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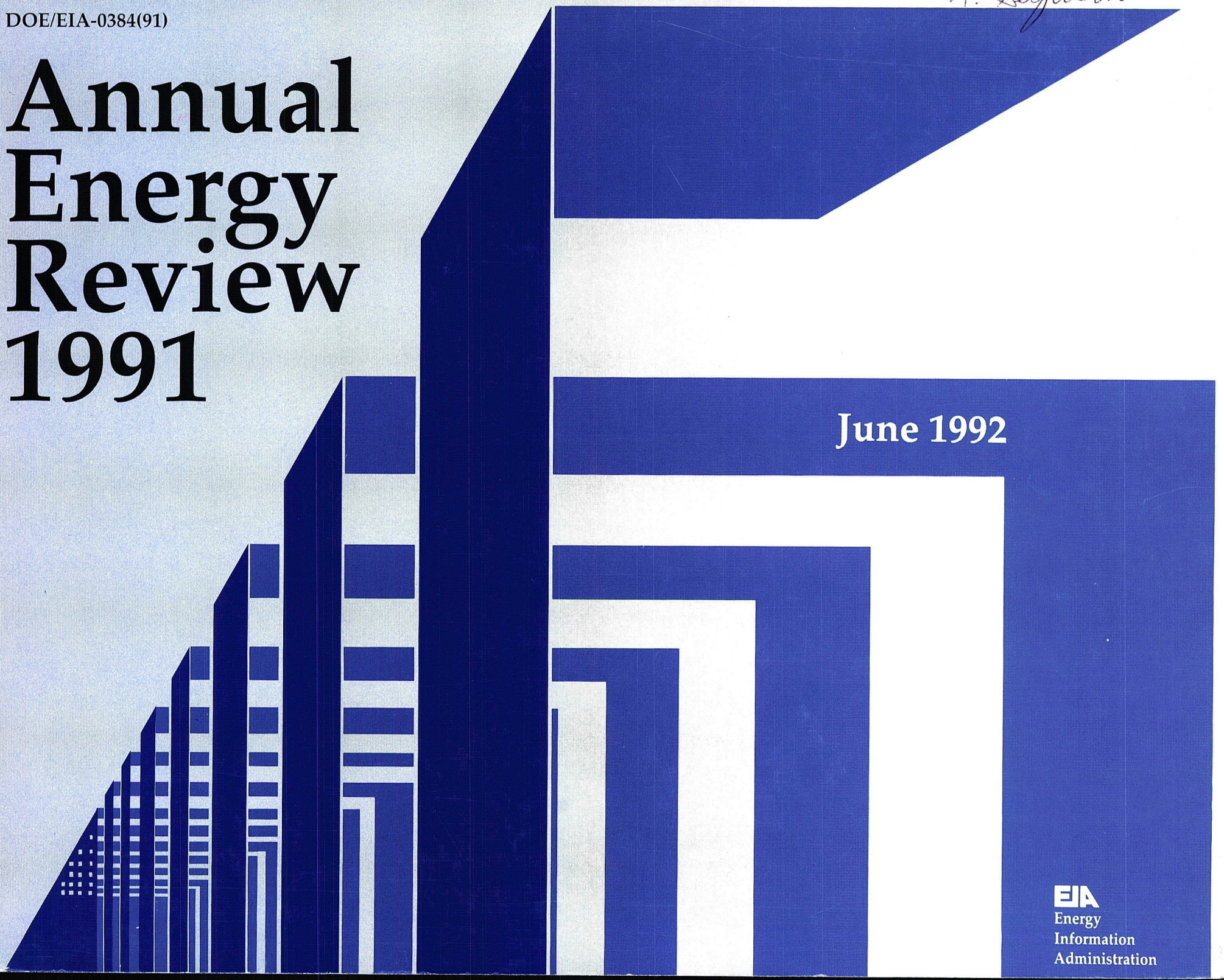
Annual Energy Review 1991

June 1992



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Preface

This tenth edition of the *Annual Energy Review* (*AER*) presents the Energy Information Administration's historical energy statistics. For most series, statistics are given for every year from 1949 through 1991. Because coverage spans four decades, the statistics in this report are well-suited to long-term trend analyses.

The *AER* is comprehensive. It covers all major energy activities, including consumption, production, trade, stocks, and prices, for all major energy commodities, including fossil fuels and electricity. The *AER* also presents statistics on some renewable energy sources. For the most part, fuel-specific data are expressed in physical units such as barrels, cubic feet, and short tons. The integrated summary data in Section 1 are expressed in Btu. The Btu values are calculated using the conversion factors in Appendix A. Statistics expressed in Btu are valuable in that they allow for comparisons among different fuels and for the calculation of integrated summary statistics such as U.S. consumption of energy.

The *AER* emphasizes *domestic* energy statistics. Accordingly, Sections 1 through 10 of this report are devoted to U.S. statistics, while Section 11 is reserved for most of the international statistics, such as world production of energy. The one exception is trade data. For example, Table 55, which presents statistics on petroleum imports by country of origin, is found in Section 5. Table 55 statistics cover petroleum imports into the United States from foreign countries. To keep table and figure titles in Sections 1 through 10 concise, "United States" is usually not specified.

This year's report presents statistics on two topics new to the *AER*. Natural gas deliveries by transporters who do not own the gas but who are transporting it to customers on behalf of other sellers are reported in Table 78. The installed capacity and the generation of electricity at nonutility power producers is reported in Table 103.

Extraordinary changes in political boundaries are reflected in the *AER*'s international energy statistics. The 1991 data are the first in which a unified Germany replaces East and West Germany, and the last in which statistics are reported for the U.S.S.R. *per se*. In response to the heightened interest in international energy markets, two new time series have been added (world natural gas consumption, in Table 128, and world coal consumption, in Table 132) and the analytical summary on international energy has been expanded.

Publication of the *AER* each year is in keeping with responsibilities given the Energy Information Administration (EIA) in Section 57(a)(2) of the Federal Energy Administration Act, Public Law 93-275. The report is intended for use by Members of Congress, Federal and State agencies, energy analysts, and the general public. The EIA welcomes suggestions from readers regarding its energy data series. To make a suggestion or to obtain specific information regarding the contents of the *AER*, readers may call any of the subject specialists listed as contacts on the following page.

Copies of the 1991 edition of the *Annual Energy Review* may be obtained by using the order form in the back of this publication. In addition, most of the data in the 1991 edition are available on diskette. For more information about the diskettes, see the inside back cover.

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Major Energy Developments in 1991

Economic Recession Restrained Growth in Energy Use

The two most dramatic energy-related events of 1991 were the war in the Persian Gulf, which entailed the loss of Iraqi and Kuwaiti oil, and the dissolution of the U.S.S.R., the world's leading oil producer. However, other producers were able to supply replacement oil to world markets. That factor, plus a worldwide economic recession that restrained petroleum demand, kept crude oil prices below 1990 levels (71).[1] In the United States, the effects of the recession and unusually warm winter weather led to the lowest level of domestic petroleum consumption since 1986 (3). The recession, as well as the availability of competitively priced natural gas, also curbed industrial demand for coal (85). On the other hand, nuclear-based electricity generation reached a record level, and natural gas consumption increased (3). U.S. total energy consumption rose 0.3 percent to 82 quadrillion Btu.

The modest increase in U.S. total energy consumption was due, in large part, to unusually warm summer weather that boosted energy requirements for space cooling. Residential use of natural gas was up 4.3 percent and commercial use of natural gas was up 4.1 percent (79). Electricity sales to the residential sector rose 3.6 percent and sales to the commercial sector rose 1.9 percent (96). The increased consumption of natural gas and electricity, the primary energy sources on which those sectors rely, more than offset declines in coal consumption (85).

The economic recession led to the first decline in industrial sector consumption of energy since 1986 (5). Industrial use of petroleum, coal, and electricity declined (63, 85, and 96). However, industrial use of natural gas increased (79). Since the 1980's, some industrial consumers have purchased natural gas directly from producers and have arranged for distributors to deliver it to them for a fee. Such deliveries for the account of others reached 64 percent of total deliveries to the industrial sector in 1990 (78).

[1]Numbers in parentheses indicate related tables. Annual data are the most recent available and frequently are preliminary.

The transportation sector uses small amounts of natural gas and electricity, but it relies overwhelmingly on petroleum. Transportation use of petroleum, and therefore of total energy, declined slightly in 1991 (63 and 5).

The slight increase in energy consumption by all sectors combined, coupled with lack of growth in the domestic economy, yielded an increase in the energy intensity of the economy. In 1991, the ratio of total energy consumption to the 1987-dollar gross domestic product, a key measure of energy intensity, was 16.8 thousand Btu per 1987 dollar (9). The 1991 ratio was 1 percent higher than the 1990 ratio. However, the energy intensity of the economy remained well below the peak level of 23.1 recorded in 1970.

Energy Production Edged Downward

U.S. energy production in 1991 totaled 67.5 quadrillion Btu, 0.5 percent lower than production in 1990 (2). The biggest changes occurred in the production of coal, which declined 0.9 quadrillion Btu, and in nuclear-based electricity generation, which rose 0.4 quadrillion Btu.

Coal production in 1991 fell for the first time since 1985, down 3.4 percent to 994 million short tons (83). The decline from the 1990 level came about in part because of record high production in that year, when stock building and higher demand boosted production. In contrast, 1991 demand was lower and stocks remained near the year-end 1990 level (87).

Net generation of electricity at electric utilities rose 0.5 percent to 2.8 trillion kilowatthours (91). That growth rate was the lowest recorded since 1982, when net generation actually declined. Net generation from every energy source except nuclear power declined, although by varying amounts (92). Nuclear-based net generation rose 6.2 percent and accounted for 22 percent of total net generation. Nonutility power producers generated increasing amounts of electricity, some of which is sold to electric utilities; in 1990, their gross generation totaled 215 billion kilowatthours (103).

Domestic production of crude oil (including lease condensate) continued to suffer from the effects of years of low oil prices and from the expectation (only briefly interrupted by the war in the Persian Gulf)

that prices would remain low. Production increases early in 1991 led to a 0.2-percent increase (to 7.4 million barrels per day) for the year as a whole (53). Much of the increased production occurred in Alaska. Production of natural gas was 17.9 trillion cubic feet in 1991, about the same as in 1990 (74). The production total included a small amount of coalbed methane, which comes primarily from Colorado, New Mexico, Alabama, and Wyoming. Three primary indicators of oil and gas exploration and development (seismic crews working, rotary rigs in operation, and exploratory wells drilled) were at their lowest levels since at least 1949 (43 and 44).

The Energy Trade Balance Improved

U.S. net imports of all forms of energy combined fell to 13.2 quadrillion Btu, down 7 percent from the level in 1990 (6). The rate of petroleum net imports declined steeply in the first half of 1991 and then rose later on, yielding an annual total of 14 quadrillion Btu, 1.2 quadrillion Btu below the 1990 total. Coal net imports fell 0.1 quadrillion Btu to -2.8 quadrillion Btu. Those declines were offset somewhat by increases in net imports of natural gas and of coal coke and electricity.

The crisis in the Persian Gulf resulted in a sharp decline in oil production capacity in Kuwait and a United Nations embargo against Iraqi exports, which in turn led to a shift in U.S. sources of imported petroleum in 1991. Imports from Iraq fell to zero. Kuwait, working to restore its lost capacity, exported only small amounts of petroleum to the United States. Saudi Arabia supplied replacement petroleum (55). However, petroleum imports from all members of the Organization of Petroleum Exporting Countries (OPEC) combined fell 5 percent to 4.1 million barrels per day. Non-OPEC countries supplied 3.5 million barrels per day (55). Petroleum imports from Canada rose to 1 million barrels per day and petroleum imports from Mexico rose to 0.8 million barrels per day. Together, they accounted for just over half of the non-OPEC total.

In addition to importing less petroleum, the United States exported a record level of petroleum products, and the economic recession led to a small decline in the amount of petroleum products supplied in 1991 (52). As a result, U.S. dependence on petroleum net imports, measured as petroleum net imports share of product supplied, fell from 42 percent in 1990 to 40 percent in 1991 (58). By comparison, natural gas net imports of 1.6 trillion cubic feet equaled 8 percent of domestic natural gas consumption in 1991 (76). The border countries of Canada and Mexico accounted for most of the natural gas trade with the United States, but the ability to ship natural gas in liquefied form allowed for trade with Algeria and Japan as well.

As usual, coal was the primary U.S. energy export, and in 1991 coal exports rose to 109 million short tons (86). Declining coal exports to Japan, Italy, and Canada (the largest markets for U.S. coal) were more than offset by significantly higher exports to France, the Netherlands, the United Kingdom, Denmark, and Brazil.

Fossil Fuel Prices Declined

U.S. refiners' composite acquisition cost of crude oil in 1991 averaged $19.05 per barrel, down from the $22.22 average for 1990 when Iraq's invasion of Kuwait had driven prices up (71). The lower average for 1991 occurred despite the loss of oil production from Iraq and Kuwait as a result of the Persian Gulf war early in the year and despite the dissolution of the U.S.S.R., the world's largest producer. The ability of other producers to provide replacement oil played a primary role in calming world energy markets.

The decrease in crude oil costs was reflected in lower product prices (72). Residual fuel oil registered the steepest year-to-year price decline; the end-use price, excluding taxes, fell 23 percent to 34 cents per gallon in 1991. The comparable price of kerosene-type jet fuel fell 15 percent to 65 cents per gallon and the price of No. 2 distillate fuel oil fell 10 percent to 65 cents per gallon. The average end-use price, excluding taxes, of all types of motor gasoline fell 10 percent to 80 cents per gallon.

The wellhead price of natural gas declined 7 percent to $1.59 per thousand cubic feet (81). Of the three consuming sectors for which year-end data are available, only the industrial sector registered a price decrease (9 percent to $2.68 per thousand cubic feet) (82). Residential prices rose slightly to $5.82 per thousand cubic feet, and commercial prices rose somewhat more (2 percent) to $4.91 per thousand cubic feet.

The average price paid by electric utilities for all ranks of coal was $30.08 per short ton, down 37 cents per short ton from the 1990 price.

1. Energy Overview

Energy Prices in a Volatile Market

Since the mid-1970's, changes in fossil fuel prices have become more frequent and more pronounced (30).[1] Prior to the Arab oil embargo of 1973-1974, the composite real price[2] per million Btu of crude oil, natural gas, and coal had gradually declined from $1.12 in 1959 to a post-World War II low of $0.90 in 1969. In 1974, the real price rose to $1.51, eventually peaking at $3.48 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 $1.71. In 1991, a year of economic recession, the composite price was $1.42, the lowest in 18 years. Throughout the 1949-1991 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 1980-1981. 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 to $2.09 per million Btu, the lowest level since 1973. In 1989, the price rose to $2.52. In 1990, the Iraqi invasion of Kuwait contributed to an increase in crude oil prices to $3.06 per million Btu. 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 to $2.43 per million Btu.

Prices of coal and natural gas were much less volatile than those of oil. Coal markets are generally more competitive than oil markets, where the output and pricing policies of the Organization of Petroleum Exporting Countries (OPEC) were a major influence throughout much of the 1970's and 1980's. Natural gas prices were subject to substantial State and Federal regulation. Throughout the 1970's, regulation dampened the response of natural gas prices relative to oil price movement. However, the weakening of crude oil prices after 1985 was severe enough to trigger declines in the prices of the other fossil fuels, particularly natural gas. The 1991 real price of crude oil per million Btu was $2.43, 45 percent below the 1985 price (30). The real price of natural gas was 49 percent lower and the real price of bituminous coal and lignite was 30 percent lower than their respective prices in 1985.

[1]Numbers in parentheses indicate related tables. Annual data are the most recent available and frequently are preliminary.

[2]Real prices are expressed in 1987 dollars.

Production

Historically, three fossil fuels have accounted for the bulk of domestic energy production, which by 1991 totaled 67 quadrillion Btu (2). Coal accounted for the largest share of domestic energy production in 1949-1951 and, after a long hiatus, again in 1982 and in 1984-1991. In the interim, first crude oil and then natural gas dominated domestic production. In 1991, coal production totaled 22 quadrillion Btu. Dry natural gas production totaled 18 quadrillion Btu and crude oil production totaled 16 quadrillion Btu. Natural gas plant liquids accounted for another 2 quadrillion Btu.

Electricity net generation increased throughout 1949-1991 (91), registering only one year-to-year decline (during the recession in 1982). Nuclear-based generation increased to the record level of 7 quadrillion Btu in 1991 (2). Since the mid-1970's, coal and nuclear fuels have provided increasing shares of fuel input for power generation, displacing substantial quantities of both petroleum and natural gas (94).

Hydroelectric generation accounted for over 1 quadrillion Btu of electricity in 1949 and from the 1970's through 1987 usually provided about 3 quadrillion Btu per year (2). In 1988, however, the second consecutive year of a drought, hydroelectric generation totaled only 2.3 quadrillion Btu, the lowest level since 1966. In 1989 through 1991, hydroelectric generation returned to the 3-quadrillion-Btu-per-year level.

Renewable energy sources (other than hydroelectric generation) contributed to the domestic energy supply. In 1991, electric utilities' generation of electricity from renewable sources such as geothermal,

biofuel, and solar energy totaled 0.2 quadrillion Btu (2). In 1990 (the most recent year for which data are available), nonutility power producers consumed 0.6 quadrillion Btu of renewable energy, and consumption of biofuels by other consumer for purposes other than electricity generation totaled 2.5 quadrillion Btu (107).[3]

Consumption by Energy Source

Energy consumption more than doubled during the 1949-1973 period, increasing from 30 quadrillion Btu in 1949 to 74 quadrillion Btu in 1973 (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 price shock, energy consumption fluctuated, rising to 79 quadrillion Btu in 1979 before returning, in 1984 through 1986, to about the same level as in 1973. In contrast, the economy registered a net expansion of about one-third. Following the plunge in crude oil prices in 1986, energy consumption increased each year and reached an all-time high of 81 quadrillion Btu in 1989 and 1990. The composition of demand after 1973 reflects a shift away from petroleum and natural gas towards electricity generated by other fuels. In 1973, petroleum and natural gas accounted for 77 percent of total energy consumption; by 1991, their share had declined to 65 percent.

Consumption by Sector: Sharing the Energy Pie

Industrial sector consumption proved to be the most responsive to the turmoil in energy markets after the 1973-1974 embargo (5). In 1979, it peaked at 33 quadrillion Btu. In the early 1980's, a stagnant economy, increases in industrial operations, and expansion in the service trades all combined to restrain 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 slower economic growth in 1990, industrial energy consumption rose modestly to 30 quadrillion Btu, but the economic recession in 1991 led to a 0.24-quadrillion Btu decline.

[3]The 3.1 quadrillion Btu consumed elsewhere than at electric utilities is not included in the Energy Information Administration's U.S. energy consumption total for 1990.

Growth in electric utility consumption continued during the 1970's and 1980's despite rising energy prices, and, in 1991, that sector's consumption reached an all-time high of 30 quadrillion Btu. However, only 9 quadrillion Btu were sold to consumers; the remainder was used to generate, transmit, and distribute the electricity (94).

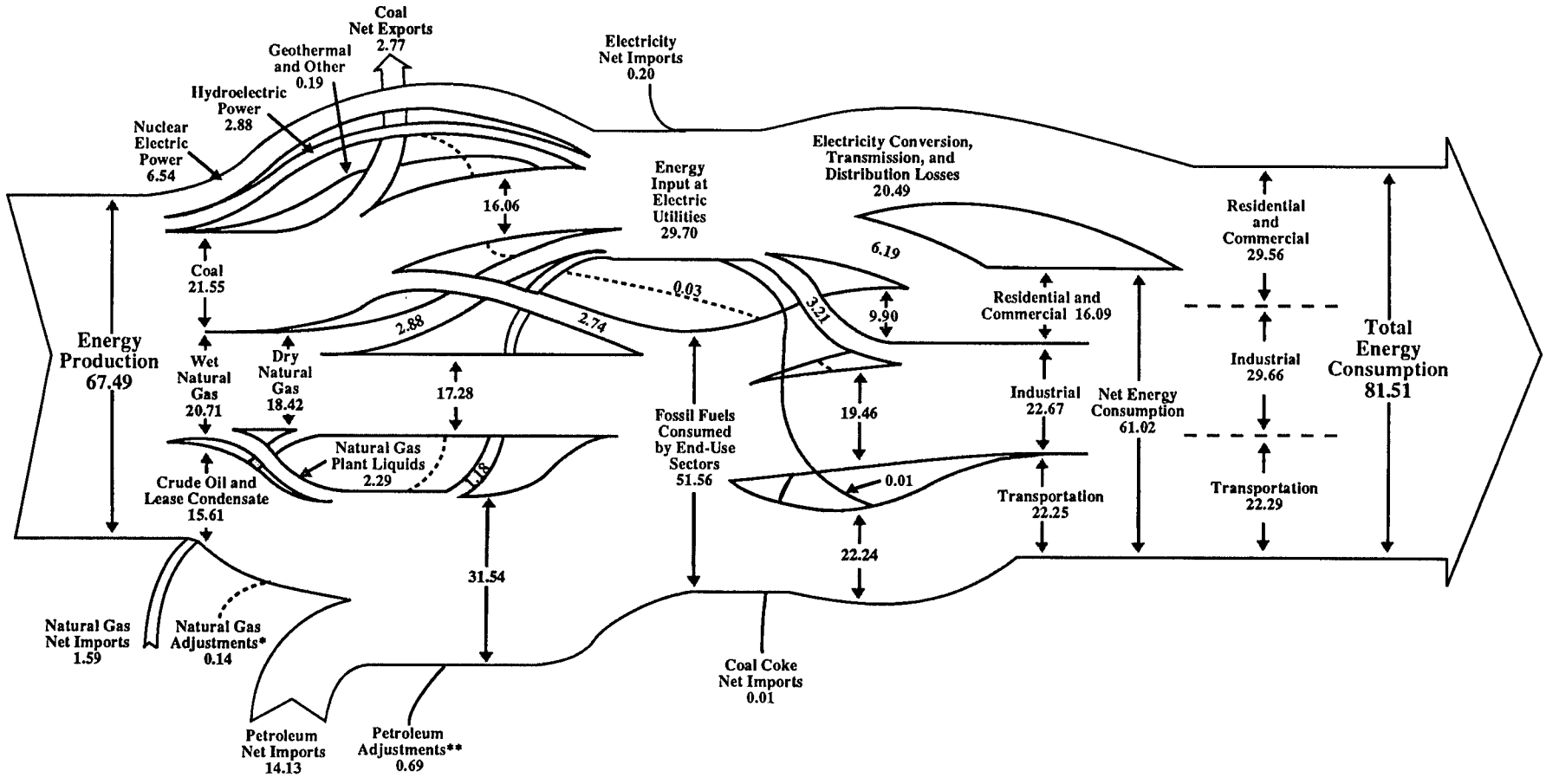
Much of the growth in energy consumption during the 1949-1991 period occurred in the residential and commercial sector and in the transportation sector (5). Residential and commercial consumption leveled off in response to higher energy prices in the late 1970's and early 1980's, but lower prices in the 1986-to-1991 period played a role in boosting residential and commercial energy consumption to the record level of 30 quadrillion Btu in 1991. Transportation sector consumption grew more slowly over the 43-year period. It totaled 22 quadrillion Btu in 1991.

