0.05	3.25	11.51	0.71	0.13	R0.31	0.00	4.07	—	(s)	7.54	14.62	26.13
1964	7.61	1.71	1.26	2.30	0.12	1.90	0.19	3.39	12.98	0.75	0.18	0.32	0.00	4.60	—	(s)	7.61	15.20	R28.18
1965	8.37	1.91	R1.32	2.36	0.27	2.21	0.28	3.47	R14.35	0.81	0.23	0.32	0.00	4.79	—	(s)	7.80	15.98	R30.33
1966	9.32	2.13	1.39	2.48	0.42	2.60	0.36	3.37	R15.77	0.88	0.29	0.33	0.00	5.23	—	(s)	8.30	17.19	R32.96
1967	9.91	2.60	1.23	2.50	0.32	2.81	0.38	3.54	R16.85	0.96	0.28	R0.36	0.00	5.68	—	(s)	8.81	18.54	R35.39
1968	10.91	2.84	1.50	2.61	0.14	3.04	0.50	R3.60	R18.79	1.19	0.30	0.39	0.00	6.08	—	(s)	9.10	19.84	R38.63
1969	11.95	3.38	1.52	2.77	0.54	3.22	0.63	3.59	R20.91	1.13	0.48	0.46	0.00	6.48	—	(s)	9.24	20.79	R41.70
1970	13.39	3.83	1.55	2.99	1.08	3.80	0.78	3.71	R23.30	1.26	0.60	0.49	0.00	6.99	—	(s)	9.64	22.59	45.89
1971	15.77	4.54	1.69	3.20	1.53	4.77	1.06	3.55	R25.21	1.35	0.78	0.49	0.01	7.48	—	(s)	9.46	23.31	48.52
1972	17.54	5.02	1.47	3.28	1.82	6.02	1.20	3.22	R26.89	1.53	0.90	0.51	0.03	7.89	—	(s)	9.44	24.25	51.14
1973	20.67	5.86	2.02	3.02	2.05	7.60	1.53	3.37	R30.63	1.80	1.09	0.47	0.03	8.32	—	(s)	9.21	25.05	55.68
1974	21.28	6.02	1.97	2.55	2.26	8.48	1.68	2.98	R30.35	1.55	1.32	0.57	0.04	8.91	—	(s)	8.77	25.37	55.72
1975	18.93	5.35	2.26	2.08	1.78	7.08	1.66	2.35	R26.77	1.43	1.49	0.71	0.19	9.52	—	0.01	8.37	26.06	52.83
1976	21.51	5.88	2.42	2.15	2.07	8.58	1.94	2.29	R30.33	1.31	1.67	0.83	0.28	10.06	—	0.25	8.13	27.01	57.34
1977	21.73	5.66	2.35	1.97	2.09	9.25	2.00	2.24	R30.89	1.32	1.87	0.98	0.28	10.60	—	0.77	8.24	28.82	59.71
1978	20.61	5.24	2.56	2.13	1.90	8.30	1.83	2.17	R29.46	1.32	2.08	1.21	0.36	11.11	—	1.08	8.71	30.70	60.16
1979	21.07	3.17	3.48	2.50	2.30	9.53	1.83	2.36	R30.58	1.50	2.12	1.46	0.40	11.38	—	1.57	8.55	32.09	62.67
1980	17.96	1.66	2.51	1.66	2.06	9.90	1.71	2.17	R26.61	1.44	2.11	1.94	0.53	11.71	—	1.62	8.60	32.99	59.60
1981	15.25	1.38	1.00	1.13	1.43	9.82	1.47	2.10	R22.48	1.29	2.01	2.31	0.50	11.85	—	1.81	8.57	33.60	56.08
1982	12.16	2.21	1.01	0.82	1.30	6.48	1.25	1.90	R18.78	1.27	2.05	2.75	0.52	11.91	—	2.07	8.65	34.70	53.48
1983	11.08	2.44	1.01	1.06	1.24	5.09	1.15	1.80	R17.50	1.36	2.12	2.69	0.61	11.97	—	2.29	8.69	35.76	53.26
1984	10.78	2.17	1.21	1.16	1.39	4.66	1.15	1.80	R17.44	1.44	2.30	2.78	0.70	11.86	—	2.48	8.88	37.05	54.49
1985	9.63	2.25	1.43	1.02	1.50	3.39	1.19	1.68	R16.18	1.47	2.51	2.75	0.79	11.59	—	2.53	8.97	37.80	53.98
1986	11.70	2.04	1.69	1.42	1.47	4.87	1.33	1.79	R18.28	1.47	2.62	2.44	0.87	11.90	—	2.54	8.68	37.95	56.23
1987	12.10	2.30	2.08	1.59	1.34	4.27	1.54	1.75	R18.52	1.54	2.69	2.55	1.02	12.05	—	2.41	8.35	38.15	56.67
1988	13.46	2.24	2.69	1.49	1.45	5.09	1.57	1.90	R20.32	1.62	2.73	2.51	1.16	12.05	—	2.23	8.14	38.42	58.74
1989	14.84	2.81	2.90	1.78	1.72	5.06	1.86	1.91	R22.07	1.56	2.76	2.52	1.55	11.72	—	1.80	7.61	37.79	59.86
1990	15.28	3.09	2.04	1.18	1.81	6.41	2.12	2.14	R23.20	1.55	2.77	2.55	1.70	10.98	—	1.82	7.36	37.37	60.57
1991	14.74	3.31	0.31	0.19	1.89	8.12	2.39	2.38	R23.27	1.55	2.84	2.68	1.89	9.99	—	1.80	7.42	36.94	60.21
1992	15.97	3.43	0.43	1.06	1.94	8.33	2.27	2.37	R24.40	1.61	2.85	2.67	2.23	—	7.63	1.83	7.17	35.82	R60.22
1993	16.71	R3.54	0.51	1.85	R1.96	8.20	2.16	2.45	R25.12	1.68	R2.89	2.67	2.35	—	R6.73	1.92	6.85	35.13	R60.25
1994	16.96	R3.62	0.55	2.03	R1.93	R8.12	2.19	R2.59	R25.51	R1.75	2.94	2.69	2.52	—	R6.14	2.37	6.66	35.49	R61.00
1995	17.30	3.64	0.56	2.06	R1.99	8.23	2.28	2.75	R26.09	1.81	R2.99	2.62	2.77	—	R6.00	2.49	R6.56	36.36	R62.45
1996 <sup>P</sup>	17.37	3.69	0.58	2.06	2.19	8.22	2.28	3.05	26.77	1.82	3.13	2.85	3.10	—	5.88	2.57	6.47	37.23	64.00

<sup>1</sup> Organization of Petroleum Exporting Countries. See Glossary for membership.

<sup>2</sup> Persian Gulf Nations are Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and United Arab Emirates.

<sup>3</sup> Includes about one-half of the production in the Neutral Zone between Kuwait and Saudi Arabia.

<sup>4</sup> Ecuador, which withdrew from OPEC on December 31, 1992, and Gabon, which withdrew on December 31, 1994, are included in "Non-OPEC" for all years.

R=Revised data. P=Preliminary data. — = Not applicable. (s)=Less than 5,000 barrels per day.

Notes: • Includes lease condensate, excludes natural gas plant liquids. • Totals may not equal sum of components due to independent rounding.

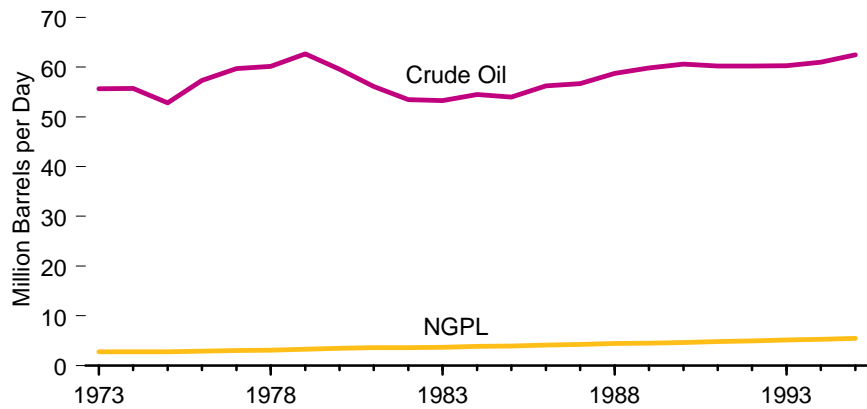
Sources: **China:** • 1960-1972—Central Intelligence Agency, unpublished data. • 1973-1979—Energy Information Administration (EIA), *International Energy Annual 1983*, Table 8. • 1980-1995—EIA, Office of Energy Markets and End Use, International Energy Database, March 1997. • 1996—EIA, *Monthly Energy Review* (March 1997), Table 10.1. **United States:** • 1960-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*. • 1976-1980—EIA, Energy Data

Reports, *Petroleum Statement, Annual*. • 1981-1995—EIA, *Petroleum Supply Annual*. • 1996—EIA, *Monthly Energy Review* (March 1997), Table 10.1. **Former U.S.S.R.:** • 1960-1969—U.S.S.R. Central Statistical Office, *Narodnoye Khozyaystvo SSSR* (National Economy USSR). • 1970-1991—EIA, *International Petroleum Statistics Report*, February 1996, Table 4.1c. **Russia:** • 1992 forward—EIA, Office of Energy Markets and End Use, International Energy Database, March 1997. **OPEC Nations:** • 1960-1972—Organization of Petroleum Exporting Countries, *Annual Statistical Bulletin 1979*. • 1973-1979—EIA, *International Energy Annual 1983*, Table 8. • 1980-1995—EIA, Office of Energy Markets and End Use, International Energy Database, March 1997. • 1996—EIA, *Monthly Energy Review* (March 1997), Table 10.1. **All Other Countries:** • 1960-1969—Bureau of Mines, *International Petroleum Annual, 1969*. • 1970-1972—EIA, *International Petroleum Annual, 1978*. • 1973-1979—EIA, *International Energy Annual 1983*, Table 8. • 1980-1995—EIA, *International Energy Annual 1995* (December 1996), Table 2.2, and the International Energy Database, March 1997. • 1996—EIA, *Monthly Energy Review* (March 1997), Table 10.1.

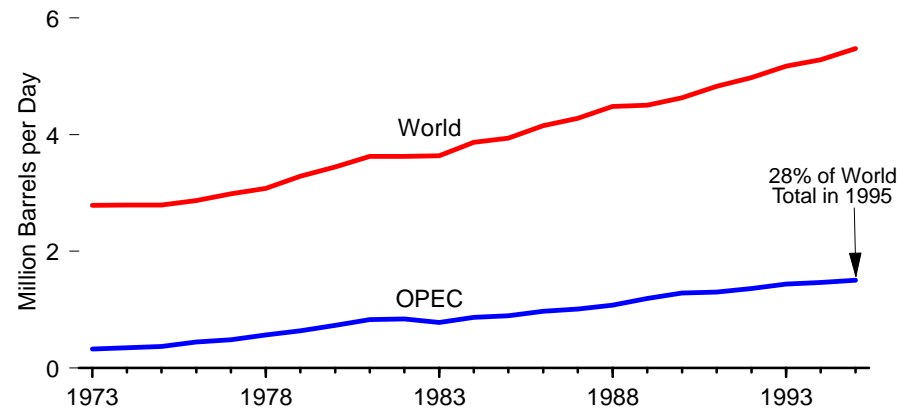


**Figure 11.6 World Natural Gas Plant Liquids Production**

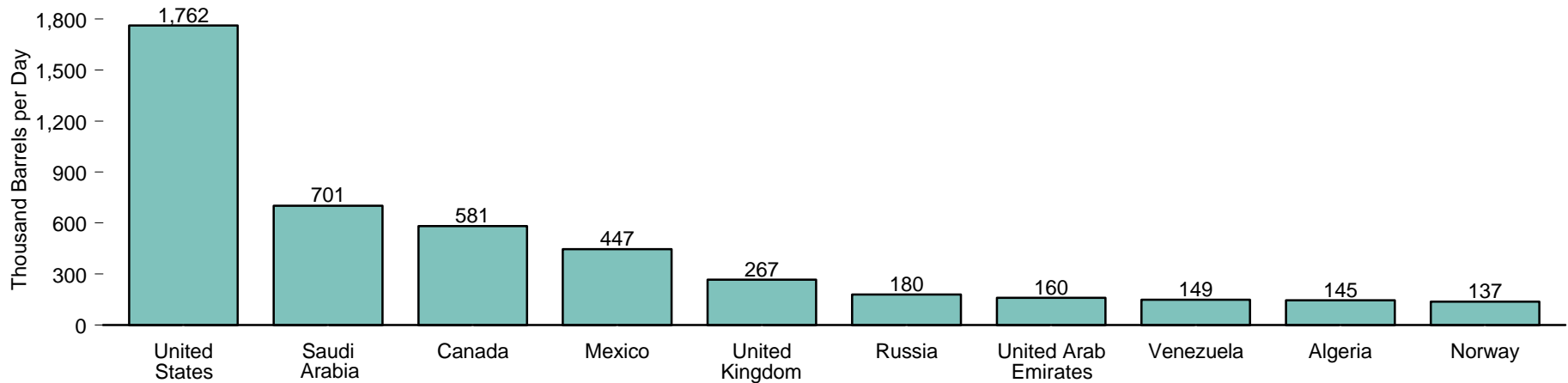
**Crude Oil and NGPL Production, 1973-1995**



**World and OPEC NGPL Production, 1973-1995**



**Top NGPL Producing Countries, 1995**



Note: Because vertical scales differ, graphs should not be compared.

Sources: Tables 11.5 and 11.6.

**Table 11.6 World Natural Gas Plant Liquids Production, 1973-1995**

(Thousand Barrels per Day)

Year	Selected OPEC <sup>1</sup> Producers								Selected Non-OPEC Producers									World	
	Algeria	Indonesia	Kuwait <sup>2</sup>	Qatar	Saudi Arabia <sup>2</sup>	United Arab Emirates	Venezuela	Total OPEC	Australia	Canada	Kazakstan	Mexico	Norway	Former U.S.S.R.	Russia	United Kingdom	United States		Total Non-OPEC <sup>3</sup>
1973	9	(s)	60	(s)	90	(s)	89	324	50	314	—	75	(s)	170	—	5	1,738	2,462	2,786
1974	12	(s)	50	5	130	(s)	84	347	50	314	—	80	(s)	190	—	5	1,688	2,443	2,790
1975	20	(s)	50	10	140	(s)	76	372	50	309	—	80	5	205	—	15	1,633	2,419	2,791
1976	24	10	50	10	185	(s)	77	442	50	289	—	95	20	220	—	15	1,604	2,425	2,867
1977	19	10	55	5	215	15	78	482	55	290	—	105	20	235	—	30	1,618	2,502	2,984
1978	25	30	75	5	250	30	61	566	60	281	—	115	35	255	—	40	1,567	2,514	3,080
1979	30	40	95	10	303	30	69	637	60	331	—	150	40	270	—	45	1,584	2,650	3,287
1980	36	70	95	10	369	35	60	732	60	331	—	193	40	285	—	45	1,573	2,712	3,444
1981	49	95	60	24	433	60	55	825	60	330	—	241	31	300	—	50	1,609	2,800	3,625
1982	58	80	40	30	430	90	60	842	52	318	—	255	33	315	—	78	1,550	2,784	3,626
1983	56	94	55	25	330	120	57	780	52	309	—	265	38	330	—	111	1,559	2,855	3,635
1984	105	75	67	28	355	130	57	869	54	336	—	257	36	340	—	136	1,630	3,000	3,869
1985	120	44	54	30	375	160	63	892	65	337	—	271	41	350	—	145	1,609	3,046	3,938
1986	120	30	75	22	385	185	97	969	60	328	—	352	53	440	—	152	1,551	3,181	4,150
1987	140	30	95	24	418	145	94	1,006	65	367	—	338	55	430	—	162	1,595	3,273	4,279
1988	120	30	100	30	499	130	98	1,077	67	381	—	370	75	450	—	159	1,625	3,404	4,481
1989	130	72	105	24	503	130	108	1,188	65	410	—	384	74	425	—	140	1,546	3,314	4,502
1990	130	77	65	40	620	135	114	1,281	63	426	—	428	78	425	—	108	1,559	3,351	4,632
1991	140	76	0	50	680	146	117	1,299	61	431	—	457	94	420	—	141	1,659	3,528	4,827
1992	140	75	34	55	713	144	113	1,364	56	460	86	454	95	—	230	160	1,697	3,609	4,973
1993	145	78	53	55	704	146	143	1,435	55	506	82	459	100	—	220	169	1,736	3,734	5,169
1994	140	80	<sup>R</sup> 85	50	698	150	146	<sup>R</sup> 1,465	56	<sup>R</sup> 529	63	461	103	—	200	218	1,727	3,817	<sup>R</sup> 5,282
1995 <sup>P</sup>	145	76	95	55	701	160	149	1,506	52	581	52	447	137	—	180	267	1,762	3,968	5,474

<sup>1</sup> Organization of Petroleum Exporting Countries. See Glossary for membership.

<sup>2</sup> Includes about one-half of the production in the Neutral Zone between Kuwait and Saudi Arabia.

<sup>3</sup> Ecuador, which withdrew from OPEC on December 31, 1992, and Gabon, which withdrew on December 31, 1994, are included in "Non-OPEC" for all years.

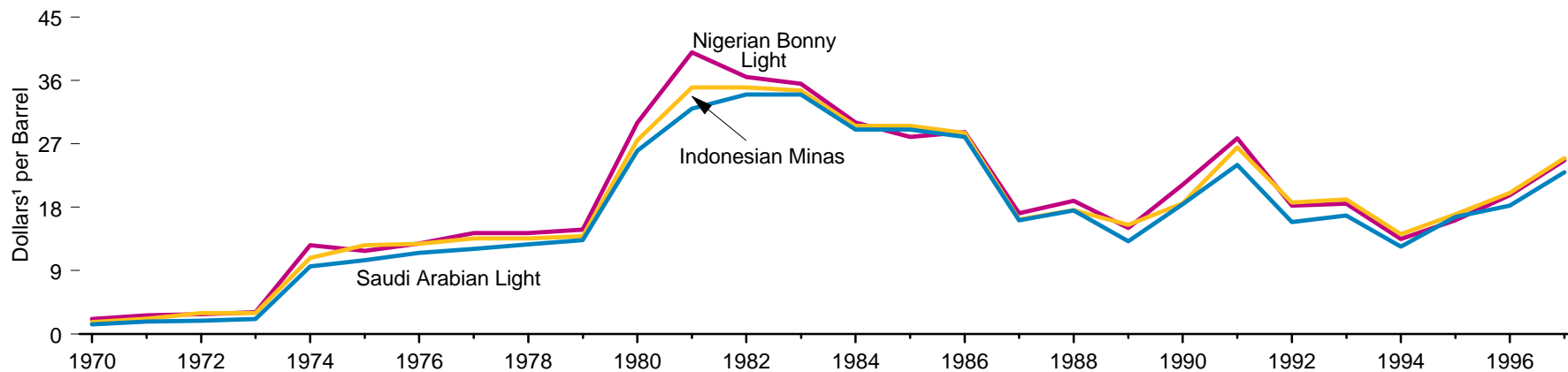
R=Revised data. P=Preliminary data. — = Not applicable. (s)=Less than 500 barrels per day.

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

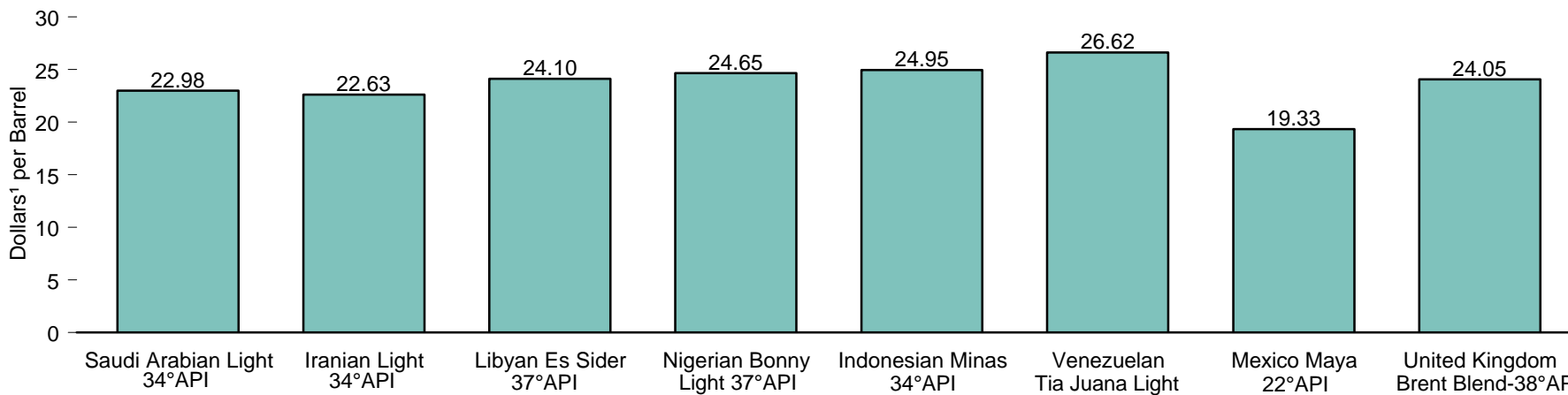
Source: Energy Information Administration, *International Energy Annual 1995* (December 1996), Table 2.3, and the International Energy Database, March 1997.

**Figure 11.7 World Crude Oil Prices by Selected Type**

**Selected Types, 1970-1997**



**Selected Types, 1997**



<sup>1</sup> Nominal dollars.

Source: Table 11.7.

Notes: • Prices are as of the first Friday in January, except in 1987, when prices are as of the first Friday in February. • Because vertical scales differ, graphs should not be compared.

**Table 11.7 World Crude Oil Prices by Selected Type, 1970-1997**

(Dollars<sup>1</sup> per Barrel)

Year	Saudi Arabian Light-34° API	Iranian Light-34° API	Libyan <sup>2</sup> Es Sider-37° API	Nigerian <sup>3</sup> Bonny Light-37° API	Indonesian Minas-34° API	Venezuelan Tia Juana Light <sup>4</sup>	Mexico Maya-22° API	United Kingdom Brent Blend-38° API
1970	1.35	1.36	2.09	2.10	1.67	2.05	NA	NA
1971	1.75	1.76	2.80	2.65	2.18	2.45	NA	NA
1972	1.90	1.91	2.80	2.80	2.96	2.45	NA	NA
1973	2.10	2.11	3.10	3.10	2.96	2.60	NA	NA
1974	9.60	10.63	14.30	12.60	10.80	9.30	NA	NA
1975	10.46	10.67	11.98	11.80	12.60	11.00	NA	NA
1976	11.51	11.62	12.21	12.84	12.80	11.12	NA	NA
1977	12.09	12.81	13.74	14.33	13.55	12.72	NA	NA
1978	12.70	12.81	13.80	14.33	13.55	12.82	NA	NA
1979	13.34	13.45	14.52	14.80	13.90	13.36	15.45	15.70
1980	26.00	<sup>5</sup> 30.37	34.50	29.97	27.50	25.20	28.00	26.02
1981	32.00	37.00	40.78	40.00	35.00	32.88	34.50	39.25
1982	34.00	34.20	36.50	36.50	35.00	32.88	26.50	36.60
1983	34.00	31.20	35.10	35.50	34.53	32.88	25.50	33.50
1984	29.00	28.00	30.15	30.00	29.53	27.88	25.00	30.00
1985	29.00	28.00	30.15	28.00	29.53	27.88	25.50	28.65
1986	28.00	28.05	30.15	28.65	28.53	<sup>R</sup> 28.05	21.93	26.00
1987	16.15	16.14	16.95	17.13	16.28	15.10	14.00	18.25
1988	17.52	15.55	18.52	18.92	17.56	17.62	11.10	18.00
1989	13.15	12.75	15.40	15.05	15.50	12.27	10.63	15.80
1990	18.40	18.20	20.40	21.20	18.55	24.69	17.05	21.00
1991	24.00	23.65	26.90	27.80	26.50	28.62	20.00	27.20
1992	15.90	15.50	17.20	18.20	18.65	19.67	10.75	17.75
1993	16.80	16.70	17.55	18.50	19.10	17.97	12.50	17.90
1994	12.40	12.40	12.55	13.50	14.15	12.97	9.01	13.15
1995	<sup>R</sup> 16.63	<sup>R</sup> 16.18	<sup>R</sup> 16.05	<sup>R</sup> 16.15	<sup>R</sup> 16.95	<sup>R</sup> 16.57	<sup>R</sup> 13.77	<sup>R</sup> 16.15
1996	18.20	17.73	19.20	19.70	20.05	<sup>R</sup> 18.52	15.79	19.37
1997	22.98	22.63	24.10	24.65	24.95	26.62	19.33	24.05

<sup>1</sup> Nominal dollars.

<sup>2</sup> Prices for 1974 and 1975 are for crude oil with 40° API gravity. Prices for 1980 include \$4.72 in retroactive charges and market premiums.

<sup>3</sup> Prices from 1977 forward include 2 cents per barrel harbor dues.

<sup>4</sup> 1970-1985—26° API; 1986 forward—31° API.

<sup>5</sup> Price for 1980 includes \$1.87 market premiums and credit charges.

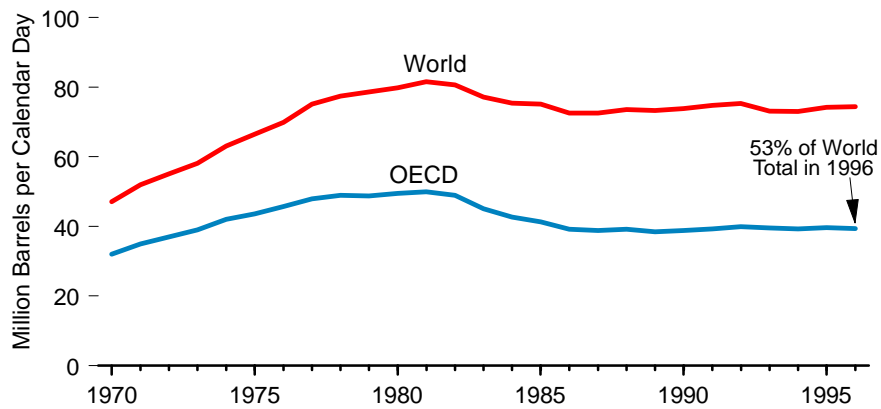
R=Revised data. NA=Not available.

Notes: • Prices are usually f.o.b. at the foreign port of lading. • Prices are as of the first Friday in January, except in 1987, when prices are as of the first Friday in February.

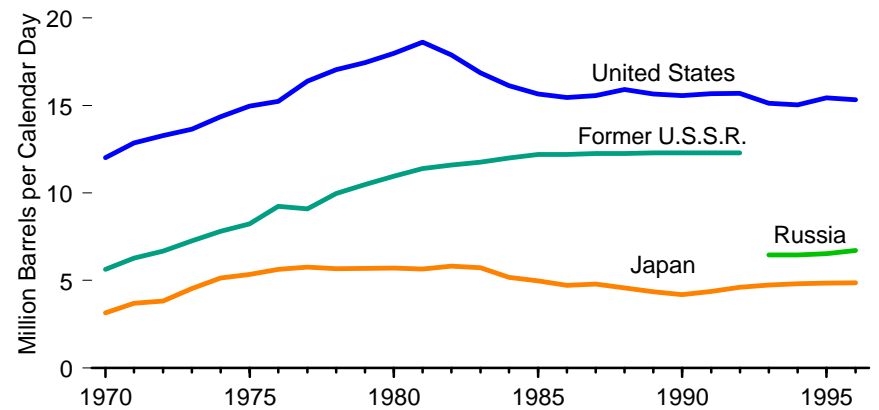
Sources: • 1970-1978—Petroleum and Energy Intelligence Weekly, Inc., *Petroleum Intelligence Weekly*. • 1979 forward—Energy Information Administration, *Weekly Petroleum Status Report*.

**Figure 11.8 World Crude Oil Refining Capacity**

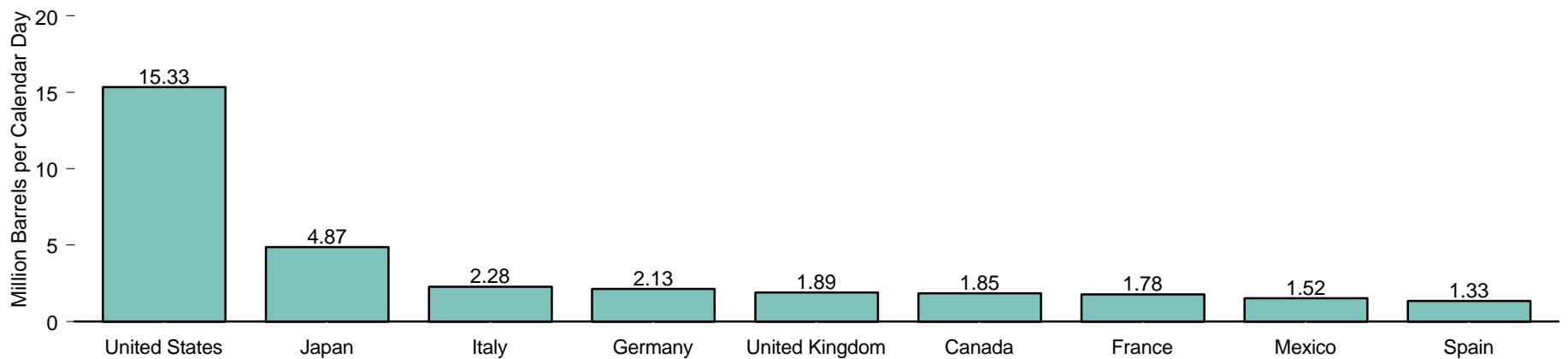
**World and OECD, 1970-1996**



**Leading Countries, 1970-1996**



**Selected OECD Countries, 1996**



Notes: • Capacity is as of January 1. • Because vertical scales differ, graphs should not be compared.

Source: Table 11.8.

**Table 11.8 World Crude Oil Refining Capacity, 1970-1996**  
(Million Barrels per Day)

Year	Selected OECD <sup>1</sup> Countries										Selected Non-OECD Countries								World
	Canada	France	Germany <sup>2</sup>	Italy	Japan	Mexico <sup>3</sup>	Spain	United Kingdom	United States	Total OECD	Brazil	China	Former U.S.S.R.	Russia	Saudi Arabia	South Korea	Ukraine	Total Non-OECD	
1970	1.40	2.32	2.36	2.96	3.14	0.50	0.69	2.30	12.02	32.00	0.50	0.30	5.64	—	0.38	0.18	—	15.10	47.10
1971	1.45	2.53	2.54	3.24	3.70	0.57	0.85	2.39	12.86	34.93	0.51	0.42	6.27	—	0.91	0.25	—	16.98	51.91
1972	1.45	2.69	2.56	3.68	3.82	0.59	0.87	2.59	13.29	37.00	0.56	0.48	6.68	—	0.51	0.22	—	18.14	55.14
1973	1.73	2.95	2.70	3.59	4.53	0.63	1.03	2.47	13.64	39.05	0.72	0.50	7.26	—	0.43	0.43	—	19.15	58.20
1974	1.79	3.14	2.83	3.88	5.15	0.63	1.16	2.76	14.36	41.99	0.79	0.60	7.81	—	0.43	0.42	—	21.16	63.15
1975	1.88	3.34	2.99	3.95	5.35	0.76	1.17	2.78	14.96	43.65	0.96	0.85	8.24	—	0.61	0.43	—	22.87	66.52
1976	2.02	3.31	3.10	4.08	5.63	0.76	1.32	2.89	15.24	45.73	0.99	1.01	9.23	—	0.54	0.44	—	24.20	69.93
1977	2.10	3.52	3.08	4.26	5.76	0.94	1.28	3.01	16.40	47.92	1.12	1.40	9.10	—	0.60	0.42	—	27.19	75.11
1978	2.17	3.46	3.08	4.23	5.67	1.38	1.27	2.91	17.05	48.89	1.16	1.46	9.98	—	0.59	0.48	—	28.57	77.46
1979	2.23	3.47	3.10	4.20	5.68	1.24	1.43	2.53	17.44	48.77	1.21	1.58	10.48	—	0.49	0.54	—	29.81	78.58
1980	2.22	3.40	2.99	4.13	5.71	1.39	1.46	2.53	17.99	49.47	1.21	1.60	10.95	—	0.49	0.60	—	30.38	79.85
1981	2.17	3.34	3.02	4.09	5.66	1.39	1.46	2.63	18.62	49.96	1.40	1.81	11.40	—	0.49	0.61	—	31.60	81.56
1982	2.20	3.29	2.94	4.00	5.81	1.47	1.52	2.48	17.89	48.95	1.41	1.81	11.60	—	0.49	0.76	—	31.68	80.63
1983	2.02	2.87	2.47	3.28	5.73	1.29	1.52	2.26	16.86	45.03	1.22	2.00	11.75	—	0.71	0.76	—	32.18	77.21
1984	1.81	2.67	2.39	3.05	5.17	1.27	1.49	2.09	16.14	42.64	1.30	2.05	12.00	—	0.86	0.78	—	32.78	75.42
1985	1.87	2.39	2.17	3.10	4.97	1.27	1.49	2.01	15.66	41.32	1.31	2.15	12.20	—	0.84	0.78	—	33.80	75.12
1986	1.86	1.95	1.93	2.74	4.72	1.27	1.37	1.79	15.46	39.22	1.31	2.15	12.20	—	1.12	0.78	—	33.33	72.55
1987	1.76	1.83	1.72	2.68	4.79	1.35	1.31	1.78	15.57	38.78	1.32	2.20	12.26	—	1.13	0.86	—	33.79	72.57
1988	1.87	1.94	1.65	2.56	4.57	1.35	1.31	1.80	15.92	39.21	1.41	2.20	12.26	—	1.38	0.82	—	34.36	73.57
1989	1.86	1.88	1.52	2.45	4.36	1.35	1.29	1.80	15.65	38.47	1.41	2.20	12.30	—	1.38	0.88	—	34.87	73.34
1990	1.85	1.82	1.51	2.80	4.20	1.51	1.29	1.83	15.57	38.79	1.40	2.20	12.30	—	1.48	0.87	—	35.07	73.86
1991	1.88	1.82	2.07	2.39	4.38	1.68	1.32	1.87	15.68	39.30	1.41	2.20	12.30	—	1.86	0.87	—	35.46	74.76
1992	1.91	1.82	2.06	2.39	4.61	1.57	1.32	1.86	15.70	<sup>R</sup> 39.91	1.41	2.20	12.30	—	1.86	1.16	—	35.43	75.34
1993	1.87	1.85	2.23	2.42	4.74	1.52	1.30	1.84	15.12	<sup>R</sup> 39.55	1.40	2.20	—	6.46	1.86	1.15	1.24	33.55	73.10
1994	1.88	1.86	2.27	2.26	4.81	1.52	1.28	1.87	15.03	<sup>R</sup> 39.25	1.25	2.20	—	6.46	1.61	1.15	1.24	33.81	73.06
1995	1.91	1.77	2.32	2.26	4.85	1.52	1.28	1.87	15.43	39.66	1.25	2.87	—	6.53	1.66	1.17	1.26	34.59	74.25
1996	1.85	1.78	2.13	2.28	4.87	1.52	1.33	1.89	15.33	39.40	1.26	2.87	—	6.72	1.66	1.24	1.26	35.03	74.43

<sup>1</sup> Organization for Economic Cooperation and Development. See Glossary for membership.

<sup>2</sup> Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.

<sup>3</sup> Mexico, which joined the OECD on May 18, 1994, is included in the OECD for all years shown in this table.

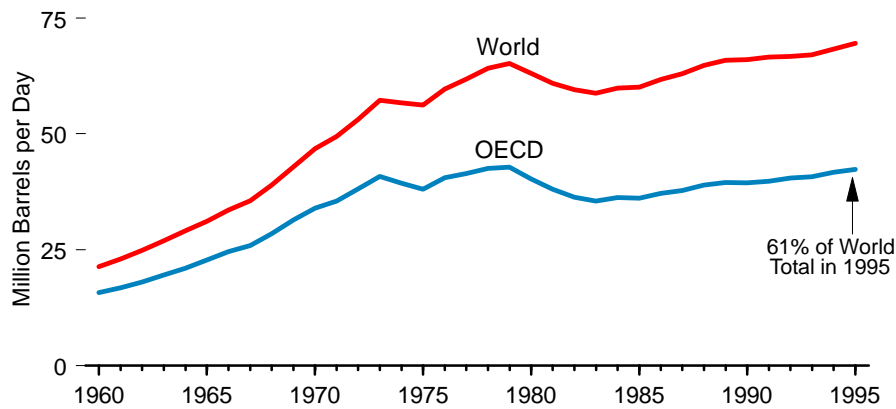
R=Revised data. — = Not applicable.

Notes: • Capacity for all years is as of January 1. • Totals may not equal sum of components due to independent rounding.

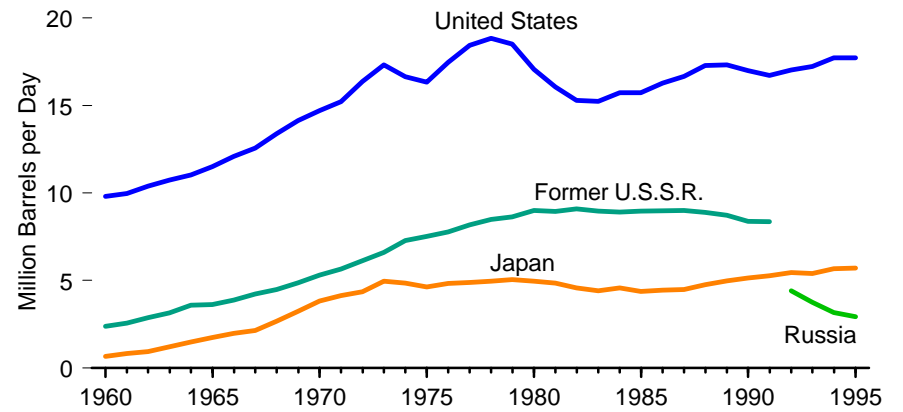
Sources: **United States:** • 1970-1977—Bureau of Mines, Mineral Industry Surveys, *Petroleum Refineries, Annual*. • 1978-1981—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Refineries in the United States and U.S. Territories*. • 1982 forward—EIA, *Petroleum Supply Annual*. **China and U.S.S.R.:** • 1970-1976—Ballinger Publishing Company, *The Energy Decade, 1970-1980, A Statistical and Graphic Chronicle*. • 1977-forward—PennWell Publishing Company, *Oil and Gas Journal*. **All Other Countries:** PennWell Publishing Company, *Oil and Gas Journal*.

**Figure 11.9 World Petroleum Consumption**

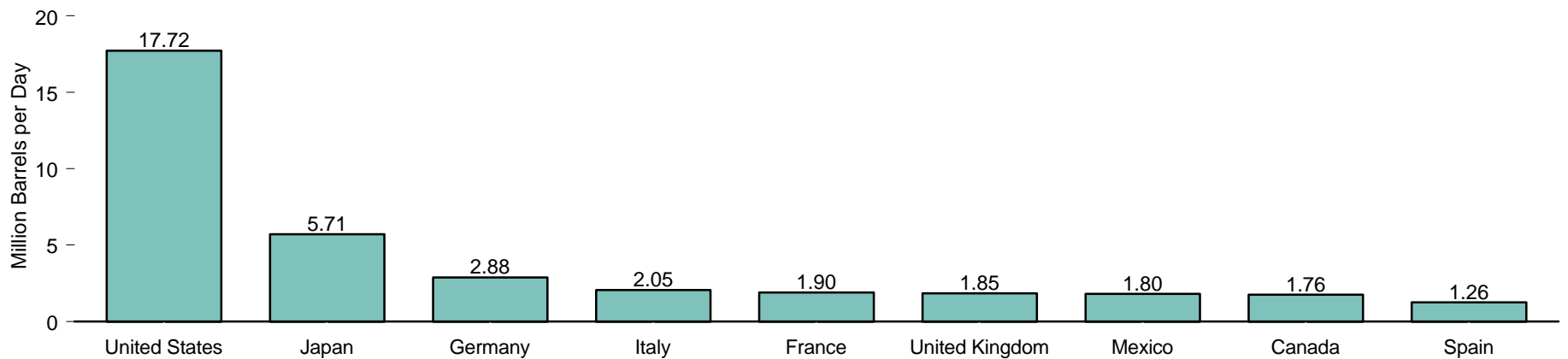
**World and OECD, 1960-1995**



**Leading Consumers, 1960-1995**



**Selected OECD Consumers, 1995**



Notes: • OECD=Organization for Economic Cooperation and Development. See Glossary for membership. • Because vertical scales differ, graphs should not be compared.

Source: Table 11.9.

**Table 11.9 World Petroleum Consumption, 1960-1995**  
(Million Barrels per Day)

Year	Selected OECD <sup>1</sup> Consumers										Selected Non-OECD Consumers							World
	Canada	France	Germany <sup>2</sup>	Italy	Japan	Mexico <sup>3</sup>	Spain	United Kingdom	United States	Total OECD	Brazil	China	India	Former U.S.S.R.	Russia	South Korea	Total Non-OECD	
1960	0.84	0.56	0.63	0.44	0.66	0.30	0.10	0.94	9.80	15.77	0.27	0.17	0.16	2.38	—	0.01	5.57	21.34
1961	0.87	0.63	0.79	0.54	0.82	0.29	0.12	1.04	<sup>R</sup> 9.98	16.75	0.28	0.17	0.17	2.57	—	0.02	6.25	23.00
1962	0.92	0.73	1.00	0.67	0.93	0.30	0.12	1.12	10.40	18.04	0.31	0.14	0.18	2.87	—	0.02	6.85	24.89
1963	0.99	0.86	1.17	0.77	1.21	0.31	0.12	1.27	10.74	19.57	0.34	0.17	0.21	3.15	—	0.03	7.35	26.92
1964	1.05	0.98	1.36	0.90	1.48	0.33	0.20	1.36	11.02	21.03	0.35	0.20	0.22	3.58	—	0.02	8.05	29.08
1965	1.14	1.09	1.61	0.98	1.74	0.34	0.23	1.49	11.51	22.78	0.33	0.23	0.25	3.61	—	0.03	8.36	31.14
1966	1.21	1.19	1.80	1.08	1.98	0.36	0.31	1.58	12.08	24.56	0.38	0.30	0.28	3.87	—	0.04	9.00	33.56
1967	1.25	1.34	1.86	1.19	2.14	0.39	0.36	1.64	12.56	25.87	0.38	0.28	0.26	4.22	—	0.07	9.72	35.59
1968	1.34	1.46	1.99	1.40	2.66	0.41	0.46	1.82	13.39	28.46	0.46	0.31	0.31	4.48	—	0.10	10.50	38.96
1969	1.42	1.66	2.33	1.69	3.25	0.45	0.49	1.98	<sup>R</sup> 14.14	31.39	0.48	0.44	0.34	4.87	—	0.15	11.50	42.89
1970	1.52	1.94	2.83	1.71	3.82	0.50	0.58	2.10	<sup>R</sup> 14.70	33.99	0.53	0.62	0.40	5.31	—	0.20	12.82	46.81
1971	1.56	2.12	2.94	1.84	4.14	0.52	0.64	2.14	15.21	35.51	0.58	0.79	0.42	5.66	—	0.29	13.91	49.42
1972	1.66	2.32	3.13	1.95	4.36	0.59	0.68	2.28	16.37	38.14	0.66	0.91	0.46	6.12	—	0.23	14.95	53.09
1973	1.73	2.60	3.34	2.07	4.95	0.67	0.78	2.34	<sup>R</sup> 17.31	40.85	0.78	1.12	0.49	6.60	—	0.28	16.39	57.24
1974	1.78	2.45	3.06	2.00	4.86	0.71	0.86	2.21	16.65	39.40	0.86	1.19	0.47	7.28	—	0.29	17.28	56.68
1975	1.78	2.25	2.96	1.86	4.62	0.75	0.87	1.91	16.32	38.04	0.92	1.36	0.50	7.52	—	0.31	18.16	56.20
1976	1.82	2.42	3.21	1.97	4.84	0.83	0.97	1.89	17.46	40.52	1.00	1.53	0.51	7.78	—	0.36	19.15	59.67
1977	1.85	2.29	3.21	1.90	4.88	0.88	0.94	1.91	18.43	41.46	1.02	1.64	0.55	8.18	—	0.42	20.37	61.83
1978	1.90	2.41	3.29	1.95	4.95	0.99	0.98	1.94	<sup>R</sup> 18.85	42.54	1.11	1.79	0.62	8.48	—	0.48	21.62	64.16
1979	1.97	2.46	3.37	2.04	5.05	1.10	1.02	1.97	18.51	42.85	1.18	1.84	0.66	8.64	—	0.53	22.37	65.22
1980	1.87	2.26	3.08	1.93	4.96	1.27	0.99	1.73	17.06	40.24	1.15	1.77	0.64	9.00	—	0.54	22.83	63.07
1981	1.77	2.02	2.80	1.87	4.85	1.40	0.94	1.59	<sup>R</sup> 16.06	38.02	1.09	1.71	0.73	8.94	—	0.54	22.88	60.90
1982	1.58	1.88	2.74	1.78	4.58	1.48	1.00	1.59	<sup>R</sup> 15.30	36.37	1.06	1.66	0.74	9.08	—	0.53	23.13	59.50
1983	1.45	1.84	2.66	1.75	4.40	1.35	1.01	1.53	15.23	35.48	0.98	1.73	0.77	8.95	—	0.56	23.26	58.74
1984	1.47	1.75	2.66	1.65	4.58	1.45	0.91	1.85	15.73	36.29	1.03	1.74	0.82	8.91	—	0.59	23.55	59.84
1985	1.50	1.78	2.70	1.72	4.38	1.47	0.85	1.63	<sup>R</sup> 15.73	36.10	1.08	1.89	0.90	8.95	—	0.57	24.00	60.10
1986	1.51	1.77	2.86	1.74	4.44	1.49	0.88	1.65	16.28	37.13	1.24	2.00	0.95	8.98	—	0.61	24.63	61.76
1987	1.55	1.79	2.77	1.86	4.48	1.52	0.90	1.60	<sup>R</sup> 16.67	37.77	1.26	2.12	0.99	9.00	—	0.64	25.23	<sup>R</sup> 63.00
1988	1.69	1.80	2.74	1.84	4.75	1.55	0.98	1.70	17.28	<sup>R</sup> 38.96	1.30	2.28	1.08	8.89	—	0.73	25.86	<sup>R</sup> 64.82
1989	1.73	1.86	2.58	1.93	4.98	<sup>R</sup> 1.64	1.03	1.74	<sup>R</sup> 17.33	<sup>R</sup> 39.51	1.32	2.38	1.15	8.74	—	0.84	26.41	<sup>R</sup> 65.92
1990	1.69	1.82	2.66	1.87	5.14	<sup>R</sup> 1.68	1.01	1.75	<sup>R</sup> 16.99	<sup>R</sup> 39.44	1.34	2.30	1.17	8.39	—	1.03	26.55	<sup>R</sup> 65.99
1991	1.62	1.94	2.83	1.86	5.28	<sup>R</sup> 1.70	1.07	1.80	16.71	<sup>R</sup> 39.76	1.35	2.50	1.19	8.35	—	1.20	26.82	<sup>R</sup> 66.58
1992	1.64	1.93	2.84	1.94	5.45	<sup>R</sup> 1.72	1.11	1.80	17.03	<sup>R</sup> 40.49	1.37	2.66	1.28	—	4.42	1.46	26.25	<sup>R</sup> 66.74
1993	1.69	1.88	2.90	1.85	5.40	<sup>R</sup> 1.78	<sup>R</sup> 1.06	1.82	<sup>R</sup> 17.24	<sup>R</sup> 40.75	1.40	2.96	1.31	—	<sup>R</sup> 3.75	1.69	26.29	<sup>R</sup> 67.04
1994	1.73	1.83	2.88	1.84	5.67	<sup>R</sup> 1.82	<sup>R</sup> 1.13	1.84	<sup>R</sup> 17.72	<sup>R</sup> 41.71	<sup>R</sup> 1.45	<sup>R</sup> 3.14	<sup>R</sup> 1.41	—	<sup>R</sup> 3.18	<sup>R</sup> 1.86	26.60	<sup>R</sup> 68.31
1995 <sup>P</sup>	1.76	1.90	2.88	2.05	5.71	1.80	1.26	1.85	17.72	42.34	1.48	3.32	1.58	—	2.93	1.96	27.21	69.55

<sup>1</sup> Organization for Economic Cooperation and Development. See Glossary for membership.

<sup>2</sup> Through 1969, the data for Germany are for the former West Germany only. For 1970 through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.

<sup>3</sup> Mexico, which joined the OECD on May 18, 1994, is included in the OECD for all years shown in this table.

R=Revised data. P=Preliminary data. — = Not applicable.

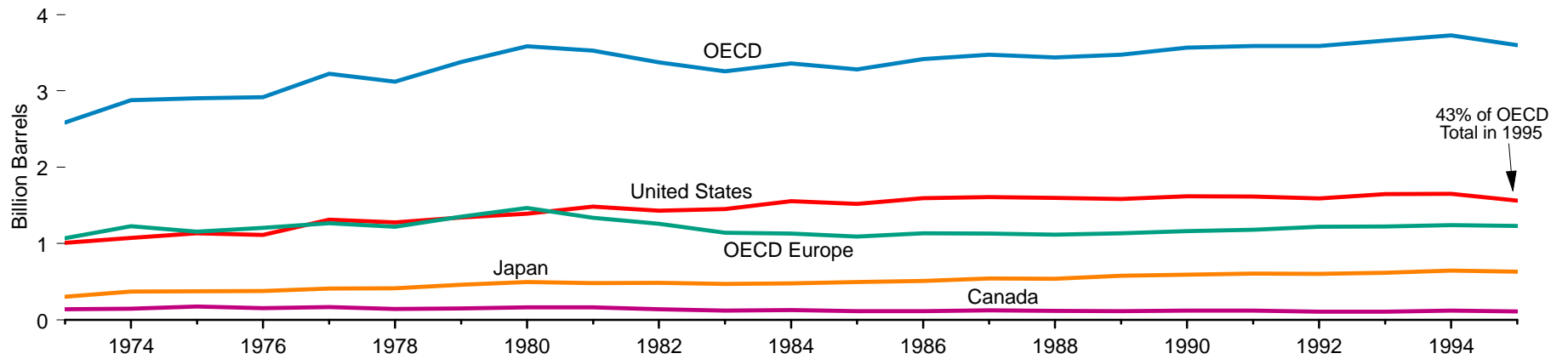
Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, *International Energy Annual 1995* (December 1996), Tables 1.1 and 1.2, and the International Energy Database, March 1997.



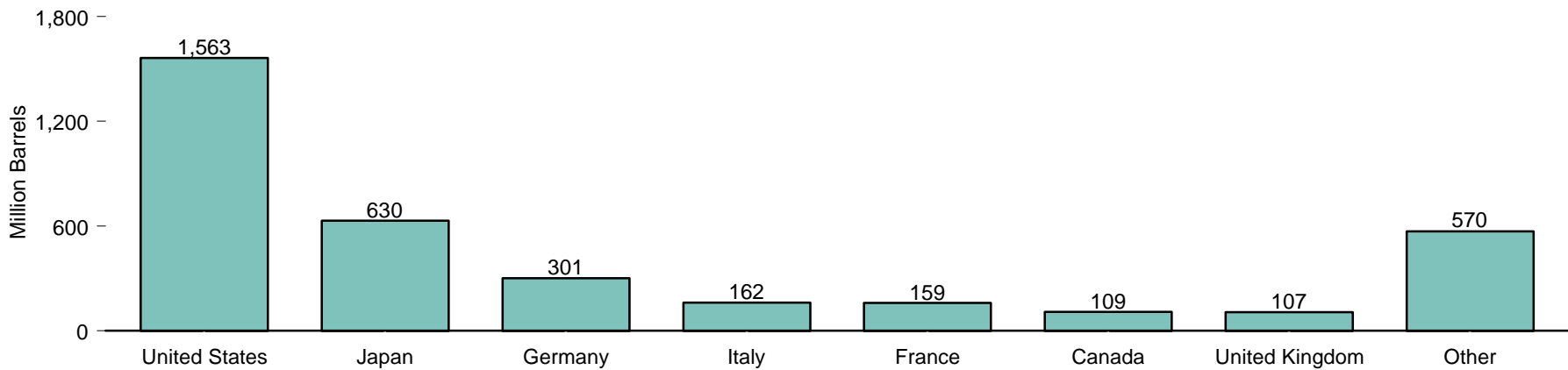
**Figure 11.10 Petroleum Stocks in OECD Countries, End of Year**

**Total, 1973-1995**



43% of OECD Total in 1995

**By Country, 1995**



Note: OECD=Organization for Economic Cooperation and Development. See Glossary for membership. Data for Mexico, which joined the OECD on May 18, 1994, are not available.

Source: Table 11.10.

**Table 11.10 Petroleum Stocks in OECD Countries, End of Year 1973-1995**  
(Million Barrels)

Year	France	Germany <sup>1</sup>	Italy	United Kingdom	Other OECD <sup>2</sup>	OECD Europe	Canada	Japan	United States	Other OECD <sup>3</sup>	OECD
1973	201	181	152	156	380	1,070	140	303	1,008	67	2,588
1974	249	213	167	191	437	1,227	145	370	1,074	64	2,880
1975	225	187	143	165	434	1,154	174	375	1,133	67	2,903
1976	234	208	143	165	455	1,205	153	380	1,112	68	2,918
1977	239	225	161	148	495	1,268	167	409	1,312	68	3,224
1978	201	238	154	157	469	1,219	144	413	1,278	68	3,122
1979	226	272	163	169	523	1,353	150	460	1,341	75	3,379
1980	243	319	170	168	564	1,464	164	495	1,392	72	3,587
1981	214	297	167	143	516	1,337	161	482	1,484	67	3,531
1982	193	272	179	125	489	1,258	136	484	1,430	68	3,376
1983	153	249	149	118	473	1,142	121	470	1,454	68	3,255
1984	152	239	159	112	468	1,130	128	479	1,556	69	3,362
1985	139	233	157	123	440	1,092	113	494	1,519	66	3,284
1986	127	252	155	124	475	1,133	111	509	1,593	72	3,418
1987	127	259	169	121	454	1,130	126	540	1,607	71	3,474
1988	140	266	155	112	445	1,118	116	538	1,597	71	3,440
1989	138	271	164	118	442	1,133	114	577	1,581	71	3,476
1990	140	265	172	112	474	1,163	121	590	1,621	73	3,568
1991	153	288	160	119	461	1,181	119	606	1,617	65	3,588
1992	146	310	174	113	476	1,219	107	603	1,592	67	3,588
1993	158	309	163	118	475	1,221	105	618	1,647	69	3,661
1994	158	312	164	115	490	1,240	119	645	1,653	69	3,726
1995	159	301	162	107	499	1,228	109	630	1,563	71	3,601

<sup>1</sup> Through 1990, the data for Germany are for the former West Germany only. Beginning in 1991, the data for Germany are for the unified Germany, i.e., the former East Germany and West Germany.

<sup>2</sup> Organization for Economic Cooperation and Development (OECD). See Glossary for membership.

<sup>3</sup> Australia, New Zealand, and United States Territories. Data for Mexico, which joined the OECD on May 18, 1994, are not available.

Notes: • Includes crude oil, lease condensate, natural gas plant liquids, unfinished oils, and finished petroleum products. See Note 2 at end of section. • Organization for Economic Cooperation and

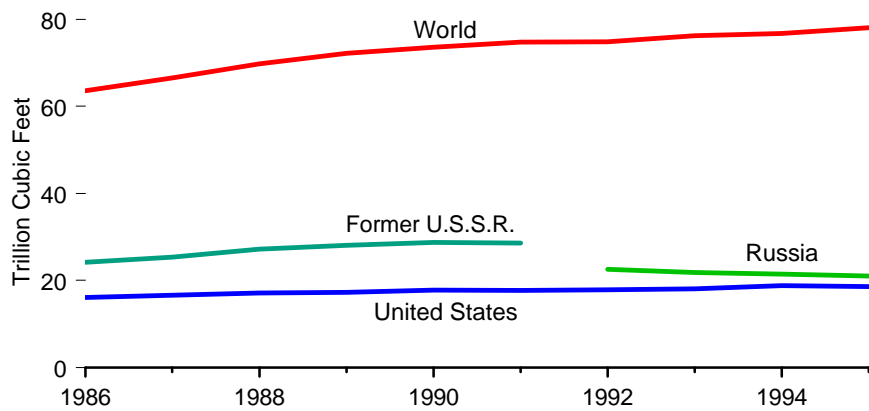
Development (OECD). See Glossary for membership. • Totals may not equal sum of components due to independent rounding.

Sources: **United States:** Table 5.14. **All Other Data:** • 1973-1982—Organization for Economic Cooperation and Development (OECD), *Quarterly Oil Statistics and Energy Balances*, various issues.

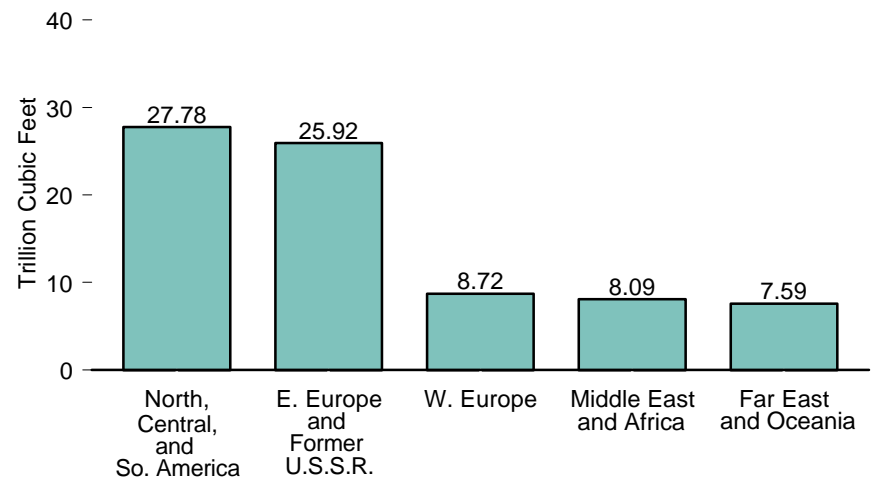
• 1983-1995 OECD *Monthly Oil Statistics* in the Energy Information Administration, International Energy Database, March 1997.

**Figure 11.11 World Dry Natural Gas Production**

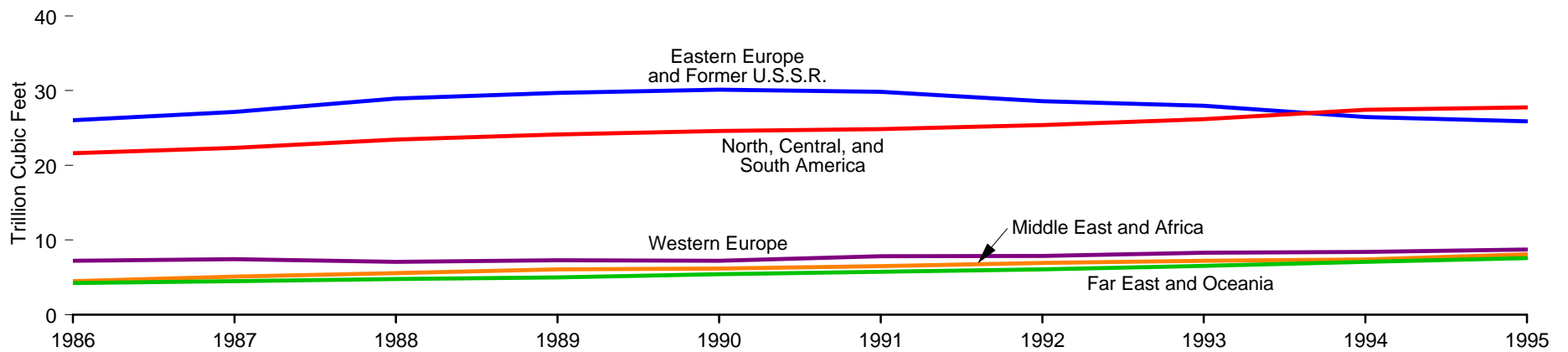
**World and Leading Producers, 1986-1995**



**World Areas, 1995**



**World Areas, 1986-1995**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 11.11.

**Table 11.11 World Dry Natural Gas Production, 1986-1995**  
(Trillion Cubic Feet)

Region and Country	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 <sup>P</sup>
<b>North, Central, and South America</b> .....	<b>21.62</b>	<b>22.33</b>	<b>23.47</b>	<b>24.16</b>	<b>24.62</b>	<b>24.84</b>	<b>25.42</b>	<b>26.20</b>	<sup>R</sup> 27.44	<b>27.78</b>
Argentina .....	0.55	0.53	0.63	0.72	0.63	0.70	0.71	0.76	<sup>R</sup> 0.79	0.89
Canada .....	2.86	3.10	3.57	3.80	3.85	4.06	4.52	4.91	<sup>R</sup> 5.26	5.60
Mexico .....	0.92	0.86	0.92	0.93	0.94	0.94	0.92	0.90	0.91	0.94
United States .....	16.06	16.62	17.10	17.31	17.81	17.70	17.84	18.10	<sup>R</sup> 18.82	18.60
Venezuela .....	0.67	0.66	0.66	0.77	0.76	0.79	0.76	0.82	0.88	0.93
Other .....	0.56	<sup>R</sup> 0.56	<sup>R</sup> 0.58	0.64	0.62	0.65	0.66	0.73	0.78	0.83
<b>Western Europe</b> .....	<sup>R</sup> 7.21	<sup>R</sup> 7.44	<sup>R</sup> 7.07	<sup>R</sup> 7.32	<sup>R</sup> 7.24	<b>7.83</b>	<b>7.89</b>	<b>8.32</b>	<sup>R</sup> 8.40	<b>8.72</b>
Germany <sup>1</sup> .....	<sup>R</sup> 0.85	<sup>R</sup> 0.92	<sup>R</sup> 0.90	<sup>R</sup> 0.86	<sup>R</sup> 0.72	0.67	0.68	0.68	<sup>R</sup> 0.67	0.72
Italy .....	0.56	0.58	0.59	0.60	0.61	0.61	0.64	0.69	0.73	0.71
Netherlands .....	2.76	2.77	2.45	2.67	2.69	3.04	3.06	3.11	2.95	2.98
Norway .....	0.99	1.06	1.05	1.09	0.98	0.97	1.04	0.97	1.04	1.07
United Kingdom .....	1.60	1.68	1.62	1.58	1.75	2.01	1.93	2.31	2.47	2.66
Other .....	0.45	0.44	<sup>R</sup> 0.47	0.51	0.50	0.53	0.54	0.56	0.54	0.56
<b>Eastern Europe and Former U.S.S.R.</b> .....	<b>26.03</b>	<b>27.14</b>	<b>28.95</b>	<b>29.70</b>	<b>30.13</b>	<b>29.85</b>	<sup>R</sup> 28.58	<sup>R</sup> 27.99	<sup>R</sup> 26.47	<b>25.92</b>
Romania .....	1.34	1.32	1.28	1.13	1.00	0.88	0.78	0.75	0.69	0.68
Former U.S.S.R. ....	24.19	25.36	27.19	28.11	28.78	28.62	—	—	—	—
Russia .....	—	—	—	—	—	—	22.62	<sup>R</sup> 21.81	<sup>R</sup> 21.45	21.01
Turkmenistan .....	—	—	—	—	—	—	<sup>R</sup> 2.02	<sup>R</sup> 2.29	1.26	1.14
Ukraine .....	—	—	—	—	—	—	0.74	0.68	<sup>R</sup> 0.64	0.62
Uzbekistan .....	—	—	—	—	—	—	1.51	1.59	1.67	1.70
Other .....	<sup>R</sup> 0.50	<sup>R</sup> 0.47	<sup>R</sup> 0.48	0.46	0.35	0.35	0.91	<sup>R</sup> 0.87	<sup>R</sup> 0.76	0.78
<b>Middle East and Africa</b> .....	<b>4.51</b>	<b>5.13</b>	<b>5.55</b>	<b>6.08</b>	<b>6.17</b>	<b>6.52</b>	<b>6.91</b>	<b>7.24</b>	<sup>R</sup> 7.41	<b>8.09</b>
Algeria .....	1.33	1.52	1.63	1.71	1.79	1.93	1.97	1.90	<sup>R</sup> 1.81	2.05
Egypt .....	0.20	0.22	0.24	0.27	0.29	0.32	0.35	0.40	0.42	0.44
Iran .....	0.54	<sup>R</sup> 0.57	0.71	0.78	0.84	0.92	0.88	0.96	1.12	1.24
Qatar .....	0.19	0.20	0.21	0.22	0.28	0.33	0.40	0.48	0.48	0.48
Saudi Arabia .....	0.89	0.95	1.03	1.05	1.08	1.13	1.20	1.27	1.33	1.42
United Arab Emirates .....	0.54	0.68	0.66	0.81	0.78	0.92	1.02	0.94	<sup>R</sup> 0.91	1.06
Other .....	<sup>R</sup> 0.83	1.00	1.07	1.24	1.13	0.98	1.08	1.30	<sup>R</sup> 1.34	1.39
<b>Far East and Oceania</b> .....	<sup>R</sup> 4.22	<b>4.50</b>	<b>4.78</b>	<b>4.98</b>	<b>5.44</b>	<b>5.76</b>	<b>6.07</b>	<b>6.55</b>	<sup>R</sup> 7.09	<b>7.59</b>
Australia .....	0.52	0.53	0.56	0.57	0.72	0.75	0.82	0.86	<sup>R</sup> 0.92	1.05
China .....	0.48	0.49	0.49	0.51	0.51	0.53	0.53	0.56	0.59	0.60
India .....	0.18	0.23	0.31	0.32	0.40	0.45	0.48	0.53	0.59	0.66
Indonesia .....	1.18	1.29	1.34	1.42	1.53	1.72	1.79	1.97	<sup>R</sup> 2.21	2.23
Malaysia .....	0.53	0.55	0.58	0.61	0.65	0.75	0.80	0.88	0.92	1.05
Pakistan .....	0.39	0.42	0.44	0.47	0.48	0.53	0.55	0.58	0.63	0.64
Other .....	<sup>R</sup> 0.94	0.98	<sup>R</sup> 1.06	<sup>R</sup> 1.09	1.15	1.03	1.10	1.16	1.23	1.36
<b>World</b> .....	<sup>R</sup> 63.59	<sup>R</sup> 66.54	<sup>R</sup> 69.81	<sup>R</sup> 72.25	<sup>R</sup> 73.61	<b>74.81</b>	<sup>R</sup> 74.87	<sup>R</sup> 76.30	<b>76.80</b>	<b>78.10</b>

<sup>1</sup> Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.

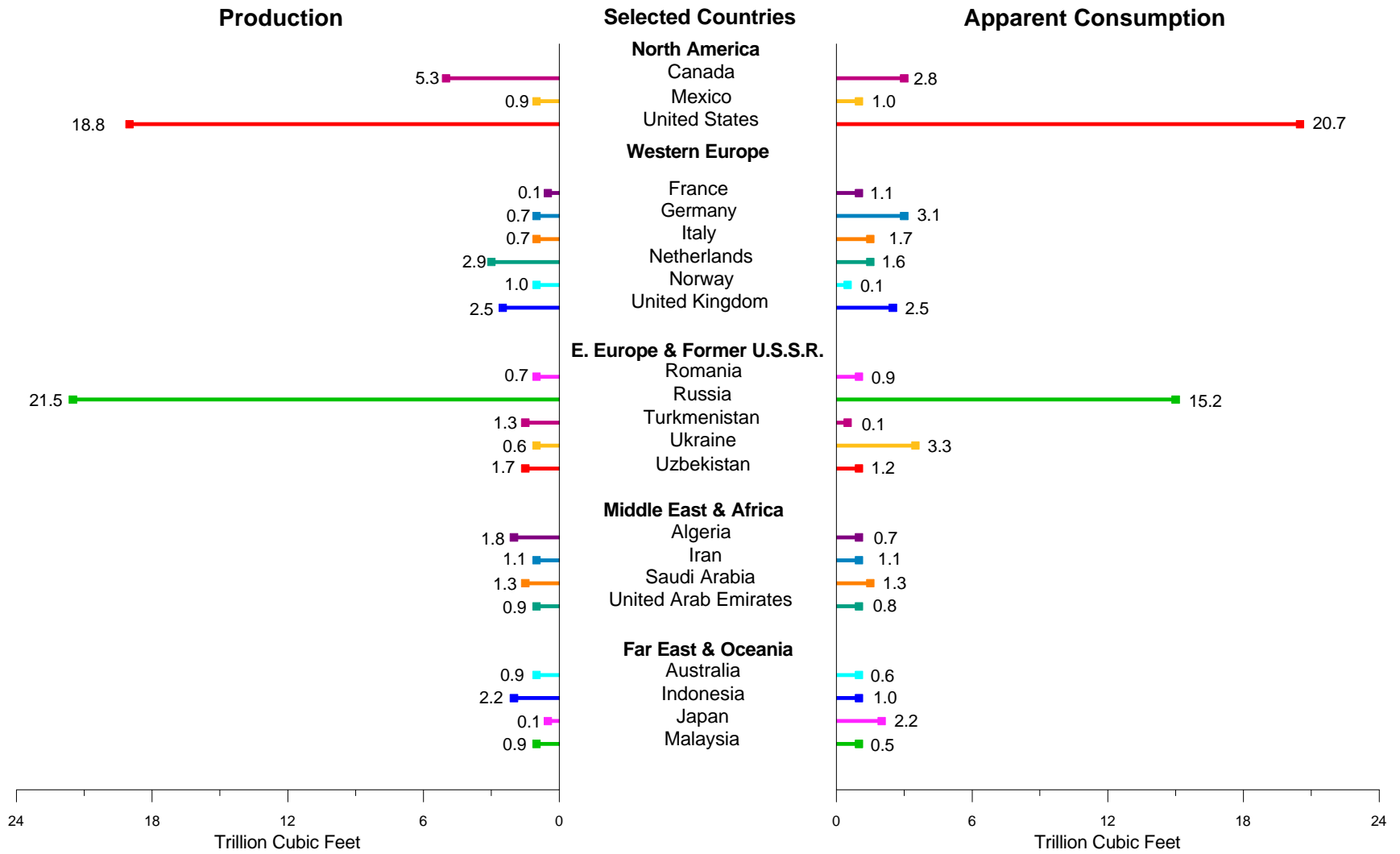
R=Revised data. P=Preliminary data. — = Not applicable.

Note: Totals may not equal sum of components due to independent rounding and the inclusion of more

recent U.S. data from an alternative source.

Sources: **United States:** Table 6.1. **All Other Data:** Energy Information Administration, *International Energy Annual 1995* (December 1996), Table 2.4, and the International Energy Database, March 1997.

**Figure 11.12 World Dry Natural Gas Supply and Disposition, 1994**



Source: Table 11.12.

**Table 11.12 World Dry Natural Gas Supply and Disposition, 1994**  
(Billion Cubic Feet)

Region and Country	Supply		Disposition	
	Dry Natural Gas Production	Imports <sup>1</sup>	Exports <sup>1</sup>	Apparent Consumption
<b>North, Central, and South America</b> .....	<b>27,439.19</b>	<b>2,777.55</b>	<b>2,760.58</b>	<b>26,924.62</b>
Argentina .....	786.46	69.92	0.00	856.39
Canada .....	5,264.81	36.66	2,521.60	2,823.33
Mexico .....	912.89	46.97	7.06	952.80
United States .....	18,821.03	2,623.84	161.74	20,707.72
Venezuela .....	876.16	0.00	0.00	876.16
Other .....	777.87	0.00	69.92	707.94
<b>Western Europe</b> .....	<b>8,396.93</b>	<b>6,241.72</b>	<b>2,575.63</b>	<b>12,001.67</b>
Belgium and Luxembourg .....	0.04	424.38	0.00	420.32
France .....	121.05	1,091.59	25.96	1,133.86
Germany .....	672.54	2,516.79	71.37	3,088.26
Italy .....	728.80	1,029.64	1.17	1,748.13
Netherlands .....	2,945.55	129.78	1,436.76	1,647.71
Norway .....	1,040.38	0.00	947.50	92.88
United Kingdom .....	2,466.05	107.00	30.72	2,542.33
Other .....	422.52	942.54	62.15	1,328.18
<b>Eastern Europe and Former U.S.S.R.</b> .....	<b>26,465.38</b>	<b>5,651.81</b>	<b>8,196.62</b>	<b>23,889.00</b>
Belarus .....	10.24	487.35	0.00	497.59
Hungary .....	171.98	183.64	0.00	355.62
Kazakstan .....	158.92	455.56	84.76	529.72
Poland .....	163.51	218.95	0.00	382.46
Romania .....	691.82	158.92	0.00	850.74
Russia .....	21,450.33	257.80	6,494.43	15,213.70
Turkmenistan .....	1,257.21	0.00	1,108.89	148.32
Ukraine .....	642.73	2,683.94	0.00	3,326.67
Uzbekistan .....	1,666.87	70.63	508.54	1,228.96
Other .....	251.77	1,135.02	0.00	1,355.22
<b>Middle East and Africa</b> .....	<b>7,412.21</b>	<b>60.50</b>	<b>1,322.20</b>	<b>6,150.05</b>
Algeria .....	1,806.72	0.00	1,116.31	690.41
Egypt .....	423.42	0.00	0.00	423.42
Iran .....	1,123.02	0.00	0.00	1,123.02
Qatar .....	476.74	0.00	0.00	476.74
Saudi Arabia .....	1,331.37	0.00	0.00	1,331.37
United Arab Emirates .....	911.83	4.00	150.09	765.28
Other .....	1,339.11	56.50	55.80	1,339.81
<b>Far East and Oceania</b> .....	<b>7,086.44</b>	<b>2,524.74</b>	<b>2,226.18</b>	<b>7,400.00</b>
Australia .....	918.61	0.00	271.15	647.46
China .....	588.70	0.00	0.00	588.70
India .....	593.64	0.00	0.00	593.64
Indonesia .....	2,206.47	0.00	1,241.32	965.15
Japan .....	80.27	2,084.72	0.00	2,179.75
Malaysia .....	922.78	0.00	441.08	481.70
Pakistan .....	627.19	0.00	0.00	627.19
Other .....	1,148.78	440.02	272.63	1,316.41
<b>World</b> .....	<b>76,800.15</b>	<b>17,256.32</b>	<b>17,081.21</b>	<b>76,365.34</b>

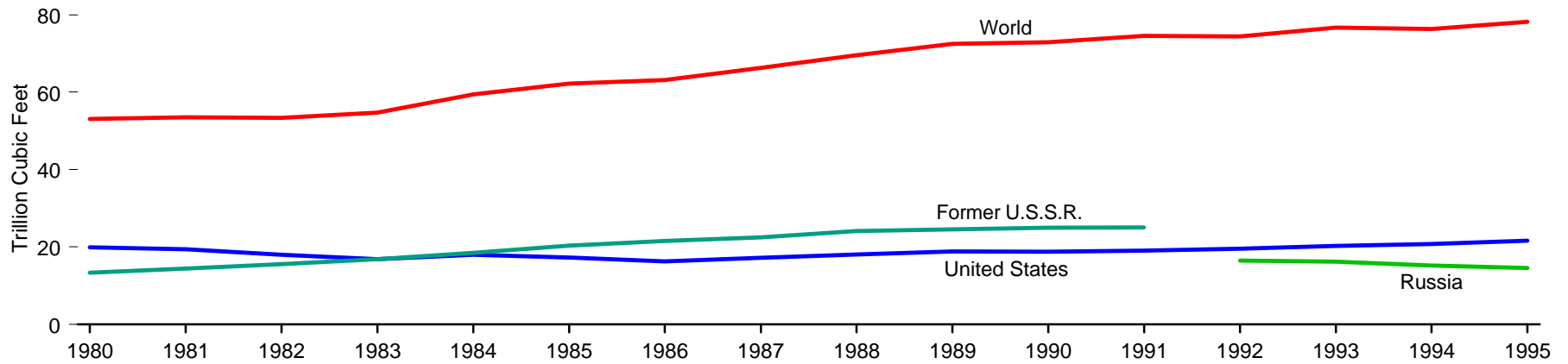
<sup>1</sup> Includes liquefied natural gas.

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

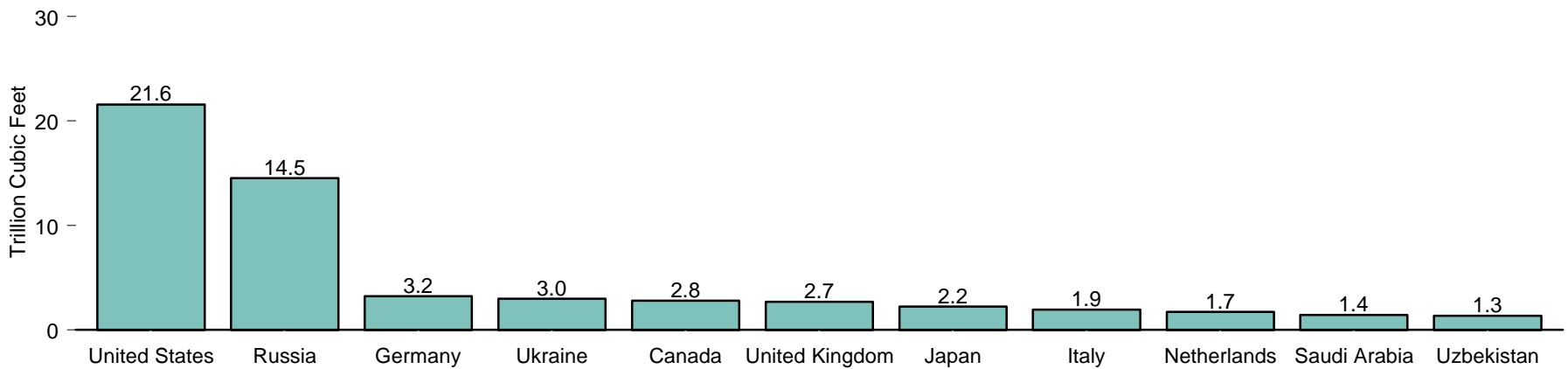
Sources: **United States:** Table 6.1. **All Other Data:** Energy Information Administration, *International Energy Annual 1995* (December 1996), Table 4.2, and the International Energy Database, March 1997.

**Figure 11.13 World Dry Natural Gas Consumption**

**World and Leading Consumers, 1980-1995**



**Top Consuming Countries, 1995**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 11.13.

**Table 11.13 World Dry Natural Gas Consumption, 1980-1995**  
(Billion Cubic Feet)

Year	Canada	France	Germany <sup>1</sup>	Indonesia	Iran	Italy	Japan	Nether-lands	Former U.S.S.R.	Russia	Saudi Arabia	Ukraine	United Kingdom	United States	Uzbek-istan	Other	World
1980	1,883	1,006	R2,621	195	232	973	903	1,493	13,328	—	R334	—	1,702	19,877	—	R8,521	R53,068
1981	1,708	996	R2,513	232	155	983	886	1,421	14,440	—	R564	—	1,671	19,404	—	R8,502	R53,475
1982	1,664	913	R2,334	218	200	989	919	1,511	15,522	—	R430	—	1,570	18,001	—	R9,048	R53,319
1983	1,807	1,049	R2,397	302	310	1,009	1,008	1,371	16,822	—	R418	—	1,774	16,835	—	R9,590	R54,692
1984	1,855	1,029	R2,584	365	476	1,171	1,367	1,395	18,512	—	R620	—	1,900	17,951	—	R10,235	R59,460
1985	2,165	1,120	R2,546	513	600	1,156	1,468	1,613	20,302	—	716	—	1,991	17,281	—	R10,770	R62,240
1986	2,131	1,127	R2,595	441	536	1,238	1,494	1,620	21,522	—	890	—	2,020	16,221	—	R11,358	R63,192
1987	2,112	1,057	R2,733	542	565	1,371	1,543	1,672	22,462	—	946	—	2,079	17,211	—	R11,989	R66,283
1988	2,331	961	R2,716	492	706	1,460	1,618	1,513	24,092	—	1,028	—	1,972	18,030	—	R12,655	R69,573
1989	2,498	991	R2,835	546	784	1,578	1,731	1,550	24,529	—	1,052	—	1,951	18,801	—	R13,672	R72,518
1990	2,378	1,022	R2,669	547	837	1,672	1,851	1,538	24,961	—	1,077	—	2,059	18,716	—	R13,634	R72,961
1991	2,400	1,143	2,883	557	811	1,773	1,976	1,715	25,014	—	1,130	—	2,218	19,035	—	R13,868	R74,523
1992	2,596	1,139	2,858	673	883	1,757	2,023	1,669	—	R16,482	1,201	R3,503	2,127	19,544	R1,095	R16,893	R74,443
1993	2,713	R1,173	3,042	850	938	1,801	1,949	1,696	—	R16,185	1,268	R3,871	2,440	20,279	1,541	R16,941	R76,686
1994	R2,823	R1,134	R3,088	965	1,123	R1,748	R2,180	R1,648	—	R15,214	1,331	R3,327	R2,542	R20,708	R1,229	R17,305	R76,365
1995 <sup>P</sup>	2,788	1,198	3,218	1,059	1,236	1,928	2,211	1,701	—	14,507	1,425	2,971	2,692	21,581	1,349	18,345	78,209

<sup>1</sup> Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.

R=Revised data. P=Preliminary data. — = Not applicable.

Note: Totals may not equal sum of components due to independent rounding and the inclusion of more

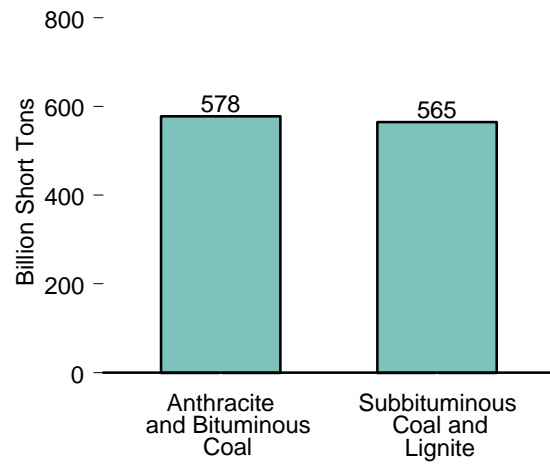
recent U.S. data from an alternative source.

Sources: **United States:** Table 6.1. **All Other Data:** Energy Information Administration, *International Energy Annual 1995* (December 1996), Table 1.3, and the International Energy Database, March 1997.

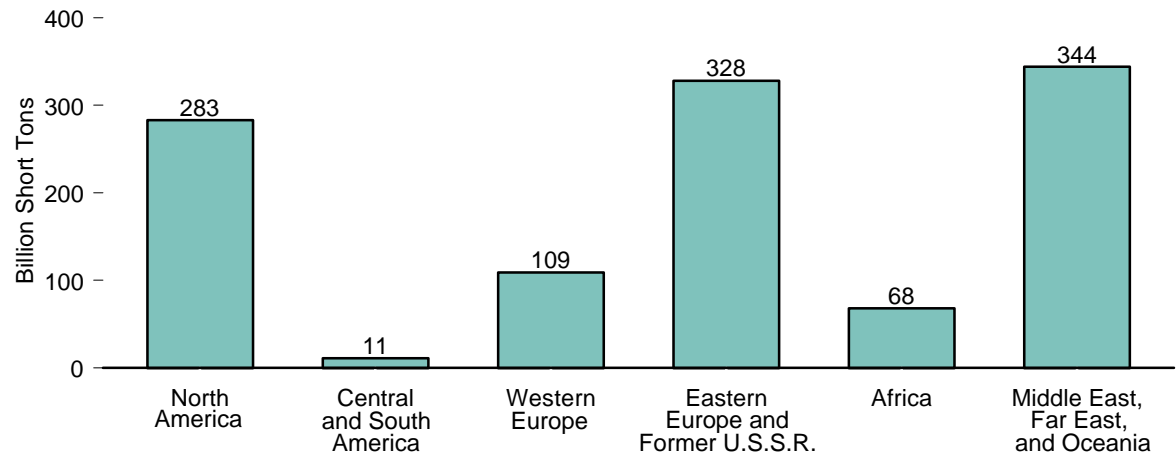


**Figure 11.14 World Recoverable Reserves of Coal**

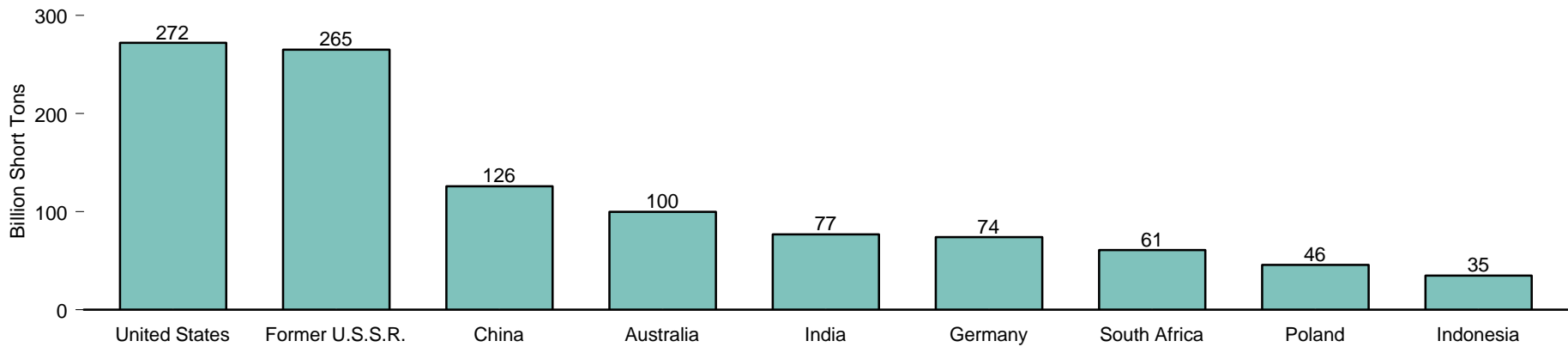
**By Type**



**By Region**



**By Selected Country**



Notes: • Recoverable reserves are as of December 31, 1993, except for U. S. recoverable reserves, which are as of January 1, 1996. • Because vertical scales differ,

graphs should not be compared.  
Source: Table 11.14.