Changing Patterns of Trade

From 1958 forward, the United States consumed more energy than it produced, and the difference was met by energy imports (3, 5, and 6). Net imports of energy (primarily petroleum) grew rapidly through 1973, as demand for cheap foreign oil eroded quotas on petroleum imports. The Arab oil embargo of 1973-1974, coupled with the increase in the price of crude oil, interrupted growth in petroleum net imports, but nevertheless they climbed to a peak of 18 quadrillion Btu in 1977 (6). A second round of price increases, in 1979-1981, suppressed demand for foreign oil. In 1985, petroleum net imports totaled 9 quadrillion Btu, and U.S. dependence fell to 27 percent of consumption (6 and 58). Subsequently, petroleum net imports increased every year through 1989. In 1990, petroleum net imports declined 0.6 percent from the 1989 level but petroleum consumption declined more (2.0 percent), and U.S. dependence on foreign sources of crude oil reached 42 percent of consumption. In 1991, lower petroleum demand due to economic recession and warm winter weather contributed to a decline in petroleum net imports and U.S. dependence fell to 40 percent.

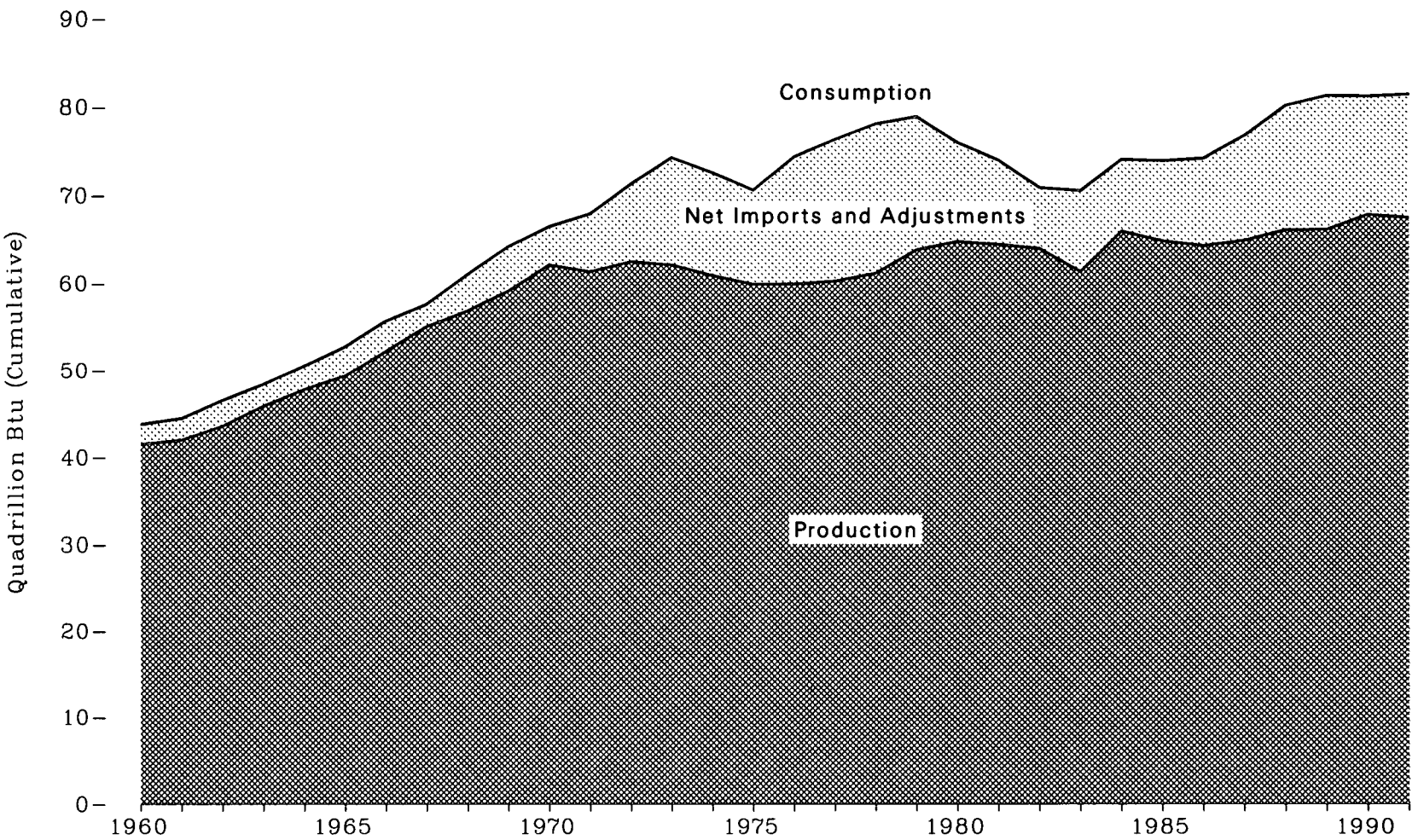
Natural gas trade was limited to border countries until the advent of shipping natural gas in liquefied form in the late 1960's. In 1991, natural gas net imports reached the record level of 1.6 quadrillion Btu. Throughout the 1949-to-1991 period, the United States was a net exporter of coal (6). In 1991, coal net exports totaled 3 quadrillion Btu.

Diagram 1. Total Energy Flow, 1991
(Quadrillion Btu)



*Supplemental gaseous fuels, net storage withdrawals, and balancing item.
**Other liquids, net stock change, refinery processing gain, and unaccounted for.
Notes: • Data are preliminary. • Sum of components may not equal totals due to independent rounding; the use of preliminary conversion factors; and the exclusion of changes in stocks, miscellaneous supply and disposition, and unaccounted for quantities.
Sources: Table 2 and *Monthly Energy Review*, March 1992, Tables 1.5 and 2.1.

Figure 1. Energy Overview, 1960-1991



Sources: Tables 2 and 3.

Table 1. Energy Overview, Selected Years, 1960-1991

(Quadrillion Btu)

Activity and Energy Source	1960	1965	1970	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 [1]
Production	**41.49**	**49.34**	**62.07**	**59.86**	**64.76**	**64.42**	**63.96**	**61.28**	**65.92**	**64.84**	**64.30**	**64.91**	**66.08**	**66.13**	**67.85**	**67.49**
Coal	10.82	13.06	14.61	14.99	18.60	18.38	18.64	17.25	19.72	19.33	19.51	20.14	20.74	21.35	22.46	21.55
Natural Gas [2]	12.66	15.78	21.67	19.64	19.91	19.70	18.32	16.59	18.01	16.98	16.54	17.14	17.60	17.85	18.36	18.42
Crude Oil [3]	14.93	16.52	20.40	17.73	18.25	18.15	18.31	18.39	18.85	18.99	18.38	17.67	17.28	16.12	15.57	15.61
Natural Gas Plant Liquids	1.46	1.88	2.51	2.37	2.25	2.31	2.19	2.18	2.27	2.24	2.15	2.22	2.26	2.16	2.17	2.29
Nuclear Electric Power	0.01	0.04	0.24	1.90	2.74	3.01	3.13	3.20	3.55	4.15	4.47	4.91	5.66	5.68	6.16	6.54
Hydroelectric Power	1.61	2.06	2.63	3.15	2.90	2.76	3.27	3.53	3.35	2.94	3.02	2.59	2.31	2.77	2.93	2.88
Other [4]	(5)	0.01	0.02	0.07	0.11	0.13	0.11	0.13	0.17	0.21	0.23	0.24	0.23	0.22	0.20	0.19
Imports	**4.23**	**5.92**	**8.39**	**14.11**	**15.97**	**13.97**	**12.09**	**12.03**	**12.76**	**12.10**	**14.43**	**15.76**	**17.56**	**18.95**	**18.99**	**18.35**
Natural Gas	0.16	0.47	0.85	0.98	1.01	0.92	0.95	0.94	0.85	0.95	0.75	0.99	1.30	1.39	1.55	1.71
Crude Oil [6]	2.20	2.65	2.81	8.72	11.19	9.34	7.42	7.08	7.30	6.81	9.00	10.07	11.03	12.60	12.77	12.55
Petroleum Products [7]	1.80	2.75	4.66	4.23	3.46	3.30	3.36	3.57	4.13	3.80	4.20	4.10	4.72	4.57	4.35	3.70
Other [8]	0.07	0.04	0.07	0.19	0.31	0.42	0.36	0.44	0.48	0.54	0.48	0.60	0.52	0.40	0.32	0.38
Exports	**1.48**	**1.85**	**2.66**	**2.36**	**3.72**	**4.33**	**4.63**	**3.72**	**3.80**	**4.23**	**4.05**	**3.85**	**4.41**	**4.77**	**4.91**	**5.19**
Coal	1.02	1.38	1.94	1.76	2.42	2.94	2.79	2.04	2.15	2.44	2.25	2.09	2.50	2.64	2.77	2.85
Crude Oil	0.43	0.39	0.55	0.44	1.16	1.26	1.73	1.57	1.54	1.66	1.67	1.63	1.74	1.84	1.82	2.13
Other [9]	0.03	0.09	0.18	0.16	0.14	0.12	0.11	0.11	0.11	0.14	0.14	0.13	0.17	0.29	0.31	0.21
Adjustments [10]	**- 0.43**	**- 0.72**	**- 1.37**	**- 1.07**	**- 1.05**	**- 0.08**	**- 0.57**	**0.94**	**- 0.78**	**1.24**	**- 0.43**	**0.03**	**0.96**	**1.03**	**- 0.64**	**0.86**
Consumption	**43.80**	**52.68**	**66.43**	**70.55**	**75.96**	**73.99**	**70.85**	**70.52**	**74.10**	**73.95**	**74.24**	**76.84**	**80.20**	**81.35**	**81.29**	**81.51**
Coal	9.84	11.58	12.26	12.66	15.42	15.91	15.32	15.89	17.07	17.48	17.26	18.01	18.85	18.94	19.12	18.81
Natural Gas	12.39	15.77	21.79	19.95	20.39	19.93	18.51	17.36	18.51	17.83	16.71	17.74	18.55	19.38	19.30	20.16
Petroleum Products [11]	19.92	23.25	29.52	32.73	34.20	31.93	30.23	30.05	31.05	30.92	32.20	32.87	34.22	34.21	33.55	32.72
Nuclear Power	0.01	0.04	0.24	1.90	2.74	3.01	3.13	3.20	3.55	4.15	4.47	4.91	5.66	5.68	6.16	6.54
Hydroelectric Power [12]	1.66	2.06	2.65	3.22	3.12	3.11	3.57	3.90	3.76	3.36	3.39	3.07	2.64	2.88	2.95	3.08
Other [13]	(5)	- 0.01	- 0.04	0.09	0.08	0.11	0.09	0.12	0.16	0.20	0.21	0.25	0.27	0.25	0.21	0.20

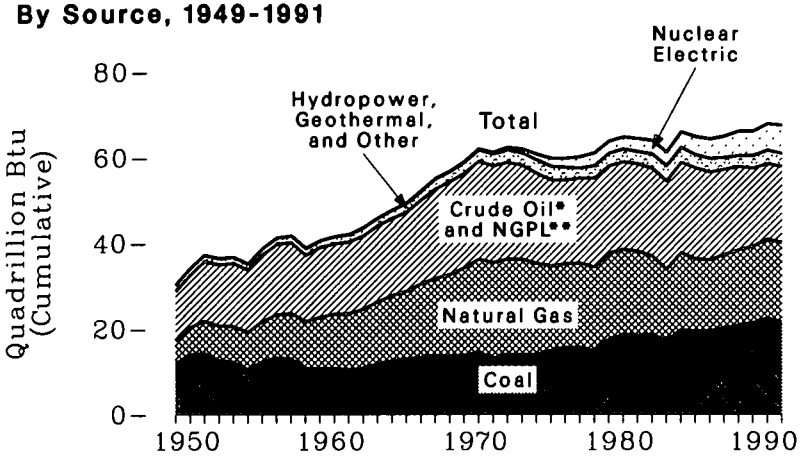
[1] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
[2] Dry natural gas.
[3] Includes lease condensate.
[4] Includes electricity produced from geothermal, wood, waste, wind, photovoltaic, and solar thermal sources connected to electric utility distribution systems.
[5] Less than 0.005 quadrillion Btu.
[6] Includes imports of crude oil for the Strategic Petroleum Reserve, which began in 1977.
[7] Includes imports of unfinished oils and natural gas plant liquids.
[8] Includes coal, coal coke, and hydroelectric power.
[9] Includes natural gas, coal coke, and hydroelectric power.
[10] A balancing item. Includes stock changes, losses, gains, miscellaneous blending components, and unaccounted for supply.
[11] Petroleum products supplied includes natural gas plant liquids and crude oil burned as fuel.
[12] Includes industrial generation of hydroelectric power and net electricity imports.
[13] Includes electricity produced from geothermal, wood, waste, wind, photovoltaic, and solar thermal sources connected to electric utility distribution systems and net imports of coal coke.

Notes: • Data do not include the consumption of wood energy (other than that consumed by the electric utility industry) which amounted to an estimated 2.4 quadrillion Btu in 1987. (See Table 108.) This table also does not include small quantities of other energy forms for which consistent historical data are not available, such as geothermal, waste, wind, photovoltaic, or solar thermal energy sources except that consumed by electric utilities. • Sum of components may not equal total due to independent rounding.

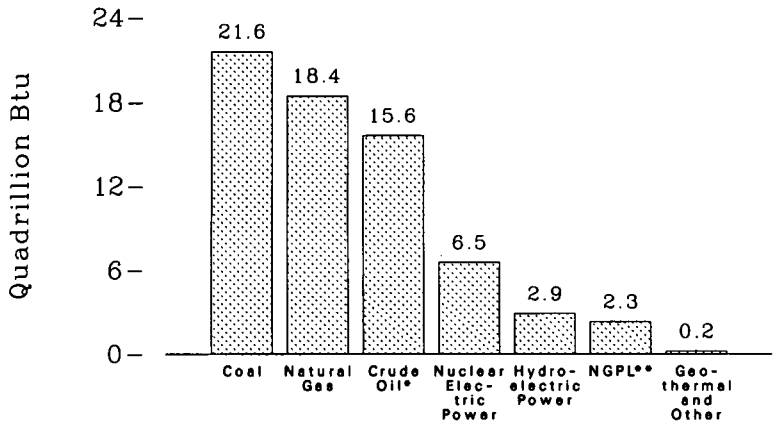
Sources: Tables 52, 74, 83, 89, 91, and 93, EIA estimates for industrial hydroelectric power, and conversion factors in Appendix A.

Figure 2. Energy Production by Source

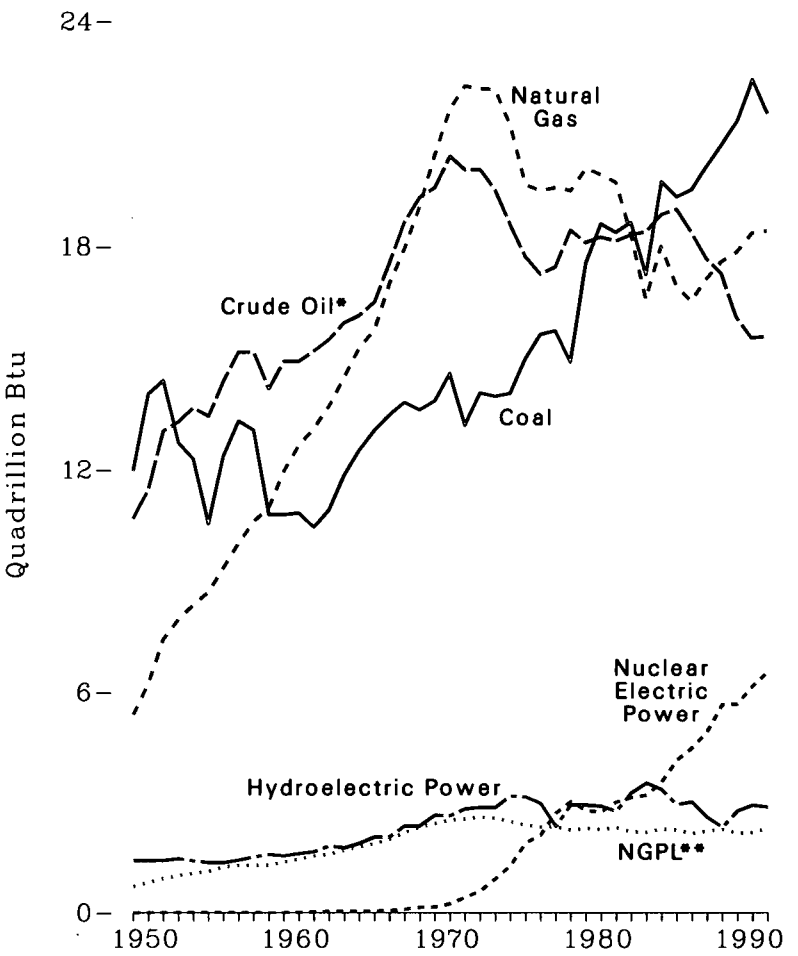
By Source, 1949-1991



By Source, 1991



By Major Source, 1949-1991



*Includes lease condensate. **Natural gas plant liquids.
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 2.

Table 2. Energy Production by Source, 1949-1991

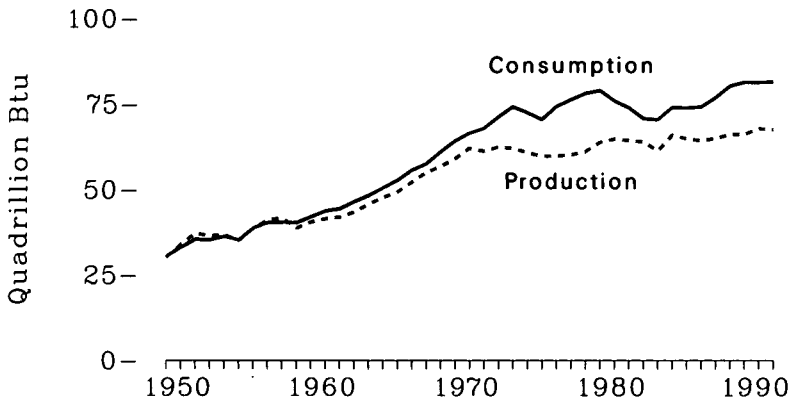
(Quadrillion Btu, Except as Noted)

Year	Coal	Natural Gas [1]	Crude Oil [2]	Natural Gas Plant Liquids	Nuclear Electric Power [3]	Hydroelectric Power [4]	Geothermal [3]	Other [5]	Total	Percent Change [6]
1949	11.97	5.38	10.68	0.71	0	1.42	0	0.01	30.18	—
1950	14.06	6.23	11.45	0.82	0	1.42	0	0.01	33.98	12.6
1951	14.42	7.42	13.04	0.92	0	1.42	0	0.01	37.22	9.5
1952	12.73	7.96	13.28	1.00	0	1.47	0	0.01	36.45	- 2.1
1953	12.28	8.34	13.67	1.06	0	1.41	0	0.01	36.77	0.9
1954	10.54	8.68	13.43	1.11	0	1.36	0	(7)	35.13	- 4.5
1955	12.37	9.34	14.41	1.24	0	1.36	0	(7)	38.73	10.2
1956	13.31	10.00	15.18	1.28	0	1.43	0	(7)	41.21	6.4
1957	13.06	10.61	15.18	1.29	0	1.52	0	(7)	41.65	1.1
1958	10.78	10.94	14.20	1.29	(7)	1.59	0	(7)	38.81	- 6.8
1959	10.78	11.95	14.93	1.38	(7)	1.55	0	(7)	40.60	4.6
1960	10.82	12.66	14.93	1.46	0.01	1.61	0	(7)	41.49	2.2
1961	10.45	13.10	15.21	1.55	0.02	1.66	(7)	(7)	41.99	1.2
1962	10.90	13.72	15.52	1.59	0.03	1.82	(7)	(7)	43.58	3.8
1963	11.85	14.51	15.97	1.71	0.04	1.77	(7)	(7)	45.85	5.2
1964	12.52	15.30	16.16	1.80	0.04	1.89	(7)	(7)	47.72	4.1
1965	13.06	15.78	16.52	1.88	0.04	2.06	(7)	(7)	49.34	3.4
1966	13.47	17.01	17.56	2.00	0.06	2.06	(7)	(7)	52.17	5.7
1967	13.83	17.94	18.65	2.18	0.09	2.35	0.01	(7)	55.04	5.5
1968	13.61	19.07	19.31	2.32	0.14	2.35	0.01	(7)	56.81	3.2
1969	13.86	20.45	19.56	2.42	0.15	2.65	0.01	(7)	59.10	4.0
1970	14.61	21.67	20.40	2.51	0.24	2.63	0.01	(7)	62.07	5.0
1971	13.19	22.28	20.03	2.54	0.41	2.82	0.01	(7)	61.29	- 1.3
1972	14.09	22.21	20.04	2.60	0.58	2.86	0.03	(7)	62.42	1.8
1973	13.99	22.19	19.49	2.57	0.91	2.86	0.04	(7)	62.06	- 0.6
1974	14.07	21.21	18.57	2.47	1.27	3.18	0.05	(7)	60.84	- 2.0
1975	14.99	19.64	17.73	2.37	1.90	3.15	0.07	(7)	59.86	- 1.6
1976	15.65	19.48	17.26	2.33	2.11	2.98	0.08	(7)	59.89	0.1
1977	15.76	19.57	17.45	2.33	2.70	2.33	0.08	0.01	60.22	0.5
1978	14.91	19.49	18.43	2.25	3.02	2.94	0.06	(7)	61.10	1.5
1979	17.54	20.08	18.10	2.29	2.78	2.93	0.08	0.01	63.80	4.4
1980	18.60	19.91	18.25	2.25	2.74	2.90	0.11	(7)	64.76	1.5
1981	18.38	19.70	18.15	2.31	3.01	2.76	0.12	(7)	64.42	- 0.5
1982	18.64	18.32	18.31	2.19	3.13	3.27	0.10	(7)	63.96	- 0.7
1983	17.25	16.59	18.39	2.18	3.20	3.53	0.13	(7)	61.28	- 4.2
1984	19.72	18.01	18.85	2.27	3.55	3.35	0.16	0.01	65.92	7.6
1985	19.33	16.98	18.99	2.24	4.15	2.94	0.20	0.01	64.84	- 1.6
1986	19.51	16.54	18.38	2.15	4.47	3.02	0.22	0.01	64.30	- 0.8
1987	20.14	17.14	17.67	2.22	4.91	2.59	0.23	0.02	64.91	1.0
1988	20.74	17.60	17.28	2.26	5.66	2.31	0.22	0.02	66.08	1.8
1989	21.35	17.85	16.12	2.16	5.68	2.77	0.20	0.02	66.13	0.1
1990	22.46	18.36	15.57	2.17	6.16	2.93	0.18	0.02	67.85	2.6
1991[8]	21.55	18.42	15.61	2.29	6.54	2.88	0.17	0.02	67.49	- 0.5

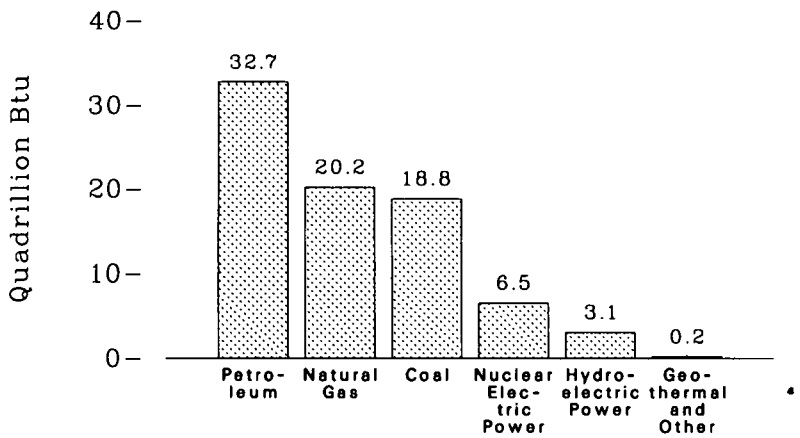
[1] Dry natural gas.
[2] Includes lease condensate.
[3] Generated by electric utilities, see Explanatory Note 1.
[4] Electric utility and industrial generation of hydroelectric power, see Appendix E, Note 1.
[5] Includes electricity produced from wood, waste, wind, photovoltaic, and solar thermal sources connected to electric utility distribution systems. Converted to Btu by applying national average heat rates for fossil fuel steam electric plants. Data do not include the consumption of wood energy (other than that consumed by the electric utility industry) which amounted to an estimated 2.4 quadrillion Btu in 1987. (See Table 108.) This table also does not include small quantities of energy forms for which consistent historical data are not available, such as geothermal, waste, wind, photovoltaic, or solar thermal energy sources except that consumed by electric utilities.
[6] Percent change from previous year calculated from data prior to rounding.
[7] Less than 0.005 quadrillion Btu.
[8] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
— = Not applicable.
Note: Sum of components may not equal total due to independent rounding.
Sources: Tables 52, 74, 84, and 93, EIA estimates for industrial hydroelectric power, and conversion factors in Appendix A.