**Table 11.14 World Recoverable Reserves of Coal**  
(Million Short Tons)

Region and Country	Anthracite and Bituminous Coal	Subbituminous Coal and Lignite	Total
<b>North America</b> .....	<b>128,647</b>	<b>154,272</b>	<b>282,919</b>
Canada .....	4,970	4,535	9,505
Greenland .....	0	202	202
Mexico .....	948	387	1,335
United States <sup>1</sup> .....	122,729	149,148	271,877
<b>Central and South America</b> .....	<b>6,227</b>	<b>5,013</b>	<b>11,240</b>
Brazil .....	0	3,136	3,136
Chile .....	34	1,268	1,302
Colombia .....	4,674	330	5,003
Peru .....	1,058	110	1,168
Other .....	461	170	631
<b>Western Europe</b> .....	<b>30,544</b>	<b>78,281</b>	<b>108,825</b>
Germany .....	26,455	47,730	74,186
Greece .....	0	3,307	3,307
Spain .....	937	661	1,598
Turkey .....	179	7,701	7,879
United Kingdom .....	2,205	551	2,756
Former Yugoslavia .....	70	18,152	18,222
Other .....	698	179	877
<b>Eastern Europe and Former U.S.S.R.</b> .....	<b>149,200</b>	<b>179,232</b>	<b>328,431</b>
Albania .....	0	(s)	(s)
Bulgaria .....	14	2,974	2,988
Czech Republic .....	1,810	3,858	5,668
Hungary .....	657	4,260	4,917
Poland .....	32,077	14,330	46,407
Romania .....	1	3,436	3,437
Slovakia .....	0	251	251
Former U.S.S.R. ....	114,640	150,122	264,762
<b>Africa</b> .....	<b>66,585</b>	<b>1,397</b>	<b>67,982</b>
Botswana .....	3,858	0	3,858
South Africa .....	60,994	0	60,994
Swaziland .....	128	1,101	1,229
Zimbabwe .....	809	0	809
Other .....	796	295	1,091
<b>Middle East, Far East, and Oceania</b> .....	<b>196,630</b>	<b>146,941</b>	<b>343,571</b>
Australia .....	49,979	50,265	100,244
China .....	68,564	57,651	126,215
India .....	75,009	2,094	77,103
Indonesia .....	1,060	34,283	35,343
Japan .....	886	19	905
Pakistan .....	0	809	809
Thailand .....	(s)	1,101	1,101
Other .....	1,132	719	1,850
<b>World</b> .....	<b>577,833</b>	<b>565,136</b>	<b>1,142,968</b>

<sup>1</sup> U.S. data are more current than other data on this table. They represent recoverable reserves as of January 1, 1996; data for the other countries are as of December 31, 1993, the most recent period for which they are available. U.S. reserves represent both measured and indicated tonnage. The U.S. term "measured" approximates the term "proved," which is used by the World Energy Council. The U.S. "measured and indicated" data have been combined prior to depletion adjustments and cannot be recaptured as "measured alone."

(s)=Less than 500 thousand short tons. NA=Not available.

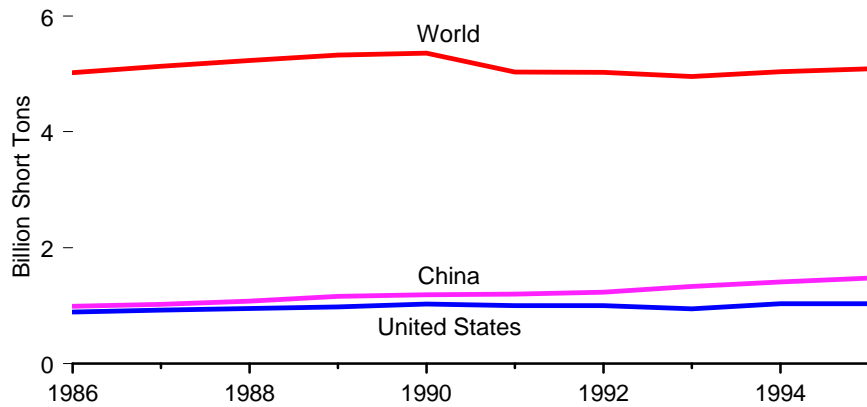
Notes: • World Energy Council definition of "Proved Recoverable Reserves" is the tonnage of Proved

Amount in Place that can be recovered (extracted from the earth in raw form) under present and expected local economic conditions with existing technology. • The EIA does not certify the international reserves data but reproduces the information as a matter of convenience for the reader. • Totals may not equal sum of components due to independent rounding.

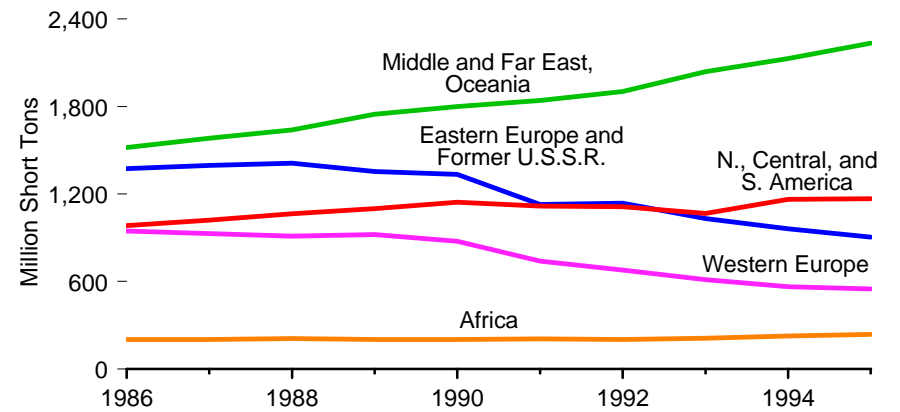
Sources: **United States:** Energy Information Administration, Unpublished File Data of the Coal Reserves Database, (September 1996). **All Other Data:** World Energy Council, *1995 Survey of Energy Resources*. World Energy Conference (1995).

**Figure 11.15 World Coal Production**

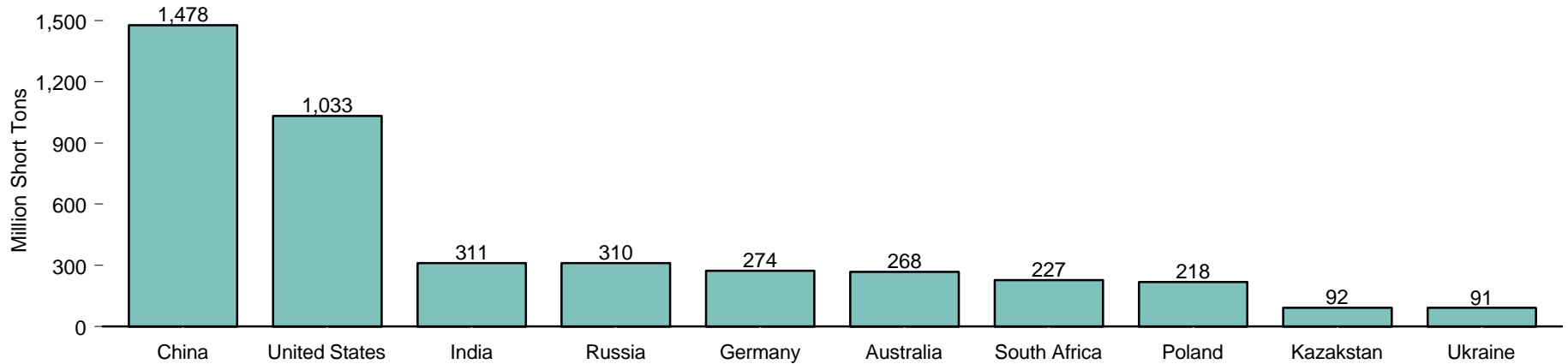
**World and Leading Producers, 1986-1995**



**World Areas, 1986-1995**



**Top Producing Countries, 1995**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 11.15.

**Table 11.15 World Coal Production, 1986-1995**  
(Million Short Tons)

Region and Country	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 <sup>P</sup>
<b>North, Central, and South America</b> .....	<b>984</b>	<b>1,021</b>	<b>1,065</b>	<b>1,100</b>	<b>R1,144</b>	<b>R1,118</b>	<b>1,113</b>	<b>1,066</b>	<b>1,163</b>	<b>1,167</b>
Canada .....	64	67	78	78	75	78	72	76	80	83
Colombia .....	12	16	17	21	23	26	26	26	28	29
Mexico .....	7	9	8	8	R7	R6	7	7	10	10
United States .....	890	919	950	981	1,029	996	998	945	1,034	1,033
Other .....	11	10	12	13	10	11	10	11	R12	13
<b>Western Europe</b> .....	<b>R945</b>	<b>R929</b>	<b>R912</b>	<b>R921</b>	<b>R875</b>	<b>R739</b>	<b>R678</b>	<b>R612</b>	<b>R564</b>	<b>548</b>
France .....	20	R20	16	16	R15	R14	R13	R12	R11	10
Germany <sup>1</sup> .....	568	554	552	R541	R514	R388	346	R315	R292	274
Greece .....	42	49	53	57	57	58	61	60	63	64
Serbia and Montenegro .....	—	—	—	—	—	—	47	41	41	44
Spain .....	52	47	45	48	R40	R37	R37	R35	R33	31
Turkey .....	R51	R52	R43	R58	R52	R51	57	R54	60	60
United Kingdom .....	119	115	115	111	R106	R107	R95	R76	R54	52
Former Yugoslavia .....	77	79	80	82	84	78	—	—	—	—
Other .....	15	12	8	7	R7	R6	R22	R19	12	12
<b>Eastern Europe and Former U.S.S.R.</b> .....	<b>1,374</b>	<b>1,397</b>	<b>1,411</b>	<b>R1,354</b>	<b>1,335</b>	<b>1,129</b>	<b>R1,137</b>	<b>R1,031</b>	<b>R962</b>	<b>904</b>
Bulgaria .....	39	41	38	38	35	31	33	32	32	31
Czech Republic .....	—	—	—	—	—	—	—	R77	R82	79
Estonia .....	—	—	—	—	—	—	21	16	16	15
Hungary .....	25	25	23	22	19	19	R17	R16	R16	15
Kazakstan .....	—	—	—	—	—	—	R139	R123	R115	92
Poland .....	286	293	294	275	237	231	219	219	R221	218
Romania .....	52	57	65	R69	42	36	R42	R43	R45	44
Former U.S.S.R. .....	828	838	851	816	882	702	—	—	—	—
Russia .....	—	—	—	—	—	—	R406	R364	R320	310
Ukraine .....	—	—	—	—	—	—	147	128	R104	91
Other .....	143	143	141	134	120	R110	R112	R12	R10	8
<b>Africa</b> .....	<b>202</b>	<b>203</b>	<b>208</b>	<b>202</b>	<b>201</b>	<b>205</b>	<b>201</b>	<b>R211</b>	<b>225</b>	<b>236</b>
South Africa .....	195	195	200	194	193	196	192	R203	216	227
Other .....	7	8	8	8	8	9	9	8	9	9
<b>Middle East, Far East, and Oceania</b> .....	<b>R1,517</b>	<b>R1,582</b>	<b>R1,639</b>	<b>1,747</b>	<b>R1,801</b>	<b>R1,842</b>	<b>R1,903</b>	<b>R2,038</b>	<b>R2,127</b>	<b>2,235</b>
Australia .....	187	209	196	216	226	236	R249	R248	R249	268
China .....	986	1,023	1,080	1,162	1,190	1,199	1,231	1,331	1,410	1,478
India .....	207	209	R215	R221	R233	R253	R263	290	R296	311
Indonesia .....	3	4	5	9	12	15	23	30	32	41
Japan .....	15	15	14	13	11	10	9	8	8	7
Mongolia .....	9	9	10	10	10	9	8	8	8	8
North Korea .....	R61	R62	R66	R69	R71	R73	74	78	R78	78
South Korea .....	27	27	27	23	19	17	13	10	8	6
Thailand .....	6	8	8	10	14	16	17	17	19	19
Other .....	17	17	18	14	15	15	16	18	18	18
<b>World</b> .....	<b>R5,022</b>	<b>R5,131</b>	<b>R5,235</b>	<b>R5,324</b>	<b>R5,356</b>	<b>R5,033</b>	<b>R5,030</b>	<b>R4,958</b>	<b>R5,041</b>	<b>5,091</b>

<sup>1</sup> Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.

R=Revised data. P=Preliminary data. — = Not applicable.

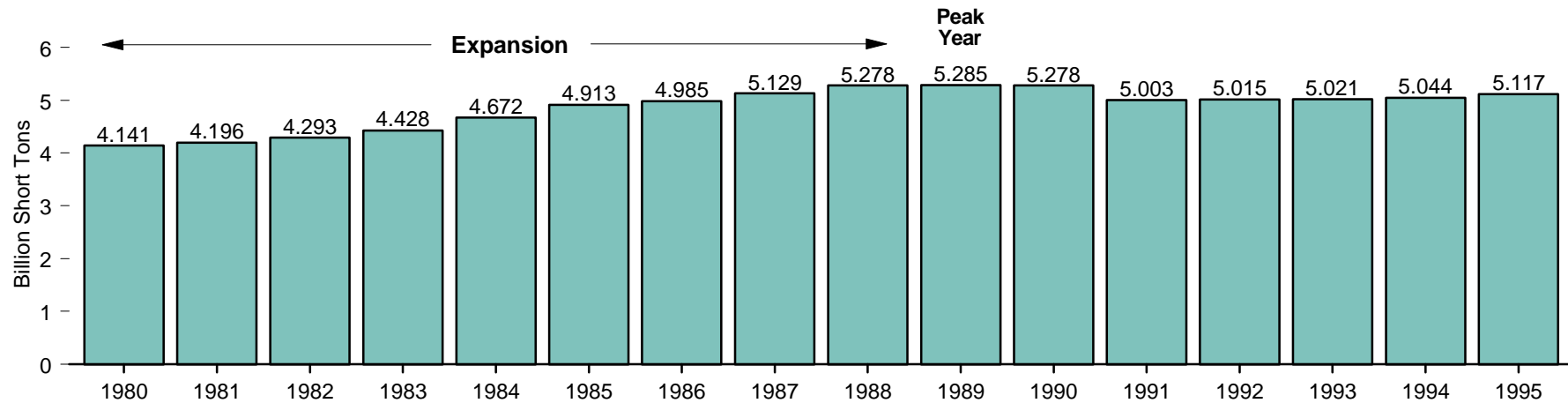
Notes: • Coal includes anthracite, subanthracite, bituminous coal, subbituminous coal, lignite, and

brown coal. • Totals may not equal sum of components due to independent rounding.

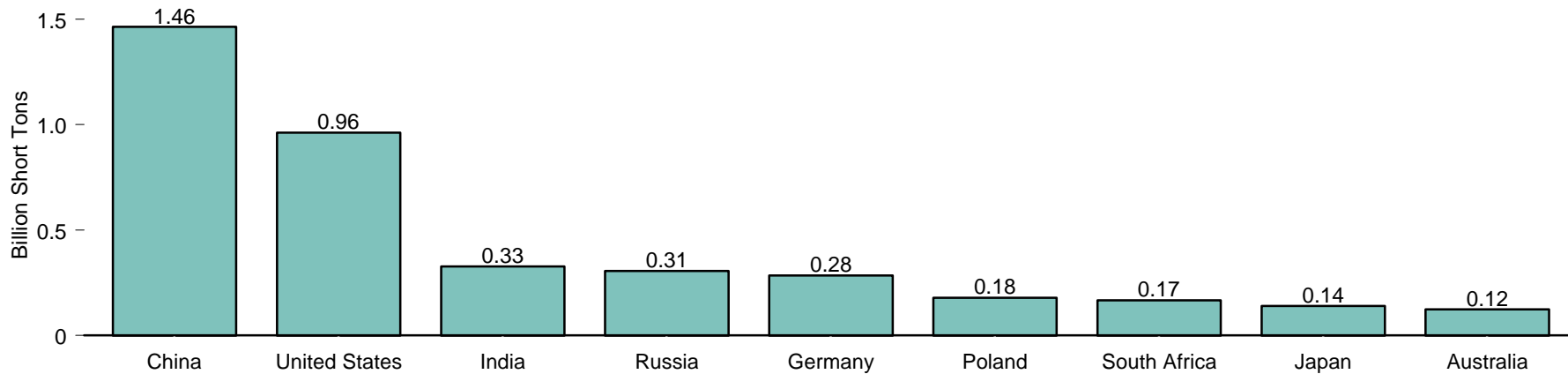
Source: Energy Information Administration, *International Energy Annual 1995* (December 1996), Table 2.5, and the International Energy Database, March 1997.

**Figure 11.16 World Coal Consumption**

**World Total, 1980-1995**



**Top Consuming Countries, 1995**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 11.16.

**Table 11.16 World Coal Consumption, 1980-1995**  
(Million Short Tons)

Year	Australia	China	Germany <sup>1</sup>	Greece	India	Japan	North Korea	Poland	Former U.S.S.R.	Russia	South Africa	Turkey	Ukraine	United Kingdom	United States	Other	World
1980	74	R679	R536	26	130	98	R51	221	751	—	105	20	—	R134	R703	R614	R4,141
1981	75	R680	544	30	139	106	R51	200	R749	—	R116	23	—	130	R733	R619	R4,196
1982	80	R726	548	31	147	105	R53	208	R771	—	R124	26	—	122	R707	R647	R4,293
1983	78	R768	549	36	161	100	R56	213	R764	—	127	29	—	123	R737	R686	R4,428
1984	R81	R847	R573	36	180	113	R61	227	R770	—	137	35	—	88	R791	R733	R4,672
1985	86	R921	585	42	194	119	R62	238	R779	—	142	46	—	116	R818	R765	R4,913
1986	R84	R962	576	44	208	109	R63	247	R803	—	145	55	—	123	R804	R762	R4,985
1987	93	R1,027	565	49	206	111	R65	258	R807	—	148	54	—	129	R837	R780	R5,129
1988	96	R1,098	R562	56	R215	123	R69	R253	R821	—	R151	46	—	123	R884	R782	R5,278
1989	104	R1,113	553	59	R226	123	R72	242	777	—	R140	60	—	126	R890	R799	R5,285
1990	R117	R1,124	R528	59	R242	R123	R74	202	848	—	R139	57	—	R118	R895	R751	R5,278
1991	R112	1,165	402	61	252	R131	R75	202	R672	—	R144	64	—	R120	R888	R716	R5,003
1992	R114	R1,201	R367	64	266	R125	76	192	—	R400	R138	65	153	R112	R907	R833	R5,015
1993	R102	1,303	R331	61	295	R126	80	194	—	R361	R146	62	132	97	R944	R786	R5,021
1994	R98	R1,397	R303	63	R309	R134	R80	R185	—	R323	R161	67	R111	R90	R951	R773	R5,044
1995 <sup>P</sup>	123	1,464	284	67	327	140	81	178	—	306	166	67	94	89	962	769	5,117

<sup>1</sup> Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.

R=Revised data. P=Preliminary data. — = Not applicable.

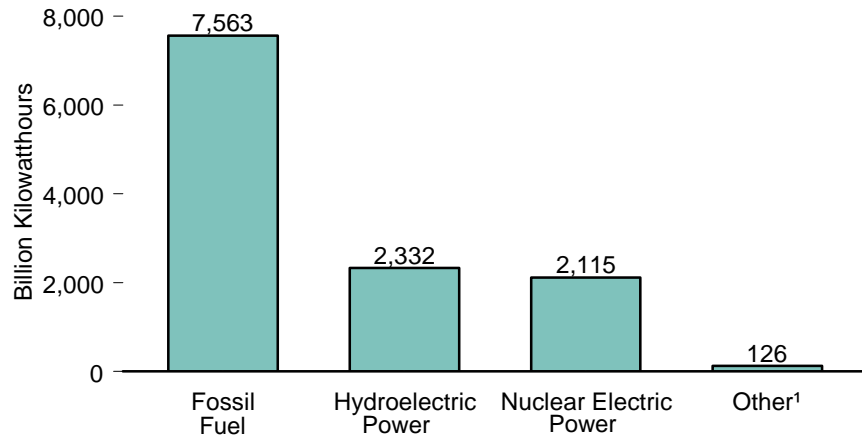
Notes: • Totals may not equal sum of components due to independent rounding and the inclusion of

more recent U.S. data from an alternative source.

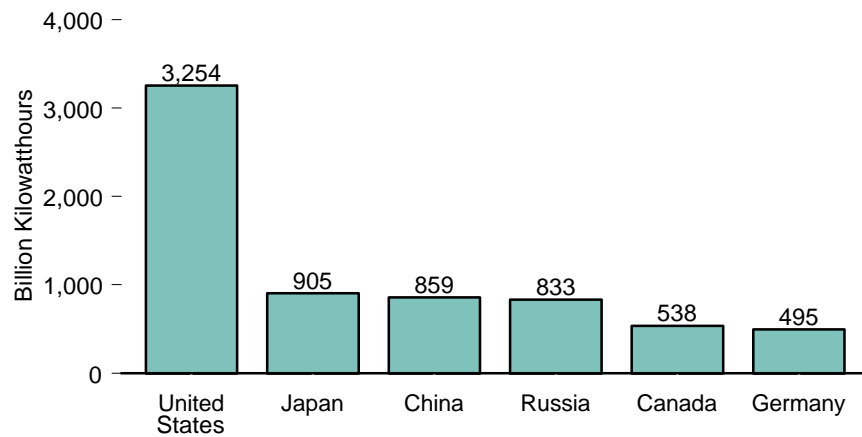
Sources: **United States:** Table 7.1. **All Other Data:** Energy Information Administration, *International Energy Annual 1995* (December 1996), Table 1.4, and the International Energy Database, March 1997.

**Figure 11.17 World Net Generation of Electricity, 1994**

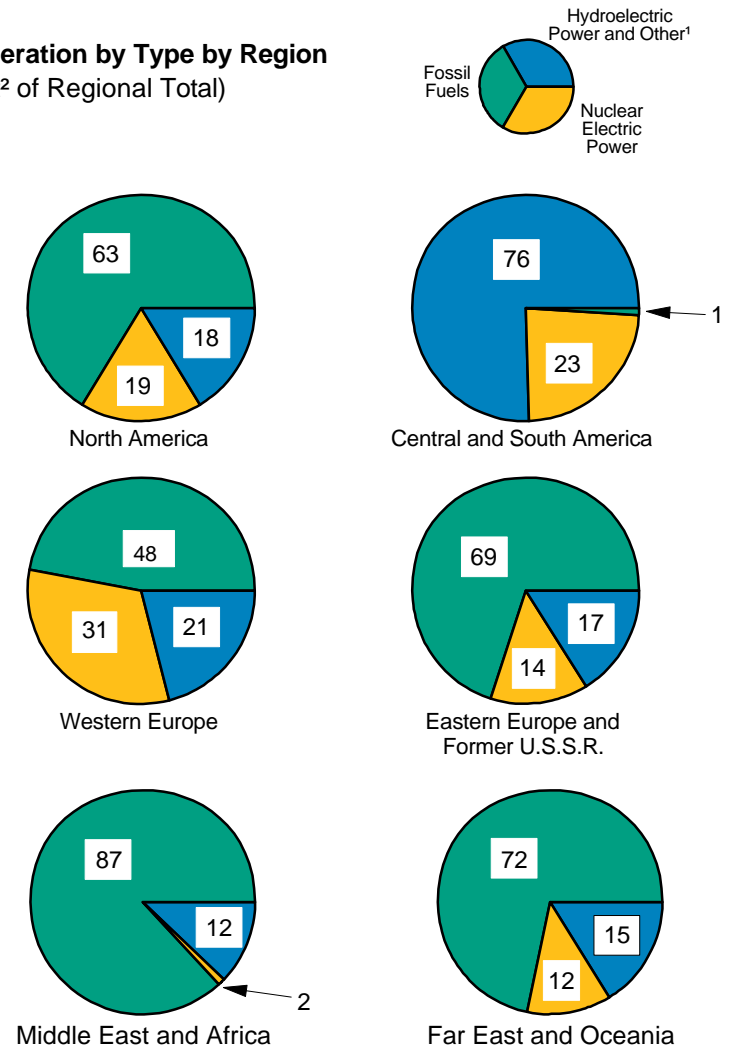
**Net Generation by Type**



**Net Generation in Leading Countries**



**Net Generation by Type by Region (Percent<sup>2</sup> of Regional Total)**



<sup>1</sup> Geothermal, biofuels, wind, photovoltaic, and solar thermal generation.

<sup>2</sup> Sum of components may not equal 100 percent due to independent rounding.

Notes: • Data include both electric utility and non-electric utility sources.

• Because vertical scales differ, graphs should not be compared.

Source: Table 11.17.

**Table 11.17 World Net Generation of Electricity by Type, 1994**  
(Billion Kilowatthours)

Region and Country	Fossil Fuel	Nuclear Electric Power	Hydro-electric Power <sup>1</sup>	Other <sup>2</sup>	Total
<b>North America</b> .....	<b>2,485.9</b>	<b>746.2</b>	<b>601.4</b>	<b>98.8</b>	<b>3,932.4</b>
Canada .....	111.1	101.7	324.7	0.1	537.7
Mexico .....	111.0	4.0	19.8	5.3	140.2
United States .....	2,263.1	640.5	256.8	93.4	3,253.8
Other .....	0.8	0.0	0.0	0.0	0.8
<b>Central and South America</b> .....	<b>134.5</b>	<b>7.9</b>	<b>446.0</b>	<b>8.0</b>	<b>596.3</b>
Argentina .....	28.7	7.8	27.1	0.0	63.6
Brazil .....	10.0	0.1	240.5	6.7	257.2
Colombia .....	10.5	0.0	32.0	0.0	42.5
Venezuela .....	20.4	0.0	50.9	0.0	71.3
Other .....	64.9	0.0	95.5	1.3	161.7
<b>Western Europe</b> .....	<b>1,176.1</b>	<b>771.9</b>	<b>497.6</b>	<b>7.7</b>	<b>2,453.4</b>
Belgium .....	28.6	38.6	0.3	(s)	67.5
Finland .....	32.3	18.5	11.7	0.0	62.4
France .....	32.6	342.0	76.5	0.5	451.6
Germany .....	331.9	143.6	18.3	1.3	495.3
Italy .....	169.5	0.0	44.2	3.5	217.2
Netherlands .....	70.8	3.8	0.1	0.2	74.9
Norway .....	0.6	0.0	111.2	(s)	111.9
Spain .....	72.4	52.5	27.9	0.1	153.0
Sweden .....	9.7	69.5	58.2	0.1	137.4
Switzerland .....	1.3	23.1	38.6	(s)	63.1
Turkey .....	44.8	0.0	30.3	0.1	75.1
United Kingdom .....	222.4	76.0	5.0	0.3	303.7
Other .....	159.3	4.3	75.3	1.4	240.2
<b>Eastern Europe and Former U.S.S.R.</b> .....	<b>1,100.3</b>	<b>217.7</b>	<b>273.4</b>	<b>(s)</b>	<b>1,591.4</b>
Czech Republic .....	41.3	12.3	1.8	0.0	55.4
Kazakhstan .....	53.8	0.4	9.1	0.0	63.2
Poland .....	123.7	0.0	3.7	0.0	127.4
Russia .....	565.0	92.9	175.2	(s)	833.2
Ukraine .....	114.5	65.4	11.7	0.0	191.6
Other .....	201.9	46.8	72.0	0.0	320.6
<b>Middle East</b> .....	<b>258.9</b>	<b>0.0</b>	<b>15.5</b>	<b>(s)</b>	<b>274.4</b>
Iran .....	67.4	0.0	7.4	0.0	74.8
Saudi Arabia .....	62.8	0.0	0.0	0.0	62.8
Other .....	128.7	0.0	8.1	(s)	136.9
<b>Africa</b> .....	<b>261.3</b>	<b>9.7</b>	<b>53.4</b>	<b>0.3</b>	<b>324.8</b>
Egypt .....	39.4	0.0	8.5	0.0	47.9
South Africa .....	148.0	9.7	1.1	0.0	158.8
Other .....	73.9	0.0	43.9	0.3	118.1
<b>Far East and Oceania</b> .....	<b>2,146.3</b>	<b>362.0</b>	<b>444.8</b>	<b>11.0</b>	<b>2,964.1</b>
Australia .....	141.3	0.0	16.4	(s)	157.8
China .....	684.2	13.5	161.3	0.0	859.0
India .....	289.2	4.7	70.4	0.1	364.4
Indonesia .....	45.1	0.0	12.1	1.1	58.3
Japan .....	580.4	255.7	66.6	1.8	904.5
South Korea .....	96.1	55.7	4.1	0.0	155.9
Taiwan .....	76.6	31.8	8.8	0.0	117.2
Thailand .....	65.7	0.0	4.5	0.0	70.2
Other .....	167.5	0.6	100.7	8.1	276.9
<b>World</b> .....	<b>7,563.3</b>	<b>2,115.4</b>	<b>2,332.2</b>	<b>125.7</b>	<b>12,136.6</b>

<sup>1</sup> Excludes pumped storage, except for the United States.

<sup>2</sup> Geothermal, biofuels, wind, photovoltaic, and solar thermal generation.

(s)=Less than 50 million kilowatthours.

Notes: • Data include both electric utility and non-electric utility sources. • Totals may not equal sum of

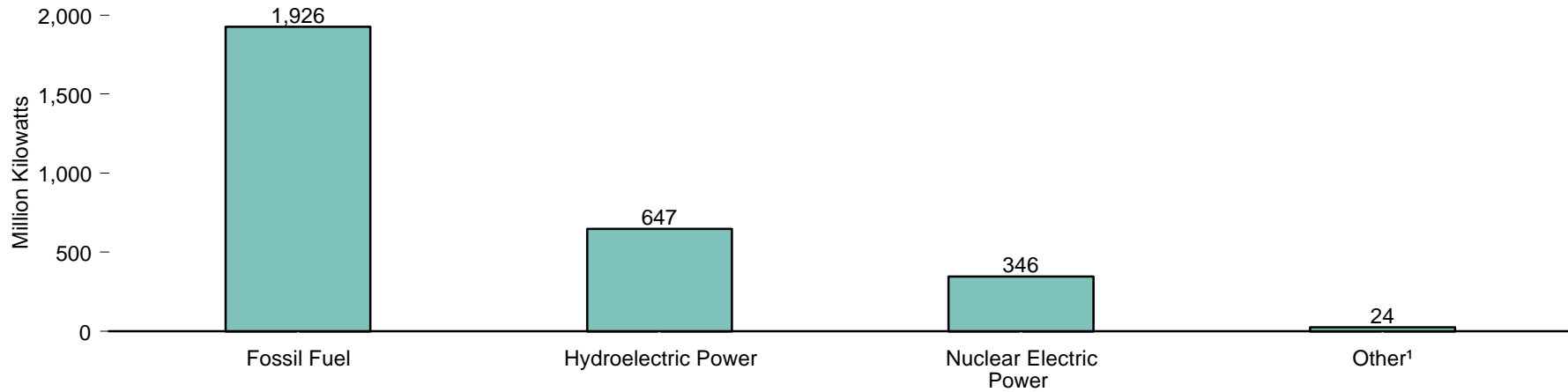
components due to independent rounding.

Source: Energy Information Administration, *International Energy Annual 1995* (December 1996), Table 6.3, and the International Energy Database, May 1997.

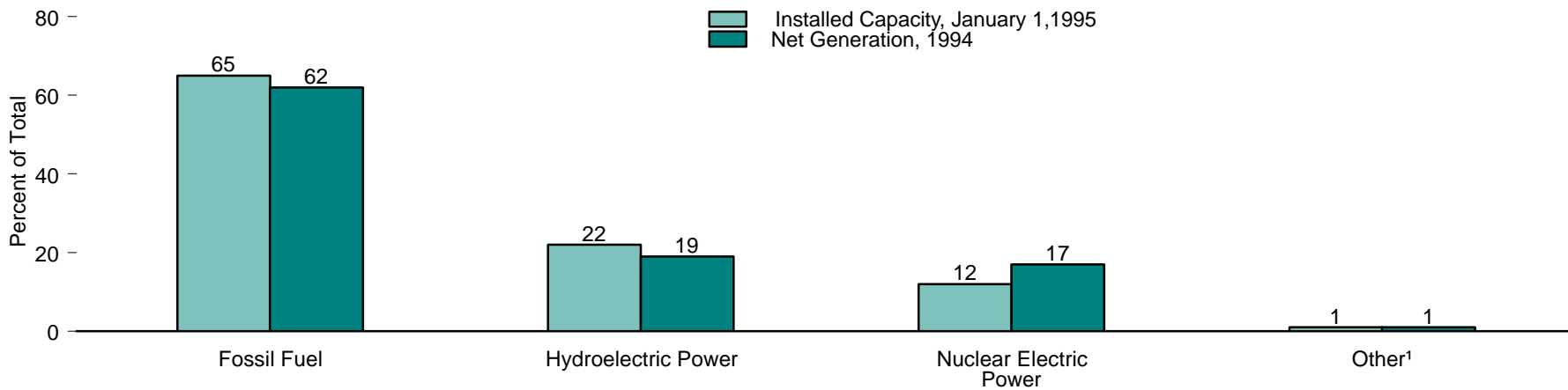


**Figure 11.18 World Electrical Installed Capacity by Type, January 1, 1995**

**By Type**



**Comparison of Installed Capacity and Net Generation Shares by Type**



¹Geothermal, biofuels, wind, and solar thermal capacity.  
 Note: Data include both electric utility and non-electric utility sources.

Sources: Tables 11.17 and 11.18.

**Table 11.18 World Electrical Installed Capacity by Type, January 1, 1995**  
(Million Kilowatts)

Region and Country	Fossil Fuel	Nuclear Electric Power	Hydro-electric Power <sup>1</sup>	Other <sup>2</sup>	Total
<b>North America</b> .....	<b>607.1</b>	<b>116.8</b>	<b>171.5</b>	<b>18.0</b>	<b>913.4</b>
Canada .....	34.2	16.4	63.0	(s)	113.6
Mexico .....	24.2	1.3	9.2	0.8	35.5
United States .....	548.5	99.1	99.2	17.2	764.0
Other .....	(s)	0.0	0.0	0.0	(s)
<b>Central and South America</b> .....	<b>48.5</b>	<b>1.7</b>	<b>95.1</b>	<b>2.3</b>	<b>147.6</b>
Argentina .....	10.6	1.0	8.0	0.0	19.6
Brazil .....	4.9	0.7	49.9	2.1	57.6
Colombia .....	2.8	0.0	8.0	0.0	10.8
Venezuela .....	8.3	0.0	10.7	0.0	19.0
Other .....	21.9	0.0	18.5	(s)	40.6
<b>Western Europe</b> .....	<b>322.7</b>	<b>122.5</b>	<b>143.9</b>	<b>1.9</b>	<b>591.0</b>
Austria .....	6.2	0.0	11.2	0.0	17.4
Finland .....	9.1	2.4	2.7	0.0	14.1
France .....	23.5	58.5	20.7	(s)	102.9
Germany .....	82.6	22.7	4.2	(s)	109.7
Italy .....	43.9	0.0	12.9	(s)	57.2
Netherlands .....	17.6	0.5	(s)	(s)	18.3
Norway .....	(s)	0.0	26.1	(s)	26.4
Spain .....	20.9	7.0	11.5	(s)	39.6
Sweden .....	8.6	10.1	16.8	(s)	35.5
Switzerland .....	0.8	3.1	10.4	(s)	14.3
Turkey .....	11.0	0.0	9.9	(s)	20.9
United Kingdom .....	52.6	12.0	1.5	(s)	66.1
Other .....	45.7	6.2	15.9	0.6	68.4
<b>Eastern Europe and Former U.S.S.R.</b> .....	<b>313.3</b>	<b>45.3</b>	<b>79.9</b>	<b>(s)</b>	<b>438.5</b>
Czech Republic .....	10.7	1.8	1.4	0.0	13.9
Kazakstan .....	16.7	(s)	2.1	0.0	18.9
Poland .....	27.6	0.0	2.0	0.0	29.6
Romania .....	16.1	0.0	5.9	0.0	22.1
Russia .....	149.7	21.2	43.8	(s)	214.7
Ukraine .....	36.7	12.8	4.7	0.0	54.2
Other .....	55.8	9.4	19.9	0.0	85.1
<b>Middle East</b> .....	<b>77.8</b>	<b>0.0</b>	<b>4.0</b>	<b>(s)</b>	<b>81.9</b>
Iran .....	23.2	0.0	2.0	0.0	25.1
Saudi Arabia .....	20.9	0.0	0.0	0.0	20.9
Other .....	33.7	0.0	2.1	(s)	35.8
<b>Africa</b> .....	<b>66.4</b>	<b>1.9</b>	<b>20.2</b>	<b>(s)</b>	<b>88.6</b>
Egypt .....	10.3	0.0	2.7	0.0	13.0
South Africa .....	32.1	1.9	0.6	0.0	34.6
Other .....	24.0	0.0	17.0	(s)	41.0
<b>Far East and Oceania</b> .....	<b>490.5</b>	<b>57.5</b>	<b>132.2</b>	<b>2.1</b>	<b>682.4</b>
Australia .....	31.4	0.0	7.4	0.0	38.8
China .....	142.0	2.1	46.0	0.0	190.1
India .....	68.6	2.0	20.9	(s)	91.6
Indonesia .....	12.7	0.0	3.4	(s)	16.3
Japan .....	137.9	40.5	21.1	(s)	199.9
South Korea .....	21.6	7.6	2.5	0.0	31.7
Taiwan .....	14.1	5.1	2.6	0.0	21.9
Thailand .....	13.2	0.0	2.6	0.0	15.8
Other .....	49.1	(s)	25.8	1.4	76.4
<b>World</b> .....	<b>1,926.4</b>	<b>345.7</b>	<b>646.9</b>	<b>24.3</b>	<b>2,943.3</b>

<sup>1</sup> Excludes pumped storage, except for the United States.

<sup>2</sup> Geothermal, biofuels, wind, photovoltaic, and solar thermal capacity.

(s)=Less than 0.5 million kilowatts.

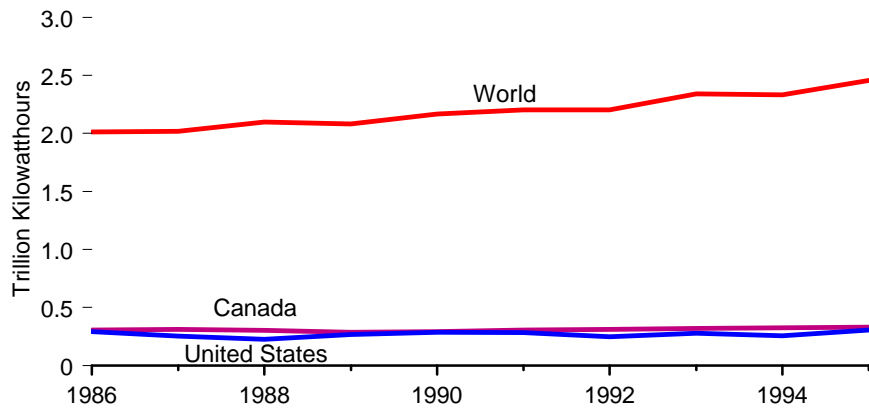
Notes: • Data include both electric utility and nonutility sources. • Totals may not equal sum of

components due to independent rounding.

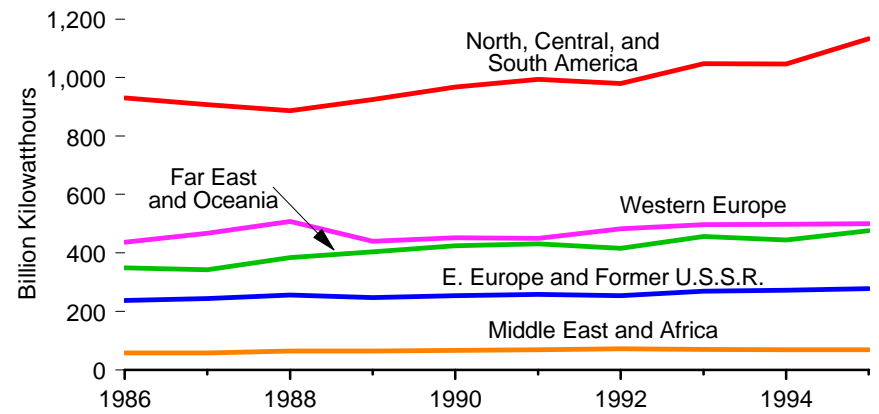
Sources: Energy Information Administration (EIA), *International Energy Annual 1995*, (December 1996), Table 6.4, except U.S. capacity, which is net summer capability at electric utilities and nonutilities from Table 8.2 in this report.

**Figure 11.19 World Hydroelectric Power Net Generation**

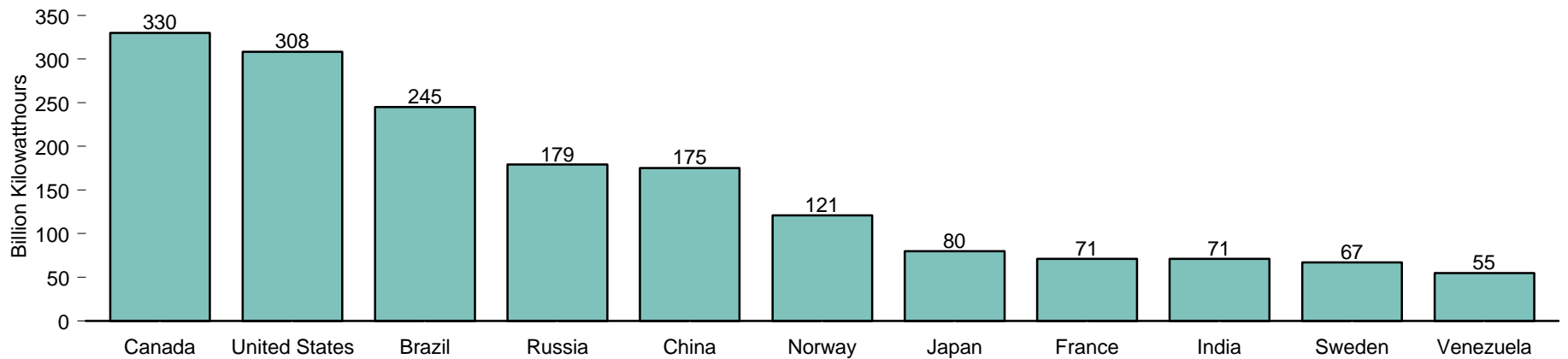
**World and Leading Producers, 1986-1995**



**World Areas, 1986-1995**



**Top Generating Countries, 1995**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 11.19.

**Table 11.19 World Hydroelectric Power Net Generation, 1986-1995**  
(Billion Kilowatthours)

Region and Country	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 <sup>P</sup>
<b>North, Central, and South America</b> .....	<b>931</b>	<b>907</b>	<b>887</b>	<b>R925</b>	<b>R968</b>	<b>R994</b>	<b>R980</b>	<b>R1,048</b>	<b>R1,047</b>	<b>1,133</b>
Argentina .....	21	22	16	13	18	16	19	24	R27	30
Brazil .....	181	184	197	203	205	216	221	R236	240	245
Canada .....	308	313	303	288	R294	R305	313	320	R325	330
Chile .....	11	12	11	10	12	13	17	17	R17	16
Colombia .....	25	21	24	26	27	27	22	28	R32	37
Mexico .....	20	18	21	24	R23	22	26	26	20	27
Paraguay .....	12	18	20	24	27	29	27	31	35	40
Peru .....	10	11	10	10	10	11	10	11	12	12
United States <sup>1</sup> .....	R294	R253	R226	R268	R288	R284	R249	R277	R257	308
Venezuela .....	25	31	34	34	37	44	47	47	R51	55
Other .....	24	24	24	24	R28	R27	R30	R31	R32	33
<b>Western Europe</b> .....	<b>437</b>	<b>467</b>	<b>508</b>	<b>440</b>	<b>453</b>	<b>450</b>	<b>R483</b>	<b>R497</b>	<b>R498</b>	<b>500</b>
Austria .....	30	25	35	35	31	31	34	36	35	37
Finland .....	12	14	13	13	11	13	15	13	12	13
France .....	61	69	74	46	53	56	67	63	R76	71
Germany <sup>2</sup> .....	18	20	20	18	17	15	17	R17	R18	20
Italy .....	41	39	40	34	31	42	42	41	44	37
Norway .....	95	102	108	117	120	109	116	118	111	121
Spain .....	26	27	35	19	25	27	19	24	R28	22
Sweden .....	60	71	69	71	72	63	74	74	58	67
Switzerland .....	33	34	35	29	30	32	32	35	39	35
Turkey .....	12	18	28	18	23	22	26	34	30	35
Other .....	49	47	50	41	41	41	R41	R40	R45	42
<b>Eastern Europe and Former U.S.S.R.</b> .....	<b>238</b>	<b>244</b>	<b>257</b>	<b>248</b>	<b>254</b>	<b>259</b>	<b>R255</b>	<b>R270</b>	<b>R273</b>	<b>278</b>
Romania .....	11	11	13	12	11	14	12	13	13	14
Former U.S.S.R. ....	213	217	229	221	231	233	—	—	—	—
Russia .....	—	—	—	—	—	—	171	173	175	179
Tajikistan .....	—	—	—	—	—	—	16	17	R16	14
Other .....	14	16	15	15	12	13	R57	R67	R69	71
<b>Middle East and Africa</b> .....	<b>58</b>	<b>58</b>	<b>R64</b>	<b>R64</b>	<b>R67</b>	<b>R69</b>	<b>R72</b>	<b>R70</b>	<b>R69</b>	<b>69</b>
Egypt .....	8	8	8	8	10	9	8	8	8	9
Zambia .....	10	8	8	7	8	8	8	8	8	8
Other .....	R41	R42	R47	R49	49	R53	R55	R53	R53	53
<b>Far East and Oceania</b> .....	<b>349</b>	<b>343</b>	<b>384</b>	<b>404</b>	<b>425</b>	<b>R432</b>	<b>R416</b>	<b>457</b>	<b>R445</b>	<b>476</b>
Australia .....	14	13	13	14	14	16	15	16	16	16
China .....	94	99	108	117	125	124	130	149	161	175
India .....	53	47	57	62	71	72	69	70	R70	71
Indonesia .....	7	8	8	9	10	10	13	12	12	12
Japan .....	80	74	90	91	88	97	82	R95	R67	80
New Zealand .....	22	22	23	22	23	23	20	23	R25	27
North Korea .....	29	29	31	31	31	31	24	24	R23	23
Pakistan .....	14	15	17	17	17	18	R18	21	R19	19
Other .....	36	36	36	42	45	41	R44	R47	R50	54
<b>World</b> .....	<b>R2,013</b>	<b>2,019</b>	<b>R2,100</b>	<b>R2,082</b>	<b>R2,167</b>	<b>R2,205</b>	<b>R2,205</b>	<b>R2,341</b>	<b>R2,332</b>	<b>2,456</b>

<sup>1</sup> Only U.S. data include pumped storage.

<sup>2</sup> Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.

R=Revised data. P=Preliminary data. — = Not applicable.

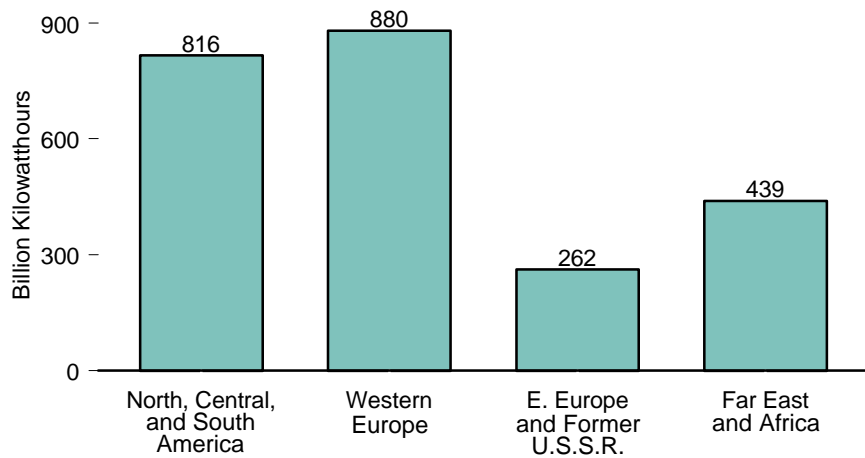
Notes: • See Note 3 at end of section. • Generation data consist of both utility and non-utility sources.

• Totals may not equal sum of components due to independent rounding.

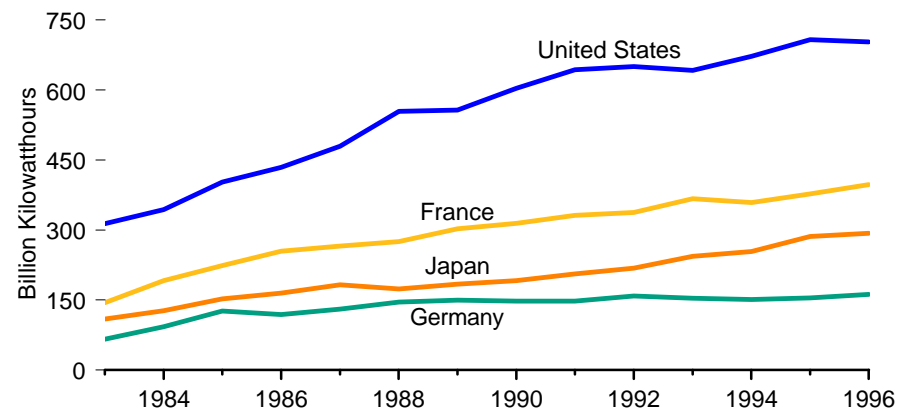
Source: Energy Information Administration, *International Energy Annual 1995* (December 1996), Table 2.6, and the International Energy Database, May 1997.

**Figure 11.20 World Nuclear Electricity Gross Generation**

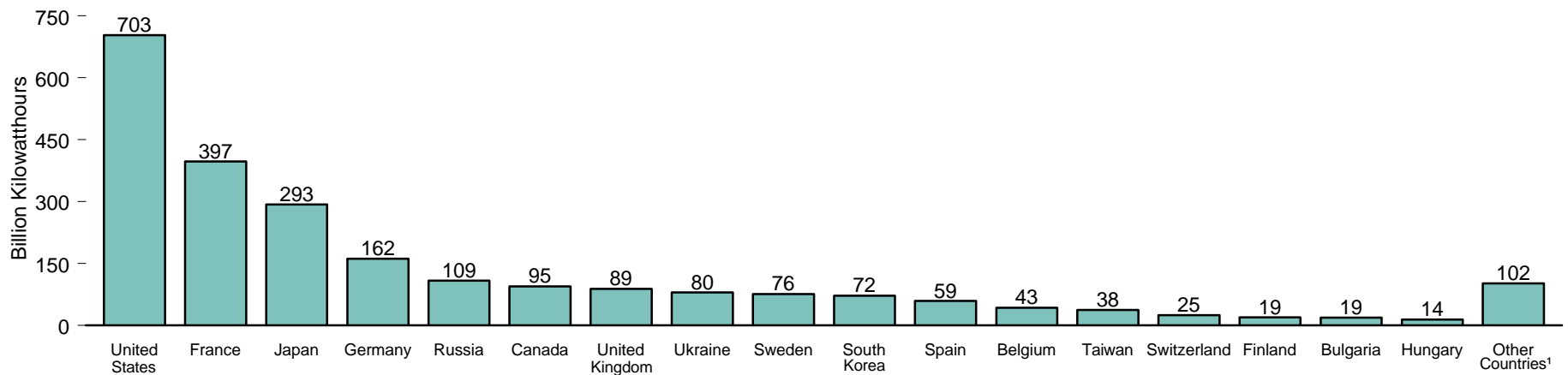
**By Region, 1996**



**By Major Producers, 1983-1996**



**By Country, 1996**



<sup>1</sup> "Other countries" are Argentina, Brazil, Mexico, Netherlands, Lithuania, Slovenia, India, Pakistan, South Africa, China, Czech Republic, Kazakstan, and Slovakia.

Note: Because vertical scales differ, graphs should not be compared.  
Source: Table 11.20.

**Table 11.20 World Nuclear Electricity Gross Generation, 1983-1996**  
(Billion Kilowatthours)

Region and Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<b>North, Central, and South America</b> .....	<b>370.2</b>	<b>404.1</b>	<b>474.8</b>	<b>514.6</b>	<b>566.3</b>	<b>645.2</b>	<b>646.9</b>	<b>690.7</b>	<b>742.6</b>	<b>744.0</b>	<b>752.7</b>	<b>795.5</b>	<b>E825.6</b>	<b>816.3</b>
Argentina .....	3.4	4.5	5.8	5.7	5.2	5.1	5.0	7.4	7.7	7.1	7.7	8.2	7.1	7.4
Brazil .....	0.2	2.1	3.4	0.1	1.0	0.3	1.6	2.0	1.4	1.8	0.4	0.0	2.5	2.4
Canada .....	53.0	53.8	62.9	74.6	80.6	85.6	83.2	75.8	86.1	81.3	97.6	110.7	E100.4	E95.2
Mexico .....	—	—	—	—	—	—	—	2.1	4.2	3.9	4.9	4.2	7.9	7.9
United States <sup>1</sup> .....	313.6	343.8	402.7	434.1	479.5	554.1	557.0	603.4	643.0	650.0	642.0	672.4	E707.7	E703.3
<b>Western Europe</b> .....	<b>377.2</b>	<b>485.4</b>	<b>582.8</b>	<b>631.5</b>	<b>648.3</b>	<b>688.1</b>	<b>732.0</b>	<b>738.6</b>	<b>769.7</b>	<b>R787.8</b>	<b>R820.9</b>	<b>R820.2</b>	<b>R,E835.7</b>	<b>E879.5</b>
Belgium .....	24.1	27.7	34.5	38.6	41.9	43.1	41.2	42.7	42.9	43.5	41.9	40.6	41.4	43.3
Finland .....	17.4	18.5	18.8	18.8	19.4	19.3	18.8	18.9	19.2	19.0	19.6	19.1	18.9	19.5
France .....	144.2	191.2	224.0	254.3	265.5	274.9	302.5	314.1	331.4	337.6	366.7	359.1	377.6	397.0
Germany <sup>2</sup> .....	65.8	92.6	125.8	118.9	130.2	145.2	149.5	147.2	147.3	158.8	153.5	151.1	154.3	161.7
Italy <sup>3</sup> .....	5.8	6.9	7.0	8.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Netherlands .....	3.6	3.8	3.9	4.2	3.6	3.7	4.0	3.4	3.3	3.8	3.9	4.0	4.0	4.2
Slovenia .....	NA	NA	NA	NA	NA	NA	NA	NA	NA	E4.0	4.0	4.6	4.8	E4.6
Spain .....	10.7	23.1	28.0	37.5	41.3	50.4	56.1	54.3	55.6	55.8	56.1	55.1	54.5	59.1
Sweden .....	40.4	51.3	58.6	69.9	67.2	69.4	65.6	68.2	76.8	63.5	61.4	72.8	69.9	76.2
Switzerland .....	15.5	16.3	22.4	22.5	23.0	22.7	22.8	23.6	22.9	23.4	23.3	24.2	24.8	25.0
United Kingdom .....	49.6	54.1	59.7	58.2	56.2	59.4	71.6	66.1	70.4	78.5	90.4	89.5	E85.5	E88.8
<b>Eastern Europe <sup>4</sup> and Former U.S.S.R.</b> .....	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>R,E267.5</b>	<b>R,E259.0</b>	<b>R,E227.8</b>	<b>R,E234.9</b>	<b>E261.6</b>
Armenia .....	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA
Bulgaria .....	NA	NA	NA	NA	NA	NA	NA	NA	NA	E12.2	14.0	14.9	17.2	18.7
Czech Republic .....	—	—	NA	NA	NA	NA	NA	NA	NA	E12.9	E13.2	E12.7	R,E12.8	E13.5
Hungary .....	—	NA	NA	NA	NA	NA	NA	NA	NA	E13.8	13.8	14.0	14.0	14.2
Kazakhstan .....	NA	NA	NA	NA	NA	NA	NA	NA	NA	E0.5	E0.4	E0.4	R,E0.4	E0.1
Lithuania .....	—	—	—	NA	NA	NA	NA	NA	NA	E16.4	E12.9	E7.0	E9.7	E13.6
Romania <sup>5</sup> .....	—	—	—	—	—	—	—	—	—	—	—	—	—	E1.0
Russia .....	NA	NA	NA	NA	NA	NA	NA	NA	NA	E125.6	120.4	97.7	98.3	108.8
Slovakia .....	NA	NA	NA	NA	NA	NA	NA	NA	NA	E11.7	E11.6	E12.7	R,E12.0	E11.8
Ukraine .....	NA	NA	NA	NA	NA	NA	NA	NA	NA	E74.6	E72.7	68.4	70.4	80.0
<b>Far East and Africa</b> .....	<b>140.1</b>	<b>171.9</b>	<b>207.9</b>	<b>232.9</b>	<b>266.1</b>	<b>259.6</b>	<b>275.2</b>	<b>293.2</b>	<b>313.0</b>	<b>325.1</b>	<b>353.0</b>	<b>377.0</b>	<b>R418.9</b>	<b>438.9</b>
China .....	—	—	—	—	—	—	—	—	—	—	E2.6	E14.2	R,E13.0	14.3
India .....	2.9	4.1	4.5	5.1	5.5	6.1	4.0	6.3	5.4	6.3	6.2	5.0	E8.0	8.3
Japan .....	109.1	127.2	152.0	164.8	182.8	173.6	183.7	191.9	205.8	218.0	243.5	253.8	286.1	293.2
Pakistan .....	0.2	0.3	0.3	0.5	0.3	0.2	0.1	0.4	0.4	0.6	0.4	0.6	0.5	0.4
South Africa .....	—	4.2	5.9	9.3	6.6	11.1	11.7	8.9	9.7	9.9	7.7	10.3	11.9	E12.5
South Korea .....	9.0	11.8	16.5	26.1	37.8	38.7	47.4	52.8	56.3	56.4	58.1	58.3	64.0	72.5
Taiwan .....	18.9	24.3	28.7	26.9	33.1	29.9	28.3	32.9	35.3	33.8	34.3	34.8	35.3	37.8
<b>World</b> <sup>6</sup> .....	<b>887.5</b>	<b>1,061.5</b>	<b>1,265.4</b>	<b>1,378.9</b>	<b>1,480.8</b>	<b>1,592.8</b>	<b>1,654.2</b>	<b>1,722.5</b>	<b>1,825.2</b>	<b>E2,124.5</b>	<b>E2,185.6</b>	<b>E2,220.4</b>	<b>R,E2,315.1</b>	<b>E2,396.3</b>

<sup>1</sup> See Note 3 at end of section.

<sup>2</sup> Through 1990, the data for Germany are for the former West Germany only. Beginning in 1991, the data for Germany are for the unified Germany, i.e., the former East Germany and West Germany.

<sup>3</sup> In 1987, Italy's citizens voted for a nuclear power moratorium, which shut down their nuclear power plants indefinitely.

<sup>4</sup> The gross generation estimates for 1992 through 1996 for Eastern European countries are calculated as 5 percent more than the annual net nuclear generation reported by the International Atomic Energy Agency and published annually in *Nuclear Power Reactors in the World*.

<sup>5</sup> Romania has one nuclear generating unit that is undergoing testing; its commercial operation was projected to begin in 1996.

<sup>6</sup> Eastern European countries are included in the total figure beginning in 1992.

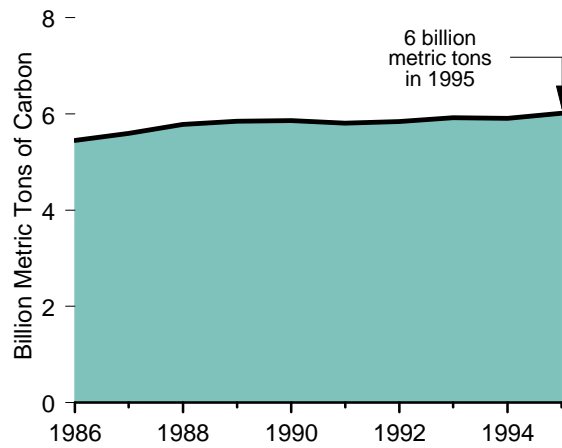
R=Revised data. E=Estimate. NA=Not available. — = Not applicable.

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

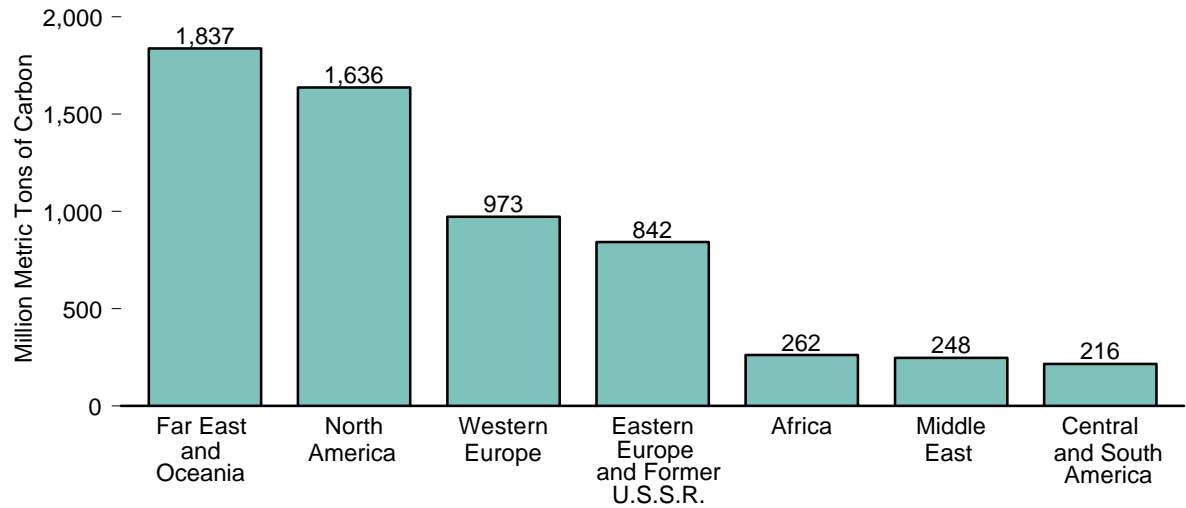
Source: Based on data from *Nucleonics Week*, a copyrighted publication of The McGraw-Hill Publishing Companies, Inc. Used with permission.

**Figure 11.21 World Carbon Dioxide Emissions**

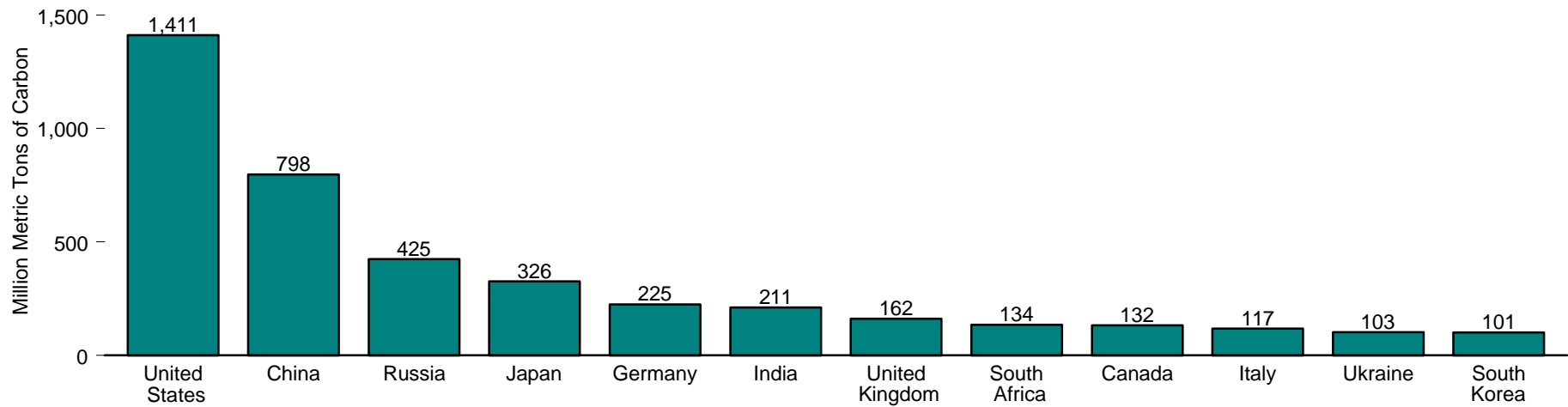
**World, 1986-1995**



**World by Region, 1995**



**Leading Countries, 1995**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 11.21.

**Table 11.21 World Carbon Dioxide Emissions, 1986-1995**  
(Million Metric Tons of Carbon <sup>1</sup>)

Region and Country	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 <sup>P</sup>
<b>North America</b> .....	<b>1,434</b>	<b>1,480</b>	<b>1,552</b>	<b>1,570</b>	<b>1,555</b>	<b>1,532</b>	<b>1,562</b>	<b>1,593</b>	<b>1,620</b>	<b>1,636</b>
Canada .....	116	120	129	133	129	122	126	126	129	132
Mexico .....	75	76	77	79	79	83	88	89	91	92
United States <sup>2</sup> .....	1,244	1,283	1,346	1,358	1,346	1,327	1,348	1,378	1,399	1,411
Other .....	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)
<b>Central and South America</b> .....	<b>178</b>	<b>183</b>	<b>186</b>	<b>191</b>	<b>188</b>	<b>192</b>	<b>199</b>	<b>209</b>	<b>209</b>	<b>216</b>
Argentina .....	28	29	30	30	27	28	31	34	32	34
Brazil .....	56	58	58	60	58	61	61	67	65	66
Venezuela .....	27	27	27	28	29	30	30	30	31	32
Other .....	67	69	70	73	73	73	77	78	80	84
<b>Western Europe</b> .....	<b>996</b>	<b>1,006</b>	<b>993</b>	<b>1,014</b>	<b>1,014</b>	<b>1,013</b>	<b>984</b>	<b>956</b>	<b>950</b>	<b>973</b>
Belgium .....	33	33	32	34	35	36	35	34	36	36
France .....	101	100	94	103	106	109	105	99	94	97
Germany <sup>3</sup> .....	287	282	279	269	267	251	248	240	228	225
Italy .....	103	111	110	114	113	114	114	108	107	117
Netherlands .....	56	56	57	57	60	62	61	59	61	64
Spain .....	60	59	61	67	61	65	68	63	64	69
Turkey .....	29	30	29	33	34	38	37	39	39	43
United Kingdom .....	162	165	163	167	167	168	158	158	161	162
Other .....	165	169	168	171	172	170	159	155	159	160
<b>Eastern Europe and Former U.S.S.R.</b> .....	<b>1,272</b>	<b>1,290</b>	<b>1,308</b>	<b>1,275</b>	<b>1,251</b>	<b>1,144</b>	<b>1,097</b>	<b>1,013</b>	<b>899</b>	<b>842</b>
Former Czechoslovakia .....	91	91	90	86	79	72	62	—	—	—
Czech Republic .....	—	—	—	—	—	—	—	44	45	45
Poland .....	115	119	116	112	88	88	88	91	85	83
Romania .....	53	55	54	56	49	36	33	33	32	34
Former U.S.S.R. .....	958	971	997	973	992	911	—	—	—	—
Russia .....	—	—	—	—	—	—	560	511	452	425
Ukraine .....	—	—	—	—	—	—	148	140	119	103
Other .....	55	54	52	48	42	36	205	194	165	152
<b>Middle East</b> .....	<b>170</b>	<b>176</b>	<b>186</b>	<b>195</b>	<b>198</b>	<b>212</b>	<b>219</b>	<b>232</b>	<b>234</b>	<b>248</b>
Iran .....	46	48	50	54	56	63	64	65	67	72
Saudi Arabia .....	50	50	53	52	53	58	60	65	61	62
Other .....	74	78	84	89	89	91	95	102	106	114
<b>Africa</b> .....	<b>199</b>	<b>203</b>	<b>210</b>	<b>209</b>	<b>217</b>	<b>225</b>	<b>232</b>	<b>241</b>	<b>254</b>	<b>262</b>
South Africa .....	105	107	109	101	101	105	113	119	129	134
Other .....	94	97	101	108	116	119	120	122	125	128
<b>Far East and Oceania</b> .....	<b>1,202</b>	<b>1,258</b>	<b>1,347</b>	<b>1,392</b>	<b>1,438</b>	<b>1,494</b>	<b>1,549</b>	<b>1,673</b>	<b>1,743</b>	<b>1,837</b>
Australia .....	58	59	63	66	76	71	72	67	65	81
China .....	537	574	613	619	618	648	672	721	761	798
India .....	129	131	140	146	155	161	172	188	196	211
Indonesia .....	29	31	33	37	39	41	43	49	49	51
Japan .....	242	244	262	271	279	289	291	299	319	326
North Korea .....	42	43	44	46	47	48	47	49	49	49
South Korea .....	47	47	54	58	64	71	76	102	96	101
Taiwan .....	24	25	30	33	33	35	36	44	45	46
Thailand .....	13	14	16	19	23	25	27	31	34	36
Other .....	82	88	92	97	105	106	112	123	128	136
<b>World</b> .....	<b>5,451</b>	<b>5,596</b>	<b>5,782</b>	<b>5,845</b>	<b>5,861</b>	<b>5,810</b>	<b>5,842</b>	<b>5,918</b>	<b>5,908</b>	<b>6,013</b>

<sup>1</sup> Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

<sup>2</sup> Data, when converted to million metric tons of carbon dioxide gas, are less than the values shown for the United States in Table 12.1 because they do not include carbon dioxide emissions from unmeted natural gas, cement production, other industrial sources, and U.S. Territories.

<sup>3</sup> Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany. P=Preliminary data. — = Not applicable.

Notes: • See Note 4 at end of section. • Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration, International Energy Database, May, 1997.



## International Energy Notes

1. World primary energy production comprises crude oil (including lease condensate), natural gas plant liquids, dry natural gas, coal, net electricity from hydroelectric power and nuclear electric power, and net electricity generated for distribution from geothermal, wind, solar and some biofuel energy. Data for the United States include biofuels. Crude oil production is measured at the wellhead and includes lease condensate. Natural gas plant liquids are products obtained from processing natural gas at natural gas processing plants, including natural gas plants, cycling plants, and fractionators. Dry natural gas production is that amount of natural gas produced that is available to be marketed and consumed as a gas. Coal (anthracitic, subanthracitic, bituminous, subbituminous, lignitic, and brown coal) production is the sum of sales, mine consumption, issues to miners, and issues to coking, briquetting, and other ancillary plants at mines. Coal production data include quantities extracted from surface and underground workings and normally exclude wastes removed at mines or associated preparation plants. The data on production of electricity from hydroelectric power, nuclear electric power, and electricity generated for distribution from geothermal, wind, and solar energy include data on both electric utility and industrial production reported on a net basis, thus excluding electricity that is generally used by the electric power plant for its own operating purposes or electricity losses in the transformers that are considered integral parts of the station.

2. Petroleum stocks reported by the Organization for Economic Cooperation and Development (OECD) include those held at (or in) the following locations or facilities: leases, refineries, natural gas processing plants,

bulk terminals, tanks associated with pipelines, barges, intercoastal tankers, ocean tankers in port, inland ship bunkers, major final consumers, and the strategic storage reserve. For an individual country, stocks include those held for the account of that country but located in another country. U.S. stocks include those held in the 50 States and the District of Columbia. "Other OECD" includes stocks held in Puerto Rico and the Virgin Islands. The OECD definition of petroleum stocks excludes petroleum in pipelines, rail tank cars, tank trucks, oceangoing ship bunkers, service stations, retail stores, and tankers at sea. An exception is U.S. stocks, which include petroleum in pipelines.

3. Data on the generation of electricity in the United States represent net generation, which is gross output of electricity (measured at the generator terminals) minus power plant use. Nuclear electricity generation data identified by individual countries in Table 11.20 are gross output of electricity.

4. Data for carbon dioxide emissions include anthropogenic (human-caused) emissions from the consumption of petroleum, natural gas, and coal, and the flaring of natural gas. They do not include carbon dioxide emissions from cement production and other industrial sources. Hydrocarbon consumption and flaring statistics for each country have been reduced to account for the fraction of fuels not combusted and the fraction of sequestration of non-fuel uses of the hydrocarbons. Carbon dioxide emissions have been determined by applying carbon emission coefficients to the adjusted consumption and flaring data. Carbon emission coefficients are from Energy Information Administration, *Emissions of Greenhouse Gases in the United States 1995*, DOE/EIA-0573(95), October 1996, Table B1.

## 12. Environmental Indicators

### Emissions of Greenhouse Gases

Greenhouse gases—carbon dioxide, methane, nitrous oxide, carbon monoxide, and others—are those which block infrared radiation from Earth to space and retain the captured heat in the atmosphere. This warming effect, known as the greenhouse effect, keeps Earth's climate hospitable to plant, animal, and human life. But many scientists believe that anthropogenic (human-caused) additions to greenhouse gases will raise global average temperatures and produce deleterious changes in the global climate.

**Carbon dioxide.** Anthropogenic emissions of carbon dioxide, which accounts for the largest share by far of all anthropogenic emissions of greenhouse gases, rose to 5.3 billion metric tons of gas in 1995, up from 4.7 billion metric tons in 1985 (12.1).<sup>\*</sup> Energy-related carbon dioxide emissions—those produced by the burning of fossil fuels—totaled 1.4 billion metric tons of carbon in 1995 (12.2). (There is one metric ton of carbon in every 3.667 metric tons of carbon dioxide gas.) Consumption of petroleum, particularly motor gasoline, by the transportation sector; coal burning at electric utilities; and natural gas use in all sectors were the biggest sources of carbon dioxide emissions in 1995 (12.3).

**Methane.** Energy-related activities also accounted for the largest share of methane emissions (11.4 million metric tons of methane) in 1994 (12.4). But landfills emitted 10.2 million metric tons and agricultural sources (such as digestive processes in ruminant animals and the anaerobic decomposition of organic materials in animal waste and rice paddies) emitted 9.1 million metric tons of methane in 1994.

**Nitrous oxide.** Emissions of nitrous oxide, which, molecule for molecule, has a warming potential greater than either carbon dioxide or methane, remained at 0.5 million metric tons of gas per year from 1991 through 1995 (12.1).

*<sup>\*</sup>Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications. Percentages and numbers in text are calculated by using data in the tables.*

**Criteria pollutants.** The Clean Air Act of 1970 requires that air quality standards be established for pollutants that harm public health. Some criteria pollutants, such as carbon monoxide, nitrogen oxides, and nonmethane volatile organic compounds (VOC's), also influence atmospheric concentrations of greenhouse gases. In 1995, carbon monoxide emissions fell 7 percent to 92.1 million metric tons, the lowest level since 1985 (12.1). Nonmethane VOC emissions fell only slightly. Emissions of nitrogen oxides declined 5 percent over the 11-year period, to 21.8 million metric tons in 1995.

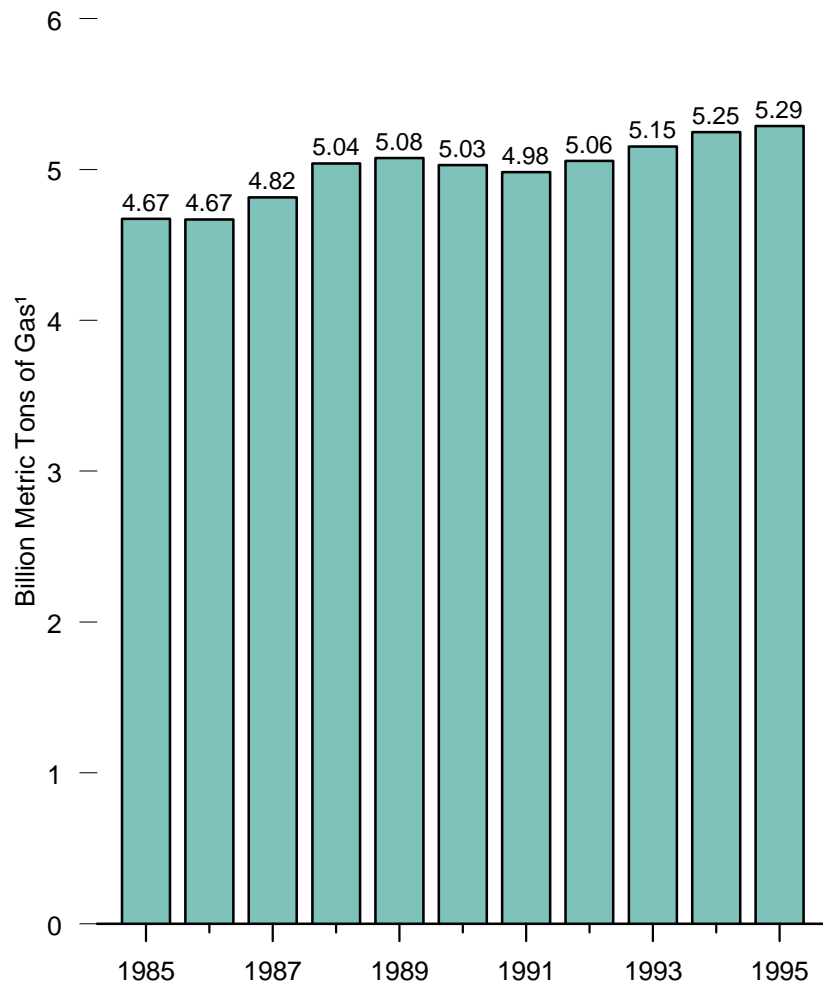
### Emissions From Electric Power Generation

Combustion of fossil fuels to generate electric power produces significant emissions, especially carbon dioxide (a greenhouse gas), sulfur dioxide, and nitrogen oxides. In 1995, electric utilities and nonutility power producers (NPP's) combined emitted 2.5 billion short tons of carbon dioxide, 12.9 million short tons of sulfur dioxide, and 8.7 million short tons of nitrogen oxides (12.5). Emissions of carbon dioxide and nitrogen oxides were 5 percent and 2 percent higher, respectively, than in 1992, the earliest year in which data for both utilities and NPP's are available. Sulfur dioxide emissions fell 22 percent over the period, due primarily to greater use of lower sulfur coal and of scrubbers at electric utility coal-fired generating units. The amount of coal-fired capacity equipped with scrubbers has risen every year since 1985, increasing 48 percent during the period (12.6).

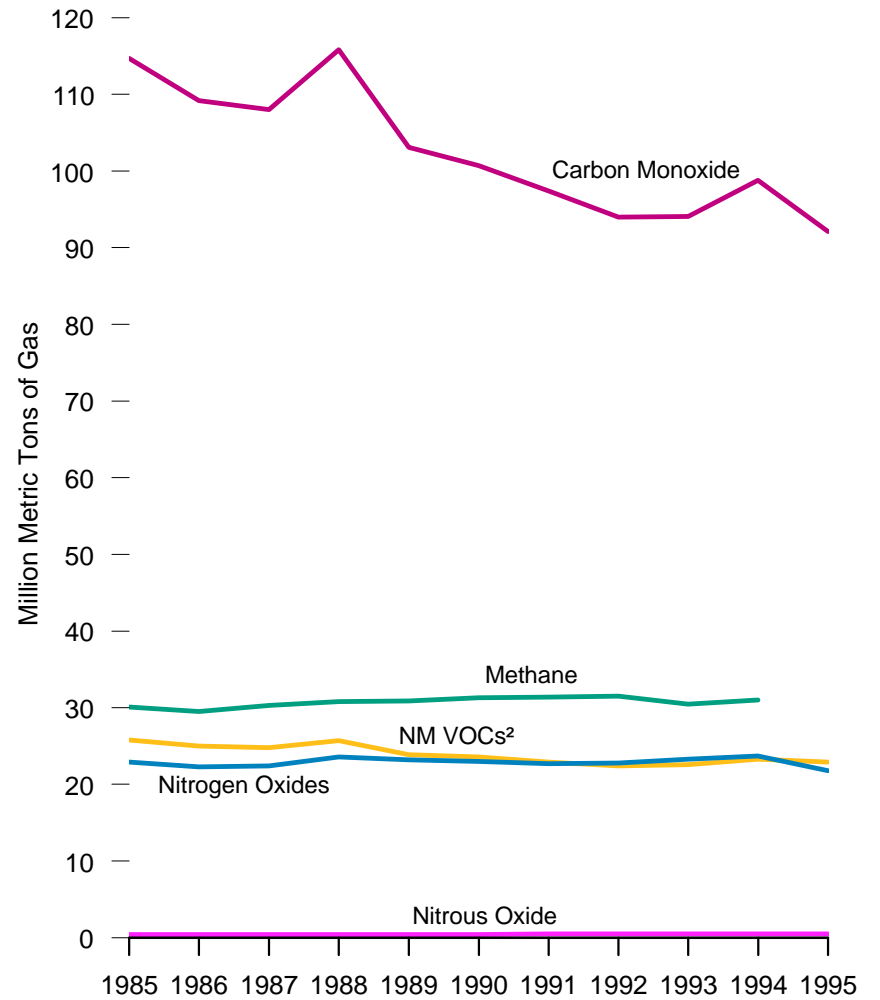
The emission patterns of electric utilities differ from those of NPP's. NPP's raised their total net electrical output by 27 percent between 1992 and 1995 (8.1) at a cost of a 9-percent increase in carbon dioxide emissions (12.5). Electric utilities' total net output increased 7 percent during the period, while their emissions of carbon dioxide rose 4 percent. The ratio difference is due in part to fuel use patterns: NPP's rely on natural gas for 52 percent of their output and natural gas has the lowest carbon content of the fossil fuels. Electric utilities produce 54 percent of their output using coal, which has the highest carbon content (8.3, 8.12).

**Figure 12.1 Estimated Emissions of Greenhouse Gases**

**Carbon Dioxide, 1985-1995**



**Other Greenhouse Gases, 1985-1995**



<sup>1</sup> Carbon dioxide gas can be converted to units of carbon by dividing by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

<sup>2</sup> Nonmethane volatile organic compounds.  
Source: Table 12.1.

**Table 12.1 Estimated Emissions of Greenhouse Gases, 1985-1995**  
(Million Metric Tons of Gas)

Year	Carbon Dioxide <sup>1</sup>	Methane	Nitrous Oxide	Halocarbons and Minor Gases				Criteria Pollutants		
				CFC-11 CFC-12 CFC-113	HCFC-22	HFC-23 and PFCs	Methyl Chloroform	Carbon Monoxide	Nitrogen Oxides	Nonmethane VOCs
1985	R4,672.5	R30.1	0.4	0.3	0.1	(s)	0.3	R114.7	R22.9	R25.8
1986	R4,668.8	R29.5	0.4	0.3	0.1	(s)	0.3	R109.2	R22.3	R25.0
1987	R4,815.5	R30.3	0.4	0.3	0.1	(s)	0.3	R108.0	R22.4	R24.8
1988	R5,040.4	R30.8	0.4	0.3	0.1	(s)	0.3	R115.8	R23.6	R25.7
1989	R5,075.6	R30.9	0.4	0.3	0.1	(s)	0.3	R103.1	R23.2	R23.9
1990	R5,030.6	R31.3	0.4	0.2	0.1	(s)	0.3	R100.7	R23.0	R23.6
1991	R4,982.2	R31.4	R0.5	0.2	0.1	(s)	0.2	R97.4	R22.7	R22.9
1992	R5,058.2	R31.5	R0.5	0.2	0.1	(s)	0.2	R94.0	R22.8	R22.4
1993	R5,151.1	R30.5	0.5	0.2	0.1	(s)	R0.1	R94.1	R23.3	R22.6
1994	R5,248.6	R31.0	R0.5	0.1	0.1	(s)	0.1	R98.8	R23.7	R23.3
1995 <sup>P</sup>	5,288.5	NA	0.5	0.1	0.1	(s)	0.1	92.1	21.8	22.9

<sup>1</sup> Carbon dioxide gas can be converted to units of carbon by dividing by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

R=Revised data. P=Preliminary data. NA=Not available. (s)=Less than 0.05 million metric tons.