Figure 3. Energy Consumption by Source

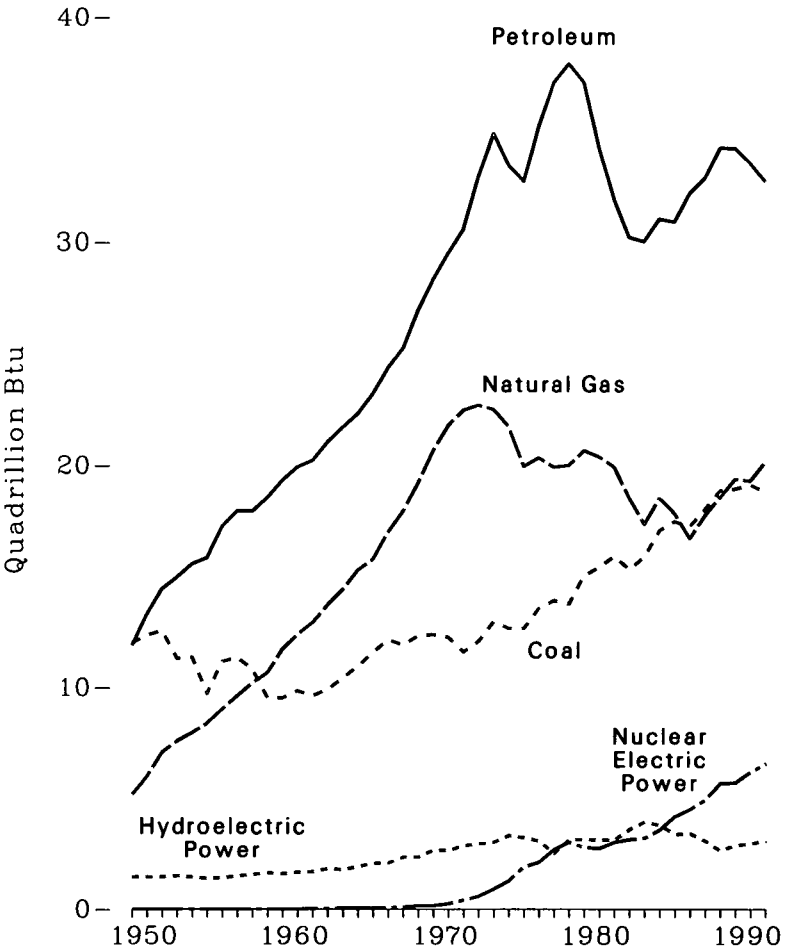
Consumption and Production, 1949-1991



By Source, 1991



By Major Source, 1949-1991



Note: Because vertical scales differ, graphs should not be compared.
Sources: Tables 2 and 3.

Table 3. Energy Consumption by Source, 1949-1991

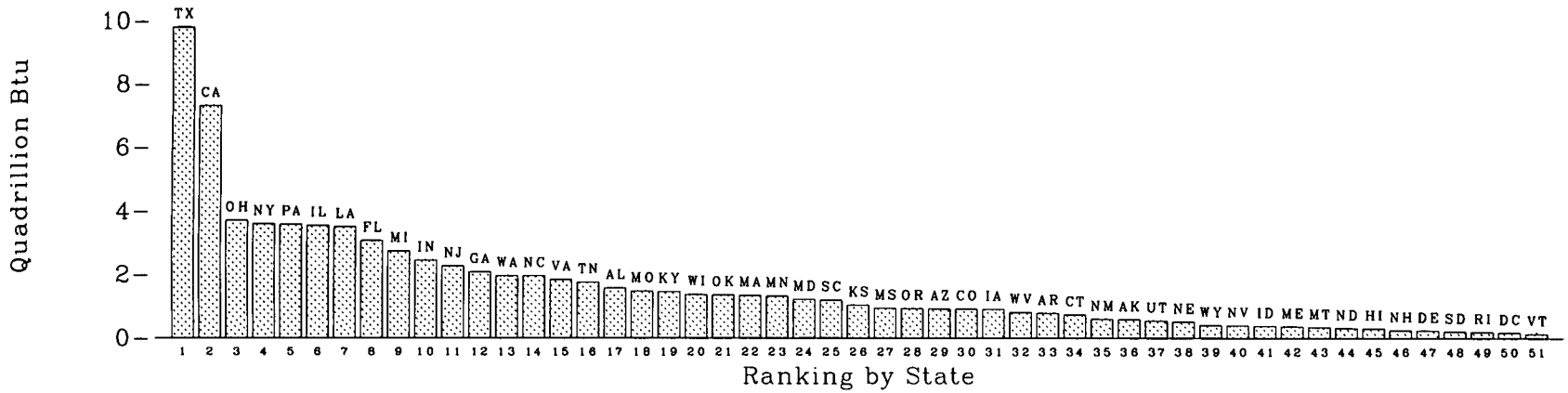
(Quadrillion Btu, Except as Noted)

Year	Coal	Natural Gas	Petroleum [1]	Nuclear Electric Power [2]	Hydroelectric Power [3]	Geothermal [2]	Other [4]	Total	Percent Change [5]
1949	11.98	5.15	11.88	0	1.45	0	(6)	30.46	—
1950	12.35	5.97	13.32	0	1.44	0	0.01	33.08	8.6
1951	12.55	7.05	14.43	0	1.45	0	- 0.02	35.47	7.2
1952	11.31	7.55	14.96	0	1.50	0	- 0.01	35.30	- 0.5
1953	11.37	7.91	15.56	0	1.44	0	(6)	36.27	2.7
1954	9.71	8.33	15.84	0	1.39	0	(6)	35.27	- 2.8
1955	11.17	9.00	17.25	0	1.41	0	- 0.01	38.82	10.1
1956	11.35	9.61	17.94	0	1.49	0	- 0.01	40.38	4.0
1957	10.82	10.19	17.93	0	1.56	0	- 0.02	40.48	0.3
1958	9.53	10.66	18.53	(6)	1.63	0	(6)	40.35	- 0.3
1959	9.52	11.72	19.32	(6)	1.59	0	- 0.01	42.14	4.4
1960	9.84	12.39	19.92	0.01	1.66	(6)	(6)	43.80	3.9
1961	9.62	12.93	20.22	0.02	1.68	(6)	- 0.01	44.46	1.5
1962	9.91	13.73	21.05	0.03	1.82	(6)	(6)	46.53	4.7
1963	10.41	14.40	21.70	0.04	1.77	(6)	- 0.01	48.32	3.9
1964	10.96	15.29	22.30	0.04	1.91	(6)	- 0.01	50.50	4.5
1965	11.58	15.77	23.25	0.04	2.06	(6)	- 0.02	52.68	4.3
1966	12.14	17.00	24.40	0.06	2.07	(6)	- 0.02	55.66	5.6
1967	11.91	17.94	25.28	0.09	2.34	0.01	- 0.01	57.57	3.4
1968	12.33	19.21	26.98	0.14	2.34	0.01	- 0.01	61.00	6.0
1969	12.38	20.68	28.34	0.15	2.66	0.01	- 0.03	64.19	5.2
1970	12.26	21.79	29.52	0.24	2.65	0.01	- 0.05	66.43	3.5
1971	11.60	22.47	30.56	0.41	2.86	0.01	- 0.03	67.89	2.2
1972	12.08	22.70	32.95	0.58	2.94	0.03	- 0.02	71.26	5.0
1973	12.97	22.51	34.84	0.91	3.01	0.04	(6)	74.28	4.2
1974	12.66	21.73	33.45	1.27	3.31	0.05	0.06	72.54	- 2.3
1975	12.66	19.95	32.73	1.90	3.22	0.07	0.02	70.55	- 2.8
1976	13.58	20.35	35.17	2.11	3.07	0.08	(6)	74.36	5.4
1977	13.92	19.93	37.12	2.70	2.51	0.08	0.02	76.29	2.6
1978	13.77	20.00	37.97	3.02	3.14	0.06	0.13	78.09	2.4
1979	15.04	20.67	37.12	2.78	3.14	0.08	0.07	78.90	1.0
1980	15.42	20.39	34.20	2.74	3.12	0.11	- 0.03	75.96	- 3.7
1981	15.91	19.93	31.93	3.01	3.11	0.12	- 0.01	73.99	- 2.6
1982	15.32	18.51	30.23	3.13	3.57	0.10	- 0.02	70.85	- 4.2
1983	15.89	17.36	30.05	3.20	3.90	0.13	- 0.01	70.52	- 0.5
1984	17.07	18.51	31.05	3.55	3.76	0.16	(6)	74.10	5.1
1985	17.48	17.83	30.92	4.15	3.36	0.20	(6)	73.95	- 0.2
1986	17.26	16.71	32.20	4.47	3.39	0.22	(6)	74.24	0.4
1987	18.01	17.74	32.87	4.91	3.07	0.23	0.02	76.84	3.5
1988	18.85	18.55	34.22	5.66	2.64	0.22	0.06	80.20	4.4
1989	18.94	19.38	34.21	5.68	2.88	0.20	0.05	81.35	1.4
1990	19.12	19.30	33.55	6.16	2.95	0.18	0.03	81.29	- 0.1
1991[7]	18.81	20.16	32.72	6.54	3.08	0.17	0.03	81.51	0.3

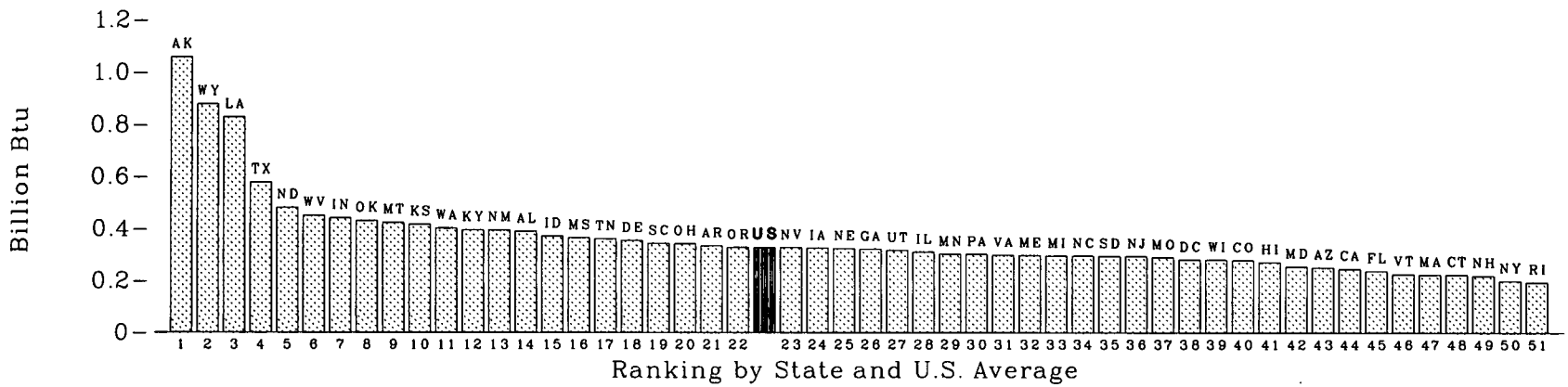
[1] Petroleum products supplied including natural gas plant liquids and crude oil burned as fuel.
[2] Generated by electric utilities.
[3] Electric utility and industrial generation of hydroelectric power and net electricity imports.
[4] Includes net imports of coal coke and electricity produced from wood, waste, wind, photovoltaic, and solar thermal sources connected to electric utility distribution systems. Converted to Btu by applying national average heat rates for fossil fuel steam electric plants. Data do not include the consumption of wood energy (other than that consumed by the electric utility industry) which amounted to an estimated 2.4 quadrillion Btu in 1987. (See Table 108.) This table also does not include small quantities of energy forms for which consistent historical data are not available, such as geothermal, waste, wind, photovoltaic, or solar thermal energy sources except that consumed by electric utilities.
[5] Percent change from previous year calculated from data prior to rounding.
[6] Less than 0.005 quadrillion Btu.
[7] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
— = Not applicable.
Note: Sum of components may not equal total due to independent rounding.
Sources: Tables 52, 74, 83, 89, 91, and 92, EIA estimates for industrial hydroelectric power, and conversion factors in Appendix A.

Figure 4. Energy Consumption and Consumption per Capita by State, 1990

Consumption



Consumption per Capita



Source: Table 4.

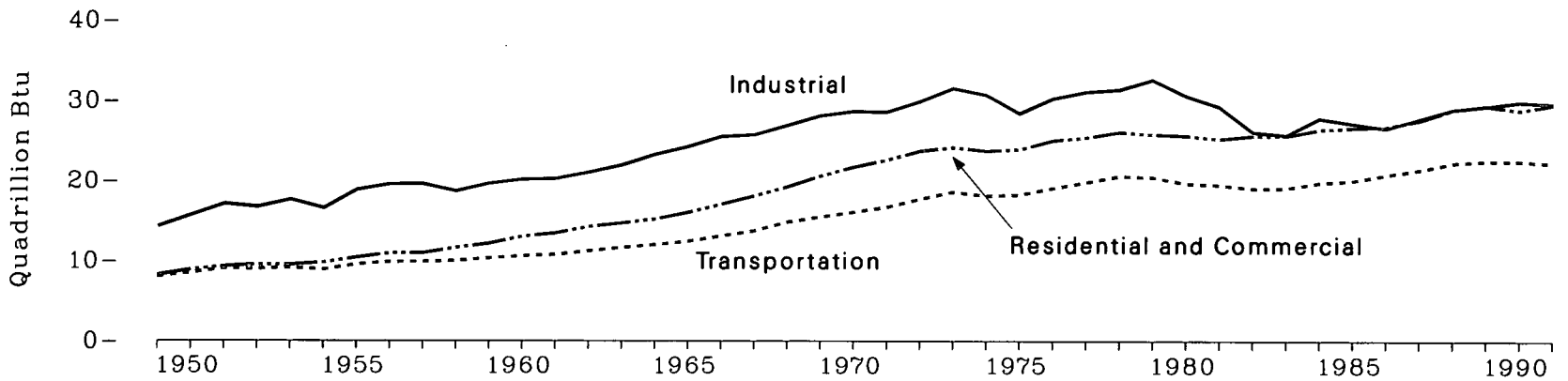
Table 4. Energy Consumption and Consumption per Capita by State, 1990

Consumption			Consumption per Capita		
Rank	State	Trillion Btu	Rank	State	Million Btu
1	Texas	9,796.9	1	Alaska	1,057.5
2	California	7,307.0	2	Wyoming	877.4
3	Ohio	3,698.1	3	Louisiana	827.9
4	New York	3,583.9	4	Texas	576.7
5	Pennsylvania	3,570.5	5	North Dakota	480.1
6	Illinois	3,534.9	6	West Virginia	449.7
7	Louisiana	3,493.7	7	Indiana	440.3
8	Florida	3,059.3	8	Oklahoma	429.8
9	Michigan	2,733.5	9	Montana	423.1
10	Indiana	2,441.1	10	Kansas	415.7
11	New Jersey	2,260.1	11	Washington	401.3
12	Georgia	2,073.8	12	Kentucky	394.6
13	Washington	1,953.1	13	New Mexico	394.0
14	North Carolina	1,948.0	14	Alabama	388.9
15	Virginia	1,837.2	15	Idaho	370.1
16	Tennessee	1,752.9	16	Mississippi	363.8
17	Alabama	1,571.9	17	Tennessee	359.4
18	Missouri	1,475.8	18	Delaware	353.5
19	Kentucky	1,454.1	19	South Carolina	342.3
20	Wisconsin	1,365.5	20	Ohio	340.9
21	Oklahoma	1,352.3	21	Arkansas	332.5
22	Massachusetts	1,341.2	22	Oregon	326.4
23	Minnesota	1,317.6	23	Nevada	325.7
24	Maryland	1,214.2	24	Iowa	323.8
25	South Carolina	1,193.7	25	Nebraska	321.8
26	Kansas	1,030.2	26	Georgia	320.1
27	Mississippi	936.3	27	Utah	315.1
28	Oregon	927.8	28	Illinois	309.2
29	Arizona	916.3	29	Minnesota	301.1
30	Colorado	913.2	30	Pennsylvania	300.5
31	Iowa	899.2	31	Virginia	296.9
32	West Virginia	806.3	32	Maine	295.8
33	Arkansas	781.7	33	Michigan	294.0
34	Connecticut	732.1	34	North Carolina	293.8
35	New Mexico	597.0	35	South Dakota	292.6
36	Alaska	581.6	36	New Jersey	292.3
37	Utah	542.9	37	Missouri	288.4
38	Nebraska	507.9	38	District of Columbia	279.3
39	Wyoming	398.3	39	Wisconsin	279.1
40	Nevada	391.6	40	Colorado	277.2
41	Idaho	372.7	41	Hawaii	269.9
42	Maine	363.2	42	Maryland	253.9
43	Montana	338.1	43	Arizona	250.0
44	North Dakota	306.8	44	California	245.5
45	Hawaii	299.0	45	Florida	236.4
46	New Hampshire	242.9	46	Vermont	224.9
47	Delaware	235.5	47	Massachusetts	222.9
48	South Dakota	203.7	48	Connecticut	222.7
49	Rhode Island	194.7	49	New Hampshire	219.0
50	District of Columbia	169.6	50	New York	199.2
51	Vermont	126.6	51	Rhode Island	194.1
	United States	81,150.8		United States	326.2

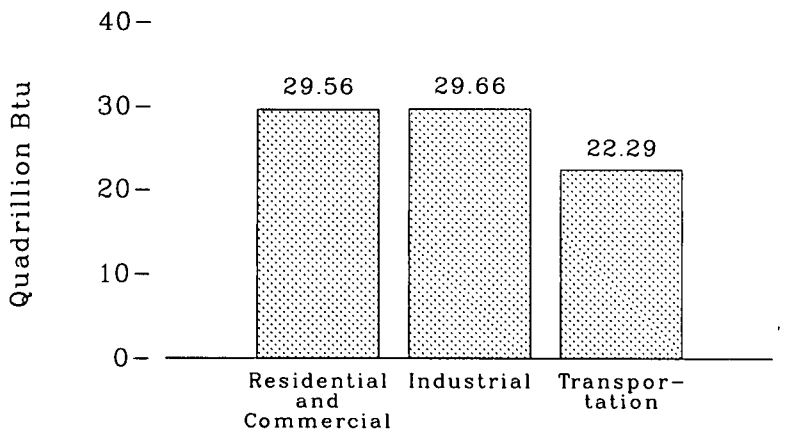
[1] The U.S. total differs from Table 3 due to the use of State-level conversion factors for coal and natural gas.
Source: Energy Information Administration, *State Energy Data Report, Consumption Estimates, 1960-1990* (May 1992).

Figure 5. Energy Consumption by Sector

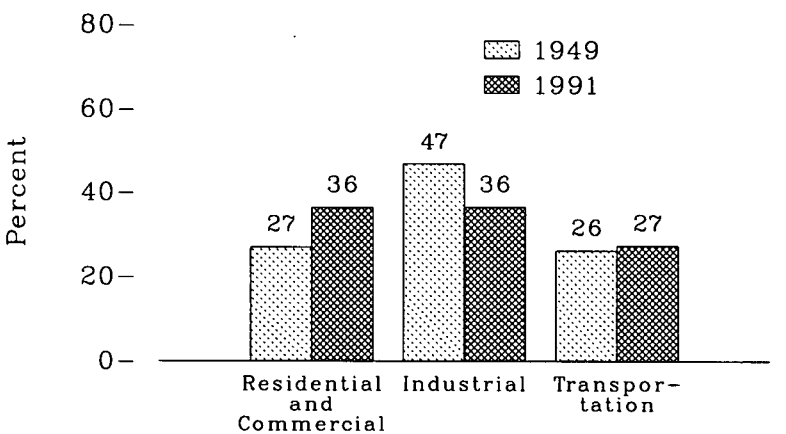
By End-Use Sector, 1949-1991



By End-Use Sector, 1991



Shares by End-Use Sector, 1949 and 1991



Source: Table 5.

Table 5. Energy Consumption by Sector, 1949-1991

(Quadrillion Btu)

Year	Residential and Commercial		Industrial		Transportation		Electric Utilities	Total
	Fossil Fuels [1]	Total [2]	Fossil Fuels [1]	Total [2]	Fossil Fuels [1]	Total [2]		
1949	6.06	8.21	12.08	14.26	7.88	7.99	4.36	30.46
1950	6.65	8.87	13.28	15.71	8.38	8.49	4.70	33.08
1951	6.87	9.30	14.50	17.13	8.93	9.04	5.09	35.47
1952	6.92	9.54	14.05	16.76	8.91	9.00	5.36	35.30
1953	6.73	9.50	14.71	17.65	9.03	9.12	5.75	36.27
1954	6.92	9.78	13.67	16.58	8.82	8.90	5.80	35.27
1955	7.39	10.41	15.42	18.86	9.48	9.55	6.50	38.82
1956	7.71	10.96	15.87	19.55	9.79	9.86	6.98	40.38
1957	7.49	10.98	15.86	19.60	9.84	9.90	7.26	40.48
1958	7.99	11.64	15.14	18.70	9.95	10.00	7.22	40.35
1959	8.19	12.15	15.79	19.64	10.30	10.35	7.82	42.14
1960	8.75	13.04	16.26	20.16	10.56	10.60	8.19	43.80
1961	8.96	13.44	16.26	20.25	10.73	10.77	8.47	44.46
1962	9.45	14.27	16.83	21.04	11.19	11.23	9.03	46.53
1963	9.48	14.71	17.56	21.95	11.62	11.66	9.63	48.32
1964	9.60	15.23	18.56	23.27	11.96	12.00	10.33	50.50
1965	10.00	16.03	19.24	24.22	12.40	12.43	11.01	52.68
1966	10.47	17.06	20.09	25.50	13.07	13.10	11.99	55.66
1967	11.04	18.10	20.08	25.72	13.72	13.75	12.70	57.57
1968	11.40	19.23	20.85	26.90	14.83	14.86	13.88	61.00
1969	11.90	20.59	21.61	28.10	15.47	15.50	15.18	64.19
1970	12.14	21.71	21.92	28.63	16.06	16.09	16.27	66.43
1971	12.35	22.59	21.66	28.57	16.69	16.72	17.15	67.89
1972	12.64	23.69	22.39	29.86	17.68	17.71	18.52	71.26
1973	12.27	24.14	23.54	31.53	18.57	18.60	19.85	74.28
1974	11.77	23.72	22.62	30.69	18.09	18.12	20.02	72.54
1975	11.60	23.90	20.36	28.40	18.21	18.25	20.35	70.55
1976	12.25	25.02	21.44	30.24	19.06	19.10	21.57	74.36
1977	11.87	25.39	21.88	31.08	19.78	19.82	22.71	76.29
1978	11.91	26.09	21.84	31.39	20.58	20.61	23.72	78.09
1979	11.53	25.81	22.77	32.61	20.43	20.47	24.13	78.90
1980	10.72	25.65	21.04	30.61	19.66	19.69	24.50	75.96
1981	10.04	25.24	19.68	29.24	19.47	19.51	24.76	73.99
1982	10.06	25.63	17.45	26.14	19.03	19.07	24.27	70.85
1983	9.71	25.63	16.72	25.75	19.10	19.13	24.96	70.52
1984	10.04	26.45	18.29	27.85	19.76	19.80	25.98	74.10
1985	9.78	26.68	17.63	27.20	20.02	20.07	26.48	73.95
1986	9.56	26.81	17.24	26.61	20.77	20.81	26.64	74.24
1987	9.71	27.60	18.15	27.81	21.40	21.44	27.55	76.84
1988	10.29	28.92	18.99	28.98	22.26	22.30	28.63	80.20
1989	10.41	29.41	19.10	29.37	22.51	22.55	29.29	81.35
1990	9.62	28.86	19.55	29.90	22.48	22.53	29.60	81.29
1991[3]	9.90	29.56	19.43	29.66	22.24	22.29	29.90	81.51

[1] Includes only those fossil fuels consumed directly in the sector (see Diagram 1).

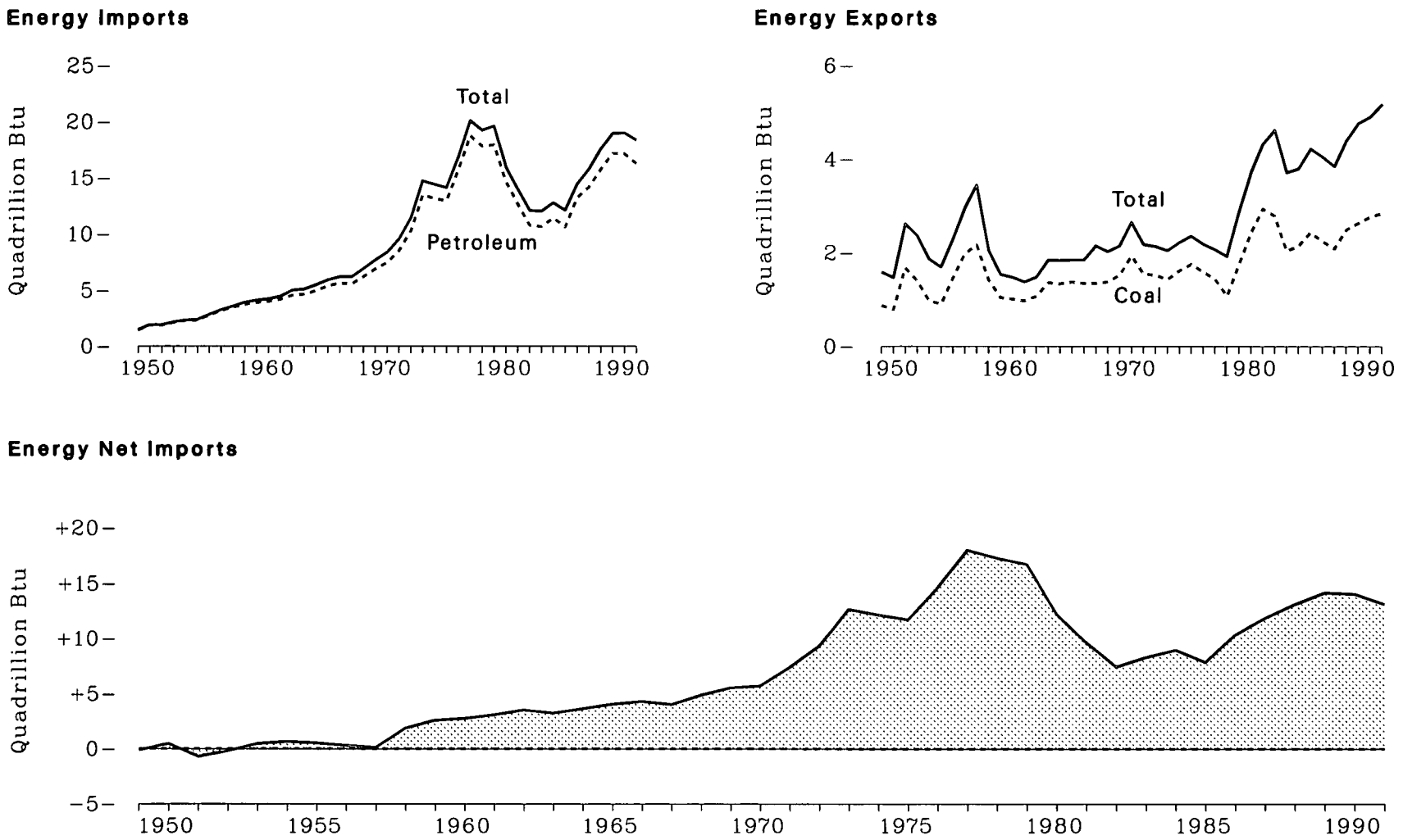
[2] Includes those fossil fuels consumed directly in the sector, utility electricity sales to the sector, and energy losses in the conversion and transmission of electricity. Conversion and transmission losses are allocated to sectors in proportion to electricity sales to sectors (see Diagram 1).

[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Notes: • Data do not include consumption of wood energy (other than that consumed by the electric utility industry) which amounted to an estimated 2.4 quadrillion Btu in 1987. (See Table 108.) This table also does not include small quantities of other energy forms for which consistent historical data are not available, such as geothermal, waste, wind, photovoltaic, or solar thermal energy sources except that consumed by electric utilities. See Appendix E, Note 2. • Sum of components may not equal total due to independent rounding.

Sources: Tables 63, 79, 85, 89, 92, and 96, EIA estimates for industrial hydroelectric power, and conversion factors in Appendix A.

Figure 6. Energy Imports, Exports, and Net Imports, 1949-1991



Notes: • Negative net imports are net exports. • Because vertical scales differ, graphs should not be compared.
Source: Table 6.

Table 6. Energy Imports, Exports, and Net Imports, 1949-1991

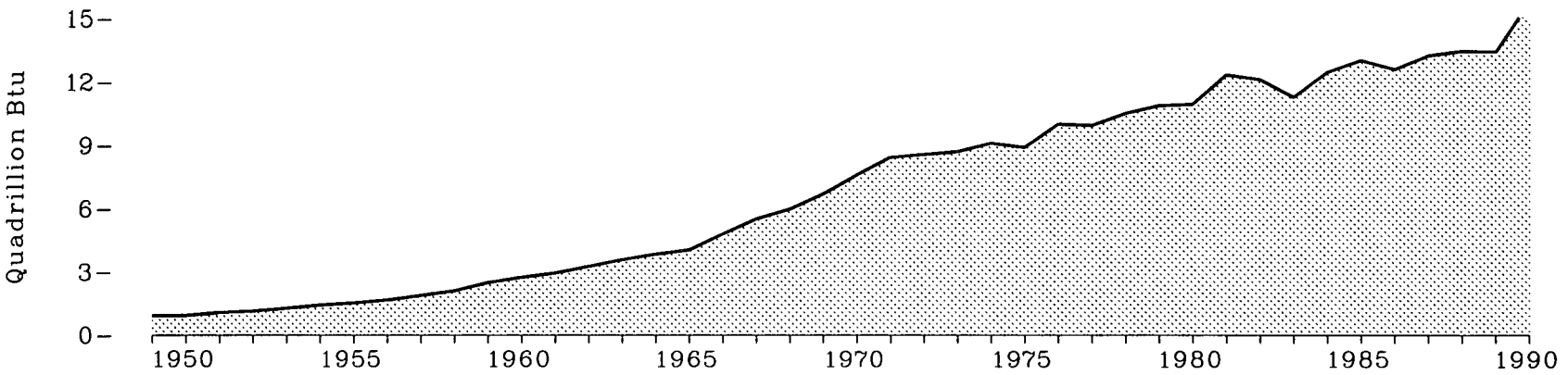
(Quadrillion Btu)

Year	Imports					Exports					Net Imports [1]				
	Coal	Natural Gas (Dry)	Petroleum [2]	Other [3]	Total	Coal	Natural Gas (Dry)	Petroleum	Other [3]	Total	Coal	Natural Gas (Dry)	Petroleum [2]	Other [3]	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	(*)	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	(*)	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	(*)	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	0.00	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	(*)	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	(*)	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	(*)	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	(*)	0.96	8.54	0.08	9.58	1.55	0.08	0.47	0.07	2.18	-1.54	0.88	8.07	(*)	7.41
1972	(*)	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	(*)	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	0.45	12.76	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	14.43	2.25	0.06	1.67	0.07	4.05	-2.19	0.69	11.53	0.35	10.38
1987	0.04	0.99	14.16	0.56	15.76	2.09	0.05	1.63	0.07	3.85	-2.05	0.94	12.53	0.48	11.90
1988	0.05	1.30	15.75	0.46	17.56	2.50	0.07	1.74	0.10	4.41	-2.45	1.22	14.01	0.36	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	0.25	18.99	2.77	0.09	1.82	0.23	4.91	-2.70	1.46	15.29	0.03	14.08
1991[5]	0.08	1.71	16.25	0.30	18.35	2.85	0.12	2.13	0.09	5.19	-2.77	1.59	14.13	0.21	13.16

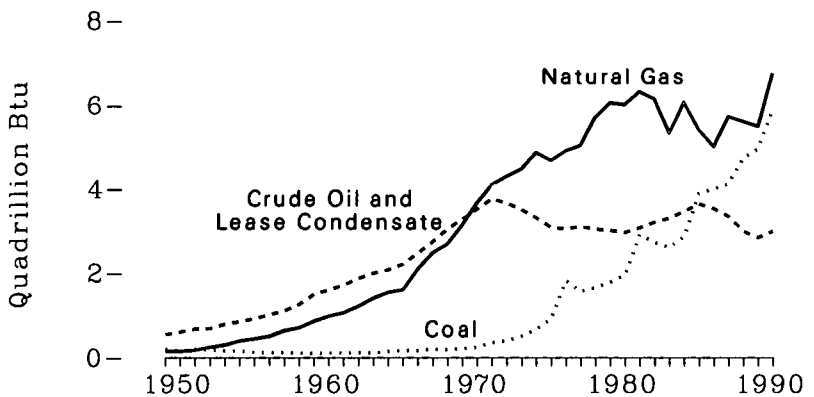
[1] Net imports = imports minus exports.
[2] Includes imports into the Strategic Petroleum Reserve which began in 1977.
[3] Coal coke and small amounts of electricity transmitted across U.S. borders with Canada and Mexico.
[4] Less than 0.005 quadrillion Btu.
[5] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Notes: • Includes trade between the United States (50 States and the District of Columbia) and its territories and possessions. • Sum of components may not equal totals or net import items due to independent rounding.
Sources: Tables 52, 56, 74, 83, 89, and 91 and conversion factors in Appendix A.

Figure 7. Fossil Fuel Production on Federally Administered Lands

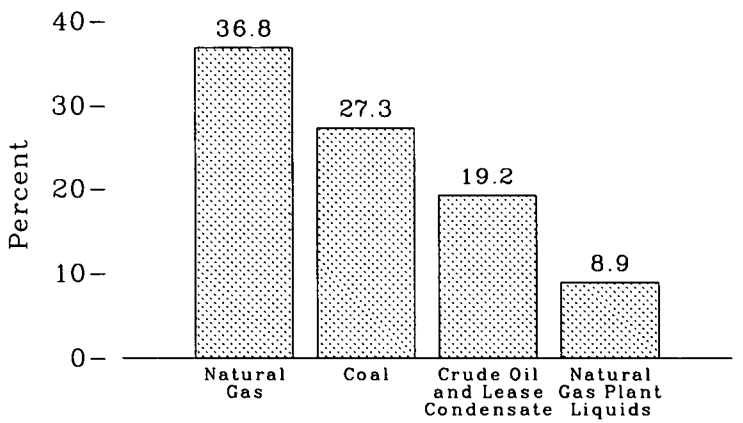
Total, 1949-1990



By Source, 1949-1990



Share of U.S. Total Production by Source, 1990



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 7.

Table 7. Fossil Fuel Production on Federally Administered Lands, 1949-1990

Year	Crude Oil and Lease Condensate [1]			Natural Gas Plant Liquids [2]			Natural Gas [3]			Coal [4]			Total	
	Million Barrels	Quadrillion Btu	Percent U.S. Total [5]	Million Barrels	Quadrillion Btu	Percent U.S. Total [5]	Trillion Cubic Feet	Quadrillion Btu	Percent U.S. Total [5]	Million Short Tons	Quadrillion Btu	Percent U.S. Total [5]	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

[1] Production from Naval Petroleum Reserve No. 1 (NPR#1) for 1974 and earlier years is for fiscal years (July through June).

[2] Includes only those quantities for which the royalties were paid based on 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.

[3] Includes some quantities of natural gas processed into liquids at natural gas processing plants and fractionators.

[4] Converted to British thermal units (Btu) based on an estimated heat content of coal produced on federally administered lands of 21.0 million Btu per short ton.

[5] Based on physical units.

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 1990 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 1990 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. Energy Consumption Indicators

Indicators of Energy Intensity

The relationship between total energy consumption and real gross domestic product (GDP) is a primary indication of the energy intensity of the economy. In 1970, 23 thousand Btu of energy was consumed for each 1987 dollar of GDP (9).[1] Higher energy prices in the early 1970's corresponded with increases in energy efficiency, and the energy intensity of the economy as a whole fell to 17 thousand Btu per 1987 dollar in 1986, a decline of over one-fourth since 1970. After the oil price collapse in 1986, the decline stopped. From 1987 through 1991, the energy intensity of the economy remained at about 17 thousand Btu per 1987 dollar.

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 (8). Per capita consumption rose from 212 million Btu in 1960 to a peak of 285 million Btu in 1973. Thereafter, per capita consumption trended downward, to as low as 225 million Btu in 1983. In 1991, end-use energy consumption was 242 million Btu per capita.

Energy consumption per household,[2] a third indicator of energy intensity, declined from 138 million Btu in 1978 to 101 million Btu in 1987 (the most recent year for which data are available), with only one small upward fluctuation, which occurred in 1984 (17). Lower use of distillate fuel oil and kerosene accounted for most of the decline.

Households in the South and West consumed the least amount of energy in 1987, an average of 84 million Btu per household in the South and 78 million Btu per household in the West. Energy consumption by households in the Midwest averaged 123 million Btu per household. Households in the Northeast averaged 124 million Btu per household in 1987, surpassing the Midwest average for the first time.

[1]Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications.

[2]Five major energy sources–natural gas, electricity, distillate fuel oil, kerosene, and liquefied petroleum gases–are covered in the data.

Household Uses of Energy

Energy consumed by households can be attributed to four primary applications: space heating, air conditioning, water heating, and appliance operation (18). In 1987 (the most recent year for which data are available), household energy consumption totaled 9 quadrillion Btu. Natural gas was the primary source of energy for space heating and provided the main source of heat in 50 million households (19).

In 1987, space heating was the most prevalent application of energy consumed by households and accounted for 5 quadrillion Btu (18). Over 2 quadrillion Btu were used to operate appliances and, as would be expected, electricity was the major source of energy for that application. Refrigerators, color television sets, ovens (regular and microwave), and automatic clothes washers were the most common household appliances (20).

Electricity was essentially the only source of energy used for air conditioning. Although air conditioning accounted for only 5 percent of household energy consumption, it accounted for 10 percent ($9.8 billion) of total household energy expenditures of $98 billion (18).

The cost of energy used to operate appliances totaled $42 billion in 1987, and the cost for space heating was $32 billion. Energy expenses for water heating came to about $14 billion.

Improvements in Motor Vehicle Efficiency

Because motor gasoline consistently accounts for the largest share of all petroleum products supplied (62), motor gasoline consumption has a significant effect on U.S. dependence on foreign sources of crude oil. Following the Arab 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 (23). The average fuel rate of passenger cars, which make up a sizable proportion of the U.S. motor vehicle fleet, was 13 miles per gallon. That measure of fuel efficiency had declined for the previous several years.

In 1973-1974, however, crude oil supply interruptions and rising prices led to concerns about the continued availability of motor gasoline at desirable prices. Mileage per passenger car immediately declined, to an average of 9.6 thousand in 1974 (23). At the same time, the average fuel rate of the passenger car fleet began to creep upward, and continued to increase throughout the remainder of the 1970's and 1980's, reaching 21 miles per gallon in 1990 (the most recent year for which data are available). Federal regulations designed to encourage improvements in the efficiency of the fleet played a role in the increases in fuel rates.

During 1987, however, new Federal legislation allowed States to raise the speed limit on some highways. Because vehicles traveling at speeds above 55 miles per hour are less efficient, higher speed limits tend to increase demand for motor fuel. Other factors at work during the 1987-to-1990 period, such as relatively low motor gasoline prices and increases in highway travel, also tended to increase demand.

Energy-Related Characteristics of Commercial Buildings

Commercial buildings are those which house mercantile, service, office, education, and other activities. In 1989 (the most recent year for which data are available), there were approximately 63 billion square feet of commercial floorspace in the United States (25). The largest amount of commercial floorspace, 22 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 almost 62 billion square feet of commercial floorspace. Natural gas was also commonly used and supplied energy for 41 billion square feet. Fuel oil, district heat, and propane were consumed in smaller, but still significant, amounts in commercial buildings.

The most common energy-consuming activities in commercial buildings were space heating, air conditioning, water heating, cooking, and manufacturing (26). Most commercial floorspace (58 billion square feet) was heated and most (54 billion square feet) had hot water. Air conditioning was prevalent (52 billion square feet). Cooking and manufacturing were less prevalent, occurring in 24 billion square feet and 6 billion square feet, respectively.

On a Btu basis, electricity and natural gas were the most common sources of energy in commercial buildings (27). In 1989, commercial buildings consumed 2.8 quadrillion Btu of electricity and 2.1 quadrillion Btu of natural gas. Consumption of district heat (steam and hot water from outside sources) totaled 0.6 quadrillion Btu and consumption of fuel oil totaled 0.4 quadrillion Btu. (Propane also supplied small amounts of energy in commercial buildings, but propane data were not collected in 1989.)

Of the $71 billion spent by commercial buildings on energy in 1989, by far the largest amount went for electricity (28). Electricity expenditures came to $56 billion, whereas expenditures for natural gas came to $9 billion. Expenditures for district heat were nearly $4 billion and expenditures for fuel oil were close to $2 billion.

Nonfuel Use of Energy Sources

The amount of energy used for nonfuel purposes is small compared with the amount of energy consumed by end users or used in the production, processing, and transportation of energy. In 1991, the 5 quadrillion Btu consumed for nonfuel uses represented a 6-percent share of total energy consumption (13).

The nonfuel use of energy is overwhelmingly the use of petroleum products, primarily asphalt and road oil, petrochemical feedstocks, and liquefied petroleum gases (LPG). Use of petroleum for nonfuel purposes appears to be slightly more in 1991 than in 1980; the apparent increase reflects some combination of actual trends and changes in data collection procedures that resulted from the discontinuation of the Energy Information Administration's survey on LPG sales.

Consumption of Energy for Manufacturing

The U.S. manufacturing sector consumed an estimated 20.5 quadrillion Btu[3] of energy in 1988 (the most recent year for which data are available). Natural gas accounted for 5.9 quadrillion Btu, a 29-percent share of total energy consumption (14). Electricity[4] accounted for 2.4 quadrillion Btu, a 12-percent share, and coal consumption accounted for the same amount. Fuel oil consumption of about 0.8 quadrillion Btu accounted for a 4-percent share.

Of all the industries, the petroleum and coal products industry was the largest user of energy in 1988, consuming 6.4 quadrillion Btu. At 4.4 quadrillion Btu, the chemicals and allied products industry was the second largest user. Together, the two industries accounted for over half of the energy consumption in the manufacturing sector.

Because the manufacturing sector accounts for a large share of total U.S. energy consumption, manufacturers' ability to cope with fluctuations in energy supplies and prices by switching to alternative sources of energy plays a significant role in the Nation's energy security. Fuel switching capability[5] in 1988 (the most recent year for which data are available) was determined for five major energy sources: natural gas, purchased electricity, coal and coke, residual fuel oil, and distillate fuel oil (15).

Residual fuel oil registered the largest value (52 percent) for switchable consumption as a percentage of actual consumption, indicating substantial fuel-switching capabilities. Almost 25 percent of distillate fuel oil consumption could have been supplied by other sources. It is estimated that about 181 thousand barrels per day of consumption of fuel oil (residual and distillate combined) could have been switched to nonpetroleum sources.

Natural gas registered the largest absolute amount of total switchable consumption. Of the 5.3 quadrillion Btu total of natural gas consumption, 2.1 quadrillion Btu (39 percent) could have been switched to other sources. Of the 2.0 quadrillion Btu of coal and coke consumed, 0.6 quadrillion Btu (29 percent) were switchable. Very little of the 2.5 quadrillion Btu of purchased electricity consumed by manufacturers in 1988 could have been switched to other sources–less than 2 percent if manufacturing output were to be maintained.

[3]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 20.5 quadrillion Btu total is the *primary consumption of energy*; 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.

[4]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.