Notes: • CFC = chlorofluorocarbons; HCFC = chlorodifluoromethane; HFC = hydrofluorocarbons; PFC = perfluorocarbon; and VOC = volatile organic compound. • Emissions are from anthropogenic sources. Anthropogenic means produced as the result of human activities, including emissions from agricultural activity and domestic livestock. Emissions from natural sources, such as wetlands and wild animals, are

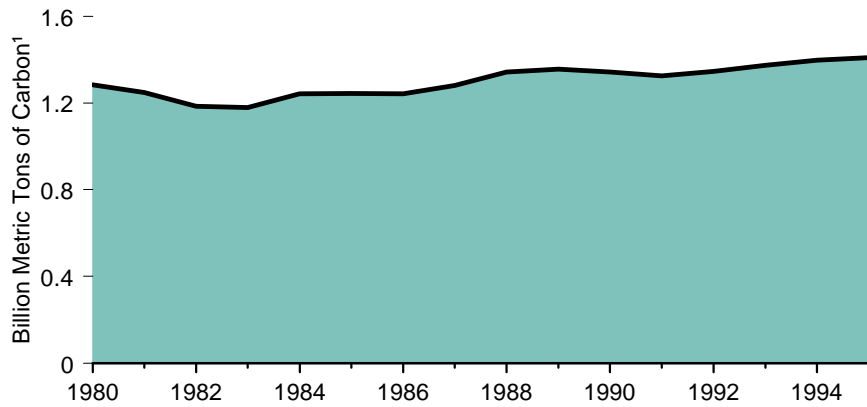
not included.

Sources: **Carbon Dioxide, Methane, Nitrous Oxide, and Halocarbons and Minor Gases:**

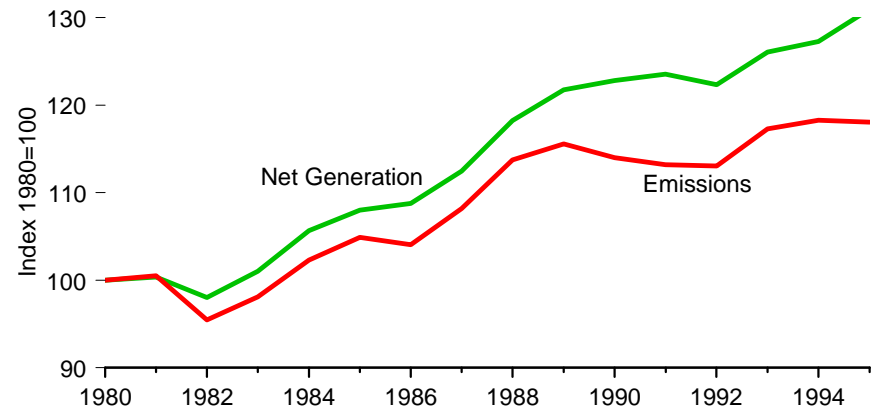
- 1985-1987—Energy Information Administration (EIA), Office of Integrated Analysis and Forecasting estimates.
- 1988 forward—EIA, *Emissions of Greenhouse Gases in the United States 1995* (October 1996), Table ES1.
- Criteria Pollutants:** 1985 forward—Environmental Protection Agency, *National Air Quality and Emissions Trends Report 1995* (October 1996), Tables A-2, A-4, and A-5.

**Figure 12.2 Carbon Dioxide Emissions From Energy Consumption by Sector, 1980-1995**

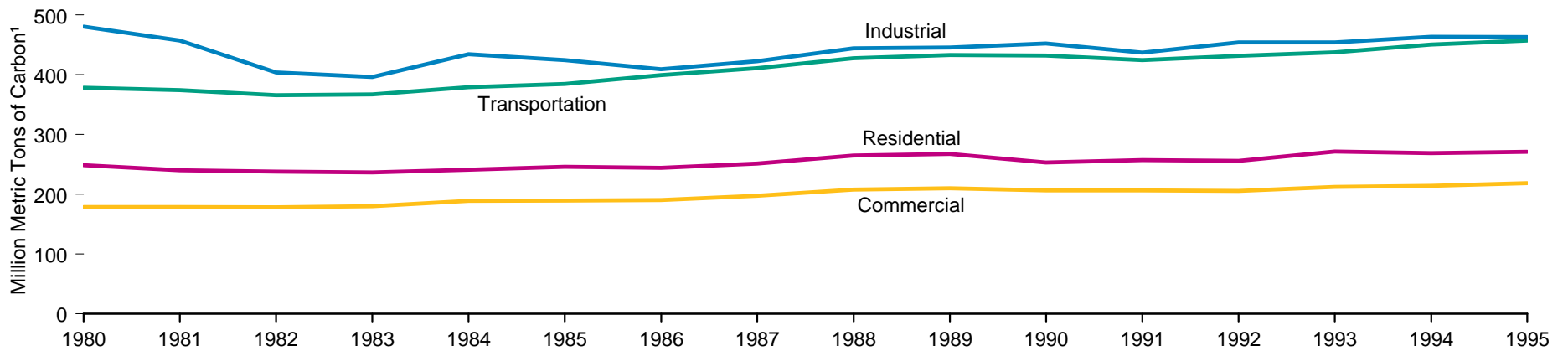
**End-Use Total**



**Electric Utility Net Generation of Electricity and Carbon Dioxide Emissions**



**By End-Use Sector**



<sup>1</sup> Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

Sources: Tables 8.1 and 12.2.

**Table 12.2 Carbon Dioxide Emissions From Energy Consumption by Sector, 1980-1995**  
(Million Metric Tons of Carbon<sup>1</sup>)

Year	Residential	Commercial	Industrial	Transportation	End-Use Total	Electric Utilities <sup>2</sup>
1980	248.4	178.3	480.5	378.1	1,285.2	418.3
1981	239.8	178.3	456.9	374.1	1,249.1	420.5
1982	237.6	178.1	403.7	365.6	1,185.0	399.3
1983	236.1	180.0	396.2	366.9	1,179.3	410.4
1984	241.1	188.8	434.4	379.0	1,243.4	427.9
1985	245.8	189.6	424.1	384.4	1,243.9	438.9
1986	244.0	190.4	409.0	399.1	1,242.5	435.4
1987	251.0	197.2	422.7	411.1	1,282.0	452.6
1988	264.8	207.6	444.1	427.5	1,344.0	475.9
1989	267.5	210.0	445.6	432.7	1,355.8	483.5
1990	253.0	206.7	452.4	432.1	1,344.2	476.9
1991	257.1	206.4	436.6	424.5	1,324.6	473.5
1992	255.9	205.5	453.6	431.4	1,346.3	472.9
1993	271.6	212.1	<sup>R</sup> 453.7	<sup>R</sup> 437.5	<sup>R</sup> 1,375.0	490.6
1994	<sup>R</sup> 268.6	<sup>R</sup> 214.1	<sup>R</sup> 463.3	<sup>R</sup> 450.4	<sup>R</sup> 1,396.5	<sup>R</sup> 494.8
1995 <sup>P</sup>	270.9	218.4	462.9	457.2	1,409.4	493.8

<sup>1</sup> Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

<sup>2</sup> Electric utility emissions are distributed across end-use sectors.

R=Revised data. P=Preliminary data.

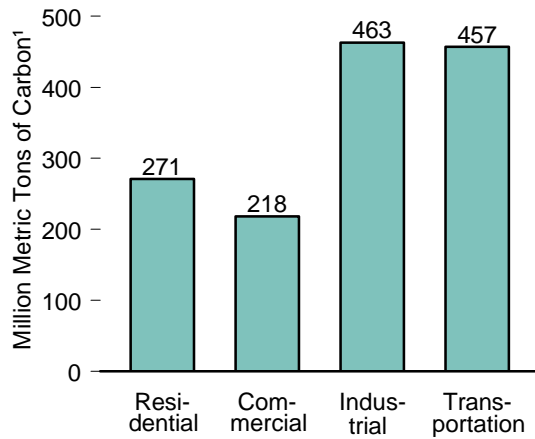
Notes: • Includes energy from petroleum, natural gas, and coal. • Totals may not equal sum of

components due to independent rounding.

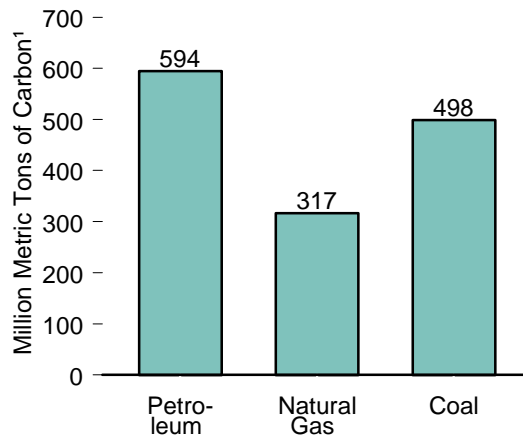
Sources: • 1980-1987—Energy Information Administration (EIA), Office of Integrated Analysis and Forecasting (OIAF) estimates. • 1988 forward—EIA, *Emissions of Greenhouse Gases in the United States 1995* (October 1996), Table 6.

**Figure 12.3 Carbon Dioxide Emissions From Energy Consumption by Sector by Energy Source, 1995**

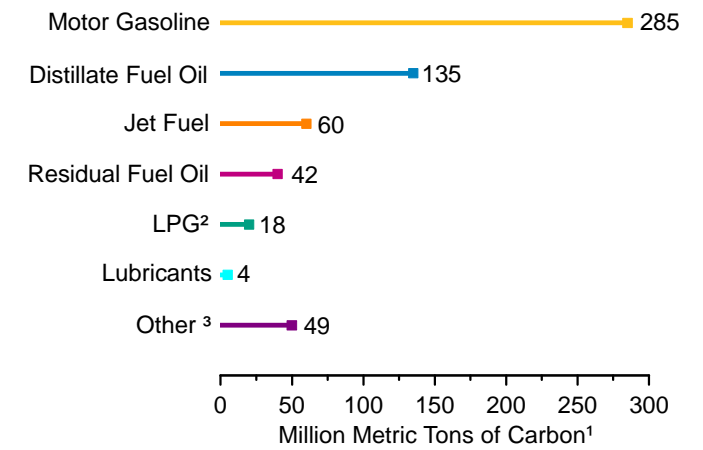
**By End-Use Sector**



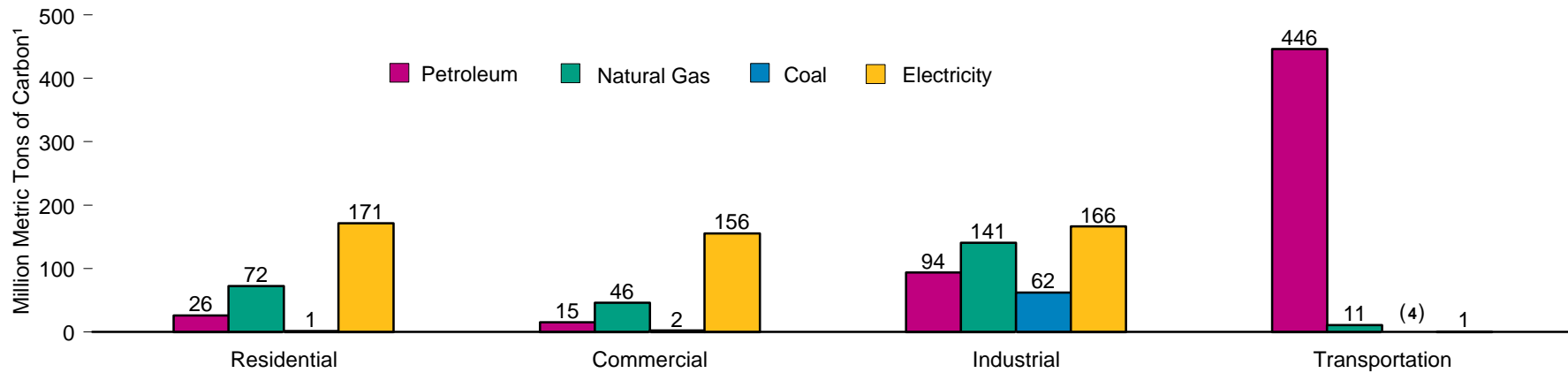
**By Fuel**



**By Petroleum Product**



**By End-Use Sector and Source**



<sup>1</sup> Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

<sup>2</sup> Liquefied petroleum gases.

<sup>3</sup> "Other" includes aviation gasoline, kerosene, and other products.

<sup>4</sup> Included in the industrial sector.

Note: Because vertical scales differ, graphs should not be compared.

Source: Table 12.3.

**Table 12.3 Carbon Dioxide Emissions From Energy Consumption by Sector by Energy Source, 1995**

(Million Metric Tons of Carbon<sup>1</sup>)

Energy Source	Residential	Commercial	Industrial	Transportation	End-Use Total	Electric Utilities <sup>2</sup>	Total
Petroleum .....	25.8	15.0	93.6	445.9	580.3	14.0	594.3
Aviation Gasoline .....	—	—	—	0.7	0.7	—	0.7
Distillate Fuel .....	17.6	9.3	22.1	83.8	132.8	<sup>3</sup> 1.8	134.6
Jet Fuel .....	—	—	—	60.0	60.0	—	60.0
Kerosene .....	1.4	0.4	0.4	—	2.2	—	2.2
Liquefied Petroleum Gases .....	6.7	1.2	9.4	0.5	17.8	—	17.8
Lubricants .....	—	—	1.8	1.7	3.5	—	3.5
Motor Gasoline .....	—	0.5	3.8	280.7	285.0	—	285.0
Residual Fuel .....	—	3.6	7.9	18.5	30.0	<sup>4</sup> 11.6	41.6
Other .....	—	—	48.3	—	48.3	<sup>5</sup> 0.6	48.9
Natural Gas .....	72.4	45.9	140.7	10.6	269.6	47.0	316.6
Coal .....	1.4	2.1	62.2	( <sup>6</sup> )	65.7	432.8	498.4
Electricity .....	171.3	155.5	166.4	0.6	493.8	—	—
Total .....	270.9	218.4	462.9	457.2	1,409.4	493.8	1,409.4

<sup>1</sup> Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

<sup>2</sup> Electric utility emissions are distributed across end-use sectors. Electric utilities include independent power producers but exclude cogeneration facilities.

<sup>3</sup> Light fuel oil.

<sup>4</sup> Heavy fuel oil.

<sup>5</sup> Petroleum coke.

<sup>6</sup> Included in the industrial sector.

— = Not applicable.

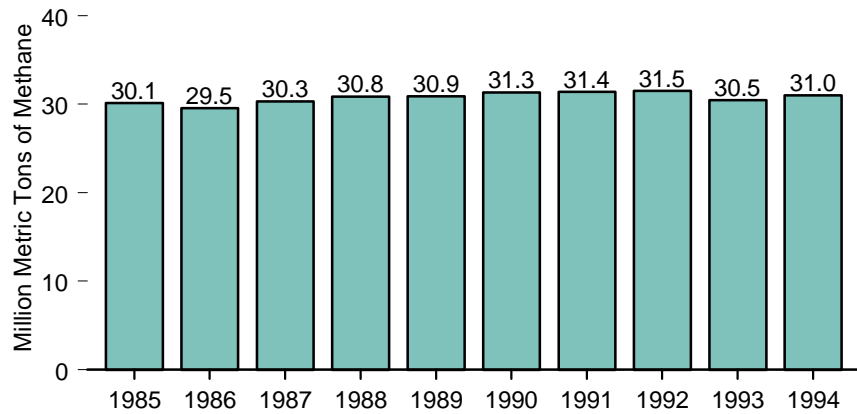
Note: Totals may not equal sum of components due to independent rounding. All values are considered preliminary.

Source: Energy Information Administration, *Emissions of Greenhouse Gases in the United States 1995* (October 1996), Tables 5 and 8-12.

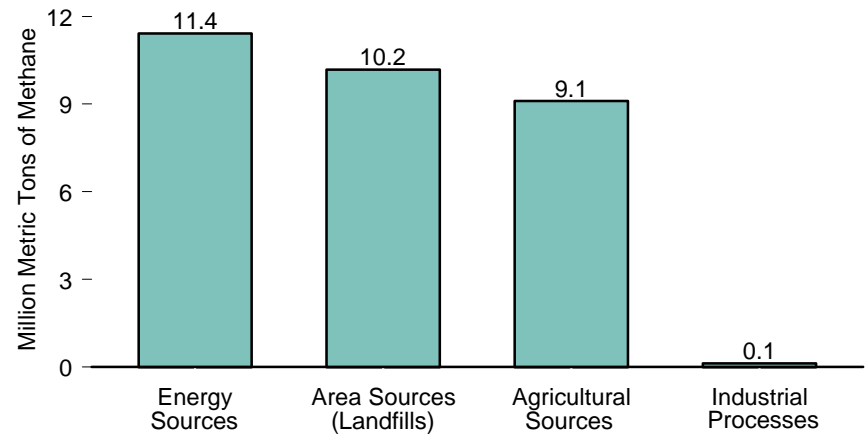


**Figure 12.4 Methane Emissions**

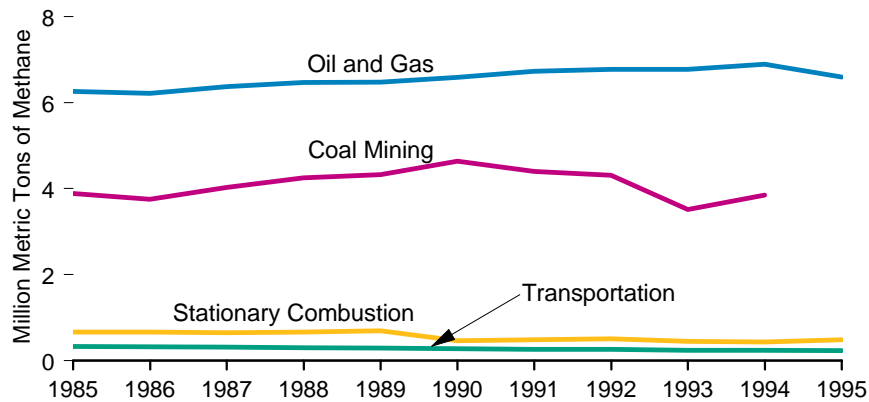
**Total, 1985-1994**



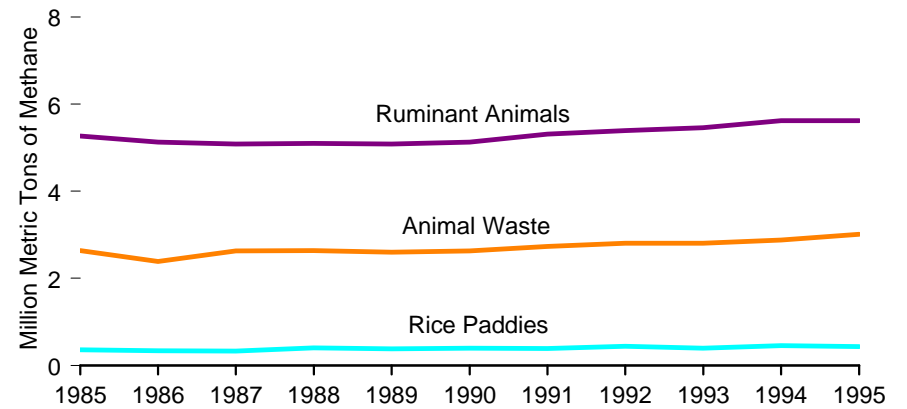
**By Source, 1994**



**Energy Sources by Type, 1985-1995**



**Agricultural Sources by Type, 1985-1995**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 12.4.

**Table 12.4 Methane Emissions, 1985-1995**  
(Million Metric Tons of Methane)

Year	Energy Sources					Area Sources	Agricultural Sources					Industrial Processes	Total
	Oil and Gas	Coal Mining	Transportation	Stationary Combustion	Total	Landfills	Ruminant Animals	Animal Waste	Rice Paddies	Crop Residue Burning	Total		
1985	R6.26	3.89	R0.33	0.66	R11.15	10.31	5.27	2.64	0.36	0.14	8.41	0.11	R30.12
1986	R6.22	3.75	R0.32	0.66	R10.95	10.34	R5.13	R2.39	0.34	0.13	R7.99	0.10	R29.53
1987	R6.37	4.03	R0.31	0.65	R11.36	10.53	5.08	2.63	0.33	0.12	8.16	0.11	R30.31
1988	R6.47	4.25	R0.30	0.66	R11.69	10.64	5.10	R2.64	0.41	0.10	R8.24	0.12	R30.84
1989	R6.48	4.33	R0.29	0.69	R11.79	10.65	5.08	R2.60	0.38	0.12	R8.18	0.12	R30.89
1990	R6.59	4.64	0.27	0.46	R11.96	10.81	5.13	R2.63	0.40	0.13	R8.29	0.12	R31.34
1991	R6.73	4.40	R0.26	0.48	R11.87	10.72	5.31	R2.73	0.39	0.12	R8.55	0.11	R31.40
1992	R6.78	4.31	R0.26	0.51	R11.86	10.60	5.39	R2.81	0.44	0.14	R8.77	0.12	R31.51
1993	R6.78	3.51	0.24	0.44	R10.97	10.43	5.46	R2.81	0.40	0.11	R8.79	0.12	R30.47
1994	R6.89	R3.85	R0.24	0.43	R11.42	R10.18	R5.62	R2.88	0.46	0.15	R9.11	R0.13	R30.99
1995 <sup>P</sup>	6.60	NA	0.23	0.48	NA	NA	5.62	3.01	0.43	0.12	9.18	0.13	NA

R=Revised data. P=Preliminary data. NA=Not available.

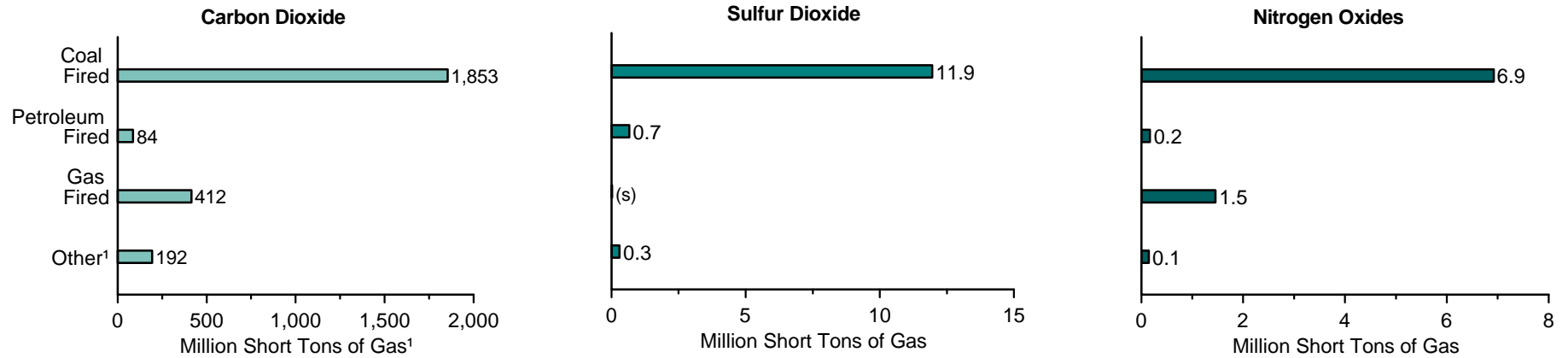
Notes: • Emissions are from anthropogenic sources. Anthropogenic means produced as the result of human activities, including emissions from agricultural activity and domestic livestock. Emissions from natural sources, such as wetlands and wild animals, are not included. • Estimates of methane emissions are, in general, highly uncertain. The level of precision is probably on the order of 30 to 50 percent. For additional information, see "Appendix C, "Uncertainty in Emission Estimates" in the source report, page 103. • Ruminant animals, such as cattle, buffalo, sheep, goats, and camels, emit methane as a product of

the digestive process. • Under certain conditions, methane may be produced via anaerobic decomposition of organic materials in landfills, animal wastes, and rice paddies. • Totals may not equal sum of components due to independent rounding.

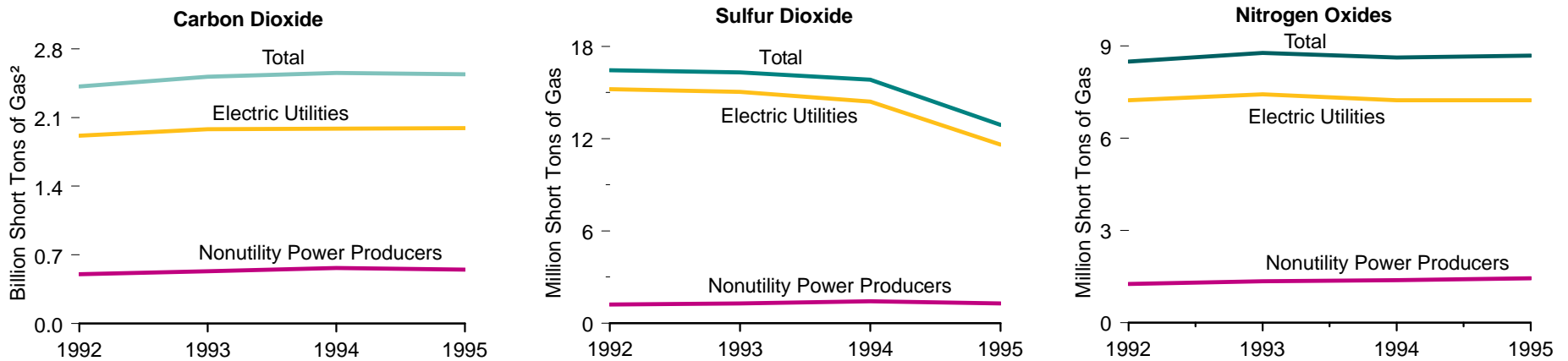
Sources: • 1985-1987—Energy Information Administration (EIA), Office of Integrated Analysis and Forecasting estimates. • 1988 forward—EIA, *Emissions of Greenhouse Gases in the United States 1995* (October 1996), Table 16.

**Figure 12.5 Emissions From Electric Generating Units**

**Emissions by Type of Generating Unit, 1995**



**Total Emissions, 1992-1995**



<sup>1</sup>Plants fired by light oil, methane, coal-oil mixture, propane gas, blast furnace gas, wood, and refuse.

<sup>2</sup>Carbon dioxide gas can be converted to units of carbon by dividing by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

(s)=Less than 0.05 million short tons.

Note: Because horizontal and vertical scales differ, graphs should not be compared.

Source: Table 12.5.

**Table 12.5 Emissions From Electric Generating Units, 1992-1995**

(Thousand Short Tons of Gas)

Year	Coal Fired			Petroleum Fired			Gas Fired			Other <sup>1</sup>			Total		
	Carbon Dioxide <sup>2</sup>	Sulfur Dioxide	Nitrogen Oxides	Carbon Dioxide <sup>2</sup>	Sulfur Dioxide	Nitrogen Oxides	Carbon Dioxide <sup>2</sup>	Sulfur Dioxide	Nitrogen Oxides	Carbon Dioxide <sup>2</sup>	Sulfur Dioxide	Nitrogen Oxides	Carbon Dioxide <sup>2</sup>	Sulfur Dioxide	Nitrogen Oxides
Electric Utilities															
1992	R1,668,404	R14,647	R6,519	R81,026	R573	R160	R160,296	R1	R547	4,509	4	7	1,914,235	15,226	7,234
1993	R1,738,068	R14,385	R6,726	R86,173	R647	R171	R154,141	R1	R526	3,754	4	4	1,982,136	15,036	7,426
1994	R1,737,512	R13,844	R6,520	R79,299	R556	R149	R168,314	R1	R562	2,758	2	3	1,987,883	14,403	7,233
1995	1,753,836	11,260	6,514	54,929	345	102	179,631	1	614	2,295	2	2	1,990,691	11,608	7,233
Nonutility Power Producers															
1992	91,833	668	367	23,510	254	56	204,158	1	704	184,569	289	130	504,071	1,211	1,257
1993	97,281	709	395	27,304	266	62	219,859	1	749	190,630	298	136	535,074	1,274	1,341
1994	102,914	797	413	33,612	327	73	232,485	1	763	198,270	301	135	567,281	1,426	1,384
1995	99,500	689	404	29,271	305	65	232,492	1	838	189,358	284	138	550,620	1,278	1,444
Total															
1992	1,760,237	15,315	6,886	104,537	827	216	364,454	2	1,251	189,078	292	138	R2,418,305	R16,437	R8,491
1993	1,835,349	15,094	7,121	113,478	913	233	374,000	2	1,275	194,385	302	139	R2,517,210	R16,310	R8,768
1994	1,840,426	14,641	6,932	112,911	882	222	400,799	2	1,325	201,028	304	138	R2,555,163	R15,828	R8,618
1995	1,853,336	11,949	6,918	84,200	650	167	412,123	2	1,452	191,653	285	140	2,541,311	12,886	8,677

<sup>1</sup> Plants fired by light oil, methane, coal-oil mixture, propane gas, blast furnace gas, wood, and refuse.

<sup>2</sup> Carbon dioxide gas can be converted to units of carbon by dividing by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

R=Revised data.

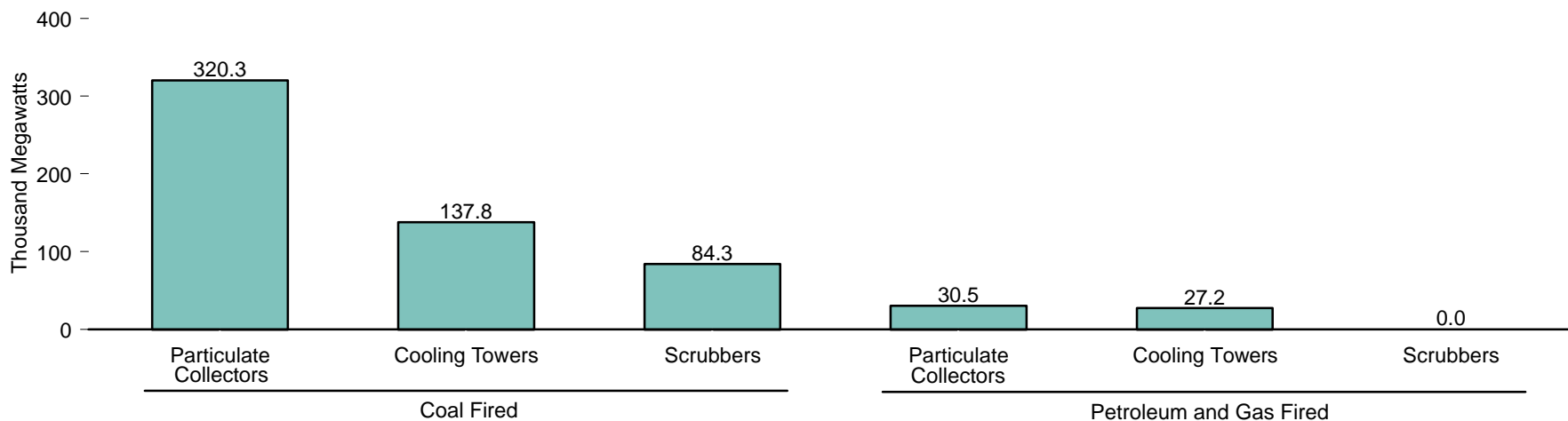
Notes: • Historical data are revised to reflect changed emission factors for the calculation of carbon dioxide and sulfur dioxide and reductions from nitrogen oxides control technologies. See Technical Notes in the *Electric Power Annual 1992* Volume II (December 1996) for additional information. • Electric Utility emissions are based on fuel consumption data reported on Form EIA-767, "Steam-Electric Plant Operation

and Design Report," for steam-electric generating units of 10 megawatts or larger and from data reported on Form EIA-759, "Monthly Power Plant Report" for steam-electric plants below 10 megawatts and for primemovers. Nonutility emissions are from data reported on Form EIA-867, "Annual Nonutility Power Producer Report," (1 megawatt and above).

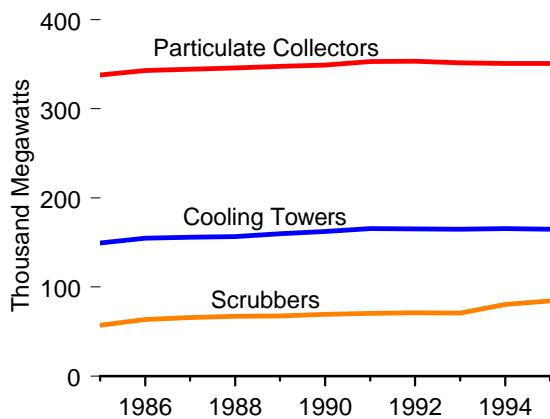
Sources: **Electric Utilities:** EIA, Form EIA-767, "Steam-Electric Plant Operation and Design Report," and Form EIA-759, "Monthly Power Plant Report." **Nonutility Power Producers:** EIA, Form EIA-867, "Annual Nonutility Power Producer Report." **Total:** Sum of Electric Utilities and Nonutility Power Producers.

**Figure 12.6 Installed Nameplate Capacity of Fossil-Fueled Steam-Electric Generators for Electric Utility Plants With Environmental Equipment**

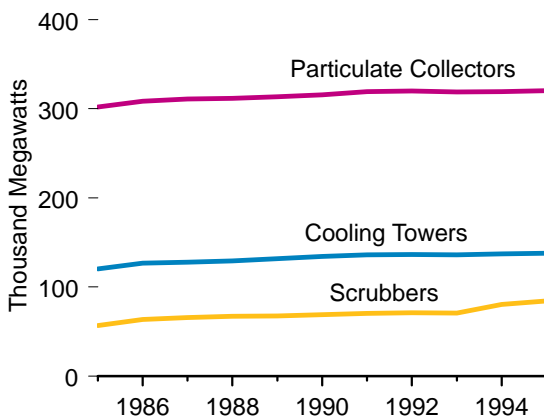
**By Fuel and Equipment Type, 1995**



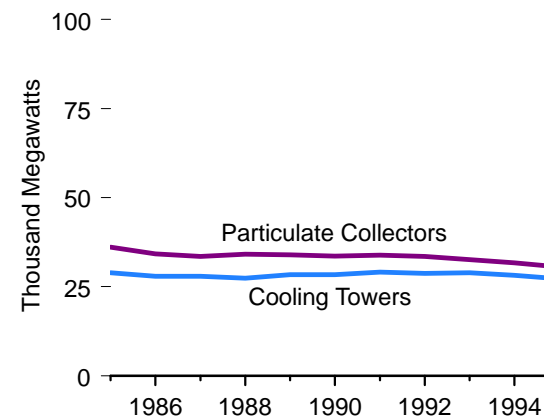
**Total Equipment by Type, 1985-1995**



**Coal-Fired Units by Equipment Type, 1985-1995**



**Petroleum- and Gas-Fired Units by Equipment Type, 1985-1995**



Note: Because vertical scales differ, graphs should not be compared.

Source: Table 12.6.

**Table 12.6 Installed Nameplate Capacity of Steam-Electric Generators for Electric Utility Plants With Environmental Equipment, 1985-1995**  
(Megawatts)

Year	Coal Fired				Petroleum and Gas Fired				Total			
	Particulate Collectors	Cooling Towers	Scrubbers	Total <sup>1</sup>	Particulate Collectors	Cooling Towers	Scrubbers	Total <sup>1</sup>	Particulate Collectors	Cooling Towers	Scrubbers	Total <sup>1</sup>
1985	302,056	120,591	56,955	304,706	36,054	28,895	65	62,371	338,110	149,486	57,020	367,078
1986	308,566	126,731	63,735	311,217	34,258	27,919	65	59,618	342,825	154,650	63,800	370,835
1987	311,043	127,875	65,688	312,885	33,431	27,912	65	58,783	344,474	155,786	65,753	371,668
1988	311,776	129,366	67,156	313,618	34,063	27,434	65	58,937	345,839	156,800	67,221	372,555
1989	313,708	131,697	67,506	315,549	33,975	28,386	65	59,736	347,655	160,087	67,534	375,257
1990	315,681	134,199	69,057	317,522	33,639	28,359	65	59,372	349,319	162,557	69,122	376,894
1991	319,127	136,270	70,294	319,189	33,864	29,067	260	59,773	352,990	165,337	70,554	378,963
1992	320,016	136,542	71,157	320,078	33,509	28,764	195	59,116	353,525	165,306	71,351	379,194
1993	318,830	136,028	70,890	318,893	32,620	28,922	0	58,580	351,451	164,951	70,890	377,473
1994	319,309	137,266	80,617	319,600	31,695	28,186	0	57,123	351,004	165,452	80,617	376,723
1995	320,268	137,825	84,260	320,467	30,513	27,187	0	54,942	350,780	165,012	84,260	375,408

<sup>1</sup> Components are not additive because some generators are included in more than one category.

Notes: • Historical data are revised to include emissions from other fuels (including light oil, methane, coal-oil mixture, propane gas, blast furnace gas, wood, and refuse); to incorporate reevaluation and resubmission of data by respondents to The Clean Air Act Amendments of 1990; and to reflect revisions to the methodology used to estimate emissions. • All data are preliminary and may be revised in future publications. • Data cover only plants with fossil-fueled steam-electric capacity of 100 megawatts or

greater.

Sources: **Coal Fired and Petroleum and Gas Fired:** • 1985-1993—Energy Information Administration (EIA), Form EIA-767, "Steam-Electric Plant Operation and Design Report." • 1994—EIA, *Electric Power Annual 1994, Volume II* (November 1995), Tables 26 and 27. **Total:** • 1985 and 1989—EIA, Form EIA-767, "Steam-Electric Plant Operation and Design Report." • 1990 forward—EIA, *Electric Power Annual 1996, Volume II* (November 1996), Table 23.

## Appendix A

# Thermal Conversion Factors

### Using Thermal Conversion Factors

The thermal conversion factors presented in the following seven tables can be used to estimate the heat content in British thermal units (Btu) of a given amount of energy measured in physical units, such as barrels or cubic feet. For example, 10 barrels of asphalt has a heat content of approximately 66.36 million Btu (10 barrels x 6.636 million Btu/barrel = 66.36 million Btu).

In general, the annual thermal conversion factors presented in Tables A2 through A7 are computed from final annual data. However, if the current year's final data are not available in time for publication, thermal conversion factors for the current year are computed from the best available data and are labeled "preliminary." The source of each factor is described in the section entitled "Thermal Conversion Factor Source Documentation," which follows Table A7 in this appendix.

Thermal conversion factors for hydrocarbon mixes are weighted averages of the thermal conversion factors for each hydrocarbon included in the mix. For example, in calculating the thermal conversion factor for a 60-40 butane-propane mixture, the thermal conversion factor for butane is weighted 1.5 times more heavily than the thermal conversion factor for propane.

More information about British thermal units (the standardized unit of measure for energy) can be found in the Glossary.

**Table A1. Approximate Heat Content of Petroleum Products**  
(Million Btu per Barrel)

Energy Source	Heat Content
Asphalt . . . . .	6.636
Aviation Gasoline . . . . .	5.048
Butane . . . . .	4.326
Butane-Propane Mixture (60 percent-40 percent) . . . . .	4.130
Distillate Fuel Oil . . . . .	5.825
Ethane . . . . .	3.082
Ethane-Propane Mixture (70 percent-30 percent) . . . . .	3.308
Isobutane . . . . .	3.974
Jet Fuel, Kerosene-Type . . . . .	5.670
Jet Fuel, Naphtha-Type . . . . .	5.355
Kerosene . . . . .	5.670
Lubricants . . . . .	6.065
Motor Gasoline . . . . .	5.253
Natural Gasoline . . . . .	4.620
Pentanes Plus . . . . .	4.620
Petrochemical Feedstocks	
Naphtha less than 401° F . . . . .	5.248
Other Oils equal to or greater than 401° F . . . . .	5.825
Still Gas . . . . .	6.000
Petroleum Coke . . . . .	6.024
Plant Condensate . . . . .	5.418
Propane . . . . .	3.836
Residual Fuel Oil . . . . .	6.287
Road Oil . . . . .	6.636
Special Naphthas . . . . .	5.248
Still Gas . . . . .	6.000
Unfinished Oils . . . . .	5.825
Unfractionated Stream . . . . .	5.418
Waxes . . . . .	5.537
Miscellaneous . . . . .	5.796

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

**Table A2. Approximate Heat Content of Crude Oil, Crude Oil and Products, and Natural Gas Plant Liquids, 1949-1996**  
(Million Btu per Barrel)

Year	Crude Oil Only			Crude Oil and Products		Natural Gas Plant Liquids Production
	Production	Imports	Exports	Imports	Exports	
1949	5.800	5.952	5.800	6.059	5.692	4.544
1950	5.800	5.943	5.800	6.080	5.766	4.522
1951	5.800	5.938	5.800	6.075	5.762	4.495
1952	5.800	5.938	5.800	6.067	5.774	4.464
1953	5.800	5.924	5.800	6.052	5.742	4.450
1954	5.800	5.931	5.800	6.052	5.745	4.415
1955	5.800	5.924	5.800	6.040	5.768	4.406
1956	5.800	5.916	5.800	6.024	5.754	4.382
1957	5.800	5.918	5.800	6.023	5.780	4.369
1958	5.800	5.916	5.800	5.993	5.779	4.366
1959	5.800	5.916	5.800	6.020	5.829	4.311
1960	5.800	5.911	5.800	6.021	5.834	4.295
1961	5.800	5.900	5.800	5.991	5.832	4.283
1962	5.800	5.890	5.800	6.004	5.841	4.273
1963	5.800	5.894	5.800	6.002	5.840	4.264
1964	5.800	5.882	5.800	5.998	5.844	4.268
1965	5.800	5.872	5.800	5.997	5.743	4.264
1966	5.800	5.863	5.800	5.993	5.729	4.259
1967	5.800	5.838	5.800	5.999	5.777	4.232
1968	5.800	5.836	5.800	5.977	5.763	4.218
1969	5.800	5.825	5.800	5.974	5.714	4.170
1970	5.800	5.822	5.800	5.985	5.810	4.146
1971	5.800	5.824	5.800	5.961	5.775	4.117
1972	5.800	5.809	5.800	5.935	5.741	4.070
1973	5.800	5.817	5.800	5.897	5.752	4.049
1974	5.800	5.827	5.800	5.884	5.774	4.011
1975	5.800	5.821	5.800	5.858	5.748	3.984
1976	5.800	5.808	5.800	5.856	5.745	3.964
1977	5.800	5.810	5.800	5.834	5.797	3.941
1978	5.800	5.802	5.800	5.839	5.808	3.925
1979	5.800	5.810	5.800	5.810	5.832	3.955
1980	5.800	5.812	5.800	5.796	5.820	3.914
1981	5.800	5.818	5.800	5.775	5.821	3.930
1982	5.800	5.826	5.800	5.775	5.820	3.872
1983	5.800	5.825	5.800	5.774	5.800	3.839
1984	5.800	5.823	5.800	5.745	5.850	3.812
1985	5.800	5.832	5.800	5.736	5.814	3.815
1986	5.800	5.903	5.800	5.808	5.832	3.797
1987	5.800	5.901	5.800	5.820	5.858	3.804
1988	5.800	5.900	5.800	5.820	5.840	3.800
1989	5.800	5.906	5.800	5.833	5.857	3.826
1990	5.800	5.934	5.800	5.849	5.833	3.822
1991	5.800	5.948	5.800	5.873	5.823	3.807
1992	5.800	5.953	5.800	5.877	5.777	3.804
1993	5.800	5.954	5.800	5.883	5.779	3.801
1994	5.800	5.950	5.800	5.861	5.781	3.794
1995	5.800	R5.924	5.800	R5.849	5.751	R3.796
1996 <sup>P</sup>	5.800	5.931	5.800	5.843	5.745	3.777

R=Revised data. P=Preliminary data.  
Note: Crude oil includes lease condensate.

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.



**Table A3. Approximate Heat Content of Petroleum Product Weighted Averages, 1949-1996**

(Million Btu per Barrel)

Year	Consumption					Imports	Exports
	Residential and Commercial	Industrial	Transportation	Electric Utilities	Total		
1949	5.631	5.947	5.465	6.254	5.649	6.261	5.651
1950	5.626	5.940	5.461	6.254	5.649	6.263	5.751
1951	5.626	5.913	5.458	6.254	5.634	6.265	5.753
1952	5.621	5.905	5.442	6.254	5.621	6.261	5.768
1953	5.606	5.897	5.426	6.254	5.608	6.268	5.732
1954	5.603	5.883	5.412	6.254	5.595	6.252	5.738
1955	5.607	5.866	5.408	6.254	5.591	6.234	5.765
1956	5.601	5.856	5.406	6.254	5.585	6.225	5.744
1957	5.587	5.842	5.405	6.254	5.577	6.219	5.774
1958	5.582	5.832	5.393	6.254	5.567	6.091	5.778
1959	5.549	5.811	5.389	6.254	5.557	6.142	5.830
1960	5.570	5.800	5.388	6.267	5.555	6.161	5.835
1961	5.570	5.795	5.386	6.268	5.552	6.102	5.833
1962	5.555	5.784	5.386	6.267	5.545	6.138	5.842
1963	5.532	5.759	5.384	6.266	5.534	6.126	5.841
1964	5.517	5.728	5.388	6.267	5.528	6.129	5.845
1965	5.535	5.728	5.387	6.267	5.532	6.123	5.742
1966	5.523	5.722	5.388	6.266	5.532	6.112	5.728
1967	5.473	5.682	5.391	6.266	5.515	6.128	5.758
1968	5.450	5.646	5.394	6.263	5.504	6.095	5.762
1969	5.399	5.603	5.394	6.259	5.492	6.093	5.713
1970	5.404	5.604	5.393	6.252	5.503	6.088	5.811
1971	5.392	5.600	5.389	6.245	5.504	6.062	5.775
1972	5.368	5.564	5.388	6.233	5.500	6.045	5.741
1973	5.387	5.568	5.395	6.245	5.515	5.983	5.752
1974	5.377	5.538	5.394	6.238	5.504	5.959	5.773
1975	5.358	5.528	5.392	6.250	5.494	5.935	5.747
1976	5.383	5.538	5.395	6.251	5.504	5.980	5.743
1977	5.389	5.555	5.400	6.249	5.518	5.908	5.796
1978	5.382	5.553	5.404	6.251	5.519	5.955	5.814
1979	5.471	5.418	5.428	6.258	5.494	5.811	5.864
1980	5.468	5.376	5.440	6.254	5.479	5.748	5.841
1981	5.409	5.313	5.432	6.258	5.448	5.659	5.837
1982	5.392	5.263	5.422	6.258	5.415	5.664	5.829
1983	5.286	5.273	5.415	6.255	5.406	5.677	5.800
1984	5.384	5.223	5.422	6.251	5.395	5.613	5.867
1985	5.326	5.221	5.423	6.247	5.387	5.572	5.819
1986	5.357	5.286	5.427	6.257	5.418	5.624	5.839
1987	5.316	5.253	5.430	6.249	5.403	5.599	5.860
1988	5.320	5.248	5.434	6.250	5.410	5.618	5.842
1989	5.257	5.233	5.440	6.241	5.410	5.641	5.869
1990	5.208	5.272	5.445	6.247	5.411	5.614	5.838
1991	5.163	5.192	5.442	6.248	5.384	5.636	5.827
1992	5.169	5.188	5.445	6.243	5.378	5.623	5.774
1993	5.148	5.200	5.438	6.241	5.379	5.620	5.777
1994	5.154	5.171	5.442	6.231	5.371	5.538	5.779
1995	5.150	5.150	5.439	6.210	5.358	<sup>R</sup> 5.511	5.746
1996 <sup>P</sup>	5.135	5.130	5.441	6.206	5.352	5.497	5.738

R=Revised data. P=Preliminary data.

Note: Weighted averages of the products included in each category are calculated by using heat content values shown in Table A1.

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

**Table A4. Approximate Heat Content of Natural Gas, 1949-1996**  
(Btu per Cubic Foot)

Year	Production		Consumption			Imports	Exports
	Dry	Marketed (Wet)	Sectors Other Than Electric Utilities	Electric Utilities	Total		
1949	1,035	1,120	1,035	1,035	1,035	—	1,035
1950	1,035	1,119	1,035	1,035	1,035	—	1,035
1951	1,035	1,114	1,035	1,035	1,035	—	1,035
1952	1,035	1,115	1,035	1,035	1,035	1,035	1,035
1953	1,035	1,116	1,035	1,035	1,035	1,035	1,035
1954	1,035	1,115	1,035	1,035	1,035	1,035	1,035
1955	1,035	1,120	1,035	1,035	1,035	1,035	1,035
1956	1,035	1,116	1,035	1,035	1,035	1,035	1,035
1957	1,035	1,113	1,035	1,035	1,035	1,035	1,035
1958	1,035	1,110	1,035	1,035	1,035	1,035	1,035
1959	1,035	1,109	1,035	1,035	1,035	1,035	1,035
1960	1,035	1,107	1,035	1,035	1,035	1,035	1,035
1961	1,035	1,108	1,035	1,035	1,035	1,035	1,035
1962	1,035	1,107	1,035	1,035	1,035	1,035	1,035
1963	1,031	1,103	1,031	1,031	1,031	1,031	1,031
1964	1,032	1,102	1,032	1,032	1,032	1,032	1,032
1965	1,032	1,101	1,032	1,032	1,032	1,032	1,032
1966	1,033	1,103	1,033	1,033	1,033	1,033	1,033
1967	1,032	1,105	1,032	1,032	1,032	1,032	1,032
1968	1,031	1,115	1,031	1,031	1,031	1,031	1,031
1969	1,031	1,103	1,031	1,031	1,031	1,031	1,031
1970	1,031	1,102	1,031	1,031	1,031	1,031	1,031
1971	1,031	1,103	1,031	1,031	1,031	1,031	1,031
1972	1,027	1,100	1,027	1,027	1,027	1,027	1,027
1973	1,021	1,093	1,020	1,024	1,021	1,026	1,023
1974	1,024	1,097	1,024	1,022	1,024	1,027	1,016
1975	1,021	1,095	1,020	1,026	1,021	1,026	1,014
1976	1,020	1,093	1,019	1,023	1,020	1,025	1,013
1977	1,021	1,093	1,019	1,029	1,021	1,026	1,013
1978	1,019	1,088	1,016	1,034	1,019	1,030	1,013
1979	1,021	1,092	1,018	1,035	1,021	1,037	1,013
1980	1,026	1,098	1,024	1,035	1,026	1,022	1,013
1981	1,027	1,103	1,025	1,035	1,027	1,014	1,011
1982	1,028	1,107	1,026	1,036	1,028	1,018	1,011
1983	1,031	1,115	1,031	1,030	1,031	1,024	1,010
1984	1,031	1,109	1,030	1,035	1,031	1,005	1,010
1985	1,032	1,112	1,031	1,038	1,032	1,002	1,011
1986	1,030	1,110	1,029	1,034	1,030	997	1,008
1987	1,031	1,112	1,031	1,032	1,031	999	1,011
1988	1,029	1,109	1,029	1,028	1,029	1,002	1,018
1989	1,031	1,107	1,031	1,030	1,031	1,004	1,019
1990	1,031	1,106	1,030	1,034	1,031	1,012	1,018
1991	1,030	1,108	1,031	1,024	1,030	1,014	1,022
1992	1,030	1,110	1,031	1,022	1,030	1,011	1,018
1993	1,027	1,106	1,028	1,022	1,027	1,020	1,016
1994	1,028	1,105	1,029	1,022	1,028	1,022	1,011
1995	<sup>R</sup> 1,027	<sup>R</sup> 1,106	<sup>R</sup> 1,027	<sup>R</sup> 1,025	<sup>R</sup> 1,027	<sup>R</sup> 1,021	1,011
1996 <sup>P</sup>	1,027	1,106	1,027	1,025	1,027	1,021	1,011

R=Revised data. P=Preliminary data. — = Not applicable.

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

**Table A5. Approximate Heat Content of Coal and Coal Coke, 1949-1996**  
(Million Btu per Short Ton)

Year	Coal								Coal Coke
	Production	Consumption					Imports	Exports	Imports and Exports
		Residential and Commercial	Coke Plants	Other Industries <sup>1</sup>	Electric Utilities	Total			
1949	24.916	24.263	26.797	24.612	23.761	24.793	25.000	26.759	24.800
1950	25.090	24.461	26.798	24.820	23.937	24.989	25.020	26.788	24.800
1951	25.019	24.281	26.796	24.521	23.701	24.813	25.034	26.848	24.800
1952	25.096	24.371	26.796	24.724	23.885	24.901	25.040	26.859	24.800
1953	25.147	24.383	26.796	24.785	23.964	25.006	25.048	26.881	24.800
1954	25.054	24.362	26.795	24.788	23.996	24.913	25.012	26.865	24.800
1955	25.201	24.373	26.794	24.821	24.056	24.982	25.000	26.907	24.800
1956	25.117	24.195	26.792	24.664	23.943	24.843	25.000	26.886	24.800
1957	25.213	24.238	26.792	24.707	23.980	24.905	25.001	26.914	24.800
1958	24.983	24.287	26.794	24.606	23.897	24.716	25.005	26.931	24.800
1959	24.910	24.224	26.790	24.609	23.924	24.719	25.003	26.927	24.800
1960	24.906	24.226	26.791	24.609	23.927	24.713	25.003	26.939	24.800
1961	24.849	24.248	26.792	24.580	23.904	24.653	25.002	26.937	24.800
1962	24.828	24.173	26.788	24.562	23.911	24.627	25.013	26.928	24.800
1963	24.831	24.033	26.784	24.509	23.897	24.588	25.007	26.894	24.800
1964	24.840	24.037	26.785	24.477	23.864	24.602	25.000	26.949	24.800
1965	24.775	24.028	26.787	24.385	23.780	24.537	25.000	26.973	24.800
1966	24.629	23.915	26.786	24.226	23.648	24.396	25.000	26.976	24.800
1967	24.475	23.685	26.781	24.040	23.506	24.243	25.000	26.981	24.800
1968	24.445	23.621	26.780	24.014	23.486	24.186	25.000	26.984	24.800
1969	24.280	23.474	26.779	23.724	23.240	23.976	25.000	26.982	24.800
1970	23.842	23.203	26.784	22.983	22.573	23.440	25.000	26.982	24.800
1971	23.507	23.090	26.784	22.670	22.301	23.124	25.000	26.981	24.800
1972	23.389	22.998	26.782	22.550	22.204	23.036	25.000	26.979	24.800
1973	23.376	22.831	26.780	22.586	22.246	23.057	25.000	26.596	24.800
1974	23.072	22.479	26.778	22.419	21.781	22.677	25.000	26.700	24.800
1975	22.897	22.261	26.782	22.436	21.642	22.506	25.000	26.562	24.800
1976	22.855	22.774	26.781	22.530	21.679	22.498	25.000	26.601	24.800
1977	22.597	22.919	26.787	22.322	21.508	22.265	25.000	26.548	24.800
1978	22.248	22.466	26.789	22.207	21.275	22.017	25.000	26.478	24.800
1979	22.454	22.242	26.788	22.452	21.364	22.100	25.000	26.548	24.800
1980	22.415	22.543	26.790	22.690	21.295	21.947	25.000	26.384	24.800
1981	22.308	22.474	26.794	22.585	21.085	21.713	25.000	26.160	24.800
1982	22.239	22.695	26.797	22.712	21.194	21.674	25.000	26.223	24.800
1983	22.052	22.775	26.798	22.691	21.133	21.576	25.000	26.291	24.800
1984	22.010	22.844	26.799	22.543	21.101	21.573	25.000	26.402	24.800
1985	21.870	22.646	26.798	22.020	20.959	21.366	25.000	26.307	24.800
1986	21.913	22.947	26.798	22.198	21.084	21.462	25.000	26.292	24.800
1987	21.922	23.404	26.799	22.381	21.136	21.517	25.000	26.291	24.800
1988	21.823	23.571	26.799	22.360	20.900	21.328	25.000	26.299	24.800
1989	21.765	23.650	26.800	22.347	20.848	21.272	25.000	26.160	24.800
1990	21.822	23.137	26.799	22.457	20.929	21.331	25.000	26.202	24.800
1991	21.681	23.114	26.799	22.460	20.755	21.146	25.000	26.188	24.800
1992	21.646	23.105	26.799	22.250	20.787	21.143	25.000	26.161	24.800
1993	21.388	22.994	26.800	22.123	20.639	20.983	25.000	26.335	24.800
1994	21.352	23.112	26.800	22.068	20.673	21.010	25.000	26.329	24.800
1995	<sup>R</sup> 21.277	<sup>R</sup> 23.118	26.800	<sup>R</sup> 21.950	<sup>R</sup> 20.495	<sup>R</sup> 20.845	25.000	<sup>R</sup> 26.180	24.800
1996 <sup>P</sup>	21.277	23.118	26.800	21.950	20.495	20.845	25.000	26.180	24.800

<sup>1</sup> Includes transportation.

R=Revised data. P=Preliminary data.

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

**Table A6. Approximate Heat Content of Coal by Type, 1949-1996**  
(Million Btu per Short Ton)

Year	Bituminous Coal <sup>1</sup> and Lignite								Anthracite				
	Production	Consumption					Imports	Exports	Production	Consumption			Imports and Exports
		Residential and Commercial	Coke Plants	Other Industry <sup>2</sup>	Electric Utilities	Total				Sectors Other Than Electric Utilities	Electric Utilities	Total	
1949	24.965	24.044	26.800	24.601	24.022	24.836	25.000	27.000	24.421	24.954	17.500	24.291	25.400
1950	25.126	24.162	26.800	24.804	24.200	25.024	25.000	27.000	24.667	25.297	17.500	24.592	25.400
1951	25.065	23.988	26.800	24.503	23.936	24.854	25.000	27.000	24.439	25.082	17.500	24.289	25.400
1952	25.157	24.108	26.800	24.711	24.118	24.955	25.000	27.000	24.400	25.063	17.500	24.257	25.400
1953	25.207	24.143	26.800	24.773	24.172	25.062	25.000	27.000	24.264	25.132	17.500	24.147	25.400
1954	25.115	24.144	26.800	24.775	24.174	24.971	25.000	27.000	24.234	25.015	17.500	24.130	25.400
1955	25.258	24.166	26.800	24.811	24.206	25.034	25.000	27.000	24.194	25.084	17.500	24.053	25.400
1956	25.187	24.082	26.800	24.668	24.080	24.913	25.000	27.000	23.899	24.548	17.500	23.580	25.400
1957	25.286	24.108	26.800	24.711	24.118	24.979	25.000	27.000	23.785	24.587	17.500	23.441	25.400
1958	25.031	24.039	26.800	24.592	24.014	24.758	25.000	27.000	24.059	25.003	17.500	23.903	25.400
1959	24.965	24.047	26.800	24.606	24.026	24.773	25.000	27.000	23.817	24.666	17.500	23.664	25.400
1960	24.960	24.054	26.800	24.604	24.029	24.765	25.000	27.000	23.717	24.721	17.500	23.592	25.400
1961	24.892	24.034	26.800	24.569	23.993	24.693	25.000	27.000	23.854	24.870	17.500	23.707	25.400
1962	24.869	24.027	26.800	24.558	23.988	24.668	25.000	27.000	23.811	24.666	17.500	23.515	25.400
1963	24.879	24.007	26.800	24.524	23.962	24.639	25.000	27.000	23.633	24.110	17.500	23.107	25.400
1964	24.887	23.988	26.800	24.490	23.928	24.652	25.000	27.000	23.507	24.164	17.500	23.128	25.400
1965	24.813	23.928	26.800	24.387	23.836	24.575	25.000	27.000	23.471	24.316	17.500	23.175	25.400
1966	24.664	23.836	26.800	24.227	23.699	24.431	25.000	27.000	23.202	24.193	17.500	22.906	25.400
1967	24.516	23.737	26.800	24.056	23.554	24.287	25.000	27.000	22.655	23.506	17.500	22.291	25.400
1968	24.487	23.724	26.800	24.034	23.531	24.229	25.000	27.000	22.426	23.293	17.500	22.037	25.400
1969	24.313	23.553	26.800	23.737	23.274	24.011	25.000	27.000	22.543	23.200	17.500	22.003	25.400
1970	23.862	23.111	26.800	22.973	22.603	23.461	25.000	27.000	22.603	23.476	17.500	22.102	25.400
1971	23.519	22.927	26.800	22.653	22.325	23.138	25.000	27.000	22.718	23.572	17.500	22.210	25.400
1972	23.400	22.861	26.800	22.539	22.225	23.050	25.000	27.000	22.422	23.403	17.500	21.822	25.400
1973	23.391	22.887	26.800	22.585	22.262	23.073	25.000	26.612	22.132	22.674	17.920	21.464	25.400
1974	23.087	22.523	26.800	22.420	21.799	22.694	25.000	26.716	21.711	22.330	17.200	20.919	25.400
1975	22.910	22.258	26.800	22.439	21.659	22.522	25.000	26.573	21.582	22.272	17.064	20.762	25.400
1976	22.863	22.819	26.800	22.528	21.692	22.509	25.000	26.613	22.045	22.618	17.526	21.254	25.400
1977	22.597	22.594	26.800	22.290	21.521	22.266	25.000	26.561	22.661	24.101	17.244	22.066	25.400
1978	22.242	22.078	26.800	22.175	21.284	22.014	25.000	26.501	23.079	24.388	17.104	22.398	25.400
1979	22.449	21.884	26.800	22.436	21.372	22.100	25.000	26.570	23.170	24.272	17.454	22.069	25.400
1980	22.411	22.488	26.800	22.690	21.301	21.950	25.000	26.404	22.869	22.719	17.652	21.405	25.400
1981	22.301	22.010	26.800	22.572	21.091	21.710	25.000	26.176	23.291	23.749	18.168	22.080	25.400
1982	22.233	22.226	26.800	22.695	21.200	21.670	25.000	26.231	23.289	24.578	18.160	22.518	25.400
1983	22.048	22.438	26.800	22.680	21.141	21.576	25.000	26.300	22.734	24.536	16.516	21.583	25.400
1984	22.005	22.406	26.800	22.525	21.108	21.570	25.000	26.410	23.107	25.128	17.018	22.322	25.400
1985	21.867	22.568	26.800	22.013	20.965	21.368	25.000	26.320	22.428	23.031	16.784	20.817	25.400
1986	21.908	22.669	26.800	22.185	21.091	21.462	25.000	26.308	23.084	24.399	15.578	21.512	25.400
1987	21.918	22.800	26.800	22.360	21.143	21.514	25.000	26.304	23.108	26.293	15.962	22.435	25.400
1988	21.817	23.135	26.800	22.341	20.905	21.324	25.000	26.308	23.266	26.021	17.312	22.423	25.400
1989	21.759	22.917	26.800	22.324	20.854	21.268	25.000	26.166	23.385	27.196	16.310	22.623	25.400
1990	21.819	22.678	26.800	22.444	20.935	21.330	25.000	26.207	22.574	25.199	16.140	21.668	25.400
1991	21.678	22.635	26.800	22.448	20.761	21.146	25.000	26.192	22.573	25.268	15.858	21.410	25.400
1992	21.643	22.768	26.800	22.242	20.792	21.142	25.000	26.165	22.572	24.617	16.944	21.423	25.400
1993	21.383	22.749	26.800	22.111	20.644	20.983	25.000	26.341	22.573	24.096	16.534	21.262	25.400
1994	21.347	22.683	26.800	22.046	20.681	21.011	25.000	26.335	22.572	25.037	14.680	20.828	25.400
1995	<sup>R</sup> 21.271	<sup>R</sup> 22.767	26.800	<sup>R</sup> 21.931	<sup>R</sup> 20.502	<sup>R</sup> 20.845	25.000	<sup>R</sup> 26.187	<sup>R</sup> 22.572	<sup>R</sup> 24.696	<sup>R</sup> 14.572	<sup>R</sup> 20.808	25.400
1996 <sup>P</sup>	21.271	22.767	26.800	21.931	20.502	20.845	25.000	26.187	22.572	24.696	14.572	20.808	25.400

<sup>1</sup> Includes subbituminous coal.

<sup>2</sup> Includes transportation.

R=Revised data. P=Preliminary data.

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

**Table A7. Approximate Heat Rates for Electricity, 1949-1996**  
(Btu per Kilowatthour)

Year	Electricity Generation			Electricity Consumption
	Fossil-Fueled Steam-Electric Plants <sup>1</sup>	Nuclear Steam-Electric Plants	Geothermal Energy Plants	
1949	15,033	—	—	3,412
1950	14,030	—	—	3,412
1951	13,641	—	—	3,412
1952	13,361	—	—	3,412
1953	12,889	—	—	3,412
1954	12,180	—	—	3,412
1955	11,699	—	—	3,412
1956	11,456	—	—	3,412
1957	11,365	11,629	—	3,412
1958	11,085	11,629	—	3,412
1959	10,970	11,629	—	3,412
1960	10,760	11,629	23,200	3,412
1961	10,650	11,629	23,200	3,412
1962	10,558	11,629	23,200	3,412
1963	10,482	11,877	22,182	3,412
1964	10,462	11,912	22,182	3,412
1965	10,453	11,804	22,182	3,412
1966	10,415	11,623	22,182	3,412
1967	10,432	11,555	21,770	3,412
1968	10,398	11,297	21,606	3,412
1969	10,447	11,037	21,606	3,412
1970	10,494	10,977	21,606	3,412
1971	10,478	10,837	21,655	3,412
1972	10,379	10,792	21,668	3,412
1973	10,389	10,903	21,674	3,412
1974	10,442	11,161	21,674	3,412
1975	10,406	11,013	21,611	3,412
1976	10,373	11,047	21,611	3,412
1977	10,435	10,769	21,611	3,412
1978	10,361	10,941	21,611	3,412
1979	10,353	10,879	21,545	3,412
1980	10,388	10,908	21,639	3,412
1981	10,453	11,030	21,639	3,412
1982	10,454	11,073	21,629	3,412
1983	10,520	10,905	21,290	3,412
1984	10,440	10,843	21,303	3,412
1985	10,447	10,813	21,263	3,412
1986	10,446	10,799	21,263	3,412
1987	10,419	10,776	21,263	3,412
1988	10,324	10,743	21,096	3,412
1989	10,317	10,724	21,096	3,412
1990	10,335	10,680	21,096	3,412
1991	10,352	10,740	20,997	3,412
1992	10,302	10,678	20,914	3,412
1993	10,280	10,682	20,914	3,412
1994	10,272	10,676	20,914	3,412
1995	<sup>R</sup> 10,301	<sup>R</sup> 10,658	20,914	3,412
1996 <sup>P</sup>	<sup>E</sup> 10,301	10,623	20,960	3,412

<sup>1</sup> Used as the thermal conversion factor for hydroelectric power generation and for wood and waste, wind, photovoltaic, and solar thermal energy consumed at electric utilities.

R=Revised data. P=Preliminary data. E=Estimate. — = Not applicable.

Source: See "Thermal Conversion Factor Source Documentation," which follows this table.

## Thermal Conversion Factor Source Documentation

### Approximate Heat Content of Petroleum and Natural Gas Plant Liquids

**Asphalt.** The Energy Information Administration (EIA) adopted the thermal conversion factor of 6.636 million British thermal units (Btu) per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

**Aviation Gasoline.** EIA adopted the thermal conversion factor of 5.048 million Btu per barrel as adopted by the Bureau of Mines from the Texas Eastern Transmission Corporation publication *Competition and Growth in American Energy Markets 1947-1985*, a 1968 release of historical and projected statistics.

**Butane.** EIA adopted the Bureau of Mines thermal conversion factor of 4.326 million Btu per barrel as published in the *California Oil World and Petroleum Industry*, First Issue, April 1942.

**Butane-Propane Mixture.** EIA adopted the Bureau of Mines calculation of 4.130 million Btu per barrel based on an assumed mixture of 60 percent butane and 40 percent propane. See **Butane** and **Propane**.

**Crude Oil, Exports.** Assumed by EIA to be 5.800 million Btu per barrel or equal to the thermal conversion factor for crude oil produced in the United States. See **Crude Oil and Lease Condensate, Production**.

**Crude Oil, Imports.** Calculated annually by EIA by weighting the thermal conversion factor of each type of crude oil imported by the quantity imported. Thermal conversion factors for each type were calculated on a foreign country basis, by determining the average American Petroleum Institute (API) gravity of crude imported from each foreign country from Form ERA-60 in 1977 and converting average API gravity to average Btu content by using National Bureau of Standards, Miscellaneous Publication No. 97, *Thermal Properties of Petroleum Products*, 1933.

**Crude Oil and Lease Condensate, Production.** EIA adopted the thermal conversion factor of 5.800 million Btu per barrel as reported

in a Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950."

**Crude Oil and Petroleum Products, Exports.** Calculated annually by EIA as the average of the thermal conversion factors for each petroleum product exported and crude oil exported weighted by the quantity of each petroleum product and crude oil exported. See **Petroleum Products, Exports** and **Crude Oil, Exports**.

**Crude Oil and Petroleum Products, Imports.** Calculated annually by EIA as the average of the thermal conversion factors for each petroleum product and each crude oil imported weighted by the quantity of each petroleum product and each type of crude oil imported. See **Crude Oil, Imports** and **Petroleum Products, Imports**.

**Distillate Fuel Oil.** EIA adopted the Bureau of Mines thermal conversion factor of 5.825 million Btu per barrel as reported in a Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950."

**Ethane.** EIA adopted the Bureau of Mines thermal conversion factor of 3.082 million Btu per barrel as published in the *California Oil World and Petroleum Industry*, First Issue, April 1942.

**Ethane-Propane Mixture.** EIA calculation of 3.308 million Btu per barrel based on an assumed mixture of 70 percent ethane and 30 percent propane. See **Ethane** and **Propane**.

**Isobutane.** EIA adopted the Bureau of Mines thermal conversion factor of 3.974 million Btu per barrel as published in the *California Oil World and Petroleum Industry*, First Issue, April 1942.

**Jet Fuel, Kerosene Type.** EIA adopted the Bureau of Mines thermal conversion factor of 5.670 million Btu per barrel for "Jet Fuel, Commercial" as published by the Texas Eastern Transmission Corporation in the report *Competition and Growth in American Energy Markets 1947-1985*, a 1968 release of historical and projected statistics.

**Jet Fuel, Naphtha Type.** EIA adopted the Bureau of Mines thermal conversion factor of 5.355 million Btu per barrel for “Jet Fuel, Military” as published by the Texas Eastern Transmission Corporation in the report *Competition and Growth in American Energy Markets 1947-1985*, a 1968 release of historical and projected statistics.

**Kerosene.** EIA adopted the Bureau of Mines thermal conversion factor of 5.670 million Btu per barrel as reported in a Bureau of Mines internal memorandum, “Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950.”

**Lubricants.** EIA adopted the thermal conversion factor of 6.065 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

**Miscellaneous Products.** EIA adopted the thermal conversion factor of 5.796 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

**Motor Gasoline.** EIA adopted the Bureau of Mines thermal conversion factor of 5.253 million Btu per barrel for “Gasoline, Motor Fuel” as published by the Texas Eastern Transmission Corporation in the report *Competition and Growth in American Energy Markets 1947-1985*, a 1968 release of historical and projected statistics.

**Natural Gas Plant Liquids, Production.** Calculated annually by EIA as the average of the thermal conversion factors of each natural gas plant liquid produced, weighted by the quantity of each natural gas plant liquid produced.

**Natural Gasoline.** EIA adopted the thermal conversion factor of 4.620 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

**Pentanes Plus.** EIA assumed the thermal conversion factor to be 4.620 million Btu or equal to that for natural gasoline. See **Natural Gasoline**.

**Petrochemical Feedstocks, Naphtha less than 401° F.** Assumed by EIA to be 5.248 million Btu per barrel, equal to the thermal conversion factor for special naphthas. See **Special Naphthas**.

**Petrochemical Feedstocks, Other Oils equal to or greater than 401° F.** Assumed by EIA to be 5.825 million Btu per barrel, equal to the thermal conversion factor for distillate fuel oil. See **Distillate Fuel Oil**.

**Petrochemical Feedstocks, Still Gas.** Assumed by EIA to be 6.000 million Btu per barrel, equal to the thermal conversion factor for still gas. See **Still Gas**.

**Petroleum Coke.** EIA adopted the thermal conversion factor of 6.024 million Btu per barrel as reported in Btu per short ton in the Bureau of Mines internal memorandum, “Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950.” The Bureau of Mines calculated this factor by dividing 30,120,000 Btu per short ton, as given in the referenced Bureau of Mines internal memorandum, by 5.0 barrels per short ton, as given in the Bureau of Mines Form 6-1300-M and successor EIA forms.

**Petroleum Products, Total Consumption.** Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed, weighted by the quantity of each petroleum product consumed.

**Petroleum Products, Consumption by Electric Utilities.** Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed at electric utilities, weighted by the quantity of each petroleum product consumed at electric utilities. The quantity of petroleum products consumed is estimated in the State Energy Data System as documented in EIA’s *State Energy Data Report*.

**Petroleum Products, Consumption by Industrial Users.** Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed in the industrial sector, weighted by the estimated quantity of each petroleum product consumed in the industrial sector. The quantity of petroleum products consumed is estimated in the State Energy Data System as documented in EIA’s *State Energy Data Report*.

**Petroleum Products, Consumption by Residential and Commercial Users.** Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed by the resi-

dential and commercial sector, weighted by the estimated quantity of each petroleum product consumed in the residential and commercial sector. The quantity of petroleum products consumed is estimated in the State Energy Data System as documented in EIA's *State Energy Data Report*.

**Petroleum Products, Consumption by Transportation Users.** Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed in the transportation sector, weighted by the estimated quantity of each petroleum product consumed in the transportation sector. The quantity of petroleum products consumed is estimated in the State Energy Data System as documented in EIA's *State Energy Data Report*.

**Petroleum Products, Exports.** Calculated annually by EIA as the average of the thermal conversion factors for each petroleum product, weighted by the quantity of each petroleum product exported.

**Petroleum Products, Imports.** Calculated annually by EIA as the average of the thermal conversion factors for each petroleum product imported, weighted by the quantity of each petroleum product imported.

**Plant Condensate.** Estimated to be 5.418 million Btu per barrel by EIA from data provided by McClanahan Consultants, Inc., Houston, Texas.

**Propane.** EIA adopted the Bureau of Mines thermal conversion factor of 3.836 million Btu per barrel as published in the *California Oil World and Petroleum Industry*, First Issue, April 1942.

**Residual Fuel Oil.** EIA adopted the thermal conversion factor of 6.287 million Btu per barrel as reported in the Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950."

**Road Oil.** EIA adopted the Bureau of Mines thermal conversion factor of 6.636 million Btu per barrel, which was assumed to be equal to that of asphalt (see **Asphalt**) and was first published by the Bureau of Mines in the *Petroleum Statement, Annual, 1970*.

**Special Naphthas.** EIA adopted the Bureau of Mines thermal conversion factor of 5.248 million Btu per barrel, which was assumed to be

equal to that of the total gasoline (aviation and motor) factor and was first published in the *Petroleum Statement, Annual, 1970*.

**Still Gas.** EIA adopted the Bureau of Mines estimated thermal conversion factor of 6.000 million Btu per barrel, first published in the *Petroleum Statement, Annual, 1970*.

**Unfinished Oil.** EIA assumed the thermal conversion factor to be 5.825 million Btu per barrel or equal to that for distillate fuel oil (see **Distillate Fuel Oil**) and first published it in EIA's *Annual Report to Congress, Volume 3, 1977*.

**Unfractionated Stream.** EIA assumed the thermal conversion factor to be 5.418 million Btu per barrel or equal to that for plant condensate (see **Plant Condensate**) and first published it in EIA's *Annual Report to Congress, Volume 2, 1981*.

**Wax.** EIA adopted the thermal conversion factor of 5.537 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

## Approximate Heat Content of Natural Gas

**Natural Gas, Total Consumption.** • 1949-1962: EIA adopted the thermal conversion factor of 1,035 Btu per cubic foot as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*. • 1963-1979: EIA adopted the thermal conversion factor calculated annually by the American Gas Association (AGA) and published in *Gas Facts*, an AGA annual publication. • 1980 forward: Calculated annually by EIA by dividing the total heat content of natural gas consumed by the total quantity of natural gas consumed.

**Natural Gas, Exports.** • 1949-1972: Assumed by EIA to be equal to the thermal conversion factor for the consumption of dry natural gas. See **Natural Gas, Total Consumption**. • 1973 forward: Calculated annually by EIA by dividing the heat content of exported natural gas by the quantity of natural gas exported, both reported on Form FPC-14.



**Natural Gas, Imports.** • 1949-1972: Assumed by EIA to be equal to the thermal conversion factor for the consumption of dry natural gas. See **Natural Gas, Total Consumption.** • 1973 forward: Calculated annually by EIA by dividing the heat content of imported natural gas by the quantity of natural gas imported, both reported on Form FPC-14.

**Natural Gas, Production (Dry).** Assumed by EIA to be equal to the thermal conversion factor for the consumption of dry natural gas. See **Natural Gas, Total Consumption.**

**Natural Gas, Production (Wet).** Calculated annually by EIA by adding the heat content of natural gas, dry production, and the total heat content of natural gas plant liquids production and dividing this sum by the total quantity of marketed (wet) natural gas production.

## Approximate Heat Content of Coal and Coal Coke

**Anthracite, Total Consumption.** Calculated annually by EIA by dividing the sum of the heat content of anthracite consumed by electric utilities and all other sectors combined by the total quantity of anthracite consumed.

**Anthracite, Consumption by Electric Utilities.** • 1949-1972: Assumed by EIA that all anthracite consumed at electric utilities was recovered from culm banks and river dredging and estimated to have an average heat content of 17.500 million Btu per short ton. • 1973 forward: Calculated annually by EIA by dividing the heat content of anthracite receipts at electric utilities by the quantity of anthracite received at electric utilities, as reported on Form FERC-423 and predecessor forms.

**Anthracite, Consumption by Sectors Other Than Electric Utilities.** Calculated annually by EIA by dividing the heat content of anthracite production less the heat content of the anthracite consumed at electric utilities, net exports, and shipments to U.S. Armed Forces overseas by the quantity of anthracite consumed by sectors other than electric utilities, less the quantity of anthracite stock changes, losses, and “unaccounted for.”

**Anthracite, Imports and Exports.** EIA assumed the anthracite imports and exports to be freshly mined anthracite having an estimated heat content of 25.400 million Btu per short ton.

**Anthracite, Production.** Calculated annually by EIA by dividing the sum of the heat content of freshly mined anthracite (estimated to have an average heat content of 25.400 million Btu per short ton) and the heat content of anthracite recovered from culm banks and river dredging (estimated to have an average heat content of 17.500 million Btu per short ton) by the total quantity of anthracite produced.

**Bituminous Coal and Lignite, Total Consumption.** Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite consumed by electric utilities, coal coke plants, other industrial plants, and by the residential and commercial sector and the transportation sector by the sum of their respective tonnages.

**Bituminous Coal and Lignite, Consumption by Coke Plants.** Estimated by EIA to be 26.800 million Btu per short ton based on input-output analysis of coal carbonization.

**Bituminous Coal and Lignite, Consumption by Electric Utilities.** • 1949-1972: EIA adopted the average thermal conversion factor of the Bureau of Mines, which used the National Coal Association average thermal conversion factor for electric utilities calculated from Form FPC-1 and published in *Steam Electric Plant Factors*, a National Coal Association annual report. • 1973 forward: Calculated annually by EIA by dividing the total heat content of bituminous coal and lignite received at electric utilities by the total quantity received at electric utilities. Heat contents and receipts are from Form FERC-423 and predecessor forms.

**Bituminous Coal and Lignite, Consumption by Other Industrial Users.** • 1949-1973: Calculated annually by EIA through regression analysis measuring the difference between the average Btu value of coal consumed by other industrial users and that of coal consumed at electric utilities in the 1974-1983 period. • 1974 forward: Calculated annually by EIA by assuming that the bituminous coal and lignite delivered to other industrial users from each coal-producing area (reported on Form EIA-6 and predecessor Bureau of Mines Form 6-1419-Q) contained a heat value equal to that of bituminous coal and lignite received at electric utilities from each of the same coal-producing area.

ing areas (reported on Form FERC-423). The average Btu value of coal by coal-producing area was applied to the volume of deliveries to other industrial users from each coal-producing area, and the sum total of the heat content was divided by the total volume of deliveries. Coal-producing areas are the Bureau of Mines coal-producing districts for 1974 through 1989 and coal-producing States for 1990 forward.

#### **Bituminous Coal and Lignite, Consumption by Residential and**

**Commercial Users.** • 1949-1973: Calculated annually by EIA through regression analysis measuring the difference between the average Btu value of coal consumed by residential and commercial users and that of

coal consumed by electric utilities in the 1974-1983 period. • 1974 forward: Calculated annually by EIA by assuming that the bituminous coal and lignite delivered to residential and commercial users from each coal-producing area (reported on Form EIA-6 and predecessor Bureau of Mines Form 6-1419-Q) contained a heat value equal to that of bituminous coal and lignite received at electric utilities from each of the same coal-producing areas (reported on Form FERC-423). The average Btu value of coal by coal-producing area was applied to the volume of deliveries to residential and commercial users from each coal-producing area, and the sum total of the heat value was divided by the total volume of deliveries. Coal-producing areas are the Bureau of Mines coal-producing districts for 1974 through 1989 and coal-producing States for 1990 forward.

#### **Bituminous Coal and Lignite, Consumption by Transportation Users.**

Assumed by EIA to be equal to the Btu conversion factor for **Bituminous Coal and Lignite, Consumption by Other Industrial Users.**

**Bituminous Coal and Lignite, Exports.** • 1949-1972: Assumed by EIA to be all metallurgical coal and to have an average thermal content of 27.000 million Btu per short ton. • 1973 forward: Calculated annually by EIA by dividing the sum of the heat content of exported metallurgical coal (estimated to average 27.000 million Btu per short ton) and the heat content of exported steam coal (estimated to have an average thermal content of 25.000 million Btu per short ton) by the total quantity of bituminous coal and lignite exported.

**Bituminous Coal and Lignite, Imports.** EIA estimated the average thermal conversion factor to be 25.000 million Btu per short ton.

**Bituminous Coal and Lignite, Production.** Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite consumption, net exports, stock changes, and unaccounted for by the sum of their respective tonnages. Consumers' stock changes by sectors were assumed to have the same conversion factor as that for the consumption sector. Producers' stock changes and unaccounted for were assumed to have the same conversion factor as that for consumption by all users.

**Coal, Total Consumption.** Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite and anthracite consumption by the sum of their respective tonnages.

**Coal, Consumption by Electric Utilities.** Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite and anthracite received at electric utilities by the sum of their respective tonnages received.

**Coal, Consumption by Sectors Other Than Electric Utilities.** Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite and anthracite consumed by sectors other than electric utilities by the sum of their respective tonnages.

**Coal, Exports.** Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite and anthracite exported by the sum of their respective tonnages.

**Coal, Imports.** Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite and anthracite imported by the sum of their respective tonnages.

**Coal, Production.** Calculated annually by EIA by dividing the sum of the total heat content of bituminous coal and lignite and anthracite produced by the sum of their respective tonnages.

**Coal Coke, Imports and Exports.** EIA adopted the Bureau of Mines estimate of 24.800 million Btu per short ton.

### **Approximate Heat Rates for Electricity**

**Fossil-Fueled Steam-Electric Plant Generation.** There is no generally accepted practice for measuring the thermal conversion rates for power plants that generate electricity from hydroelectric, wood and

waste, wind, photovoltaic, or solar thermal energy sources. Therefore, EIA used data from Form EIA-767, "Steam-Electric Power Operation and Design Report," to calculate a rate factor that is equal to the prevailing annual average heat rate factor for fossil-fueled steam-electric power plants in the United States. By using that factor, it is possible to evaluate fossil fuel requirements for replacing those sources during

periods of interruption, such as droughts. The heat content of a kilowatthour of electricity produced, regardless of the generation process, is 3,412 Btu. • 1949-1955: The weighted annual average heat rate for fossil-fueled steam-electric power plants in the United States, as published by EIA in *Thermal-Electric Plant Construction*

## Appendix B

# Metric and Other Physical Conversion Factors

Data presented in the *Annual Energy Review* and in other Energy Information Administration publications are expressed predominately in units that historically have been used in the United States, such as British thermal units, barrels, cubic feet, and short tons. However, because U.S. commerce involves other nations, most of which use metric units of measure, the U.S. Government is committed to the transition to the metric system, as stated in the Metric Conversion Act of 1975 (Public Law 94–168), amended by the Omnibus Trade and Competitiveness Act of 1988 (Public Law 100–418), and Executive Order 12770 of July 25, 1991.

The metric conversion factors presented in Table B1 can be used to calculate the metric-unit equivalents of values expressed in U.S. customary units. For example, 500 short tons is the equivalent of 453.6

metric tons (500 short tons x 0.9071847 metric tons/short ton = 453.6 metric tons).

In the metric system of weights and measures, the names of multiples and subdivisions of any unit may be derived by combining the name of the unit with prefixes, such as deka, hecto, and kilo, meaning, respectively, 10, 100, 1,000, and deci, centi, and milli, meaning, respectively, one-tenth, one-hundredth, and one-thousandth. Common metric prefixes can be found in Table B2.

The conversion factors presented in Table B3 can be used to calculate equivalents in various physical units commonly used in energy analyses. For example, 10 barrels is the equivalent of 420 U.S. gallons (10 barrels x 42 gallons/barrel = 420 gallons).