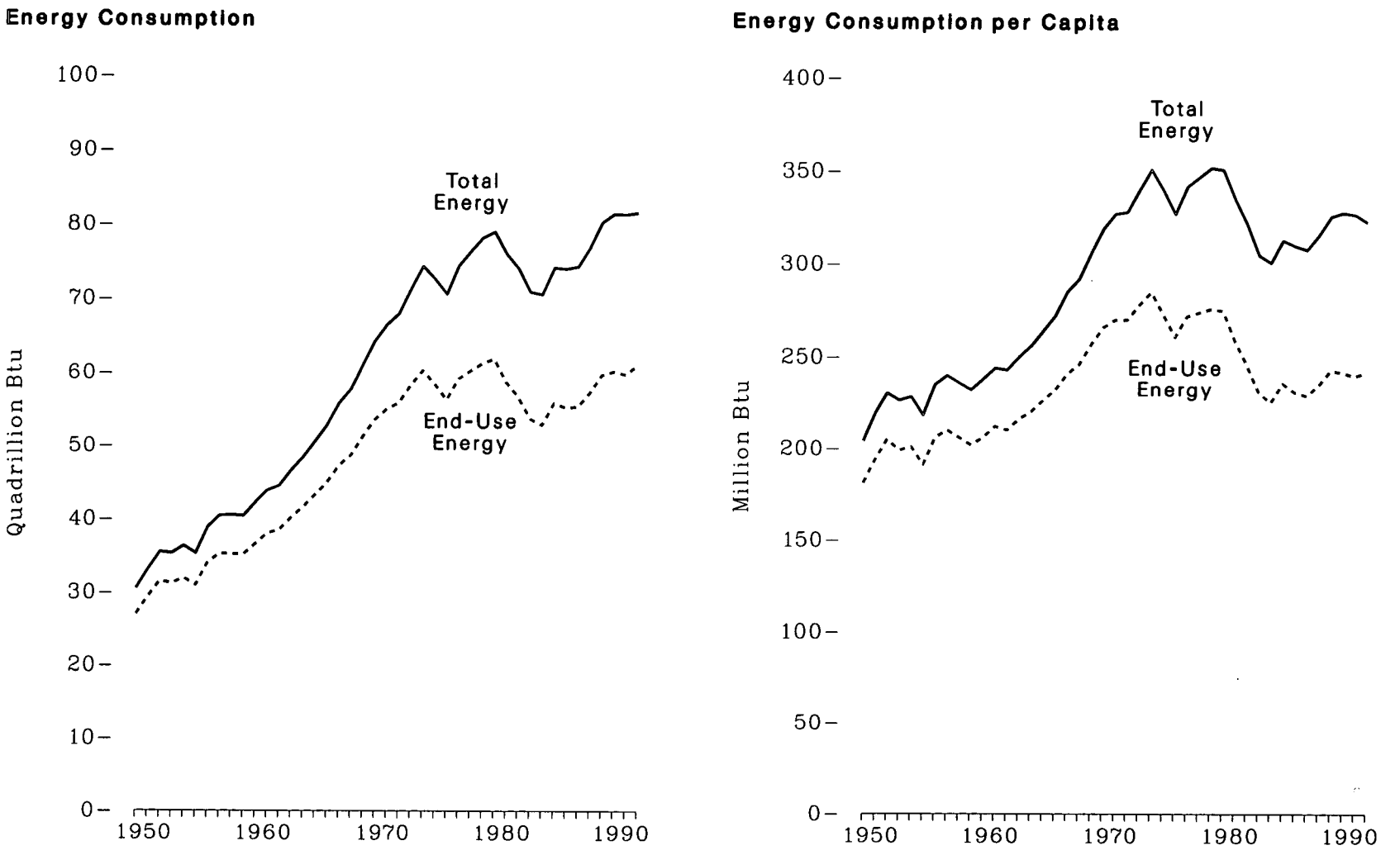
[5]The capability of U.S. manufacturers to switch fuels within 30 days, using only existing equipment and keeping production output constant.

Trends in Industrial Energy Consumption

Energy consumption by the industrial sector increased throughout the 1960's and attained an all-time high in 1973 of 26 quadrillion Btu (12). After 1973, increasing energy prices tended to depress industrial sector demand for energy, and the rate of consumption trended downward. By 1986, the annual total was 20 quadrillion Btu. Following the 1986 fall in crude oil prices, industrial energy consumption rose each year, reaching 23 quadrillion Btu in 1990. In 1991, however, the economic recession contributed to a slight decline in industrial energy consumption.

The industrial sector relied on the three major fossil fuels–petroleum, natural gas, and coal–and electricity throughout the 1960-to-1991 period, but the relative contributions of each form of energy changed over time. Coal, which accounted for a 26-percent share in 1960, provided only 12 percent of industrial energy in 1991. Meanwhile, electricity's share rose from 7 percent to 14 percent. The share supplied by petroleum ranged from 33 percent to 41 percent, and the share supplied by natural gas ranged from 33 percent to 42 percent. In 1991, petroleum accounted for 35 percent, while competitively priced natural gas accounted for a 39-percent share.

Figure 8. Energy Consumption and Energy Consumption per Capita, 1949-1991



Source: Table 8.

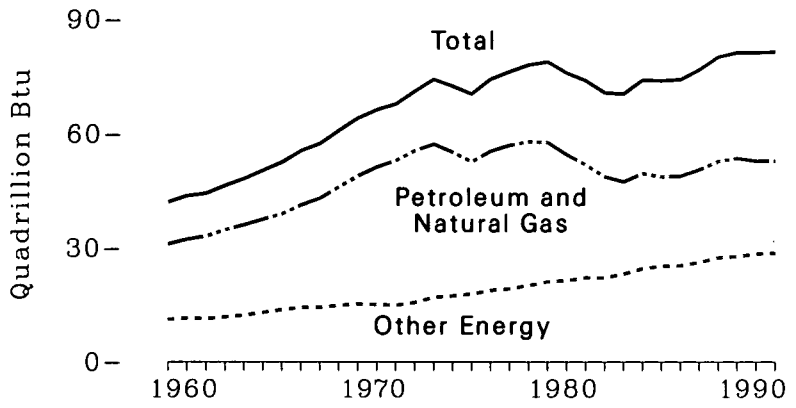
Table 8. Energy Consumption and Energy Consumption per Capita, 1949-1991

Year	Total Energy Consumption (quadrillion Btu)	End-Use Energy Consumption [1] (quadrillion Btu)	Population [2] (million)	Consumption per Capita			
				Total Energy		End-Use Energy [1]	
				Quantity (million Btu)	Change from Previous Year (percent) [3]	Quantity (million Btu)	Change from Previous Year (percent) [3]
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	44.92	193.5	272	3.0	232	2.7
1966	55.66	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	51.21	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	61.24	222.1	352	1.4	276	0.7
1979	78.90	61.83	224.6	351	-0.3	275	-0.4
1980	75.96	58.59	226.5	335	-4.6	259	-5.8
1981	73.99	56.55	229.6	322	-3.9	246	-5.0
1982	70.85	53.63	232.0	305	-5.3	231	-6.1
1983	70.52	52.78	234.3	301	-1.3	225	-2.6
1984	74.10	55.74	236.5	313	4.0	236	4.9
1985	73.95	55.13	238.7	310	-1.0	231	-2.1
1986	74.24	55.27	241.1	308	-0.6	229	-0.9
1987	76.84	57.16	243.4	316	2.6	235	2.6
1988	80.20	59.67	245.8	326	3.2	243	3.4
1989	81.35	60.16	248.2	328	0.6	242	-0.4
1990	81.29	59.75	248.7	327	-0.3	240	-0.8
1991[4]	81.51	61.02	252.2	323	-1.2	242	0.8

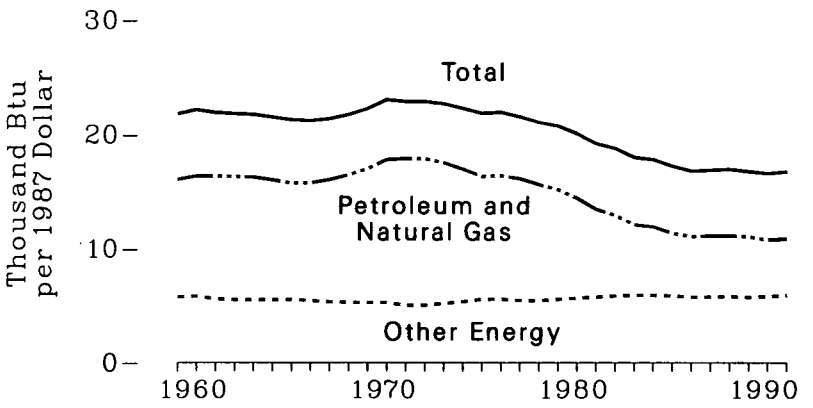
[1] End-use energy consumption is total energy consumption less losses incurred in the generation, transmission, and distribution of electricity, less power plant electricity use and unaccounted for electrical system energy losses. (See Glossary).
[2] Resident population of the 50 States and the District of Columbia estimated for July 1 of each year, except for the April 1 census count in 1950, 1960, 1970, and 1980.
[3] Percent change calculated from data prior to rounding.
[4] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
— = Not applicable.
Sources: **Total Energy Consumption:** Table 3. **End-Use Energy Consumption:** Tables 3 and 94. **Population:** •1949—Bureau of the Census, *Current Population Reports*, "Population Estimates and Projections," Series P-25, No. 802, May 1979. •1950-1980—Bureau of the Census, *Current Population Reports*, "Population Estimates and Projections," Series P-25, No. 990, July 1986. •1981 foward—unpublished data consistent with the Bureau of the Census Press Release CB91-204, December 1991. **Consumption per Capita:** Calculated by Energy Information Administration.

Figure 9. Energy Consumption per Dollar of Gross Domestic Product

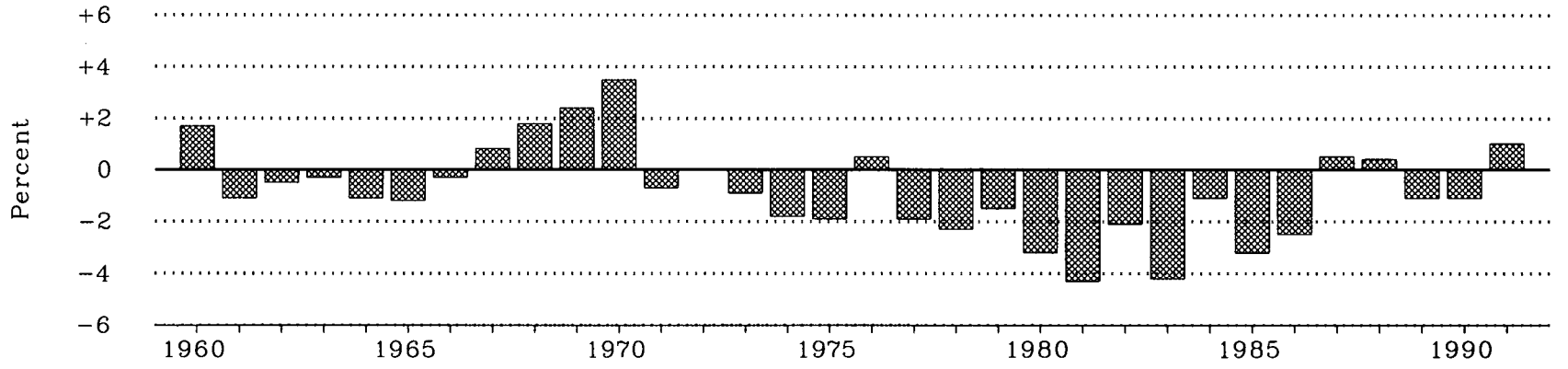
Energy Consumption, 1959-1991



Energy Consumption per Dollar of Gross Domestic Product, 1959-1991



Total Energy Consumption per Dollar of Gross Domestic Product, Change from Previous Year, 1960-1991



Source: Table 9.

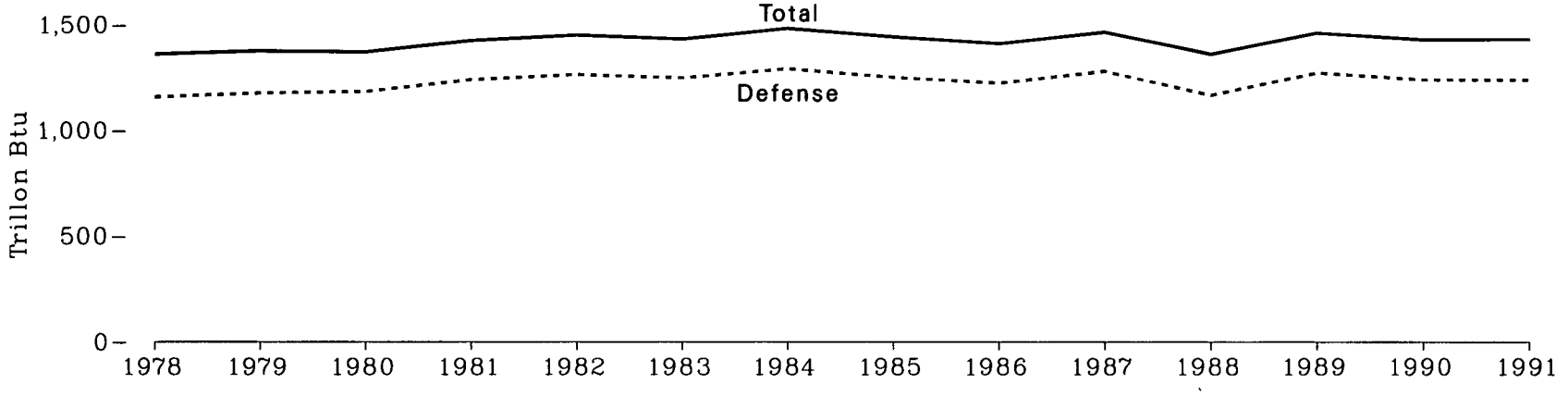
Table 9. Energy Consumption per Dollar of Gross Domestic Product, 1949-1991

Year	Energy Consumption			Gross Domestic Product (GDP)	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 1987 Dollars	Thousand Btu per 1987 Dollar			Percent [1]
1949	17.03	13.43	30.46	NA	NA	NA	NA	NA
1950	19.28	13.79	33.08	NA	NA	NA	NA	NA
1951	21.48	13.99	35.47	NA	NA	NA	NA	NA
1952	22.51	12.80	35.30	NA	NA	NA	NA	NA
1953	23.46	12.81	36.27	NA	NA	NA	NA	NA
1954	24.17	11.10	35.27	NA	NA	NA	NA	NA
1955	26.25	12.57	38.82	NA	NA	NA	NA	NA
1956	27.55	12.83	40.38	NA	NA	NA	NA	NA
1957	28.12	12.36	40.48	NA	NA	NA	NA	NA
1958	29.19	11.16	40.35	NA	NA	NA	NA	NA
1959	31.04	11.10	42.14	1,931.3	16.07	5.75	21.82	NA
1960	32.30	11.50	43.80	1,973.2	16.37	5.83	22.20	1.7
1961	33.14	11.32	44.46	2,025.6	16.36	5.59	21.95	- 1.1
1962	34.78	11.75	46.53	2,129.8	16.33	5.52	21.85	- 0.5
1963	36.10	12.22	48.32	2,218.0	16.28	5.51	21.79	- 0.3
1964	37.59	12.91	50.50	2,343.3	16.04	5.51	21.55	- 1.1
1965	39.01	13.67	52.68	2,473.5	15.77	5.53	21.30	- 1.2
1966	41.40	14.26	55.66	2,622.3	15.79	5.44	21.23	- 0.3
1967	43.23	14.34	57.57	2,690.3	16.07	5.33	21.40	0.8
1968	46.19	14.81	61.00	2,801.0	16.49	5.29	21.78	1.8
1969	49.02	15.18	64.19	2,877.1	17.04	5.27	22.31	2.4
1970	51.32	15.12	66.43	2,875.8	17.84	5.26	23.10	3.5
1971	53.03	14.85	67.89	2,959.3	17.92	5.02	22.94	- 0.7
1972	55.64	15.61	71.26	3,107.1	17.91	5.03	22.93	- 0.0
1973	57.35	16.93	74.28	3,268.6	17.55	5.18	22.73	- 0.9
1974	55.19	17.36	72.54	3,248.1	16.99	5.34	22.33	- 1.8
1975	52.68	17.87	70.55	3,221.7	16.35	5.55	21.90	- 1.9
1976	55.52	18.84	74.36	3,380.8	16.42	5.57	22.00	0.5
1977	57.05	19.24	76.29	3,533.3	16.15	5.44	21.59	- 1.9
1978	57.97	20.12	78.09	3,703.5	15.65	5.43	21.09	- 2.3
1979	57.79	21.11	78.90	3,796.8	15.22	5.56	20.78	- 1.5
1980	54.60	21.36	75.96	3,776.3	14.46	5.66	20.11	- 3.2
1981	51.86	22.13	73.99	3,843.1	13.49	5.76	19.25	- 4.3
1982	48.74	22.11	70.85	3,760.3	12.96	5.88	18.84	- 2.1
1983	47.41	23.11	70.52	3,906.6	12.14	5.92	18.05	- 4.2
1984	49.56	24.54	74.10	4,148.5	11.95	5.92	17.86	- 1.1
1985	48.76	25.19	73.95	4,279.8	11.39	5.89	17.28	- 3.2
1986	48.90	25.33	74.24	4,404.5	11.10	5.75	16.85	- 2.5
1987	50.61	26.23	76.84	4,540.0	11.15	5.78	16.93	0.5
1988	52.77	27.42	80.20	4,718.6	11.18	5.81	17.00	0.4
1989	53.59	27.75	81.35	4,836.9	11.08	5.74	16.82	- 1.1
1990	52.86	28.44	81.29	4,884.9	10.82	5.82	16.64	- 1.1
1991[2]	52.88	28.63	81.51	4,848.8	10.90	5.91	16.81	1.0

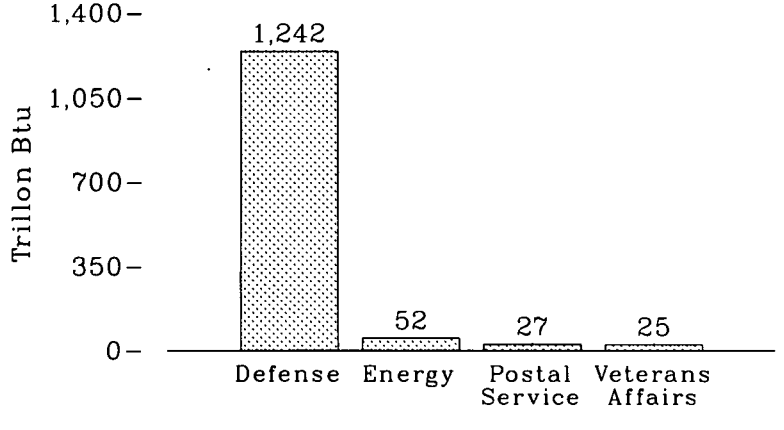
[1] Percent calculated from data prior to rounding.
[2] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
NA = Not available.
Sources: Tables 3 and C1.

Figure 10. U.S. Government Energy Consumption, Fiscal Years

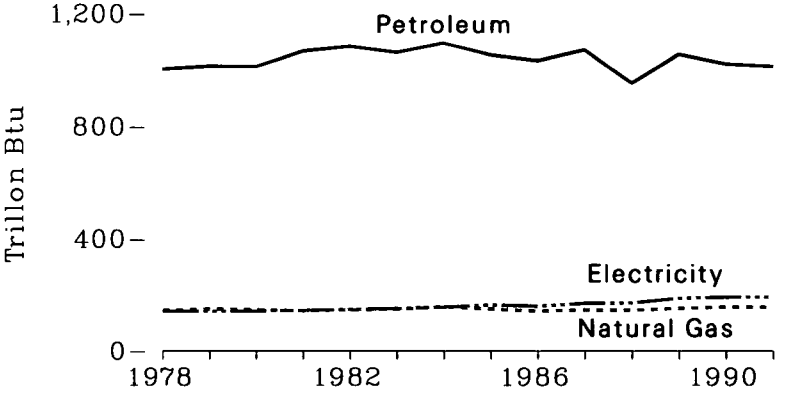
Total and U.S. Department of Defense, 1978-1991



Top Four Consuming Agencies, 1991



By Major Energy Source, 1978-1991



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 10.

Table 10. U.S. Government Energy Consumption, Fiscal Years 1978-1991

(Trillion Btu)

Category	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 [1]
Total, All Agencies	**1,360.9**	**1,375.4**	**1,371.2**	**1,424.2**	**1,451.4**	**1,431.8**	**1,482.5**	**1,442.2**	**1,409.4**	**1,465.4**	**1,359.7**	**1,463.2**	**1,430.9**	**1,433.7**
Defense	1,157.8	1,175.8	1,183.1	1,239.5	1,264.5	1,248.3	1,292.1	1,250.6	1,222.8	1,280.5	1,165.8	1,274.4	1,241.7	1,241.7
Energy	50.1	49.6	47.4	47.3	49.0	49.5	51.6	52.0	49.9	48.2	49.8	43.9	43.4	52.1
Postal Service	30.9	29.3	27.2	27.9	27.5	26.5	27.7	27.8	28.0	28.5	29.6	30.3	29.6	26.7
Veterans Affairs	26.8	25.7	24.8	24.0	24.2	24.1	24.6	24.3	24.7	24.6	26.0	26.0	24.6	25.0
Transportation	20.6	19.6	19.2	18.8	19.1	19.4	19.8	19.5	19.4	19.0	18.7	18.5	19.0	19.0
General Services Administration	20.4	19.6	18.1	18.0	18.1	16.1	16.2	15.5	14.0	13.1	12.4	12.7	13.8	13.4
NASA	11.2	11.1	10.4	10.0	10.1	10.3	10.6	11.0	11.2	11.2	11.3	12.2	12.4	12.7
Agriculture	9.1	9.2	8.6	7.9	7.6	7.4	7.9	8.3	6.7	7.2	7.7	8.6	9.4	10.1
Health and Human Services	6.5	6.4	6.0	6.7	6.4	6.2	6.4	7.0	6.2	6.6	6.4	6.7	8.0	8.0
Justice	5.9	6.4	5.7	5.4	5.8	5.5	6.4	8.2	8.6	8.1	9.4	7.7	7.0	7.0
Interior	9.2	10.4	8.5	7.6	7.4	7.7	8.4	7.4	6.9	6.6	6.9	7.1	7.4	6.0
Other [2]	12.4	12.3	12.3	11.1	11.6	10.8	10.7	10.7	11.0	11.7	15.7	15.0	14.8	12.1
Total, All Sources	**1,360.9**	**1,375.4**	**1,371.2**	**1,424.2**	**1,451.4**	**1,431.8**	**1,482.5**	**1,442.2**	**1,409.4**	**1,465.4**	**1,359.7**	**1,463.2**	**1,430.9**	**1,433.7**
Petroleum	1,002.7	1,013.2	1,011.8	1,066.1	1,082.7	1,061.1	1,093.8	1,052.5	1,032.2	1,069.7	952.2	1,054.3	1,020.3	1,011.9
Jet Fuel	601.1	618.6	638.7	653.3	672.7	673.4	693.7	705.7	710.2	702.3	617.2	761.7	732.4	732.3
Distillate and Residual Fuel Oil	332.3	327.1	307.7	351.3	349.4	329.5	342.9	290.4	271.4	319.3	284.6	245.1	244.0	241.0
Motor Gasoline	60.1	59.1	56.5	53.2	53.1	51.6	51.2	50.5	45.3	43.1	41.2	41.1	37.2	32.0
Liquefied Petroleum Gases	3.0	3.7	4.0	3.7	3.9	4.0	4.1	4.0	3.9	4.0	3.2	5.6	6.2	6.1
Aviation Gasoline	6.2	4.7	4.9	4.6	3.6	2.6	1.9	1.9	1.4	1.0	6.0	0.8	0.5	0.5
Electricity	141.0	141.2	141.9	144.5	147.5	151.5	155.9	164.0	159.0	169.6	171.0	188.2	192.3	192.7
Natural Gas	144.7	148.9	147.3	142.2	146.2	147.8	157.4	149.0	141.3	145.7	144.8	151.6	156.0	155.8
Coal	66.0	65.1	63.5	65.1	68.6	62.4	65.3	64.0	63.8	67.0	60.1	48.6	44.2	54.4
Purchased Steam	6.4	7.1	6.8	6.2	6.2	9.0	10.1	12.7	13.1	13.4	31.6	20.3	18.1	18.9

[1] Previous-year data have been revised. Current-year data are estimated and will be revised in future publications. Other estimated data are Environmental Protection Agency (EPA) 1982 and 1988, U.S. Department of Treasury 1982 and 1983, and National Science Foundation (NSF) 1988, 1989, and 1990.