**Table B1. Metric Conversion Factors**

U.S. Unit	multiplied by	Conversion Factor	equals	Metric Unit	U.S. Unit	multiplied by	Conversion Factor	equals	Metric Unit
<b>Mass</b>					<b>Volume</b>				
short tons (2,000 lb)	x	0.907 184 7	=	metric tons (t)	barrels of oil (bbl)	x	0.158 987 3	=	cubic meters (m <sup>3</sup> )
long tons	x	1.016 047	=	metric tons (t)	cubic yards (yd <sup>3</sup> )	x	0.764 555	=	cubic meters (m <sup>3</sup> )
pounds (lb)	x	0.453 592 37 <sup>a</sup>	=	kilograms (kg)	cubic feet (ft <sup>3</sup> )	x	0.028 316 85	=	cubic meters (m <sup>3</sup> )
pounds uranium oxide (lb U <sub>3</sub> O <sub>8</sub> )	x	0.384 647 <sup>b</sup>	=	kilograms uranium (kgU)	U.S. gallons (gal)	x	3.785 412	=	liters (L)
ounces, avoirdupois (avdp oz)	x	28.349 52	=	grams (g)	ounces, fluid (fl oz)	x	29.573 53	=	milliliters (mL)
					cubic inches (in <sup>3</sup> )	x	16.387 06	=	milliliters (mL)
<b>Length</b>					<b>Area</b>				
miles (mi)	x	1.609 344 <sup>a</sup>	=	kilometers (km)	acres	x	0.404 69	=	hectares (ha)
yards (yd)	x	0.914 4 <sup>a</sup>	=	meters (m)	square miles (mi <sup>2</sup> )	x	2.589 988	=	square kilometers (km <sup>2</sup> )
feet (ft)	x	0.304 8 <sup>a</sup>	=	meters (m)	square yards (yd <sup>2</sup> )	x	0.836 127 4	=	square meters (m <sup>2</sup> )
inches (in)	x	2.54 <sup>a</sup>	=	centimeters (cm)	square feet (ft <sup>2</sup> )	x	0.092 903 04 <sup>a</sup>	=	square meters (m <sup>2</sup> )
					square inches (in <sup>2</sup> )	x	6.451 6 <sup>a</sup>	=	square centimeters (cm <sup>2</sup> )
<b>Energy</b>					<b>Temperature</b>				
British thermal units (Btu)	x	1,055.056 <sup>c</sup>	=	joules (J)	degrees Fahrenheit (°F)	x	5/9 (after subtracting 32) <sup>a,d</sup>	=	degrees Celsius (°C)
calories (cal)	x	4.186 8 <sup>a</sup>	=	joules (J)					
kilowatthours (kWh)	x	3.6 <sup>a</sup>	=	megajoules (MJ)					

<sup>a</sup>Exact conversion.

<sup>b</sup>Calculated by the Energy Information Administration.

<sup>c</sup>The Btu used in this table is the International Table Btu adopted by the Fifth International Conference on Properties of Steam, London, 1956.

<sup>d</sup>To convert degrees Celsius (°C) to degrees Fahrenheit (°F) exactly, multiply by 9/5, then add 32.

Notes: Spaces have been inserted after every third digit to the right of the decimal for ease of reading. Most metric units belong to the International System of Units (SI), and the liter, hectare, and metric ton are accepted for use with the SI units. For more information about the SI units, contact Dr. Barry Taylor

at Building 245, Room C229, National Institute of Standards and Technology, Gaithersburg, MD 20899, or on telephone number 301-975-4220.

Sources: • General Services Administration, Federal Standard 376B, *Preferred Metric Units for General Use by the Federal Government* (Washington, DC, January 27, 1993), pp. 9-11, 13, and 16. National Institute of Standards and Technology, Special Publications 330, 811, and 814. • American National Standards Institute/Institute of Electrical and Electronic Engineers, ANSI/IEEE Std. 268-1992, pp. 28 and 29.

**Table B2. Metric Prefixes**

Unit Multiple	Prefix	Symbol	Unit Multiple	Prefix	Symbol
10 <sup>1</sup>	deka	da	10 <sup>-1</sup>	deci	d
10 <sup>2</sup>	hecto	h	10 <sup>-2</sup>	centi	c
10 <sup>3</sup>	kilo	k	10 <sup>-3</sup>	milli	m
10 <sup>6</sup>	mega	M	10 <sup>-6</sup>	micro	μ
10 <sup>9</sup>	giga	G	10 <sup>-9</sup>	nano	n
10 <sup>12</sup>	tera	T	10 <sup>-12</sup>	pico	p
10 <sup>15</sup>	peta	P	10 <sup>-15</sup>	femto	f
10 <sup>18</sup>	exa	E	10 <sup>-18</sup>	atto	a
10 <sup>21</sup>	zetta	Z	10 <sup>-21</sup>	zepto	z
10 <sup>24</sup>	yotta	Y	10 <sup>-24</sup>	yocto	y

Source: U.S. Department of Commerce, National Institute of Standards and Technology, *The International System of Units (SI)*, NIST Special Publication 330, 1991 Edition (Washington, DC, August 1991), p. 10.

**Table B3. Other Physical Conversion Factors**

Energy Source	Original Unit	multiplied by	Conversion Factor	equals	Final Unit
<b>Petroleum</b>	barrels (bbl)	x	42 <sup>a</sup>	=	U.S. gallons (gal)
<b>Coal</b>	short tons	x	2,000 <sup>a</sup>	=	pounds (lb)
	long tons	x	2,240 <sup>a</sup>	=	pounds (lb)
	metric tons (t)	x	1,000 <sup>a</sup>	=	kilograms (kg)
<b>Wood</b>	ords (cd)	x	1.25 <sup>b</sup>	=	short tons
	ords (cd)	x	128 <sup>a</sup>	=	cubic feet (ft <sup>3</sup> )

<sup>a</sup>Exact conversion.

<sup>b</sup>Calculated by the Energy Information Administration.

Source: U.S. Department of Commerce, National Institute of Standards and Technology, *Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices*, NIST Handbook 44, 1994 Edition (Washington, DC, October 1993), pp. B-10, C-17, and C-21.

## Appendix C

# Carbon Dioxide Emission Factors for Coal

The need for accurate estimates of carbon dioxide emissions produced during the combustion of coal has led the Energy Information Administration (EIA) to develop basic emission factors. Basic emission factors reflect the carbon-to-heat-content ratio of coal, a ratio which measures carbon dioxide emissions per unit of energy (pounds per million Btu), assuming complete combustion. These basic factors are derived from 5,426 sample analyses maintained in EIA's Coal Analysis File. Variations in the carbon-to-heat-content ratios of different coals were observed to follow coal rank and geographic origin, leading EIA to develop basic emission factors specific to the rank and the State of origin of the coal and thence emission factors by sector. These sectoral emission factors weight the coal consumed in a given sector by its rank and State of origin. Table C1 presents the U.S. average carbon dioxide emission factors for coal by sector. Emission factors differ among sectors and within a given sector over time for a number of reasons:

- A higher average emission factor in the residential and commercial sector can be attributed to the steady consumption of bituminous coal and anthracite (presumably for home heating).
- Virtually all of the coal consumed by coke plants comes from only a few States in the Appalachian Coal Basin (West Virginia, Virginia, and eastern Kentucky). Hence, the emission factors for this sector have remained fairly constant.
- Other industrial users of coal (not coke plants) increased consumption of low-rank, high-emission western coals, which has contributed to a rise in their average emission factor.
- Electric utilities, which account for most U.S. coal consumption, have shifted over time away from high-rank, low-emission bituminous coal to low-rank,

**Table C1. Average Carbon Dioxide Emission Factors for Coal by Coal-Consuming Sector, 1980-1995**  
(Pounds of Carbon Dioxide per Million Btu)

Year	Residential and Commercial	Industrial		Electric Utilities	U.S. Average <sup>b</sup>
		Coke Plants <sup>a</sup>	Other Coal		
1980	210.6	205.8	205.9	206.7	206.5
1981	212.0	205.8	205.9	206.9	206.7
1982	210.4	205.7	206.0	207.0	206.9
1983	209.2	205.5	205.9	207.1	207.0
1984	209.5	205.6	206.2	207.1	207.0
1985	209.3	205.6	206.4	207.3	207.1
1986	209.2	205.4	206.5	207.3	207.1
1987	209.4	205.2	206.4	207.3	207.2
1988	209.1	205.3	206.4	207.6	207.3
1989	209.7	205.3	206.6	207.5	207.3
1990	209.5	206.2	206.8	207.6	207.4
1991	210.2	206.2	206.9	207.7	207.5
1992	211.2	206.2	207.1	207.7	207.6
1993	209.9	206.2	207.0	207.8	207.7
1994	209.8	206.3	207.2	207.9	207.8
1995	210.2	206.4	207.2	208.1	207.9

<sup>a</sup>No allowances have been made for carbon retained in non-energy coal chemical byproducts from the coal carbonization process.

<sup>b</sup>Weighted average. The weights used are consumption values by sector.  
Source: Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels.

Appendix D

**Gross Domestic Products and Implicit Price Deflators**



**Table D1. Gross Domestic Products and Implicit Price Deflators, 1949-1996**

Year	Gross Domestic Product (Billion Chained (1992) Dollars)	Implicit Price Deflator (1992=100)
1949	(1)	(1)
1950	(1)	(1)
1951	(1)	(1)
1952	(1)	(1)
1953	(1)	(1)
1954	(1)	(1)
1955	(1)	(1)
1956	(1)	(1)
1957	(1)	(1)
1958	(1)	(1)
1959	2,212.3	22.9
1960	2,261.7	23.3
1961	2,309.8	23.6
1962	2,449.1	23.9
1963	2,554.0	24.2
1964	2,702.9	24.5
1965	2,874.8	25.0
1966	3,060.2	25.7
1967	3,140.2	26.5
1968	3,288.6	27.7
1969	3,388.0	29.0
1970	3,388.2	30.6
1971	3,500.1	32.2
1972	3,690.3	33.5
1973	3,902.3	35.4
1974	3,888.2	38.5
1975	3,865.1	42.2
1976	4,081.1	44.6
1977	4,279.3	47.4
1978	4,493.7	51.0
1979	4,624.0	55.3
1980	4,611.9	60.4
1981	4,724.9	65.9
1982	4,623.6	70.1
1983	4,810.0	73.1
1984	5,138.2	75.9
1985	5,329.5	78.4
1986	5,489.9	80.6
1987	5,648.4	83.1
1988	5,862.9	86.1
1989	6,060.4	89.7
1990	6,138.7	93.6
1991	6,079.0	97.3
1992	6,244.4	100.0
1993	<sup>R</sup> 6,386.4	102.6
1994	<sup>R</sup> 6,608.7	<sup>R</sup> 104.9
1995	<sup>R</sup> 6,742.9	<sup>R</sup> 107.6
1996 <sup>P</sup>	6,907.4	109.7

<sup>1</sup> For 1949-1958 the gross domestic product implicit price deflators, which are used to convert nominal dollars to real (inflation-adjusted) values, were not available in time to use in this report.

R=Revised data. P=Preliminary data.

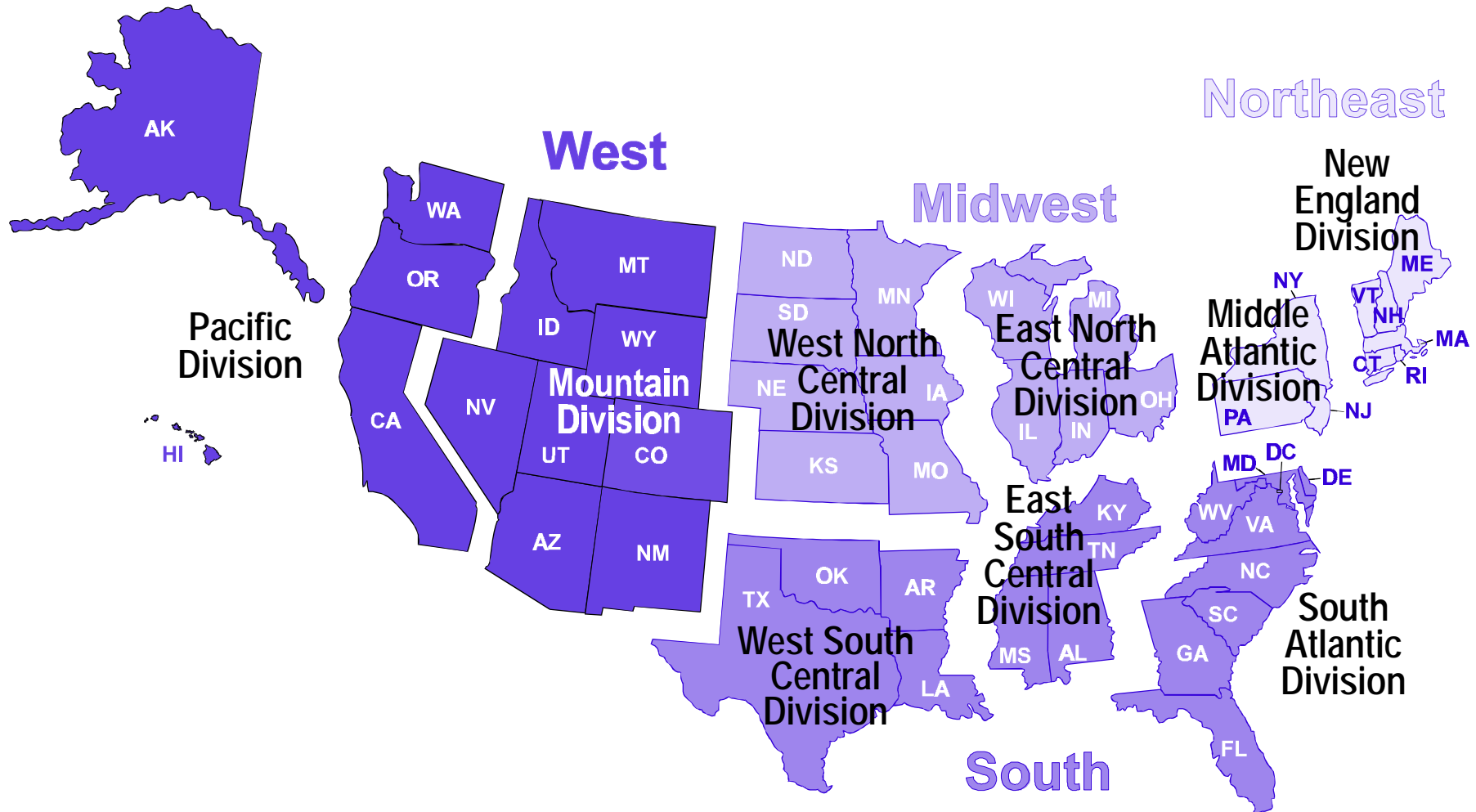
Sources: **Gross Domestic Product:** • 1959-1992—U.S. Department of Commerce (DOC), Bureau of Economic Analysis (BEA), *Survey of Current Business*, January/February 1996, "Summary National Income and Product Series, 1959-94" (Washington, DC, February 1996), Table 2 • 1993-1996—DOC,

BEA, *United States Department of Commerce News* (Washington, DC, February 28, 1997), Table 2. **Implicit Price Deflators** • 1959-1992—DOC, BEA, *Survey of Current Business*, January/February 1996, "Summary National Income and Product Series, 1959-94" (Washington, DC, February 1996), Table 3. • 1993-1996—DOC, BEA, *United States Department of Commerce News* (Washington DC, February 28, 1997), Table 3.

## Appendix E

# U.S. Census Regions and Divisions

Figure E1. U.S. Census Regions and Divisions



Source: U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States, 1996* (Washington, DC, October 1996), Figure 1.

# Glossary

**Account of Others (natural gas):** Natural gas deliveries for the account of others are deliveries to customers by transporters that do not own the natural gas but deliver it for others for a fee. Included are quantities covered by long-term contracts and quantities involved in short-term or spot market sales.

**Additions to Property:** The current year's expenditures on property, plant, and equipment. The amount is predicated upon each reporting company's accounting practices. That is, accounting practices with regard to capitalization of certain items may differ across companies, and, therefore, this figure is a function of each reporting company's policy.

**Alcohol:** The family name of a group of organic chemical compounds composed of carbon, hydrogen, and oxygen. The series of molecules vary in chain length and are composed of a hydrocarbon plus a hydroxyl group;  $\text{CH}_3\text{-(CH}_2\text{)}_n\text{-OH}$  (e.g., methanol, ethanol, and tertiary butyl alcohol).

**Anthracite:** A hard, black, lustrous coal containing a high percentage of fixed carbon and a low percentage of volatile matter. Often referred to as hard coal. It conforms to ASTM Specification D388-84 for anthracite, meta-anthracite, and semianthracite.

**API:** The American Petroleum Institute, a trade association.

**API Gravity:** An arbitrary scale expressing the gravity or density of liquid petroleum products. The measuring scale is calibrated in terms of degrees API. A lighter, less dense product has a higher API gravity.

**Apparent Consumption, Natural Gas (international):** Dry natural gas production plus imports minus exports plus or minus stock changes. U.S. data are from Table 6.1.

**Apparent Consumption, Petroleum (international):** Consumption which includes internal consumption, refinery fuel, all losses (such as those due to leakage, spillage, and fires), and bunkering. For countries in the Organization for Economic Cooperation and Development (OECD), apparent consumption is derived from refined product output plus refined product imports minus refined product exports plus refined product stock changes plus other oil consumption (such as direct use of crude oil and natural gas liquids). For countries outside the OECD, apparent consumption is either

a reported figure or is derived from refined product output plus refined product imports minus refined product exports, with stock levels assumed to remain the same. Apparent consumption also includes, where available, the direct use of crude oil and natural gas plant liquids.

**Asphalt:** A dark-brown-to-black cement-like material containing bitumens as the predominant constituents. It is obtained by petroleum processing. The definition includes crude asphalt as well as the following finished products: cements, fluxes, the asphalt content of emulsions (exclusive of water), and petroleum distillates blended with asphalt to make cutback asphalts.

**ASTM:** The American Society for Testing and Materials.

**Aviation Gasoline Blending Components:** Naphthas that are used for blending or compounding into finished aviation gasoline (e.g., straight-run gasoline, alkylate, and reformat). Excluded are oxygenates (alcohols, ethers), butane, and pentanes plus.

**Aviation Gasoline, Finished:** All special grades of gasoline for use in aviation reciprocating engines, as given in ASTM Specification D910 and Military Specification MIL-G-5572. Excludes blending components that will be used in blending or compounding into finished aviation gasoline.

**Barrel (petroleum):** A unit of volume equal to 42 U.S. gallons.

**Barrels per Calendar Day (operable refinery capacity):** The maximum number of barrels of input that can be processed during a 24-hour period after making allowances for the following limitations: the capability of downstream facilities to absorb the output of crude oil processing facilities of a given refinery (no reduction is made when a planned distribution of intermediate streams through other than downstream facilities is part of a refinery's normal operation); the types and grades of inputs to be processed; the types and grades of products to be manufactured; the environmental constraints associated with refinery operations; the reduction of capacity for scheduled downtime, such as routine inspection, mechanical problems, maintenance, repairs, and turnaround; and the reduction of capacity for unscheduled downtime, such as mechanical problems, repairs, and slowdowns.

## Glossary

**Base (Cushion) Gas:** The volume of gas needed as a permanent inventory to maintain adequate underground storage reservoir pressures and deliverability rates throughout the withdrawal season. All native gas is included in the base gas volume.

**Biofuels:** Nonfossil biomass energy sources and biomass-derived fuels, which together encompass all energy sources from recent-term organic (plant and animal) matter.

Nonfossil biomass energy *sources* are essentially unprocessed; they are burned or gasified, as received, to produce thermal energy or electricity. Examples are fuelwood, waste wood, garbage, and crop waste.

Biomass-derived *fuels*, on the other hand, result from the processing of biomass energy sources. They may be by-products of industrial or agricultural processes or they may be fuels made from biomass feedstocks. Biomass-derived fuels generally have concentrated energy density and are more easily transported and used. Examples are wood by-products (such as wood chips and dewatered wood liquors), pellets, briquettes, refuse-derived fuel (made from garbage), ethanol (made from crops such as corn), and methanol (made from wood).

Different mixes of biofuels are used by each consuming sector. The residential and commercial sectors burn wood and pellets for space heating. The industrial sector's largest biofuel source is combustible by-products used for electricity generation and process steam, followed in importance by wood chips. The transportation sector uses ethanol as an additive to motor gasoline. Some electric utilities use wood, industrial wood waste, and municipal waste as cofiring or primary fuels.

**Bituminous Coal:** A dense black coal, often with well-defined bands of bright and dull material, with a moisture content usually less than 20 percent. Often referred to as soft coal. It is the most common coal and is used primarily for generating electricity, making coke, and space heating. It conforms to ASTM Specification D388-84 for bituminous coal. In this report, bituminous coal includes subbituminous coal.

**British Thermal Unit (Btu):** The quantity of heat needed to raise the temperature of 1 pound of water by 1° F at or near 39.2° F. (See **Heat**

**Content of a Quantity of Fuel, Gross, and Heat Content of a Quantity of Fuel, Net.)**

**Butane:** A normally gaseous straight-chain or branched-chain hydrocarbon (C<sub>4</sub>H<sub>10</sub>). It is extracted from natural gas or refinery gas streams. It includes isobutane and normal butane and is designated in ASTM Specification D1835 and Gas Processors Association Specifications for commercial butane. *Isobutane:* A normally gaseous branched-chain hydrocarbon. It is a colorless paraffinic gas that boils at a temperature of 10.9° F. It is extracted from natural gas or refinery gas streams. *Normal Butane:* A normally gaseous straight-chain hydrocarbon. It is a colorless paraffinic gas that boils at a temperature of 31.1° F. It is extracted from natural gas or refinery gas streams.

**Butylene:** An olefinic hydrocarbon (C<sub>4</sub>H<sub>8</sub>) recovered from refinery processes.

**Capacity Factor:** The ratio of the electrical energy produced by a generating unit for a given period of time to the electrical energy that could have been produced at continuous full-power operation during the same period.

**Chained Dollars:** A measure used to express real prices. Real prices are those that have been adjusted to remove the effect of changes in the purchasing power of the dollar; they usually reflect buying power relative to a reference year. Prior to 1996, real prices were expressed in constant dollars, a measure based on the weights of goods and services in a single year, usually a recent year. In 1996, the U.S. Department of Commerce introduced the chained-dollar measure. The new measure is based on the average weights of goods and services in successive pairs of years. It is "chained" because the second year in each pair, with its weights, becomes the first year of the next pair. The advantage of using the chained-dollar measure is that it is more closely related to any given period covered and is therefore subject to less distortion over time.

**CIF:** See **Cost, Insurance, Freight.**

**City Gate:** A point or measuring station at which a distribution gas utility receives gas from a natural gas pipeline company or transmission system.

**Class A Electric Utility:** An electric utility having annual electric operating revenues of \$2.5 million or more. (Use of this term ceased on December 31, 1983.)

**Class B Electric Utility:** An electric utility having annual electric operating revenues of \$1.0 million or more but less than \$2.5 million. (Use of this term ceased on December 31, 1983.)

**Coal:** A black or brownish-black solid, combustible substance formed by the partial decomposition of vegetable matter without access to air. The rank of coal, which includes anthracite, bituminous coal, subbituminous coal, and lignite, is based on fixed carbon, volatile matter, and heating value. Coal rank indicates the progressive alteration, or coalification, from lignite to anthracite. Lignite contains approximately 9 to 17 million Btu per ton. The heat contents of subbituminous and bituminous coal range from 16 to 24 million Btu per ton, and from 19 to 30 million Btu per ton, respectively. Anthracite contains approximately 22 to 28 million Btu per ton.

**Coalbed Methane:** Methane that is produced from coalbeds in the same manner as natural gas produced from other strata. Methane is the principal component of natural gas.

**Coal Coke:** A hard, porous product made from baking bituminous coal in ovens at temperatures as high as 2,000° F. It is used both as a fuel and as a reducing agent in smelting iron ore in a blast furnace.

**Cogenerator:** A generating facility that produces electricity and another form of useful thermal energy (such as heat or steam) used for industrial, commercial, heating, and cooling purposes. See **Nonutility Power Producer**.

**Commercial Building:** A building with more than 50 percent of its floorspace used for commercial activities. Commercial buildings include, but are not limited to, stores, offices, schools, churches, gymnasiums, libraries, museums, hospitals, clinics, warehouses, and jails. Government buildings are included, except buildings on military bases or reservations.

**Commercial Sector:** The commercial sector, as defined economically, consists of business establishments that are not engaged in transportation or in manufacturing or other types of industrial activity (agriculture, mining, or construction). Commercial establishments include hotels, motels, restaurants, wholesale businesses, retail stores, laundries, and other service enterprises; religious and nonprofit organizations; health, social, and educational institutions; and Federal, State, and local governments. Street lights, pumps, bridges, and public services are also included if the establishment operating them is considered commercial. Standard Industrial Classification (SIC) codes used to classify an establishment as commercial are 50 through 87, 89, and 91 through 97.

**Completion:** The installation of permanent equipment for the production of oil or gas. If a well is equipped to produce only oil or gas from one zone or reservoir, the definition of a well (classified as an oil well or gas well) and the definition of a completion are identical. However, if a well is equipped to produce oil and/or gas separately from more than one reservoir, a well is not synonymous with a completion.

**Constant Dollars:** See **Chained Dollars**.

**Conversion Factor:** A number that translates units of one system into corresponding values of another system. Conversion factors can be used to translate physical units of measure for various fuels into Btu equivalents.

**Cost, Insurance, Freight (CIF):** A type of sale in which the buyer of the product agrees to pay a unit price that includes the f.o.b. value of the product at the point of origin, plus all costs of insurance and transportation. This type of transaction differs from a “delivered” purchase in that the buyer accepts the quantity as determined at the loading port (as certified by the Bill of Lading and Quality Report) rather than pay on the basis of the quantity and quality ascertained at the unloading port. It is similar to the terms of an f.o.b. sale, except that the seller, as a service for which he is compensated, arranges for transportation and insurance.

**Crude Oil f.o.b. Price:** The crude oil price actually charged at the oil-producing country’s port of loading. Includes deductions for any

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rebates and discounts or additions of premiums, where applicable. It is the actual price paid with no adjustment for credit terms.

**Crude Oil (Including Lease Condensate):** A mixture of hydrocarbons that exists in liquid phase in underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities. Included are lease condensate and liquid hydrocarbons produced from tar sands, gilsonite, and oil shale. Drip gases are also included, but topped crude oil (residual oil) and other unfinished oils are excluded. Where identifiable, liquids produced at natural gas processing plants and mixed with crude oil are likewise excluded.

**Crude Oil Landed Cost:** The price of crude oil at the port of discharge, including charges associated with the purchase, transporting, and insuring of a cargo from the purchase point to the port of discharge. The cost does not include charges incurred at the discharge port (e.g., import tariffs or fees, wharfage charges, and demurrage).

**Crude Oil Refinery Input:** The total crude oil put into processing units at refineries.

**Crude Oil Stocks:** Stocks of crude oil and lease condensate held at refineries, in pipelines, at pipeline terminals, and on leases.

**Crude Oil Used Directly:** Crude oil consumed as fuel by crude oil pipelines and on crude oil leases.

**Cubic Foot (natural gas):** A unit of volume equal to 1 cubic foot at a pressure base of 14.73 pounds standard per square inch absolute and a temperature base of 60° F.

**Current Dollars:** See **Nominal Dollars**.

**Degree-Days, Cooling (CDD):** The number of degrees per day that the daily average temperature is above 65° F. The daily average temperature is the mean of the maximum and minimum temperatures for a 24-hour period.

**Degree-Days, Heating (HDD):** The number of degrees per day that the daily average temperature is below 65° F. The daily average temperature is the mean of the maximum and minimum temperatures for a 24-hour period.

**Degree-Days, Population-Weighted:** Heating or cooling degree-days weighted by the population of the area in which the degree-days are recorded. To compute State population-weighted degree-days, each State is divided into from one to nine climatically homogeneous divisions, which are assigned weights based on the ratio of the population of the division to the total population of the State. Degree-day readings for each division are multiplied by the corresponding population weight for each division and those products are then summed to arrive at the State population-weighted degree-day figure. To compute national population-weighted degree-days, the Nation is divided into nine Census regions, each comprising from three to eight States, which are assigned weights based on the ratio of the population of the region to the total population of the Nation. Degree-day readings for each region are multiplied by the corresponding population weight for each region and those products are then summed to arrive at the national population-weighted degree-day figure.

**Demonstrated Reserve Base (coal):** A collective term for the sum of coal in both measured and indicated resource categories of reliability, representing 100 percent of the in-place coal in those categories as of a certain date. Includes beds of bituminous coal and anthracite 28 or more inches thick and beds of subbituminous coal 60 or more inches thick that can occur at depths of up to 1,000 feet. Includes beds of lignite 60 or more inches thick that can be surface mined. Includes also thinner and/or deeper beds that currently are being mined or for which there is evidence that they could be mined commercially at a given time. Represents that portion of the identified coal resource from which reserves are calculated.

**Design Electrical Rating, Net:** The nominal net electrical output of a nuclear unit as specified by the electric utility for the purpose of plant design.

**Development Well:** A well drilled within the proved area of an oil or gas reservoir to the depth of a stratigraphic horizon known to be productive.

**Distillate Fuel Oil:** A general classification for one of the petroleum fractions produced in conventional distillation operations. Included are products known as No. 1, No. 2, and No. 4 fuel oils and No. 1, No. 2, and No. 4 diesel fuels. It is used primarily for space heating, on-and-off-highway diesel engine fuel (including railroad engine fuel and fuel for agricultural machinery), and electric power generation.

**Distillation Unit (atmospheric):** The primary distillation unit that processes crude oil (including mixtures of other hydrocarbons) at approximately atmospheric conditions. It includes a pipe still for vaporizing the crude oil and a fractionation tower for separating the vaporized hydrocarbon components in the crude oil into fractions with different boiling ranges. This is done by continuously vaporizing and condensing the components to separate higher boiling point material. The selected boiling ranges are set by the processing scheme, the properties of the crude oil, and the product specifications.

**District Heat:** Steam or hot water from an outside source used as an energy source in a building. The steam or hot water is produced in a central plant and piped into the building. The district heat may be purchased from a utility or provided by a physical plant in a separate building that is part of the same facility (for example, a hospital complex or university).

**Dry Hole:** An exploratory or development well found to be incapable of producing either oil or gas in sufficient quantities to justify completion as an oil or gas well.

**Dry Natural Gas Production (as a decrement from gas reserves):** The volume of natural gas withdrawn from reservoirs during the report year less (1) the volume returned to such reservoirs in cycling, repressuring of oil reservoirs, and conservation operations; (2) shrinkage resulting from the removal of lease condensate and plant liquids; and (3) nonhydrocarbon gases, where they occur in sufficient quantity to render the gas unmarketable. Volumes of gas withdrawn from gas storage reservoirs and native gas that has been transferred to the

storage category are not considered in production. This is not the same as marketed production, since the latter also excludes vented and flared gas but contains liquids.

**Dry Natural Gas Production (as an increment to gas supply):** Gross withdrawals from production reservoirs less gas used in reservoir repressuring, amounts vented and flared, nonhydrocarbons removed, and various natural gas constituents, such as ethane, propane, and butane, removed at natural gas processing plants. The parameters for measurement are 60° F and 14.73 pounds standard per square inch absolute.

**Eastern Europe and Former U.S.S.R.:** Includes Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Czech Republic, Estonia, Former Czechoslovakia, Former U.S.S.R., Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Slovakia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan.

**Electrical System Energy Losses:** The amount of energy lost during generation, transmission, and distribution of electricity, including plant and unaccounted-for uses.

**Electricity Generation:** The process of producing electric energy or transforming other forms of energy into electric energy. Also, the amount of electric energy produced or expressed in watthours (Wh).

**Electricity Generation, Gross:** The total amount of electric energy produced by a generating facility, as measured at the generator terminals.

**Electricity Generation, Net:** Gross generation minus plant use from all electric utility-owned plants. The energy required for pumping at a pumped-storage hydroelectric plant is regarded as plant use and must be deducted from the gross generation.

**Electricity Production:** Net electricity (gross electricity output measured at generator terminals minus power plant use) generated by publicly and privately owned electric utilities. Excludes industrial electricity generation (except autogeneration of hydroelectric power).

**Electricity Sales:** The amount of kilowatthours sold in a given period of time; usually grouped by classes of service, such as residential,

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commercial, industrial, and other. “Other” sales include sales for public street and highway lighting and other sales to public authorities and railways, and interdepartmental sales.

**Electric Power Plant:** A station containing prime movers, electric generators, and auxiliary equipment for converting mechanical, chemical, and/or fission energy into electric energy.

**Electric Utilities:** All privately owned companies and all publicly owned agencies engaged in the generation, transmission, or distribution of electric power for public use. Publicly owned agencies include municipal electric utilities; Federal power projects, such as the Tennessee Valley Authority (TVA); rural electrification cooperatives; power districts; and State power projects.

**Electric Utility:** A corporation, person, agency, authority, or other legal entity or instrumentality that owns and/or operates facilities within the United States, its territories, or Puerto Rico for the generation, transmission, distribution, or sale of electric energy, primarily for use by the public, and that files forms listed in the *Code of Federal Regulations*, Title 18, Part 141. Facilities that qualify as cogenerators or small power producers under the Public Utility Regulatory Policies Act are not considered electric utilities.

**Electric Utility Sector:** The electric utility sector consists of privately and publicly owned establishments that generate, transmit, distribute, or sell electricity primarily for use by the public and that meet the definition of an electric utility. Nonutility power producers are not included in the electric utility sector.

**Eliminations:** Revenues and expenses resulting from transactions between segments. Consolidated company accounts do not include intersegment revenues and expenses. Therefore, such intersegment transactions must be eliminated.

**End-Use Sectors:** The residential, commercial, industrial, and transportation sectors of the economy.

**Energy:** The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy). Energy has several forms, some of which are

easily convertible and can be changed to another form useful for work. Most of the world’s convertible energy comes from fossil fuels that are burned to produce heat that is then used as a transfer medium to mechanical or other means in order to accomplish tasks. Electrical energy is usually measured in kilowatthours, while heat energy is usually measured in British thermal units.

**Energy Consumption:** The use of energy as a source of heat or power or as an input in the manufacturing process.

**Energy Consumption, End-Use:** The sum of fossil fuel consumption by the four end-use sectors (residential, commercial, industrial, and transportation) plus electric utility sales to those sectors and generation of hydroelectric power by nonelectric utilities. Net end-use energy consumption excludes electrical system energy losses. Total end-use energy consumption includes electrical system energy losses.

**Energy Consumption, Total:** The sum of fossil fuel consumed by the five sectors (residential, commercial, industrial, transportation, and electric utility) plus hydroelectric power, nuclear electric power, net imports of coal coke, and electricity generated for distribution from wood, waste, geothermal, wind, photovoltaic, and solar thermal energy.

**Energy Expenditures:** The money directly spent by consumers to purchase energy. Expenditures equal the amount of energy used by the consumer times the price per unit paid by the consumer.

**Energy Source:** A substance, such as petroleum, natural gas, or coal, that supplies heat or power. In Energy Information Administration (EIA) reports, electricity and renewable forms of energy, such as biomass, geothermal, wind, and solar, are considered to be energy sources.

**Energy-Weighted Industrial Output:** The weighted sum of real output for all two-digit Standard Industrial Classification (SIC) manufacturing industries, plus agriculture, construction, and mining. The weight for each industry is the ratio of the quantity of end-use energy consumption to the value of real output. The base year for those weights is either 1981 or 1982, depending on data availability.



**Ethane:** A normally gaseous straight-chain hydrocarbon ( $C_2H_6$ ). It is a colorless, paraffinic gas that boils at a temperature of  $-127.48^\circ F$ . It is extracted from natural gas and refinery gas streams.

**Ethylene:** An olefinic hydrocarbon ( $C_2H_4$ ) recovered from refinery processes or petrochemical processes.

**Exploratory Well:** A well drilled to find and produce oil or gas in an unproved area, to find a new reservoir in a field previously found to be productive of oil or gas in another reservoir, or to extend the limit of a known oil or gas reservoir.

**Exports:** Shipments of goods from the 50 States and the District of Columbia to foreign countries and to Puerto Rico, the Virgin Islands, and other U.S. possessions and territories.

**Extraction Loss:** The reduction in volume of natural gas due to the removal of natural gas constituents, such as ethane, propane, and butane, at natural gas processing plants.

**f.a.s.:** See **Free Alongside Ship**.

**Federal Energy Regulatory Commission (FERC):** The Federal agency with jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, oil pipeline rates, and gas pipeline certification. FERC is an independent regulatory agency within the Department of Energy and is the successor to the Federal Power Commission.

**Federal Power Commission (FPC):** The predecessor agency of the Federal Energy Regulatory Commission. The Federal Power Commission was created by an Act of Congress under the Federal Water Power Act on June 10, 1920. It was charged originally with regulating the electric power and natural gas industries. It was abolished on September 30, 1977, when the Department of Energy was created. Its functions were divided between the Department of Energy and the Federal Energy Regulatory Commission, an independent regulatory agency.

**First Purchase Price:** The marketed first sales price of domestic crude oil, consistent with the removal price defined by the provisions

of the Windfall Profits Tax on Domestic Crude Oil (Public Law 96-223, Sec. 4998 [c]).

**Fiscal Year:** The U.S. Government's fiscal year runs from October 1 through September 30. The fiscal year is designated by the calendar year in which it ends; e.g., fiscal year 1992 begins on October 1, 1991, and ends on September 30, 1992.

**Flared Natural Gas:** Natural gas burned in flares on the base site or at gas processing plants.

**Floorspace:** All the area enclosed by the exterior walls of a building, including indoor parking facilities, basements, hallways, lobbies, stairways, and elevator shafts. For aggregate floorspace statistics, square footage was summed or aggregated over all buildings in a category (such as all office buildings in the United States).

**f.o.b.:** See **Free on Board**.

**Former U.S.S.R.:** See **U.S.S.R.**

**Footage Drilled:** Total footage for wells in various categories, as reported for any specified period, includes (1) the deepest total depth (length of well bores) of all wells drilled from the surface, (2) the total of all bypassed footage drilled in connection with reported wells, and (3) all new footage drilled for directional sidetrack wells. Footage reported for directional sidetrack wells does not include footage in the common bore, which is reported as footage for the original well. In the case of old wells drilled deeper, the reported footage is that which was drilled below the total depth of the old well.

**Forward Costs:** The operating and capital costs still to be incurred in the production of uranium from estimated reserves; such costs are used in assigning the uranium reserves to cost categories. Those costs include labor, materials, power and fuel, royalties, payroll and production taxes, insurance, and applicable general and administrative costs. They exclude expenditures prior to reserve estimates, for example, for property acquisition, exploration, mine development, and mill construction from the forward cost determinations, as well as income taxes, profit, and the cost of money. Forward costs are neither the full

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costs of production nor the market price at which the uranium will be sold.

**Fossil Fuel:** Any naturally occurring organic fuel formed in the Earth's crust, such as petroleum, coal, and natural gas.

**Fossil Fuel Steam-Electric Power Plant:** An electricity generation plant in which the prime mover is a turbine rotated by high-pressure steam produced in a boiler by heat from burning fossil fuels.

**Free Alongside Ship (f.a.s.):** The value of a commodity at the port of exportation, generally including the purchase price, plus all charges incurred in placing the commodity alongside the carrier at the port of exportation.

**Free on Board (f.o.b.):** A transaction whereby the seller makes the product available within an agreed-on period at a given port at a given price. It is the responsibility of the buyer to arrange for the transportation and insurance.

**Fuel Ethanol:** An anhydrous, denatured aliphatic alcohol (C<sub>2</sub>H<sub>5</sub>OH) intended for motor gasoline blending. See **Oxygenates**.

**Fuel-Switching Capability:** The short-term capability of a manufacturing establishment to have used substitute energy sources in place of those actually consumed. Capability to use substitute energy sources means that the establishment's combustors (for example, boilers, furnaces, ovens, and blast furnaces) had the machinery or equipment either in place or available for installation so that substitutions could actually have been introduced within 30 days without extensive modifications. Fuel-switching capability does not depend on the relative prices of energy sources; it depends only on the characteristics of the equipment and certain legal constraints.

**Full-Power Operation:** Operation of a nuclear generating unit at 100 percent of its design capacity. Full-power operation precedes commercial operation.

**Gasohol:** A blend of finished motor gasoline (leaded or unleaded) and alcohol (generally ethanol but sometimes methanol) limited to 10 percent by volume of alcohol. Gasohol is included in finished leaded and unleaded motor gasoline.

**Gas-Turbine Electric Power Plant:** A plant in which the prime mover is a gas turbine. A gas turbine typically consists of an axial-flow air compressor and one or more combustion chambers where liquid or gaseous fuel is burned. The hot gases expand to drive the generator and then are used to run the compressor.

**Gas Well:** A well completed for the production of natural gas from one or more gas zones or reservoirs. (Wells producing both crude oil and natural gas are classified as oil wells.)

**Gas Well Productivity:** Derived annually by dividing gross natural gas withdrawals from gas wells by the number of producing gas wells on December 31 and then dividing the quotient by the number of days in the year.

**Geothermal Energy:** Energy from the internal heat of the Earth, which may be residual heat, friction heat, or a result of radioactive decay. The heat is found in rocks and fluids at various depths and can be extracted by drilling and/or pumping.

**Geothermal Energy (as used at electric utilities):** Hot water or steam, extracted from geothermal reservoirs in the Earth's crust, and supplied to steam turbines at electric utilities that drive generators to produce electricity.

**Gross Domestic Product (GDP):** The total value of goods and services produced by labor and property located in the United States. As long as the labor and property are located in the United States, the supplier (that is, the workers and, for property, the owners) may be either U.S. residents or residents of foreign countries.

**Gross Domestic Product (GDP) Implicit Price Deflator:** A measure used to convert nominal prices to real prices. See **Chained Dollars**.

**Gross Electricity Generation:** See **Electricity Generation, Gross.**

**Gross Input to Atmospheric Crude Oil Distillation Units:** Total input to atmospheric crude oil distillation units. Includes all crude oil, lease condensate, natural gas plant liquids, unfinished oils, liquefied refinery gases, slop oils, and other liquid hydrocarbons produced from tar sands, gilsonite, and oil shale.

**Heat Content of a Quantity of Fuel, Gross:** The total amount of heat released when a fuel is burned. Coal, crude oil, and natural gas all include chemical compounds of carbon and hydrogen. When those fuels are burned, the carbon and hydrogen combine with oxygen in the air to produce carbon dioxide and water. Some of the energy released in burning goes into transforming the water into steam and is usually lost. The amount of heat spent in transforming the water into steam is counted as part of gross heat content but is not counted as part of net content. Also referred to as the higher heating value. Btu conversion factors typically used by EIA represent gross heat content.

**Heat Content of a Quantity of Fuel, Net:** The amount of usable heat energy released when a fuel is burned under conditions similar to those in which it is normally used. Also referred to as the lower heating value. Btu conversion factors typically used by EIA represent gross heat content.

**Heavy Oil:** The fuel oils remaining after the lighter oils have been distilled off during the refining process. Except for start-up and flame stabilization, virtually all petroleum used in steam-electric power plants is heavy oil.