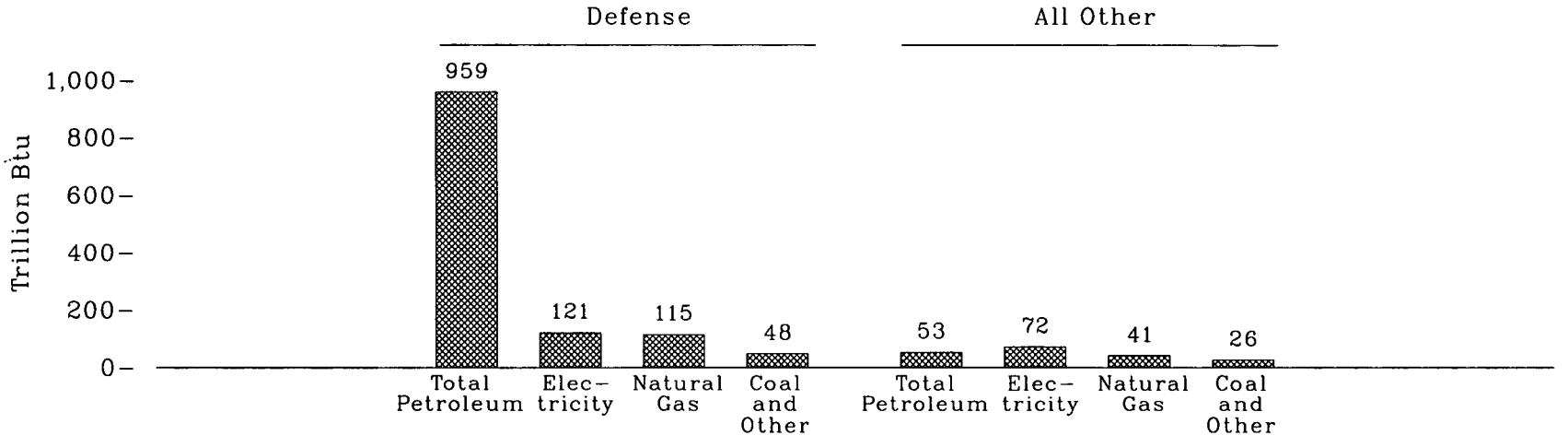
[2] Includes National Archives and Records Administration, U.S. Department of Commerce, Panama Canal Commission, Tennessee Valley Authority, U.S. Department of Labor, NSF, Federal Trade Commission, Federal Communications Commission, EPA, U.S. Department of Housing and Urban Development, Railroad Retirement Board, Commodity Futures Trading Commission, Equal Employment Opportunity Commission, Nuclear Regulatory Commission, U.S. Department of State, U.S. Department of Treasury, Small Business Administration, Office of Personnel Management, and U.S. Information Agency.

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. • These 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 enrich uranium is included. • The U.S. Government's fiscal year runs from October 1 through September 30. • Sum of components may not equal total due to independent rounding.

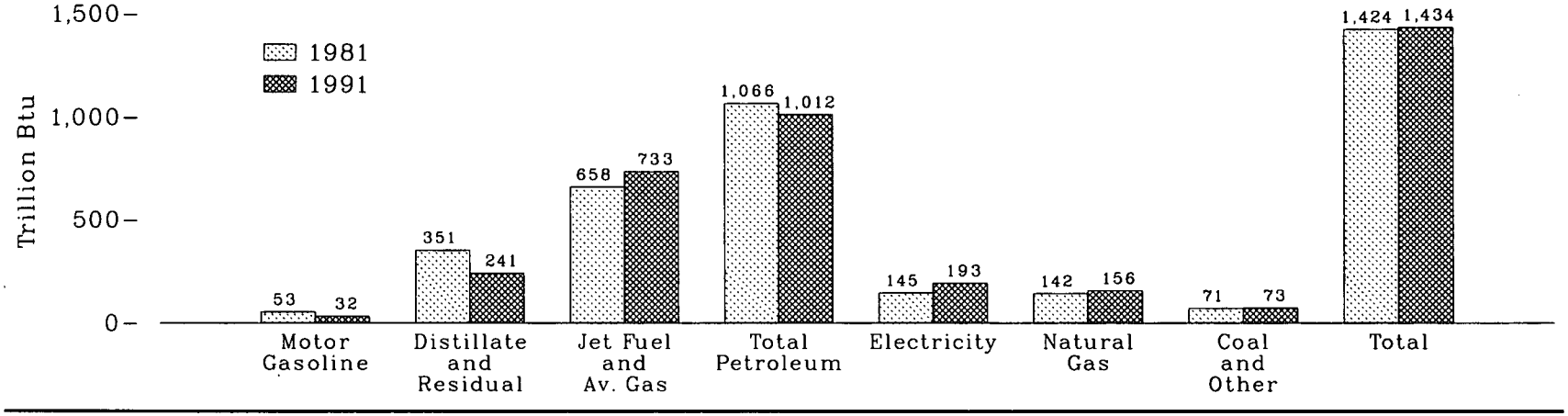
Source: U.S. Department of Energy, Form DOE F 6200.2, "Federal Energy Usage Report," quarterly.

Figure 11. U.S. Government Energy Consumption by Agency and Source

By Agency, Fiscal Year 1991



By Source, Fiscal Years 1981 and 1991



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 11.

Table 11. U.S. Government Energy Consumption by Agency and Source, Fiscal Years 1981 and 1991

(Trillion Btu)

	Petroleum								
	Motor Gasoline	Distillate and Residual Fuel Oils	Jet Fuel and Aviation Gas	Other [1]	Total	Electricity	Natural Gas	Coal and Other [2]	Total
Total, 1981	**53.2**	**351.3**	**658.0**	**3.7**	**1,066.2**	**144.5**	**142.2**	**71.3**	**1,424.2**
Defense	27.4	322.6	650.8	2.4	1,003.2	89.5	102.0	44.9	1,239.5
Energy	1.3	3.7	0.3	0.2	5.5	15.8	7.8	18.3	47.3
Postal Service	9.8	3.0	0.0	0.2	13.0	9.5	4.6	0.8	27.9
Veterans Affairs	0.5	3.4	0.0	0.0	3.9	5.4	13.6	1.1	24.0
Transportation	1.3	7.3	4.8	0.0	13.5	3.8	1.2	0.3	18.8
General Services Administration	0.1	1.8	0.0	0.0	1.9	8.8	2.9	4.4	18.0
NASA	0.3	0.8	1.5	0.0	2.5	4.6	2.4	0.4	10.0
Agriculture	4.1	1.1	0.1	0.2	5.6	1.2	1.0	0.0	7.9
Interior	2.3	1.9	0.1	0.4	4.8	1.3	1.4	0.2	7.6
Health and Human Services	0.6	2.7	0.0	0.1	3.4	1.6	1.6	0.0	6.7
Justice	1.7	0.5	0.1	0.0	2.3	0.7	1.8	0.5	5.4
Other [3]	3.7	~~0.5~~ 2.6	0.2	~~2.1~~ 2.0	6.5	2.2	2.0	0.4	11.1
Total, 1991 [4]	**32.0**	**241.0**	**732.9**	**6.1**	**1,011.9**	**192.7**	**155.8**	**73.3**	**1,433.7**
Defense	12.5	218.0	723.9	4.4	958.9	120.6	114.5	47.7	1,241.7
Energy	1.5	3.6	0.5	0.2	5.7	18.8	6.7	20.9	52.1
Postal Service	6.3	3.2	0.0	0.2	9.7	12.1	4.6	0.4	26.7
Veterans Affairs	0.4	1.5	0.0	0.0	1.9	8.3	13.9	0.9	25.0
Transportation	1.8	6.5	5.5	0.1	13.8	3.9	1.1	0.1	19.0
General Services Administration	0.0	0.5	0.0	0.0	0.5	8.9	2.5	1.6	13.4
NASA	0.2	0.9	1.5	0.0	2.6	6.7	2.7	0.6	12.7
Agriculture	4.7	0.6	0.1	0.2	5.7	2.1	2.4	0.0	10.1
Health and Human Services	0.0	2.1	0.0	0.0	2.1	3.4	2.2	0.2	8.0
Justice	1.8	0.4	0.2	0.0	2.5	1.9	2.2	0.4	7.0
Interior	1.5	1.0	0.2	0.9	3.6	1.4	1.0	0.1	6.0
Other [5]	1.2	~~1.1~~ 2.8	1.0	~~1.1~~ 0.0	5.0	4.7	2.1	0.4	12.1

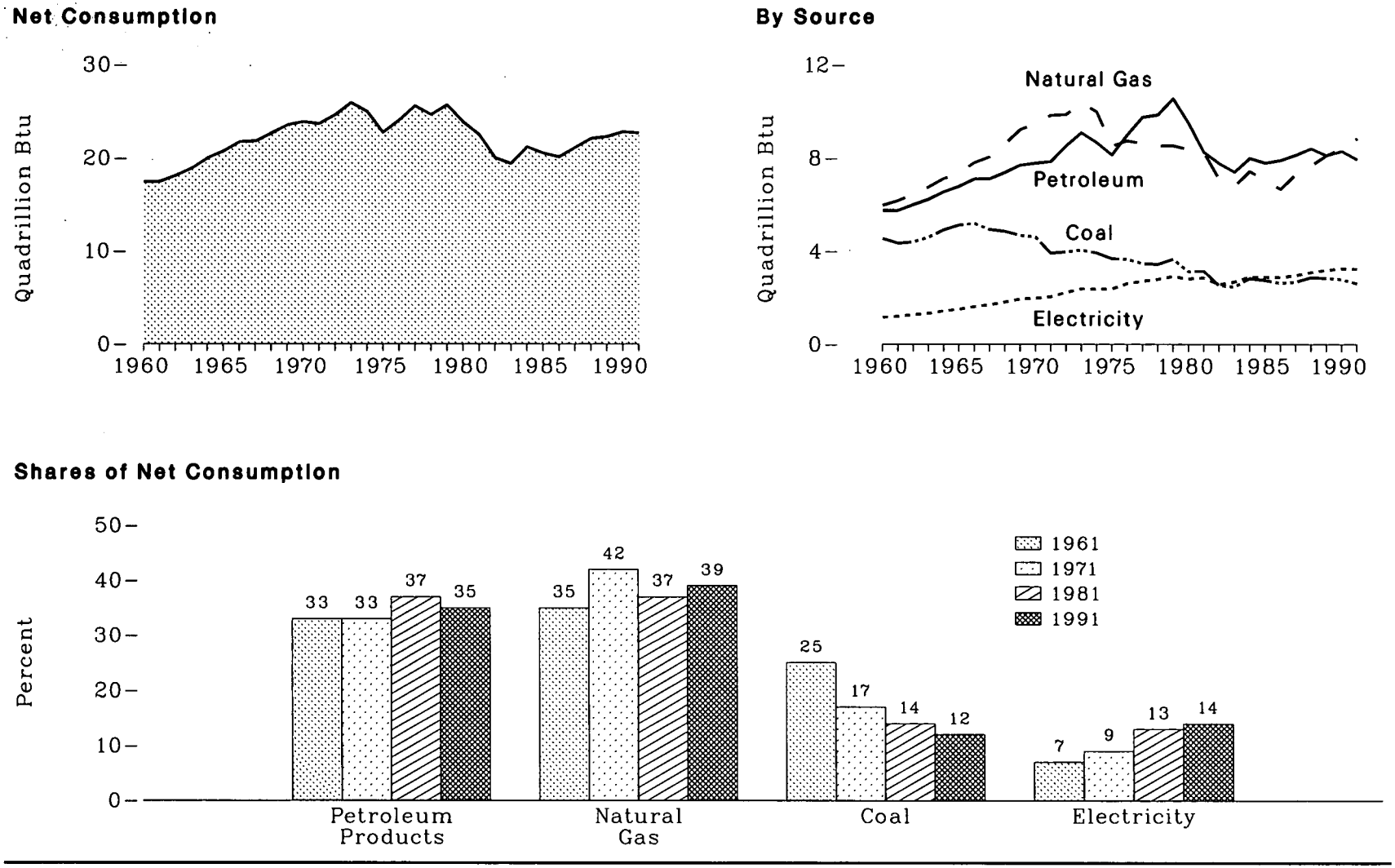
[1] Includes liquefied petroleum gases, and other.
[2] Includes purchased steam, coal, and other.
[3] Includes U.S. Department of Commerce, Panama Canal Commission, Tennessee Valley Authority, U.S. Department of Labor, National Science Foundation, U.S. Department of Housing and Urban Development, Federal Communications Commission, Office of Personnel Management, U.S. Department of State, U.S. Department of Treasury, Small Business Administration, and Environmental Protection Agency.
[4] Data are estimated and will be revised in future publications.
[5] 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, National Science Foundation, Panama Canal Commission, Commodity Futures Trading Commission, Equal Employment Opportunity Commission, Nuclear Regulatory Commission, Office of Personnel Management, U.S. Department of Housing and Urban Development, U.S. Department of Treasury, Railroad Retirement Board, Tennessee Valley Authority, and U.S. Information Agency.

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. • These 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 enrich uranium is included. • The U.S. Government's fiscal year runs from October 1 through September 30. • Sum of components may not equal total due to independent rounding.

Source: U.S. Department of Energy, Form DOE F 6200.2, "Federal Energy Usage Report," quarterly.

Corrections 9/11/92 from CE, Rick Klinkos x 8287

Figure 12. Industrial Energy Consumption by Source, 1960-1991



Notes: • Net consumption excludes energy losses from electricity generation, transmission, and distribution. Electricity includes hydroelectric power generated by the industrial sector. • Because vertical scales differ, graphs should not be compared.

Source: Table 12.

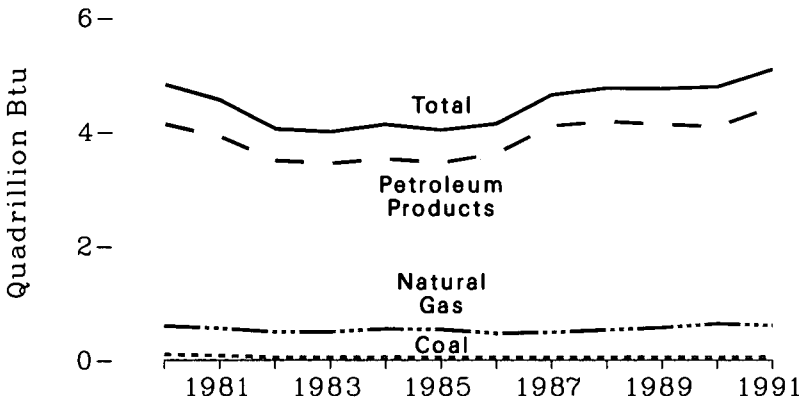
Table 12. Industrial Energy Consumption by Source, 1960-1991

Year	Petroleum Products		Natural Gas		Coal [1]		Electricity [2]		Net Consumption [3]
	Quadrillion Btu	Percent	Quadrillion Btu	Percent	Quadrillion Btu	Percent	Quadrillion Btu	Percent	Quadrillion Btu
1960	5.75	33	5.97	34	4.54	26	1.15	7	17.41
1961	5.75	33	6.17	35	4.34	25	1.19	7	17.45
1962	6.00	33	6.45	36	4.39	24	1.26	7	18.10
1963	6.23	33	6.76	36	4.59	24	1.32	7	18.90
1964	6.55	33	7.13	36	4.91	25	1.42	7	20.00
1965	6.79	33	7.35	35	5.12	25	1.50	7	20.75
1966	7.11	33	7.81	36	5.20	24	1.61	7	21.73
1967	7.12	33	8.06	37	4.93	23	1.69	8	21.80
1968	7.39	33	8.62	38	4.85	21	1.81	8	22.67
1969	7.70	33	9.22	39	4.68	20	1.94	8	23.54
1970	7.79	33	9.50	40	4.61	19	1.98	8	23.87
1971	7.86	33	9.85	42	3.92	17	2.04	9	23.67
1972	8.53	35	9.88	40	3.97	16	2.22	9	24.61
1973	9.10	35	10.39	40	4.05	16	2.38	9	25.92
1974	8.69	35	10.00	40	3.93	16	2.37	9	24.99
1975	8.15	36	8.53	38	3.68	16	2.38	10	22.74
1976	9.01	38	8.76	36	3.66	15	2.61	11	24.04
1977	9.77	40	8.64	34	3.47	14	2.71	11	25.59
1978	9.87	40	8.54	35	3.44	14	2.79	11	24.64
1979	10.57	41	8.55	33	3.66	14	2.91	11	25.68
1980	9.52	40	8.39	35	3.12	13	2.81	12	23.85
1981	8.28	37	8.26	37	3.14	14	2.85	13	22.53
1982	7.79	39	7.12	36	2.53	13	2.57	13	20.02
1983	7.42	38	6.83	35	2.47	13	2.68	14	19.40
1984	8.01	38	7.45	35	2.83	13	2.89	14	21.18
1985	7.81	38	7.08	35	2.75	13	2.89	14	20.52
1986	7.92	39	6.69	33	2.63	13	2.87	14	20.10
1987	8.15	39	7.32	35	2.68	13	2.96	14	21.11
1988	8.43	38	7.70	35	2.87	13	3.09	14	22.08
1989	8.13	36	8.13	36	2.84	13	3.19	14	22.29
1990	8.32	36	8.45	37	2.79	12	3.26	14	22.81
1991[4]	7.96	35	8.86	39	2.61	12	3.24	14	22.68

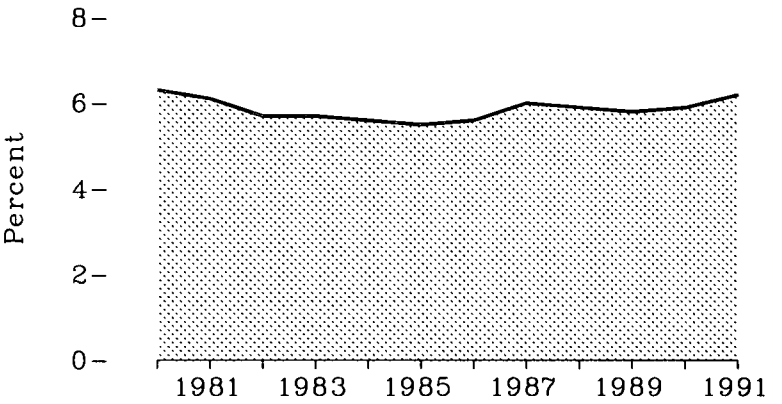
[1] Includes net imports of coal coke.
[2] Includes hydroelectric power generated by the industrial sector.
[3] Exludes energy losses from electricity generation, transmission, and distribution.
[4] Previous-year data have been revised. Current-year data are estimated and will be revised in future publications.
Note: Sum of components may not equal total due to independent rounding.
Sources: • 1960-1972—Energy Information Administration (EIA), "State Energy Data System 1990." • 1973 forward—EIA, *Monthly Energy Review*, March 1992, Table 2.4.

Figure 13. Fossil Fuel Consumption for Nonfuel Use

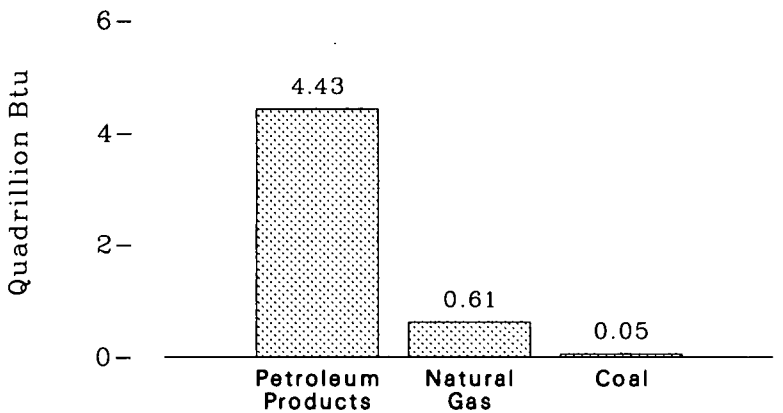
Total, 1980-1991



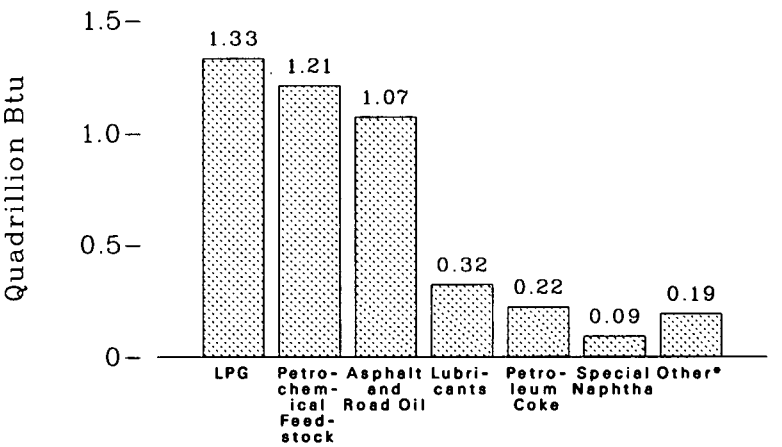
As Share of Total Energy Consumption, 1980-1991



By Fuel, 1991



By Petroleum Product, 1991



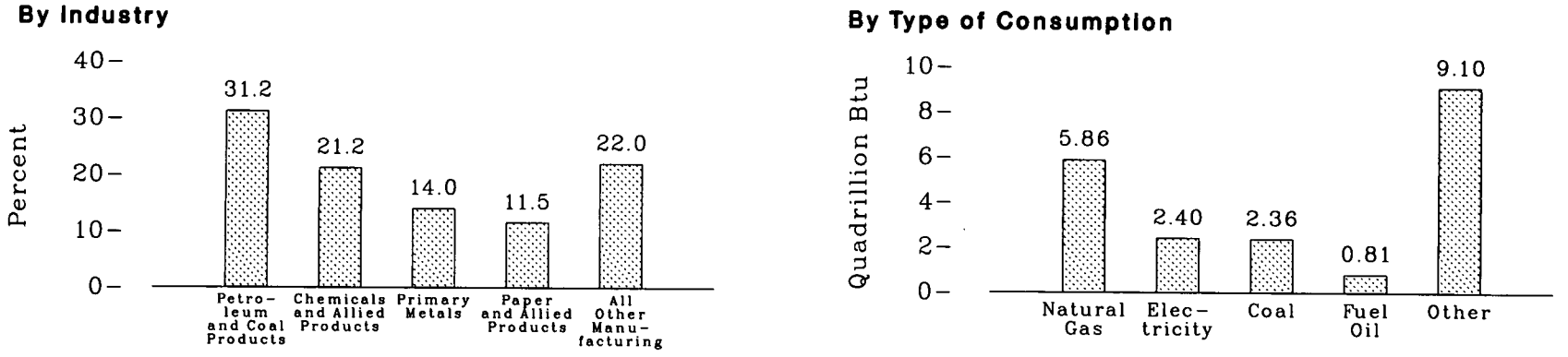
*Waxes and miscellaneous products.
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 13.