**Household:** A family, an individual, or a group of up to nine unrelated persons occupying the same housing unit. Occupy means the housing unit was the person's usual or permanent place of residence. The household includes babies, lodgers, boarders, employed persons who live in the housing unit, and persons who usually live in the household but are away traveling or in a hospital. The household does not include persons who are normally members of the household but who are away from home as college students or members of the armed forces. The household does not include persons temporarily visiting with the household if they have a place of

residence elsewhere, persons who take their meals with the household but usually lodge or sleep elsewhere, domestic employees or other persons employed by the household who do not sleep in the same housing unit, or persons who are former members of the household, but have since become inmates of correctional or penal institutions, mental institutions, homes for the aged or needy, homes or hospitals for the chronically ill or handicapped, nursing homes, convents or monasteries, or other places in which residents may remain for long periods of time. By definition, the number of households is the same as the number of occupied housing units.

**Housing Unit:** A structure or part of a structure where a household lives. It has access from the outside of the building either directly or through a common hall. Housing units do not include group quarters, such as prisons or nursing homes where 10 or more unrelated persons live. Hotel and motel rooms are considered housing units if occupied as the usual or permanent place of residence.

**Hydrocarbon:** An organic chemical compound of hydrogen and carbon in the gaseous, liquid, or solid phase. The molecular structure of hydrocarbon compounds varies from the simplest (methane, a constituent of natural gas) to the very heavy and very complex.

**Hydroelectric Power:** The production of electricity from the kinetic energy of falling water.

**Hydroelectric Power Plant:** A plant in which the turbine generators are driven by falling water.

**Implicit Price Deflator:** See **Gross Domestic Product (GDP) Implicit Price Deflator.**

**Imports:** Receipts of goods into the 50 States and the District of Columbia from foreign countries and from Puerto Rico, the Virgin Islands, and other U.S. possessions and territories.

**Independent Power Producer:** Wholesale electricity producers (other than qualifying facilities under the Public Utilities Regulatory Policies Act of 1978) that are unaffiliated with franchised utilities in the area in which the independent power producers are selling power and that lack significant marketing power. Unlike traditional electric

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utilities, independent power producers do not possess transmission facilities that are essential to their customers and do not sell power in any retail service territory where they have a franchise. See **Nonutility Power Producer**.

**Indicated Resources, Coal:** Coal for which estimates of the rank, quality, and quantity are based partly on sample analyses and measurements and partly on reasonable geologic projections. Indicated resources are computed partly from specified measurements and partly from projection of visible data for a reasonable distance on the basis of geologic evidence. The points of observation are 1/2 to 1-1/2 miles apart. Indicated coal is projected to extend as a 1/2-mile-wide belt that lies more than 1/4 mile from the outcrop or points of observation or measurement.

**Industrial Sector:** The industrial sector comprises manufacturing industries which make up the largest part of the sector along with mining, construction, agriculture, fisheries, and forestry. Establishments in this sector range from steel mills, to small farms, to companies assembling electronic components. The SIC codes used to classify establishments as industrial are 1 through 39.

**Internal Combustion Electric Power Plant:** A power plant in which the prime mover is an internal combustion engine. Diesel or gas-fired engines are the principal types used in electric power plants. The plant is usually operated during periods of high demand for electricity.

**International Bunkers:** Storage compartments, found on vessels and aircraft engaged in international commerce, where fuel to be used by the vessel or aircraft is stored.

**Jet Fuel:** The term includes kerosene-type jet fuel and naphtha-type jet fuel. Kerosene-type jet fuel is a kerosene-quality product used primarily for commercial turbojet and turboprop aircraft engines. Naphtha-type jet fuel is a fuel in the heavy naphthas range used primarily for military turbojet and turboprop aircraft engines.

**Kerosene:** A petroleum distillate that has a maximum distillation temperature of 401° F at the 10-percent recovery point, a final boiling point of 572° F, and a minimum flash point of 100° F. Included are the

two grades designated in ASTM D3699 (No. 1-K and No. 2-K) and all grades of kerosene called range or stove oil. Kerosene is used in space heaters, cook stoves, and water heaters; it is suitable for use as an illuminant when burned in wick lamps.

**Lease and Plant Fuel:** Natural gas used in well, field, and lease operations (such as gas used in drilling operations, heaters, dehydrators, and field compressors) and as fuel in natural gas processing plants.

**Lease Condensate:** A natural gas liquid recovered from gas well gas (associated and non-associated) in lease separators or natural gas field facilities. Lease condensate consists primarily of pentanes and heavier hydrocarbons.

**Light Oil:** Lighter fuel oils distilled off during the refining process. Virtually all petroleum used in internal combustion and gas-turbine engines is light oil.

**Lignite:** A brownish-black coal of low rank with a high content of moisture and volatile matter. Often referred to as brown coal. It is used almost exclusively for electric power generation. It conforms to ASTM Specification D388-84 for lignite.

**Line-Miles of Seismic Exploration:** The distance along the Earth's surface that is covered by seismic surveying.

**Liquefied Natural Gas (LNG):** Natural gas (primarily methane) that has been liquefied by reducing its temperature to -260° F at atmospheric pressure.

**Liquefied Petroleum Gases (LPG):** Ethane, ethylene, propane, propylene, normal butane, butylene, and isobutane produced at refineries or natural gas processing plants, including plants that fractionate new natural gas plant liquids.

**Liquefied Refinery Gases (LRG):** Liquefied petroleum gases fractionated from refinery or still gases. Through compression and/or refrigeration, they are retained in the liquid state. The reported categories are ethane/ethylene, propane/propylene, normal butane/butylene, and isobutane. Excludes still gas.

**Low-Power Testing:** The period of time between a nuclear generating unit's initial fuel loading date and the issuance of its operating (full-power) license. The maximum level of operation during that period is 5 percent of the unit's design thermal rating.

**Lubricants:** Substances used to reduce friction between bearing surfaces or as process materials either incorporated into other materials used as processing aids in the manufacturing of other products or as carriers of other materials. Petroleum lubricants may be produced either from distillates or residues. Other substances may be added to impart or improve certain required properties. Excluded are byproducts of lubricating oil refining, such as aromatic extracts derived from solvent extraction or tars derived from deasphalting. Lubricants include all grades of lubricating oils from spindle oil to cylinder oil and those used in greases. Lubricant categories include paraffinic and naphthenic.

**Main Cooking Fuel:** Fuel most often used for cooking.

**Main Heating Equipment:** Equipment used primarily for heating ambient air in a housing unit.

**Main Heating Fuel:** Fuel that powers the main heating equipment.

**Major Electric Utility:** A utility that, in the last 3 consecutive calendar years, had sales or transmission services exceeding one of the following: (1) 1 million megawatthours of total annual sales; (2) 100 megawatthours of annual sales for resale; (3) 500 megawatthours of annual gross interchange out; or (4) 500 megawatthours of wheeling (deliveries plus losses) for others.

**Major Fuels:** The energy sources or fuels for which consumption and expenditure data were collected on the 1986 Nonresidential Building Energy Consumption Survey. Those fuels or energy sources are as follows: electricity, fuel oil, liquefied petroleum gases, natural gas, district steam, district hot water, and district chilled water.

**Manufacturing Establishment:** An economic unit at a single physical location where the mechanical or chemical transformation of materials or substances into new products is performed. Those operations are generally conducted in facilities described as plants,

factories, or mills and characteristically use power-driven machines and material handling equipment. In addition, the assembly of components of manufactured products is considered manufacturing, as is the blending of materials, such as lubricating oil, plastics, resins, or liquors. Manufacturing establishments are covered by SIC codes 20 through 39.

**Manufacturing Sector:** The universe of manufacturing establishments within the 50 States and the District of Columbia.

**Measured Resources, Coal:** Coal resources for which estimates of the rank, quality, and quantity have been computed, within a margin of error of less than 20 percent, from sample analyses and measurements from closely spaced and geologically well known sample sites. Measured resources are computed from dimensions revealed in outcrops, trenches, mine workings, and drill holes. The points of observation and measurement are so closely spaced and the thickness and extent of coals are so well defined that the tonnage is judged to be accurate within 20 percent. Although the spacing of the point of observation necessary to demonstrate continuity of the coal differs from region to region, according to the character of the coalbeds, the points of observation are no greater than 1/2 mile apart. Measured coal is projected to extend as a belt 1/4 mile wide from the outcrop or points of observation or measurement.

**Metallurgical Coal:** Coal that meets the requirements for making coke. It must be low in ash and sulfur and form a coke that is capable of supporting the charge of iron ore and limestone in a blast furnace. A blend of two or more bituminous coals is usually required to make coke.

**Methanol:** A light, volatile alcohol (CH<sub>3</sub>OH) eligible for motor gasoline blending. See **Oxygenates**.

**Metropolitan:** Refers to buildings located within Metropolitan Statistical Areas (MSA's) as defined in the 1980 Census. Except in New England, an MSA is a county or a group of contiguous counties that contains at least one city of 50,000 inhabitants or more, or twin cities with a combined population of 50,000 or more. The contiguous counties are included in an MSA if they are essentially metropolitan in

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character and are socially and economically integrated with the central city. In New England, MSA's consist of towns and cities rather than counties.

**Miscellaneous Petroleum Products:** All finished petroleum products not classified elsewhere, for example, petrolatum, lube refining byproducts (aromatic extracts and tars), absorption oils, ram-jet fuel, petroleum rocket fuels, synthetic natural gas feedstocks, and specialty oils.

**Motor Gasoline:** A complex mixture of relatively volatile hydrocarbons, with or without small quantities of additives, obtained by blending appropriate refinery streams to form a fuel suitable for use in spark-ignition engines. Motor gasoline includes both leaded and unleaded grades of finished motor gasoline, blending components, and gasohol.

**Motor Gasoline Blending Components:** Naphthas that will be used for blending or compounding into finished motor gasoline (e.g., straight-run gasoline, alkylate, reformate, benzene, toluene, and xylene). Excluded are oxygenates (alcohols and ethers), butane, and pentanes plus.

**Motor Gasoline, Finished:** A complex mixture of relatively volatile hydrocarbons, with or without small quantities of additives, that has been blended to form a fuel suitable for use in spark-ignition engines. Motor gasoline, as given in ASTM Specification D439 or Federal Specification VV-G-1690B, includes a range in distillation temperatures from 122° to 158° F at the 10-percent recovery point and from 365° to 374° F at the 90-percent recovery point. Motor gasoline includes reformulated motor gasoline, oxygenated motor gasoline (Environmental Protection Agency [EPA] approved), and other finished motor gasoline. Blendstock is excluded until blending has been completed.

- *Reformulated Motor Gasoline:* Motor gasoline, formulated for use in motor vehicles, the composition and properties of which are certified as "reformulated motor gasoline" by the EPA.
- *Oxygenated Motor Gasoline (EPA Approved):* Motor gasoline, formulated for use in motor vehicles, that is intended for use in the

EPA carbon monoxide nonattainment program. Reformulated motor gasoline is excluded.

· *Other Finished:* Motor gasoline that is not included in the reformulated or oxygenated categories.

**Motor Gasoline, Finished Gasohol:** A blend of finished motor gasoline (leaded or unleaded) and alcohol (generally ethanol, but sometimes methanol) in which 10 percent or more of the product is alcohol.

**Motor Gasoline, Finished Leaded:** Motor gasoline that contains more than 0.05 gram of lead per gallon or more than 0.005 gram of phosphorus per gallon. Premium and regular grades are included, depending on the octane rating. Includes leaded gasohol. Blendstock is excluded until blending has been completed. Alcohol that is to be used in the blending of gasohol is also excluded.

**Motor Gasoline, Finished Leaded Premium:** Motor gasoline having an antiknock index, calculated as  $(R+M)/2$ , greater than 90 and containing more than 0.05 gram of lead per gallon or more than 0.005 gram of phosphorus per gallon.

**Motor Gasoline, Finished Leaded Regular:** Motor gasoline having an antiknock index, calculated as  $(R+M)/2$  greater than or equal to 87 and less than or equal to 90 and containing more than 0.05 gram of lead or 0.005 gram of phosphorus per gallon.

**Motor Gasoline, Finished Unleaded:** Motor gasoline containing not more than 0.05 gram of lead per gallon and not more than 0.005 gram of phosphorus per gallon. Premium and regular grades are included, depending on the octane rating. Includes unleaded gasohol. Blendstock is excluded until blending has been completed. Alcohol that is to be used in the blending of gasohol is also excluded.

**Motor Gasoline, Finished Unleaded Midgrade:** Motor gasoline having an antiknock index calculated as  $(R+M)/2$ , greater than or equal to 88 and less than or equal to 90 and containing not more than 0.05 gram of phosphorus per gallon.

**Motor Gasoline, Finished Unleaded Premium:** Motor gasoline having an antiknock index calculated as  $(R+M)/2$ , greater than 90 and

containing not more than 0.05 gram of lead or 0.005 gram of phosphorus per gallon.

**Motor Gasoline, Finished Unleaded Regular:** Motor gasoline having an antiknock index, calculated as  $(R+M)/2$ , of 87 and containing not more than 0.05 gram of lead per gallon and not more than 0.005 gram of phosphorus per gallon.

**Motor Gasoline, Leaded:** Motor gasoline that contains more than 0.05 gram of lead per gallon or more than 0.005 gram of phosphorus per gallon. Premium and regular grades are included.

**Motor Gasoline Retail Prices:** Motor gasoline prices calculated each month by the Bureau of Labor Statistics (BLS) in conjunction with the construction of the Consumer Price Index (CPI). Those prices are collected in 85 urban areas selected to represent all urban consumers—about 80 percent of the total U.S. population. The service stations are selected initially, and on a replacement basis, in such a way that they represent the purchasing habits of the CPI population. Service stations in the current sample include those providing all types of service (i.e., full-, mini-, and self-service).

**Motor Gasoline, Total:** Includes finished leaded motor gasoline (premium and regular), finished unleaded motor gasoline (premium, midgrade, and regular), motor gasoline blending components, and gasohol.

**Motor Gasoline, Unleaded:** Gasoline that contains not more than 0.05 gram of lead per gallon and not more than 0.005 gram of phosphorus per gallon. Premium and regular grades are included, depending on the octane rating.

**MTBE (Methyl Tertiary Butyl Ether):** An ether,  $(CH_3)_3COCH_3$ , intended for motor gasoline blending. See **Oxygenates**.

**Naphtha:** A generic term applied to a petroleum fraction with an approximate boiling range between 122° and 400° F.

**Native Gas:** The total volume of natural gas indigenous to the storage reservoir at the time the storage started.

**Natural Gas:** A mixture of hydrocarbons (principally methane) and small quantities of various nonhydrocarbons existing in the gaseous phase or in solution with crude oil in underground reservoirs.

**Natural Gas, Dry:** The marketable portion of natural gas production, which is obtained by subtracting extraction losses, including natural gas liquids removed at natural gas processing plants, from total production.

**Natural Gas Gross Withdrawals:** Full well stream volume of produced natural gas, excluding condensate separated at the lease.

**Natural Gas Liquids (NGL):** Those hydrocarbons in natural gas that are separated as liquids from the gas. Natural gas liquids include natural gas plant liquids (primarily ethane, propane, butane, and isobutane), and lease condensate (primarily pentanes produced from natural gas at lease separators and field facilities.)

**Natural Gas Marketed Production:** Gross withdrawals of natural gas from production reservoirs, less gas used for reservoir repressuring; nonhydrocarbon gases removed in treating and processing operations; and quantities vented and flared.

**Natural Gas Plant Liquids (NGPL):** Natural gas liquids recovered from natural gas in processing plants and, in some situations, from natural gas field facilities, as well as those extracted by fractionators. Natural gas plant liquids are defined according to the published specifications of the Gas Processors Association and the American Society for Testing and Materials as follows: ethane, propane, normal butane, isobutane, pentanes plus, and other products from natural gas processing plants (i.e., products meeting the standards for finished petroleum products produced at natural gas processing plants, such as finished motor gasoline, finished aviation gasoline, special naphthas, kerosene, distillate fuel oil, and miscellaneous products).

**Natural Gas Wellhead Price:** The wellhead price of natural gas is calculated by dividing the total reported value at the wellhead by the total quantity produced as reported by the appropriate agencies of individual producing States and the U.S. Minerals Management Service. The price includes all costs prior to shipment from the lease, including

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gathering and compression costs, in addition to State production, severance, and similar charges.

**Natural Gas, Wet:** Natural gas prior to the extraction of liquids and other miscellaneous products.

**NERC:** See **North American Electric Reliability Council**.

**Net Electricity Generation:** See **Electricity Generation, Net**.

**Net Income:** Operating income plus earnings from unconsolidated affiliates; gains from disposition of property, plant, and equipment; minority interest income; and foreign currency translation effects less income taxes, extraordinary items, and the cumulative effect of accounting changes.

**Net Ownership Interest:** The sum of net working interest and royalty interest. Net ownership interest applies to both production and reserves.

**Net Property Investment:** The original cost of property, plant, and equipment (PP&E), less accumulated depreciation.

**Net Summer Capability:** The steady hourly output that generating equipment is expected to supply to system load, exclusive of auxiliary power, as demonstrated by testing at the time of summer peak demand.

**Net Working Interest:** A company's working interest, not including any basic royalty or overriding royalty interests.

**Nominal Dollars:** A measure used to express nominal prices.

**Nominal Price:** The price paid for goods or services at the time of the transaction. Nominal prices are those that have not been adjusted to remove the effect of changes in the purchasing power of the dollar; they reflect buying power in the year in which the transaction occurred.

**Nonhydrocarbon Gases:** Typical nonhydrocarbon gases that may be present in reservoir natural gas are carbon dioxide, helium, hydrogen sulfide, and nitrogen.

**Nonmetropolitan:** Refers to buildings not located within Metropolitan Statistical Areas as defined in the 1980 Census.

**Nontraceables:** Those revenues, costs, assays, and liabilities that cannot be directly attributed to a type of business by use of a reasonable allocation method developed on the basis of operating-level utilities.

**Nonutility Power Producer:** A corporation, person, agency, authority, or other legal entity or instrumentality that owns electric generating capacity and is not an electric utility. Nonutility power producers include qualifying cogenerators, qualifying small power producers, and other nonutility generators (including independent power producers) without a designated, franchised service area that do not file forms listed in the *Code of Federal Regulations*, Title 18, Part 141. See **Cogenerator; Independent Power Producer; and Small Power Producer**.

**North American Electric Reliability Council (NERC):** A council formed in 1968 by the electric utility industry to promote the reliability and adequacy of bulk power supply in the electric utility systems of North America. The NERC consists of nine regional reliability councils and encompasses essentially all the power systems of the contiguous United States and Canada. The NERC regions are as follows: (1) East Central Area Reliability Coordination Agreement (ECAR); (2) Electric Reliability Council of Texas (ERCOT); (3) Mid-America Interpol Network (MAIN); (4) Mid-Atlantic Area Council (MAAC); (5) Mid-Continent Area Power Pool (MAPP); (6) Northeast Power Coordinating Council (NPCC); (7) Southeastern Electric Reliability Council (SERC); (8) Southwest Power Pool (SPP); and (9) Western Systems Coordinating Council (WSCC).

**Nuclear Electric Power:** Electricity generated by an electric power plant whose turbines are driven by steam generated in a reactor by heat from the fissioning of nuclear fuel.

**Nuclear Electric Power Plant:** A single-unit or multi-unit facility in which heat produced in one or more reactors by the fissioning of nuclear fuel is used to drive one or more steam turbines.



**Nuclear Reactor:** An apparatus in which the nuclear fission chain can be initiated, maintained, and controlled so that energy is released at a specific rate. The reactor includes fissionable material (fuel), such as uranium or plutonium; fertile material; moderating material (unless it is a fast reactor); a heavy-walled pressure vessel; shielding to protect personnel; provision for heat removal; and control elements and instrumentation.

**Offshore:** That geographic area that lies seaward of the coastline. In general, the coastline is the line of ordinary low water along with that portion of the coast that is in direct contact with the open sea or the line marking the seaward limit of inland water.

**Oil:** See **Crude Oil (Including Lease Condensate)**.

**Oil Well:** A well completed for the production of crude oil from one or more oil zones or reservoirs. Wells producing both crude oil and natural gas are classified as oil wells.

**Operable (nuclear):** A U.S. nuclear generating unit is considered operable after it completes low-power testing and is issued a full-power operating license by the Nuclear Regulatory Commission. A foreign nuclear generating unit is considered operable once it has generated electricity to the grid.

**Operable Refineries:** Refineries that were in one of the following three categories at the beginning of a given year: in operation; not in operation and not under active repair, but capable of being placed into operation within 30 days; or not in operation, but under active repair that could be completed within 90 days.

**Operating Income:** Operating revenues less operating expenses. Excludes items of other revenue and expense, such as equity in earnings of unconsolidated affiliates, dividends, interest income and expense, income taxes, extraordinary items, and cumulative effect of accounting changes.

**Organization for Economic Cooperation and Development (OECD):** Member countries currently included are Australia, Austria, Belgium, Canada, Denmark and its territories (Faroe Islands and Greenland), Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal,

Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States and its territories (Guam, Puerto Rico, and Virgin Islands). Data for Czech Republic, Hungary, Poland, and South Korea, which recently joined the OECD, are not included.

**Organization of Petroleum Exporting Countries (OPEC):** Countries that have organized for the purpose of negotiating with oil companies on matters of oil production, prices, and future concession rights. Current members are Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela.

**Other Hydrocarbons (petroleum):** Other materials processed at refineries. Includes coal tar derivatives, hydrogen, gilsonite, and natural gas received by the refinery for reforming into hydrogen.

**Oxygenated Motor Gasoline:** See **Motor Gasoline, Finished**.

**Oxygenates:** Any substance which, when added to motor gasoline, increases the amount of oxygen in that motor gasoline blend. Through a series of waivers and interpretive rules, the Environmental Protection Agency (EPA) has determined the allowable limits for oxygenates in unleaded gasoline. The “Substantially Similar” Interpretive Rules (56 FR [February 11, 1991]) allows blends of aliphatic alcohols other than methanol and aliphatic ethers, provided the oxygen content does not exceed 2.7 percent by weight. The “Substantially Similar” Interpretive Rules also provide for blends of methanol up to 0.3 percent by volume exclusive of other oxygenates, and butanol or alcohols of a higher molecular weight up to 2.75 percent by weight. Individual waivers pertaining to the use of oxygenates in unleaded motor gasoline have been issued by the EPA. They include the following:

- *Fuel Ethanol:* Blends of up to 10 percent by volume anhydrous ethanol (200 proof).
- *Methanol:* Blends of methanol and gasoline-grade tertiary butyl alcohol (GTBA) such that the total oxygen content does not exceed 3.5 percent by weight and the ratio of methanol to GTBA is less than or equal to 1. It is also specified that this blended fuel must meet ASTM volatility specifications. Blends of up to 5.0 percent by volume methanol with a minimum of 2.5 percent by volume cosolvent alcohols having carbon number of 4 or less (i.e., ethanol,

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propanol, butanol, and/or GTBA). The total oxygen must not exceed 3.7 percent by weight, and the blend must meet ASTM volatility specifications as well as phase separation and alcohol purity specifications.

*MTBE (Methyl tertiary butyl ether)*: Blends up to 15.0 percent by volume MTBE that must meet the ASTM D4814 specifications. Blenders must take precautions that the blends are not used as base gasolines for other oxygenated blends.

**Pentanes Plus:** A mixture of hydrocarbons, mostly pentanes and heavier, extracted from natural gas. Includes isopentane, natural gasoline, and plant condensate.

**Petrochemical Feedstocks:** Chemical feedstocks derived from petroleum principally for the manufacture of chemicals, synthetic rubber, and a variety of plastics. The categories reported are naphthas less than 401° F endpoint and other oils equal to or greater than 401° F endpoint.

**Petroleum:** A generic term applied to oil and oil products in all forms, such as crude oil, lease condensate, unfinished oils, petroleum products, natural gas plant liquids, and nonhydrocarbon compounds blended into finished petroleum products.

**Petroleum Coke:** A residue that is the final product of the condensation process in cracking. The product is either marketable petroleum coke or catalyst petroleum coke.

**Petroleum Coke, Catalyst:** The carbonaceous residue that is deposited on and deactivates the catalyst used in many catalytic operations (e.g., catalytic cracking). Carbon is deposited on the catalyst, thus deactivating the catalyst. The catalyst is reactivated by burning off the carbon, which is used as a fuel in the refining process. That carbon or coke is not recoverable in a concentrated form.

**Petroleum Coke, Marketable:** Those grades of coke produced in delayed or fluid cokers that may be recovered as relatively pure carbon. Marketable petroleum coke may be sold as is or further purified by calcining.

**Petroleum Consumption:** The sum of all refined petroleum products supplied. For each refined petroleum product, the amount supplied is

calculated by adding production and imports, then subtracting changes in primary stocks (net withdrawals are a plus quantity and net additions are a minus quantity) and exports.

**Petroleum Imports:** Imports of petroleum into the 50 States and the District of Columbia from foreign countries and from Puerto Rico, the Virgin Islands, and other U.S. territories and possessions. Included are imports for the Strategic Petroleum Reserve and withdrawals from bonded warehouses for onshore consumption, offshore bunker use, and military use. Excluded are receipts of foreign petroleum into bonded warehouses and into U.S. territories and U.S. Foreign Trade Zones.

**Petroleum Products:** Products obtained from the processing of crude oil (including lease condensate), natural gas, and other hydrocarbon compounds. Petroleum products include unfinished oils, liquefied petroleum gases, pentanes plus, aviation gasoline, motor gasoline, naphtha-type jet fuel, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, petrochemical feedstocks, special naphthas, lubricants, waxes, petroleum coke, asphalt, road oil, still gas, and miscellaneous products.

**Petroleum Products Supplied:** See **Petroleum Consumption**.

**Petroleum Stocks, Primary:** For individual products, quantities that are held at refineries, in pipelines, and at bulk terminals that have a capacity of 50,000 barrels or more, or that are in transit thereto. Stocks held by product retailers and resellers, as well as tertiary stocks held at the point of consumption, are excluded. Stocks of individual products held at gas processing plants are excluded from individual product estimates but are included in other oil estimates and total.

**Photovoltaic and Solar Thermal Energy (as used at electric utilities):** Energy radiated by the sun as electromagnetic waves (electromagnetic radiation) that is converted at electric utilities into electricity by means of solar (photovoltaic) cells or concentrating (focusing) collectors.

**Photovoltaic Module:** A group of photovoltaic cells. (Cells are solid-state devices that produce electricity when exposed to sunlight.) The electricity is used primarily in applications requiring remote

power, such as radio communication, cathodic protection, and navigational aids.

**Pipeline, Natural Gas:** A continuous pipe conduit, complete with such equipment as valves, compressor stations, communications systems, and meters, for transporting natural gas and/or supplemental gaseous fuels from one point to another, usually from a point in or beyond the producing field or processing plant to another pipeline or to points of utilization. Also refers to a company operating such facilities.

**Pipeline, Petroleum:** Crude oil and product pipelines (including interstate, intrastate, and intracompany pipelines) used to transport crude oil and petroleum products, respectively, within the 50 States and the District of Columbia.

**Plant Condensate:** One of the natural gas liquids, mostly pentanes and heavier hydrocarbons, recovered and separated as liquids at gas inlet separators or scrubbers in processing plants.

**Primary Energy Consumption Expenditures:** Expenditures for energy consumed in each of the four major end-use sectors, excluding energy in the form of electricity, plus expenditures by the electric utilities sector for energy used to generate electricity. There are no fuel-associated expenditures for hydroelectric power, geothermal energy, photovoltaic and solar energy, or wind energy. Also excluded are the quantifiable consumption expenditures that are an integral part of process fuel consumption.

**Process Fuel:** All energy consumed in the acquisition, processing, and transportation of energy. Quantifiable process fuel includes three categories: natural gas lease and plant operations, natural gas pipeline operations, and oil refinery operations.

**Processing Gain:** The amount by which total volume of refinery output is greater than the volume of input for a given period of time. The processing gain arises when crude oil and other hydrocarbons are processed into products that are, on average, less dense than the input.

**Processing Loss:** The amount by which total volume of refinery output is less than input for a given period of time. The processing loss

arises when crude oil and other hydrocarbons are processed into products that are, on average, more dense than the input.

**Processing Plant (natural gas):** A surface installation designed to separate and recover natural gas liquids from a stream of produced natural gas through the processes of condensation, absorption, refrigeration, or other methods, and to control the quality of natural gas marketed or returned to oil or gas reservoirs for pressure maintenance, repressuring, or cycling.

**Propane:** A normally gaseous straight-chain hydrocarbon ( $C_3H_8$ ). It is a colorless paraffinic gas that boils at a temperature of  $-43.67^\circ F$ . It is extracted from natural gas or refinery gas streams. It includes all products designated in ASTM Specification D1835 and Gas Processors Association Specifications for commercial propane and HD-5 propane.

**Propylene:** An olefinic hydrocarbon ( $C_3H_6$ ) recovered from refinery or petrochemical processes.

**Proved Reserves, Crude Oil:** The estimated quantities of all liquids defined as crude oil that geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.

**Proved Reserves, Lease Condensate:** The volumes of lease condensate expected to be recovered in future years in conjunction with the production of proved reserves of natural gas based on the recovery efficiency of lease and/or field separation facilities installed.

**Proved Reserves, Natural Gas:** The estimated quantities of natural gas that analysis of geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.

**Proved Reserves, Natural Gas Liquids:** Those volumes of natural gas liquids (including lease condensate) demonstrated with reasonable certainty to be separable in the future from proved natural gas reserves, under existing economic and operating conditions.

**Real Price:** A price that has been adjusted to remove the effect of changes in the purchasing power of the dollar. Real prices, which are

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expressed in chained dollars in this report, reflect buying power relative to a reference year. See **Chained Dollars**.

**Refiner Acquisition Cost of Crude Oil:** The cost of crude oil to the refiner, including transportation and fees. The composite cost is the weighted average of domestic and imported crude oil costs.

**Refinery Input:** The raw materials and intermediate materials processed at refineries to produce finished petroleum products. They include crude oil, products of natural gas processing plants, unfinished oils, other hydrocarbons and alcohol, motor gasoline and aviation gasoline blending components, and finished petroleum products.

**Refinery Output:** The total amount of petroleum products produced at a refinery. Includes petroleum consumed by the refinery.

**Refinery (petroleum):** An installation that manufactures finished petroleum products from crude oil, unfinished oils, natural gas liquids, other hydrocarbons, and alcohol.

**Renewable Energy:** Energy obtained from sources that are essentially inexhaustible (unlike, for example, the fossil fuels, of which there is a finite supply). Renewable sources of energy include wood, waste, geothermal, wind, photovoltaic, and solar thermal energy.

**Reservoir Repressuring:** The injection of a pressurized fluid (such as air, gas, or water) into oil and gas reservoir formations to effect greater ultimate recovery.

**Residential Building:** A structure used primarily as a dwelling for one or more households.

**Residential Sector:** The residential sector is considered to consist of all private residences, whether occupied or vacant, owned or rented, including single-family homes, multifamily housing units, and mobile homes. Secondary homes, such as summer homes, are also included. Institutional housing, such as school dormitories, hospitals, and military barracks, generally are not included in the residential sector; they are included in the commercial sector. The Standard Industrial Classification (SIC) code used to classify an establishment as residential is 88 (Household).

**Residential Vehicles:** Motorized vehicles used by U.S. households for personal transportation. Excluded are motorcycles, mopeds, large trucks, and buses. Included are automobiles, station wagons, passenger vans, cargo vans, motor homes, pickup trucks, and jeeps or similar vehicles. In order to be included, vehicles must be: (1) owned by members of the household, or (2) company cars not owned by household members but regularly available to household members for their personal use and ordinarily kept at home, or (3) rented or leased for 1 month or more.

**Residual Fuel Oil:** The heavier oils that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in refinery operations and that conform to ASTM Specifications D396 and D975. Included are No. 5, a residual fuel oil of medium viscosity; Navy Special, for use in steam-powered vessels in government service and in shore power plants; and No. 6, which includes Bunker C fuel oil and is used for commercial and industrial heating, for electricity generation, and to power ships. Imports of residual fuel oil include imported crude oil burned as fuel.

**Road Oil:** Any heavy petroleum oil, including residual asphaltic oil, used as a dust palliative and surface treatment on roads and highways. It is generally produced in six grades, from 0, the most liquid, to 5, the most viscous.

**Rotary Rig:** A machine used for drilling wells that employs a rotating tube attached to a bit for boring holes through rock.

**Royalty Interest:** An interest in a mineral property provided through a royalty contract.

**Rural Area:** A place that had a population of less than 2,500 as of the 1980 U.S. Census.

**Short Ton (coal):** A unit of weight equal to 2,000 pounds.

**SIC:** See **Standard Industrial Classification**.

**Small Power Producer:** Under the Public Utility Regulatory Policies Act, a small power production facility (small power producer) generates electricity by using waste or renewable energy (biomass,

conventional hydroelectric, wind, solar, and geothermal) as a primary energy source. Fossil fuels can be used, but renewable resources must provide at least 75 percent of the total energy input. See **Nonutility Power Producer**.

**Solar Collector:** Equipment that actively concentrates thermal energy from the sun. The energy is usually used for space heating, for water heating, or for heating swimming pools. Either air or liquid is the working fluid.

**Solar Energy:** The radiant energy of the sun that can be converted into other forms of energy, such as heat or electricity.

**Solar Thermal Collector:** A device designed to receive solar radiation and convert it into thermal energy. Normally, a solar thermal collector includes a frame, glazing, and an absorber, together with appropriate insulation. The heat collected by the solar thermal collector may be used immediately or stored for later use.

**Solar Thermal Collector, High-Temperature:** A collector that generally operates at temperatures above 180° F.

**Solar Thermal Collector, Low-Temperature:** A collector that generally operates at temperatures below 110° F. Typically, it has no glazing or insulation and is made of plastic or rubber, although some are made of metal.

**Solar Thermal Collector, Medium-Temperature:** A collector that generally operates at temperatures of 140° to 180° F but can also operate at temperatures as low as 110° F. Typically, it has one or two glazings, a metal frame, a metal absorption panel with integral flow channels or attached tubing (liquid collector) or with integral ducting (air collector) and insulation on the sides and back of the panel.

**Solar Thermal Collector, Special:** An evacuated tube collector or a concentrating (focusing) collector. Special collectors operate in the temperature range from just above ambient temperature (low concentration for pool heating) to several hundred degrees Fahrenheit (high concentration for air conditioning and specialized industrial processes).

**Space Heating:** The use of mechanical equipment (including wood stoves and active solar heating devices) to heat all, or part, of a building to at least 50° F.

**Special Naphthas:** All finished products within the naphtha boiling range that are used as paint thinners, cleaners, or solvents. Those products are refined to a specified flash point. Special naphthas include all commercial hexane and cleaning solvents conforming to ASTM Specifications D1836 and D484, respectively. Naphthas to be blended or marketed as motor gasoline or aviation gasoline, or that are to be used as petrochemical and synthetic natural gas (SNG) feedstocks, are excluded.

**Spot Market Price:** A transaction price concluded “on the spot,” that is, on a one-time, prompt basis; usually the transaction involves only one specific quantity of product. This contrasts with a term contract sale price, which obligates the seller to deliver a product at an agreed frequency and price over an extended period.

**Standard Industrial Classification (SIC):** A set of codes developed by the Office of Management and Budget which categorizes industries according to groups with similar economic activities.

**Startup Test Phase of Nuclear Power Plant:** A nuclear power plant that has been licensed by the Nuclear Regulatory Commission to operate but is still in the initial testing phase, during which the production of electricity may not be continuous. In general, when the electric utility is satisfied with the plant’s performance, it formally accepts the plant from the manufacturer and places it in commercial operation status. A request is then submitted to the appropriate utility rate commission to include the power plant in the rate base calculation.

**Steam-Electric Power Plant:** A plant in which the prime mover is a steam turbine. The steam used to drive the turbine is produced in a boiler where fossil fuels are burned.

**Still Gas (refinery gas):** Any form or mixture of gas produced in refineries by distillation, cracking, reforming, and other processes. The principal constituents are methane, ethane, ethylene, normal butane, butylene, propane, and propylene. It is used primarily as refinery fuel and petrochemical feedstock.

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**Strategic Petroleum Reserve (SPR):** Petroleum stocks maintained by the Federal Government for use during periods of major supply interruption.

**Stripper Well (natural gas):** A well that produces 60 thousand cubic feet per day or less of gas-well gas, for a period of 3 consecutive months while producing at its maximum rate flow. In determining abandonments, a stripper well is one that produced less than 22.5 million cubic feet in its last 12 months of production.

**Stripper Well Property (petroleum):** A property whose average daily production of crude oil per well (excluding condensate recovered in nonassociated natural gas production) did not exceed an average of 10 barrels per day during any preceding consecutive 12-month period beginning after December 31, 1972.

**Subbituminous Coal:** A dull, black coal of rank intermediate between lignite and bituminous coal. It conforms to ASTM Specification D388-84 for subbituminous coal. In this report, subbituminous coal is included in bituminous coal.

**Supplemental Gaseous Fuels:** Any gaseous substance that, introduced into or commingled with natural gas, increases the volume available for disposition. Such substances include, but are not limited to, propane-air, refinery gas, coke oven gas, still gas, manufactured gas, biomass gas, or air or inert gases added for Btu stabilization.

**Synthetic Natural Gas (SNG):** A manufactured product chemically similar in most respects to natural gas, resulting from the conversion or reforming of petroleum hydrocarbons. It may easily be substituted for, or interchanged with, pipeline quality natural gas. Also referred to as substitute natural gas.

**Transportation Sector:** The transportation sector consists of private and public vehicles that move people and commodities. Included are automobiles, trucks, buses, motorcycles, railroads, and railways (including streetcars), aircraft, ships, barges, and natural gas pipelines. The SIC codes used to classify establishments as belonging to the transportation sector are 40 through 49.

**Unaccounted-for Crude Oil:** Represents the arithmetic difference between the calculated supply and the calculated disposition of crude oil. The calculated supply is the sum of crude oil production and imports, less changes in crude oil stocks. The calculated disposition of crude oil is the sum of crude oil input to refineries, crude oil exports, crude oil burned as fuel, and crude oil losses.

**Unaccounted-for Natural Gas:** Quantities lost, the net result of flow data metered at varying temperature and pressure conditions and converted to a standard temperature and pressure base; metering inaccuracies; differences between the billing cycle and calendar period timeframes; the effect of variations in company accounting and billing practices; and imbalances from the merger of data reporting systems which vary in scope, format, definitions, and type of respondents.

**Underground Storage:** The storage of natural gas in underground reservoirs at locations other than those from which it was produced.

**Undiscovered Recoverable Reserves (crude oil and natural gas):** Those economic resources of crude oil and natural gas, yet undiscovered, that are estimated to exist in favorable geologic settings.

**Unfinished Oils:** All oils requiring further refinery processing, except those requiring only mechanical blending. Includes naphthas and lighter oils, kerosene and light gas oils, heavy gas oils, and residuum.

**Unfractionated Streams:** Mixtures of unsegregated natural gas liquid components, excluding those in plant condensate. This product is extracted from natural gas.

**United States:** Unless otherwise noted, United States in this publication means the 50 States and the District of Columbia. U.S. exports include shipments to U.S. territories, and imports include receipts from U.S. territories.

**Uranium:** A heavy, naturally radioactive, metallic element (atomic number 92). Its two principally occurring isotopes are uranium-235 and uranium-238. Uranium-235 is indispensable to the nuclear industry, because it is the only isotope existing in nature to any appreciable extent that is fissionable by thermal neutrons. Uranium-238 is also important, because it absorbs neutrons to produce a radioactive isotope that

subsequently decays to plutonium-239, an isotope that also is fissionable by thermal neutrons.

**Uranium Ore:** Rock containing uranium mineralization (typically 1 to 4 pounds of  $U_3O_8$  per ton or 0.05 percent to 0.2 percent  $U_3O_8$ ) that can be mined economically.

**Uranium Oxide:** Uranium concentrate or yellowcake.

**Uranium Resources:** Uranium resource estimates are divided into three separate categories reflecting different levels of confidence in the quantities estimated: reasonable assured resources, estimated additional resources, and speculative resources. Reasonably assured resources refers to uranium in known mineral deposits of such size, grade, and configuration that it could be recovered within the given cost ranges with currently proven mining and processing technology. Estimated additional resources refers to uranium in addition to reasonably assured resources that is expected, mostly on the basis of direct geological evidence, to occur in extensions of well-explored deposits and in deposits in which geological continuity has been well established, as well as in deposits believed to exist in well-defined geologic trends or areas of mineralization with known deposits. Deposits in this category can be discovered and delineated and the uranium subsequently recovered, all within the given cost range. Speculative resources refers to uranium in addition to estimated additional resources that are thought to exist, mostly on the basis of indirect evidence and geological extrapolations.

**Urban Area:** A place that had a population of 2,500 or more as of the 1970 U.S. Census.

**U.S.S.R.:** The Union of Soviet Socialist Republics consisted of 15 constituent republics: Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. As a political entity, the U.S.S.R. ceased to exist as of December 31, 1991.

**Vented Natural Gas:** Gas released into the air on the base site or at processing plants.

**Vessel:** Tankers used to transport crude oil and petroleum products. Vessel categories are as follows: Ultra Large Crude Carrier (ULCC), Very

Large Crude Carrier (VLCC), Other Tanker, and Specialty Ships (LPG/LNG).

**Waxes:** Solid or semisolid materials derived from petroleum distillates or residues. Waxes are light-colored, more or less translucent crystalline masses, slightly greasy to the touch, consisting of a mixture of solid hydrocarbons in which the paraffin series predominates. Included are all marketable waxes, whether crude scale or fully refined. Waxes are used primarily as industrial coating for surface protection.

**Well:** A hole drilled in the Earth for the purpose of finding or producing crude oil or natural gas; or providing services related to the production of crude oil or natural gas. Wells are classified as oil wells, gas wells, dry holes, stratigraphic test wells, or service wells. The latter two types of wells are counted for Federal Reporting System data reporting. Oil wells, gas wells, and dry holes are classified as exploratory wells or development wells. Exploratory wells are subclassified as new-pool wildcats, deeper-pool tests, shallow-pool tests, and outpost (extension) tests. Well classifications reflect the status of wells after drilling has been completed.

**Wellhead Price:** The value of crude oil or natural gas at the mouth of the well.

**Well Servicing Unit:** Truck-mounted equipment generally used for downhole services after a well is drilled. Services include well completions and recompletions, maintenance, repairs, workovers, and well plugging and abandonments. Jobs range from minor operations, such as pulling the rods and rod pumps out of an oil well, to major workovers, such as milling out and repairing collapsed casing. Well depth and characteristics determine the type of equipment used.

**Western Europe:** Includes Austria, Belgium, Bosnia and Herzegovina, Croatia, Denmark, East Germany, Faroe Islands, Finland, Former Yugoslavia, France, Germany, Gibraltar, Greece, Iceland, Ireland, Italy, Luxembourg, Macedonia (The Former Yugoslav Republic of), Malta, Netherlands, Norway, Portugal, Serbia and Montenegro, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, West Germany.