Table 13. Fossil Fuel Consumption for Nonfuel Use, 1980-1991

Year	Petroleum Products								Natural Gas	Coal	Total	Percent of Total Energy Consumption
	Asphalt and Road Oil	Liquefied Petroleum Gases	Lubricants	Petro-chemical Feedstock	Petroleum Coke	Special Naphtha	Other [1]	Total				
	Physical Units [2]											
1980	145	231	58	253	16	37	47	788	589	2.9	—	—
1981	125	230	56	236	34	27	43	752	546	2.5	—	—
1982	125	259	51	169	28	25	37	694	491	1.8	—	—
1983	136	267	53	153	15	30	34	688	482	1.5	—	—
1984	149	260	57	144	22	40	27	699	530	1.8	—	—
1985	153	255	53	143	23	30	27	684	520	1.8	—	—
1986	164	268	47	180	21	24	30	734	457	1.8	—	—
1987	170	316	59	170	33	28	29	805	477	1.8	—	—
1988	171	340	56	174	33	22	34	830	515	1.8	—	—
1989	165	330	58	172	31	20	33	809	560	1.8	—	—
1990	164	362	60	153	38	20	29	826	624	1.8	—	—
1991[3]	161	380	53	214	37	17	33	895	596	1.8	—	—
	Quadrillion Btu											
1980	0.96	0.82	0.35	1.43	0.10	0.19	0.27	4.13	0.60	0.10	4.82	6.3
1981	0.83	0.81	0.34	1.33	0.21	0.14	0.25	3.91	0.56	0.08	4.55	6.1
1982	0.83	0.90	0.31	0.95	0.17	0.13	0.21	3.50	0.50	0.05	4.05	5.7
1983	0.90	0.93	0.32	0.86	0.09	0.16	0.19	3.45	0.50	0.05	4.00	5.7
1984	0.99	0.89	0.35	0.81	0.13	0.21	0.15	3.53	0.55	0.05	4.13	5.6
1985	1.02	0.86	0.32	0.81	0.14	0.16	0.15	3.46	0.54	0.05	4.03	5.5
1986	1.09	0.82	0.29	1.02	0.13	0.13	0.14	3.62	0.47	0.05	4.14	5.6
1987	1.13	1.12	0.35	1.00	0.20	0.14	0.16	4.10	0.49	0.05	4.64	6.0
1988	1.14	1.21	0.35	1.00	0.20	0.11	0.17	4.18	0.53	0.05	4.76	5.9
1989	1.10	1.20	0.35	1.00	0.19	0.11	0.18	4.13	0.57	0.05	4.75	5.8
1990	1.09	1.31	0.37	0.82	0.23	0.11	0.16	4.09	0.64	0.05	4.78	5.9
1991[3]	1.07	1.33	0.32	1.21	0.22	0.09	0.19	4.43	0.61	0.05	5.09	6.2

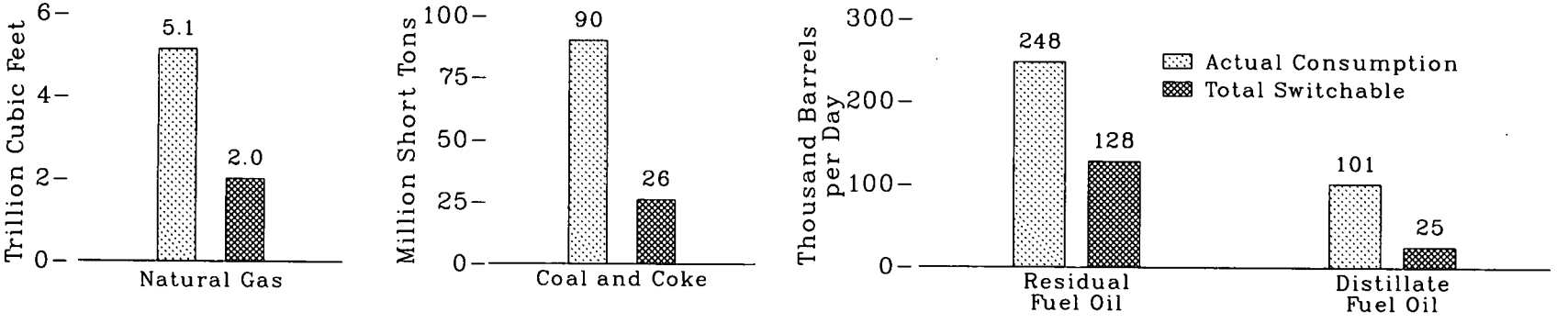
[1] Includes waxes and miscellaneous products.
[2] Petroleum - million barrels; natural gas - billion cubic feet; and coal - million short tons.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
— = Not applicable.
Sources: **Petroleum 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:** • 1980—EIA, *Coke and Coal Chemicals in 1980.* • 1981—EIA, Energy Data Report, *Coke Plant Report,* quarterly. • 1982 forward—EIA, *Quarterly Coal Report* and EIA estimates. **Percent of Total Energy Consumption:** Derived by dividing total by total consumption on Table 3.

Figure 14. Manufacturing Primary Consumption of Energy, 1988



Note: "Other" includes all other types of energy that respondents indicated were consumed; included are feedstocks and raw materials for the production of nonenergy products such as asphalt.
Source: Table 14.

Figure 15. Manufacturing Fuel-Switching Capability Within 30 Days, 1988



Source: Table 15.

Table 14. Manufacturing Energy Consumption Measures, 1988

(Quadrillion Btu, Except as Noted)

Type of Consumption and Selected Industries	Electricity	Fuel Oil	Natural Gas	Coal	Other [1]	Total	Percent
Primary Consumption [2] of Energy	**2.398**	**0.810**	**5.860**	**2.363**	**9.103**	**20.534**	**100.0**
Paper and Allied Products	0.189	0.191	0.431	0.315	1.240	2.366	11.5
Chemicals and Allied Products	0.416	0.137	2.049	0.307	1.451	4.360	21.2
Petroleum and Coal Products [3]	0.106	0.126	0.723	0.008	5.449	6.412	31.2
Primary Metal Industries	0.509	0.059	0.751	1.118	0.438	2.875	14.0
All Other Manufacturing Industries	1.178	0.297	1.906	0.615	0.525	4.521	22.0
Total Energy Consumed to Produce Heat, Power, and Electricity [4]	**2.398**	**0.783**	**5.290**	**1.290**	**5.729**	**15.489**	**100.0**
Paper and Allied Products	0.189	0.190	0.427	0.315	1.226	2.347	15.2
Chemicals and Allied Products	0.416	0.120	1.507	0.293	0.526	2.862	18.5
Petroleum and Coal Products	0.106	0.124	0.722	0.006	2.164	3.122	20.2
Primary Metal Industries	0.509	0.054	0.741	0.061	1.257	2.622	16.9
All Other Manufacturing Industries	1.178	0.294	1.892	0.615	0.556	4.536	29.3
Offsite-Produced Energy Consumed to Produce Heat, Power, and Electricity	**2.485**	**0.713**	**5.281**	**1.283**	**1.290**	**11.052**	**100.0**
Paper and Allied Products	0.208	0.190	0.427	0.316	0.268	1.409	12.7
Chemicals and Allied Products	0.443	0.114	1.502	0.289	0.220	2.568	23.2
Petroleum and Coal Products	0.117	0.061	0.720	0.007	0.165	1.070	9.7
Primary Metal Industries	0.515	0.054	0.740	0.060	0.404	1.773	16.0
All Other Manufacturing Industries	1.202	0.294	1.891	0.611	0.233	4.232	38.3

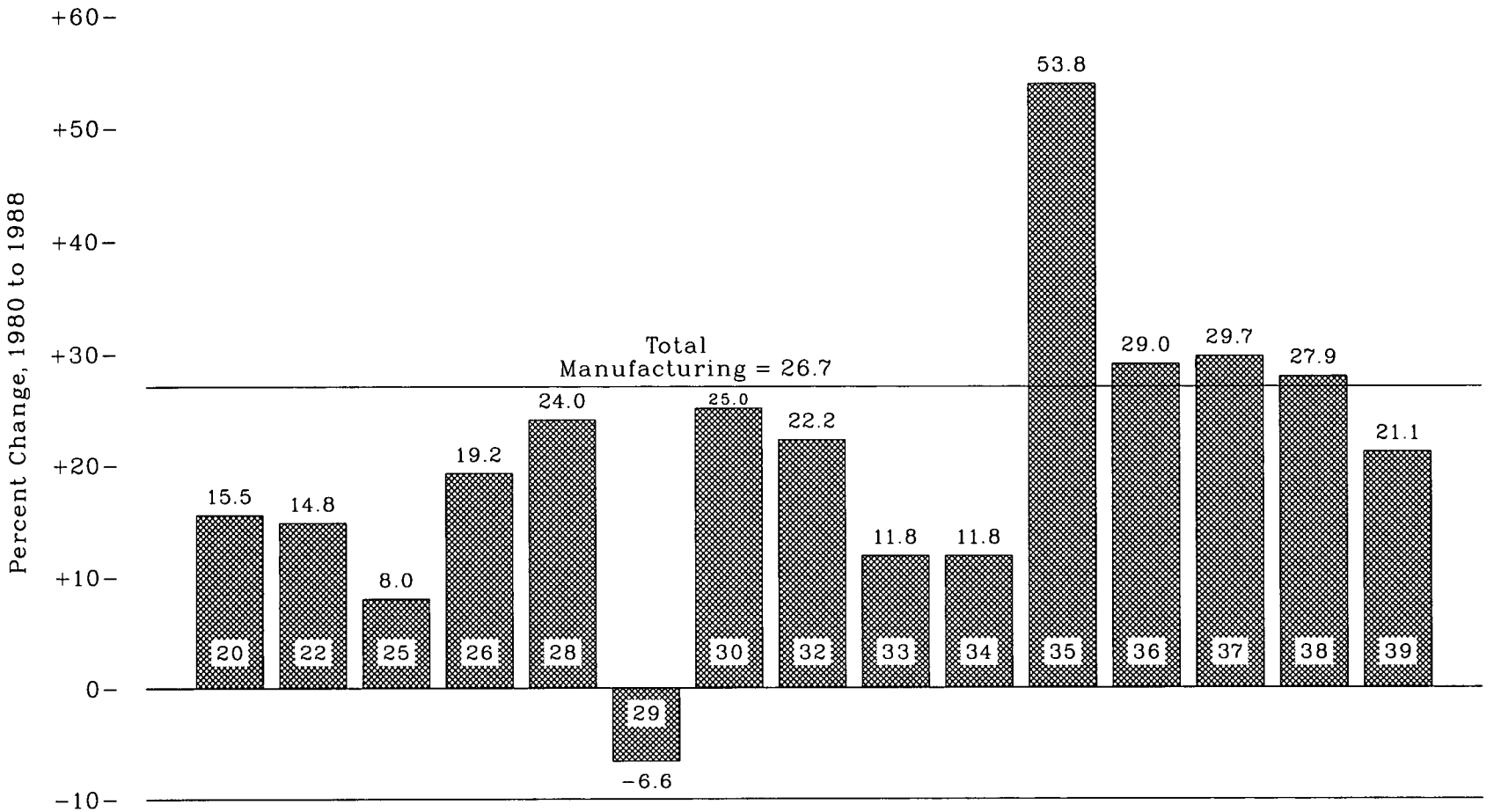
[1] Includes all other types of energy that respondents indicated were consumed.
[2] Includes feedstocks; does not include by-product fuels.
[3] Includes feedstocks and raw materials for the production of nonenergy products, regardless of the type of energy; also includes feedstock consumption at adjoining petrochemical plants.
[4] Includes by-product energy.
Note: Sum of components may not equal total due to independent rounding.
Source: Energy Information Administration, *Manufacturing Energy Consumption Survey: Consumption of Energy, 1988.*

Table 15. Manufacturing Fuel-Switching Capability Within 30 Days, 1988

Measure of Consumption	Natural Gas		Purchased Electricity [1]		Coal and Coke		Residual Fuel Oil		Distillate Fuel Oil	
	Billion Cubic Feet per Year	Quadrillion Btu per Year	Million Kilowatt-hours per Year	Quadrillion Btu per Year	Thousand Short Tons per Year	Quadrillion Btu per Year	Thousand Barrels per Day	Quadrillion Btu per Year	Thousand Barrels per Day	Quadrillion Btu per Year
Actual	5,141	5.306	728,168	2.485	89,968	2.010	248	0.568	101	0.214
Minimum [2]	3,133	3.233	716,905	2.446	64,179	1.434	120	0.274	76	0.161
Maximum [3]	5,840	6.027	771,426	2.632	96,225	2.150	726	1.667	671	1.426
Total Switchable [4]	2,008	2.072	11,264	0.038	25,789	0.576	[5] 128	0.294	[5] 25	0.053

[1] Those quantities for which payment was made and that were available onsite for consumption.
[2] The amount of fuel actually consumed minus the amount of actual consumption that could have been replaced by other fuels.
[3] The amount of fuel actually consumed plus the amount of additional consumption that could have occurred if all possible switching from other fuels took place.
[4] The amount of actual consumption that could have been replaced by other fuels.
[5] The total estimated quantity of residual and distillate fuel oil combined that is switchable to nonpetroleum alternate fuels is 181 thousand barrels per day.
Note: Consumption includes energy consumed for heat, power, and onsite electricity generation. It excludes energy consumed as petrochemical feedstocks and raw material inputs.
Source: Energy Information Administration, *Manufacturing Energy Consumption Survey: Fuel Switching, 1988* (September 1991).

Figure 16. Manufacturing Energy Intensity by Industry Group



Note: Numbers that appear within each bar are the Standard Industrial Classification (SIC) codes for industry groups.

Source: Table 16.

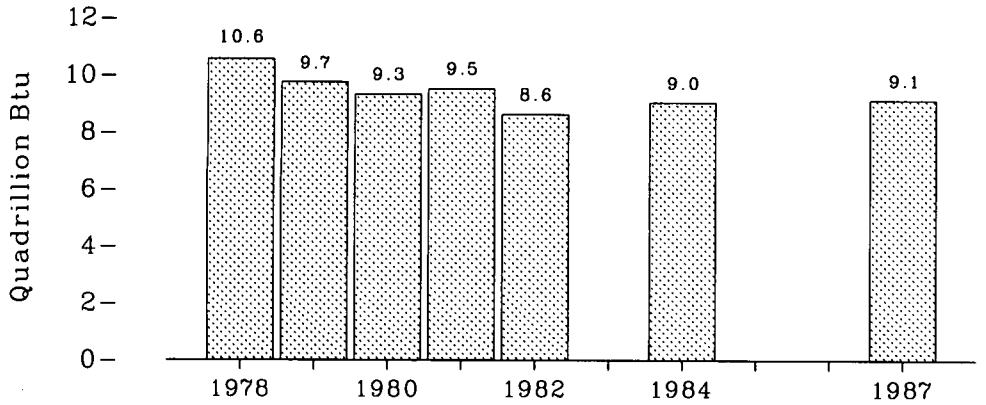
Table 16. Manufacturing Energy Intensity by Industry Group, 1980, 1985, and 1988

SIC [2] Code	Industry Group	Energy Intensity Ratios [3]			Energy Intensity Change [1] (percent)		
		1980	1985	1988	1980 to 1985	1985 to 1988	1980 to 1988
20	Food and Kindred Products	3.52	2.72	2.98	22.8	-9.4	15.5
21	Tobacco Products	NA	NA	NA	NA	NA	NA
22	Textile Mill Products	5.69	4.80	4.85	15.6	-0.9	14.8
23	Apparel and Other Textile Mill Products	NA	NA	NA	NA	NA	NA
24	Lumber and Wood Products	NA	NA	NA	NA	NA	NA
25	Furniture and Fixtures	1.87	1.55	1.72	16.5	-10.1	8.0
26	Paper and Allied Products	15.92	13.96	12.86	12.3	7.9	19.2
27	Printing and Publishing	NA	NA	NA	NA	NA	NA
28	Chemicals and Allied Products	14.91	12.40	11.34	16.8	8.6	24.0
29	Petroleum and Coal Products	5.32	4.87	5.67	8.3	-16.3	-6.6
30	Rubber and Misc. Plastics Products	4.29	3.10	3.22	27.7	-3.8	25.0
31	Leather and Leather Products	NA	NA	NA	NA	NA	NA
32	Stone, Clay, and Glass Products	21.53	16.74	16.74	22.3	0	22.2
33	Primary Metal Industries	16.30	14.64	14.37	10.2	1.8	11.8
34	Fabricated Metal Products	2.74	2.33	2.42	15.2	-4.0	11.8
35	Industrial Machinery and Equipment	1.66	0.95	0.77	43.2	18.7	53.8
36	Electronic and Other Electric Equipment	1.67	1.25	1.18	24.9	5.4	29.0
37	Transportation Equipment	1.51	1.15	1.06	23.6	8.0	29.7
38	Instruments and Related Products	1.60	1.19	1.16	26.0	2.5	27.9
39	Misc. Manufacturing Industries	1.71	1.36	1.35	20.3	1.1	21.1
	Total Manufacturing	5.78	4.43	4.23	23.4	4.3	26.7

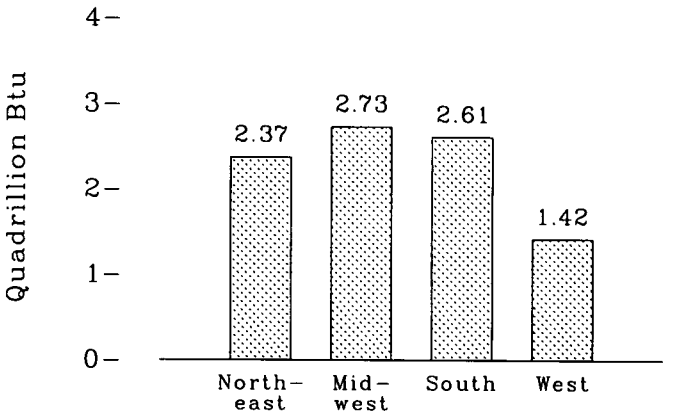
[1] A decrease in the energy intensity ratio results in an increase in energy efficiency represented by a positive value.
[2] Standard Industrial Classification.
[3] Thousand Btu per constant (1982) dollar of value of shipments and receipts.
NA = Not available.
Note: Data for 1985 are different from previously published data due to deflator adjustments.
Sources: Energy Information Administration, *Manufacturing Energy Consumption Survey: Changes in Energy Intensity in the Manufacturing Sector 1980-1988.*

Figure 17. Household Energy Consumption

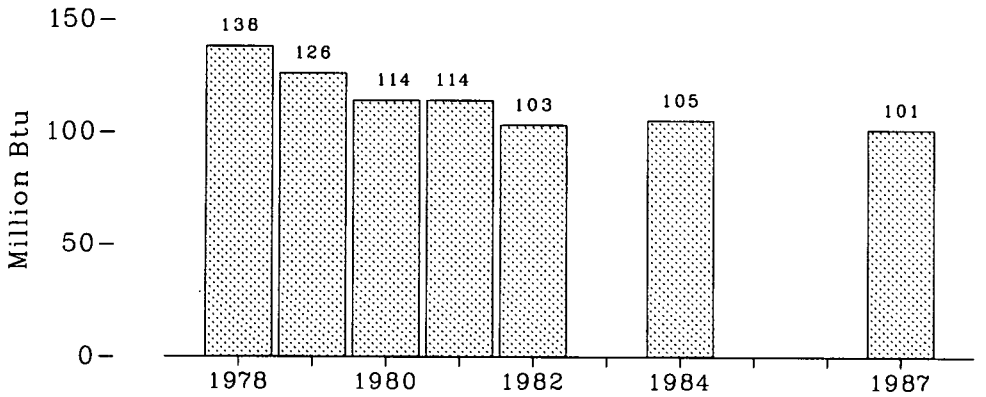
Consumption by All Households, Selected Years, 1978-1987



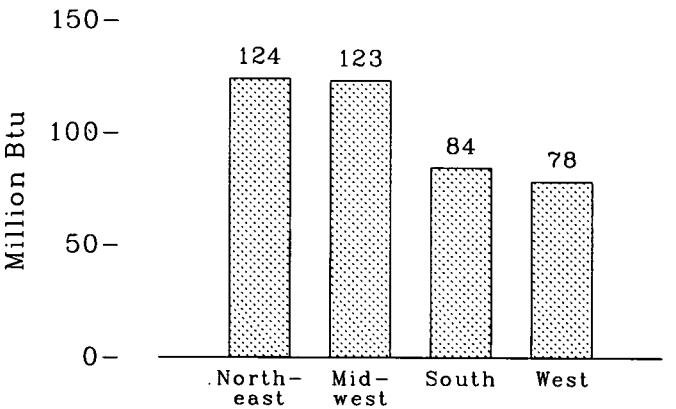
Consumption by All Households, by Census Region, 1987



Consumption per Household, Selected Years, 1978-1987



Consumption per Household, by Census Region, 1987



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

Source: Table 17. See Appendix D for Census regions.

Table 17. Household Energy Consumption by Census Region, Selected Years, 1978-1987

(Quadrillion Btu, Except as Noted)

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

[1] See Appendix D for Census regions.

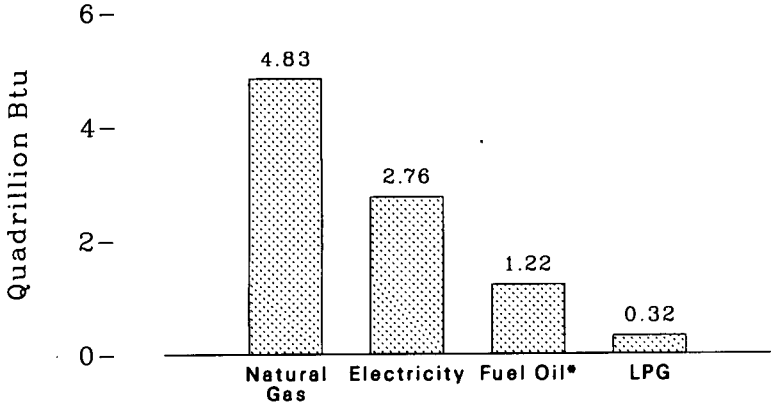
[2] Includes electricity generated for distribution from wood, waste, geothermal, wind, photovoltaic, and solar thermal energy.

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 are for the calendar year. • Sum of components may not equal total due to independent rounding.

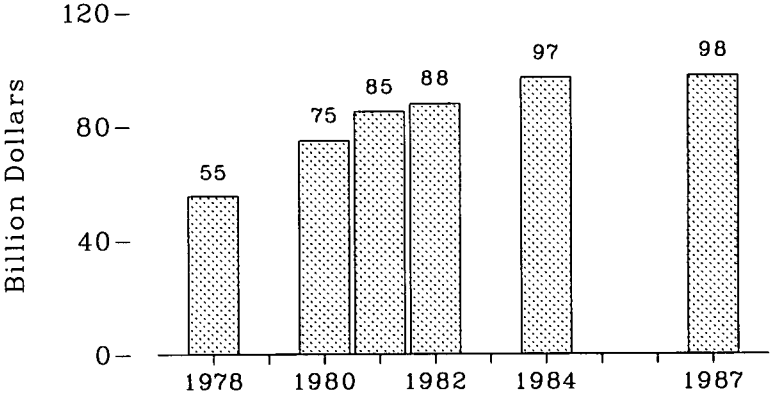
Sources: • 1978 and 1979—Energy Information Administration (EIA), Form EIA-84, "Residential Energy Consumption Survey." • 1980 forward—EIA, Form EIA-457, "Residential Energy Consumption Survey."

Figure 18. Household Energy Consumption and Expenditures

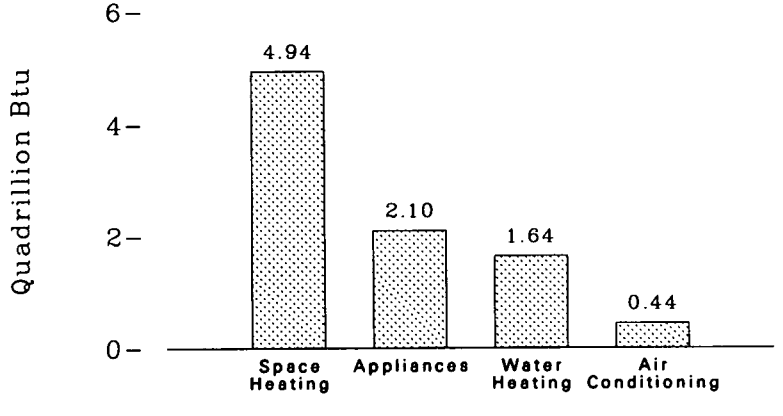
Household Consumption by Energy Source, 1987



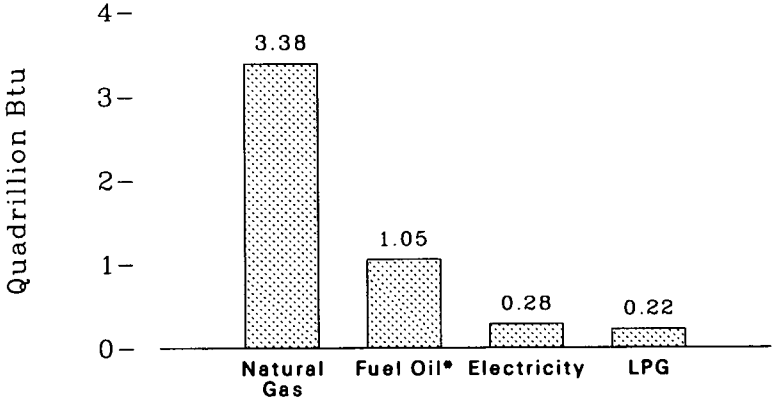
Household Energy Expenditures, Selected Years, 1978-1987



Consumption by End Use, 1987



Consumption for Space Heating, 1987



*Fuel oil is distillate fuel oil and kerosene.

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

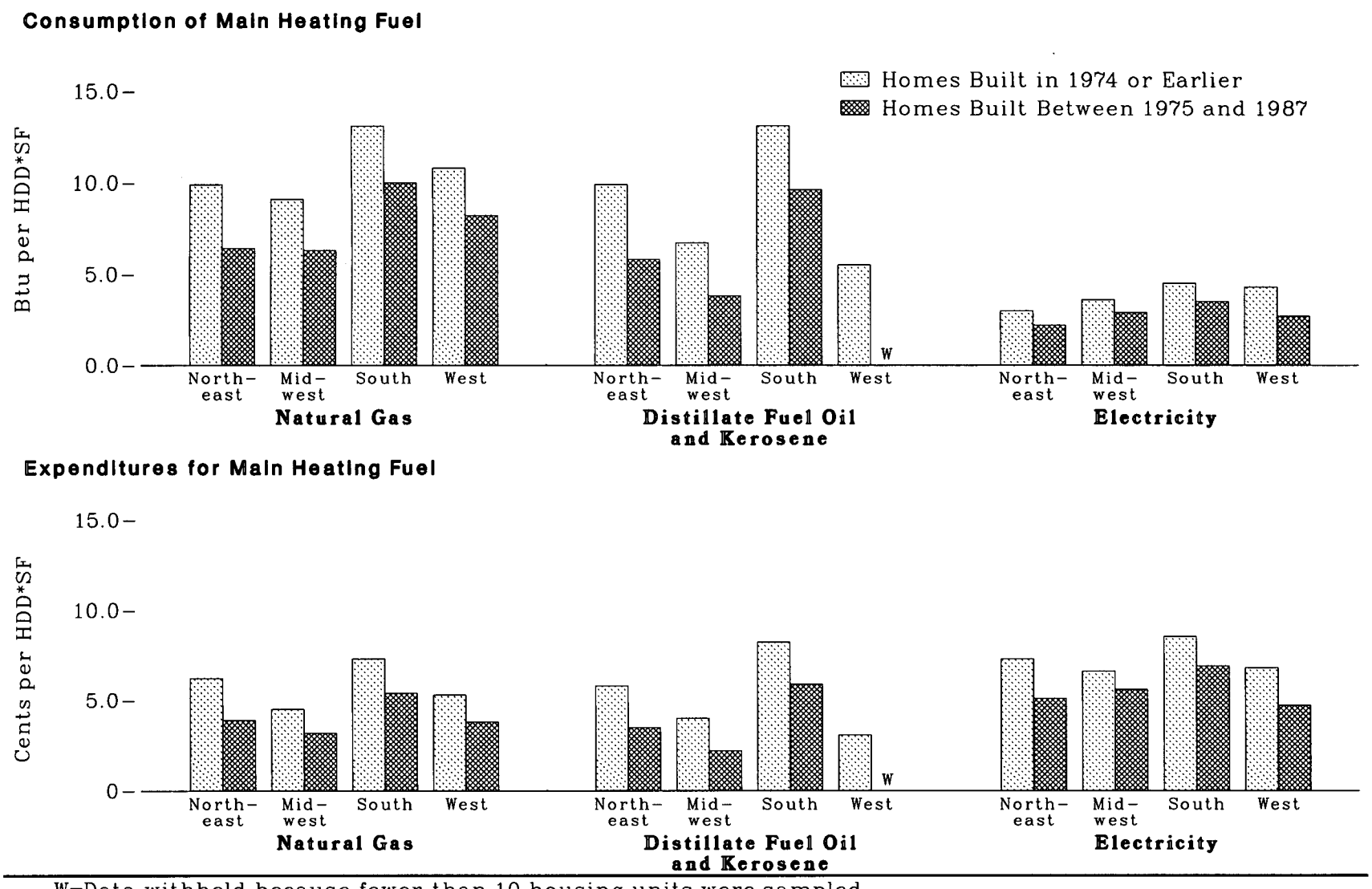
Source: Table 18.

Table 18. Household Energy Consumption and Expenditures by End Use and Energy Source, Selected Years, 1978-1987

Year	Space Heating				A/C [1] [2]	Water Heating				Appliances			Total [2]			
	Natural Gas	Electricity [3]	Fuel Oil [4]	LPG [5]	Electricity [3]	Natural Gas	Electricity [3]	Fuel Oil [4]	LPG [5]	Natural Gas	Electricity [3]	LPG [5]	Natural Gas	Electricity [3]	Fuel Oil [4]	LPG [5]
	Consumption (quadrillion Btu)															
1978	4.26	0.41	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	3.81	0.30	1.13	0.22	0.33	1.10	0.33	0.21	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	1.10	0.21	0.36	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
	Expenditures (billion dollars)															
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	0.41	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	7.51	6.63	6.44	1.09	0.58	2.31	34.95	0.54	29.80	54.50	9.60	3.10
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

[1] A/C = Air conditioning.
[2] A small amount of natural gas used for air conditioning is included in "Natural Gas" under "Total."
[3] Includes electricity generated for distribution from wood, waste, geothermal, wind, photovoltaic, and solar thermal electricity.
[4] Fuel oil is distillate fuel oil and kerosene.
[5] LPG = Liquefied petroleum gas.
Notes: • No data are available for years not shown. Consumption totals for 1979 are available on Table 17. • One Btu of electricity = 0.000293 (1/3,412) kWh. • Sum of components may not equal total 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 19. Household Energy Consumption Indicators by Census Region and Vintage of Housing Unit, 1987



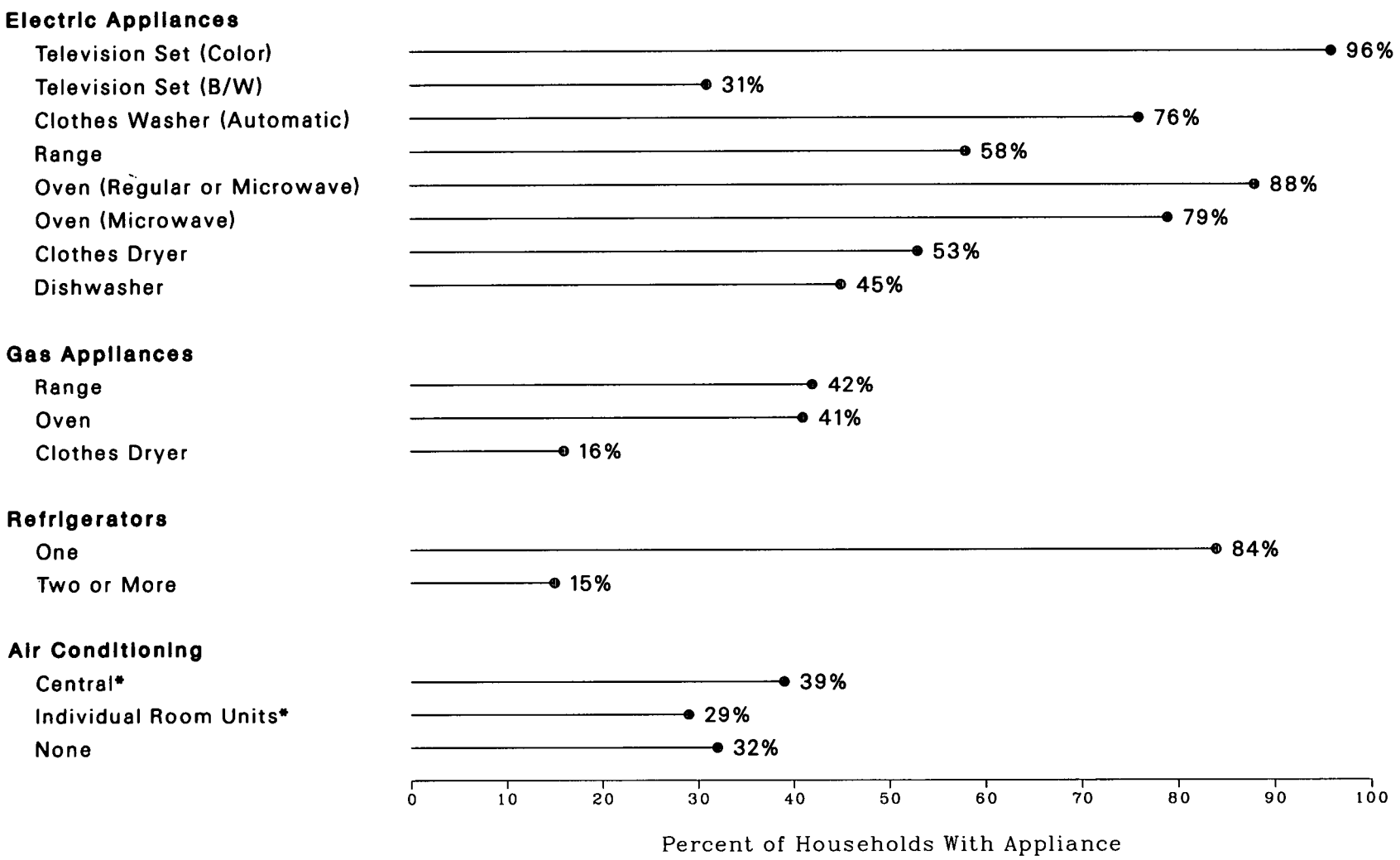
W=Data withheld because fewer than 10 housing units were sampled.
Notes: • HDD*SF=heating degree-days times square footage. • All data are preliminary.
Source: Table 19.

Table 19. Household Energy Consumption Indicators by Census Region and Vintage of Housing Unit, 1987

Source and Indicator (Units)	Census Regions [1]								United States	
	Northeast		Midwest		South		West			
	Built in 1974 or Earlier	Built Between 1975-1987	Built in 1974 or Earlier	Built Between 1975-1987	Built in 1974 or Earlier	Built Between 1975-1987	Built in 1974 or Earlier	Built Between 1975-1987	Built in 1974 or Earlier	Built Between 1975-1987
Natural Gas										
Households Using Natural Gas as Main Heating Source (million)	7.6	0.5	13.9	2.6	11.7	1.8	9.3	2.5	42.5	7.5
Average Consumption per Household for Space Heating (million Btu)	90.5	74.5	88.6	63.2	54.4	52.3	40.7	43.4	69.0	54.8
Average Expenditures per Household for Space Heating (dollars)	563	457	434	316	303	282	201	199	370	279
Average Heating Degree-Days (degree-days)	5,555	5,821	5,682	5,783	2,961	3,095	2,765	3,409	4,271	4,335
Average Heated Floor Space (square feet)	1,643	1,994	1,707	1,735	1,402	1,689	1,364	1,554	1,536	1,682
Consumption per Square Foot*HDD (Btu)	9.9	6.4	9.1	6.3	13.1	10.0	10.8	8.2	10.5	7.5
Expenditures per 1,000 Square Foot*HDD (cents)	6.2	3.9	4.5	3.2	7.3	5.4	5.3	3.8	5.6	3.8
Electricity [2]										
Households Using Electricity as Main Heating Source (million)	0.9	1.2	0.8	0.6	4.3	6.3	1.8	2.0	7.8	10.1
Average Consumption per Household for Space Heating (million Btu)	21.1	20.9	28.3	26.6	13.0	11.4	15.0	11.2	16.1	13.4
Average Expenditures for Household for Space Heating (dollars)	508	479	523	514	246	222	238	193	304	265
Average Heating Degree-Days (degree-days)	5,723	5,885	5,434	5,509	2,310	2,402	3,323	3,237	3,273	3,173
Average Heated Floor Space (square feet)	1,211	1,610	1,461	1,658	1,246	1,347	1,051	1,273	1,220	1,383
Consumption per Square Foot*HDD (Btu)	3.0	2.2	3.6	2.9	4.5	3.5	4.3	2.7	4.0	3.1
Expenditures per 1,000 Square Foot*HDD (cents)	7.3	5.1	6.6	5.6	8.5	6.9	6.8	4.7	7.6	6.0
Distillate Fuel Oil and Kerosene (Oil)										
Households Using Oil as Main Heating Source (million)	7.3	0.8	1.3	0.2	2.1	0.2	0.3	W	11.0	1.2
Average Consumption per Household for Space Heating (million Btu)	86.3	76.3	82.7	63.6	63.3	40.8	53.2	W	80.5	67.7
Average Expenditures per Household for Space Heating (dollars)	500	460	485	379	394	252	299	W	472	409
Average Heating Degree-Days (degree-days)	5,647	6,495	6,243	6,532	3,563	3,721	4,299	W	5,284	6,003
Average Heated Floor Space (square feet)	1,538	2,037	1,964	2,579	1,351	1,145	2,232	W	1,574	1,977
Consumption per Square Foot*HDD (Btu)	9.9	5.8	6.7	3.8	13.1	9.6	5.5	W	9.7	5.7
Expenditures per 1,000 Square Foot*HDD (cents)	5.8	3.5	4.0	2.2	8.2	5.9	3.1	W	5.7	3.4
Liquefied Petroleum Gases (LPG)										
Households Using LPG as Main Heating Source (million)	W	W	1.0	0.3	1.4	0.7	0.5	W	3.0	1.2
Average Consumption per Household for Space Heating (million Btu)	W	W	73.0	58.7	37.0	35.0	53.6	W	52.3	42.8
Average Expenditures per Household for Space Heating (dollars)	W	W	523	456	340	298	457	W	429	353
Average Heating Degree-Days (degree-days)	W	W	5,804	6,023	2,423	2,818	4,347	W	3,993	3,937
Average Heated Floor Space (square feet)	W	W	1,579	1,484	1,101	1,247	1,415	W	1,317	1,306
Consumption per Square Foot*HDD (Btu)	W	W	8.0	6.6	13.9	10.0	8.7	W	9.9	8.3
Expenditures per 1,000 Square Foot*HDD (cents)	W	W	5.7	5.1	12.7	8.5	7.4	W	8.2	6.9

[1] See Appendix D for Census regions.
[2] 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.
Source: Energy Information Administration, Form EIA-457, "Residential Energy Consumption Survey."

Figure 20. Households With Selected Appliances, 1990



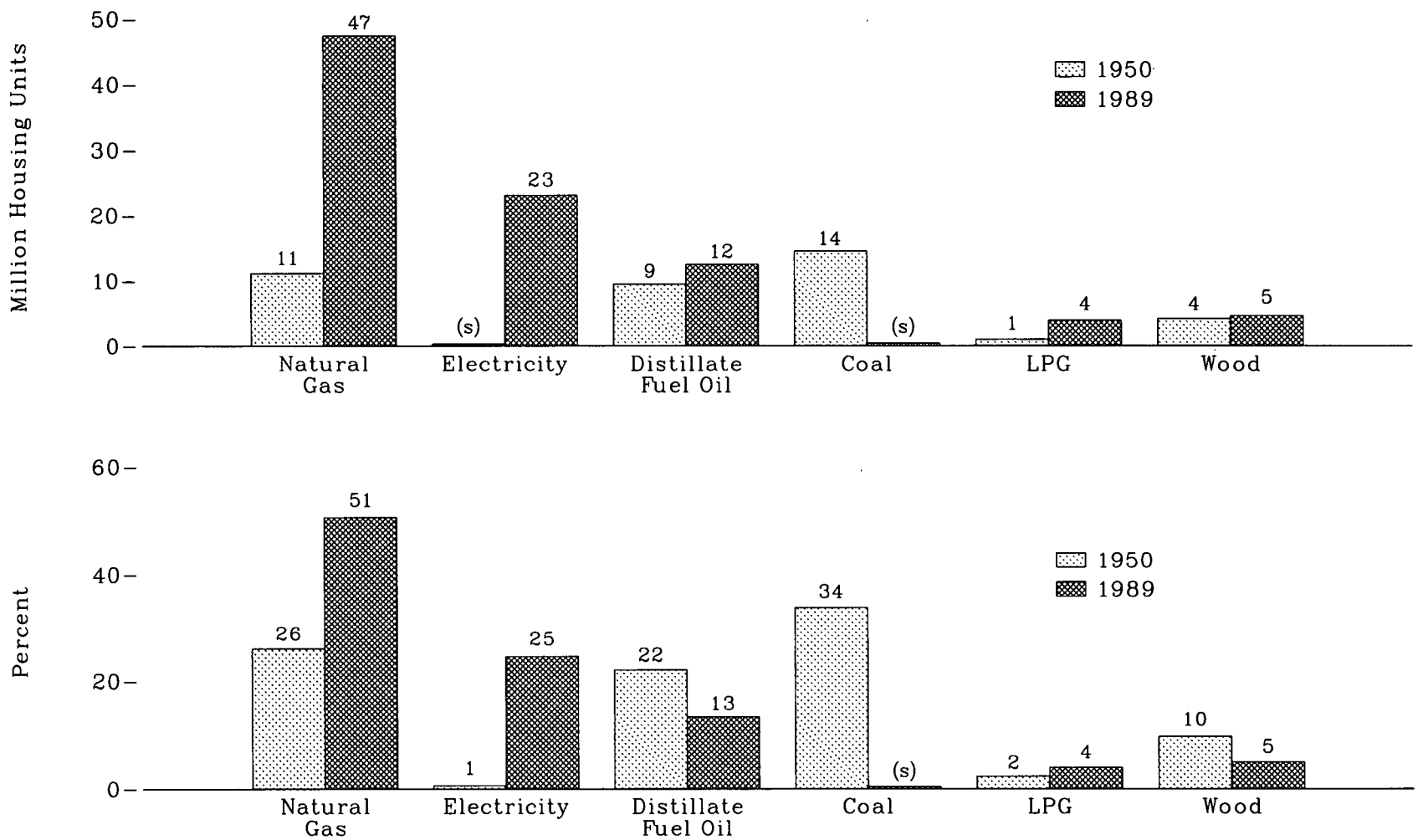
*Households with both central and individual room units are counted only under "central."
Source: Table 20.

Table 20. Households With Selected Appliances, Selected Years, 1978-1990

Appliance	Percent of Households								Percent Change
	1978	1979	1980	1981	1982	1984	1987	1990	1980 to 1990
Total Households	100	100	100	100	100	100	100	100	—
Type of Appliances									
Electric Appliances									
Television Set (Color)	NA	NA	82	82	85	88	93	96	14
Television Set (B/W)	NA	NA	51	48	47	43	36	31	-20
Clothes Washer	75	NA	75	74	72	74	76	76	1
Range (Stove-Top Burner)	53	NA	54	54	53	54	57	58	4
Oven, Regular or Microwave	54	NA	59	58	59	63	79	88	29
Oven, Microwave	8	NA	14	17	21	34	61	79	65
Clothes Dryer	45	NA	47	45	45	46	51	53	6
Separate Freezer	35	NA	38	38	37	37	34	35	-3
Dishwasher	35	NA	37	37	36	38	43	45	8
Dehumidifier	NA	NA	9	9	9	9	10	12	3
Waterbed Heaters	NA	NA	NA	NA	NA	10	14	15	NA
Window or Ceiling Fan	NA	NA	NA	NA	28	35	46	51	NA
Whole House Fan	NA	NA	NA	NA	8	8	9	10	NA
Evaporative Cooler	NA	NA	4	4	4	4	3	4	[1]
Personal Computer	NA	NA	NA	NA	NA	NA	NA	16	NA
Pump for Well Water	NA	NA	NA	NA	NA	NA	NA	15	NA
Swimming-Pool Pump [2]	NA	NA	4	4	3	NA	NA	5	1
Gas Appliances [3]									
Range (Stove-Top or Burners)	48	NA	46	46	47	45	43	42	-4
Oven	47	NA	42	40	42	42	41	41	-1
Clothes Dryer	14	NA	14	16	15	16	15	16	2
Outdoor Gas Grill	NA	NA	9	9	11	13	20	26	17
Outdoor Gas Light	2	NA	2	2	2	1	1	1	-1
Swimming Pool Heater [4]	NA	NA	NA	NA	NA	1	1	2	NA
Refrigerators [5]									
One	86	NA	86	87	86	88	86	84	-2
Two or More	14	NA	14	13	13	12	14	15	1
Air Conditioning (A/C)									
Central [6]	23	24	27	27	28	30	36	39	12
Individual Room Units [6]	33	31	30	31	30	30	30	29	-1
None	44	45	43	42	42	40	36	32	-11
Portable Kerosene Heaters	[1]	NA	[1]	1	3	6	6	5	5

[1] Less than 0.5 percent.
[2] All reported swimming pools were assumed to have an electric pump for filtering and circulating the water.
[3] Includes natural gas or liquefied petroleum gases (LPG).
[4] In 1984, 1987, and 1990, also includes heaters for jacuzzis and hot tubs.
[5] Fewer than 0.5 percent of the households do not have a refrigerator.
[6] Households with both central and individual room units are counted only under central.
— = Not applicable.
NA = Not available.
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 21. Type of Heating in Occupied Housing Units, 1950 and 1989



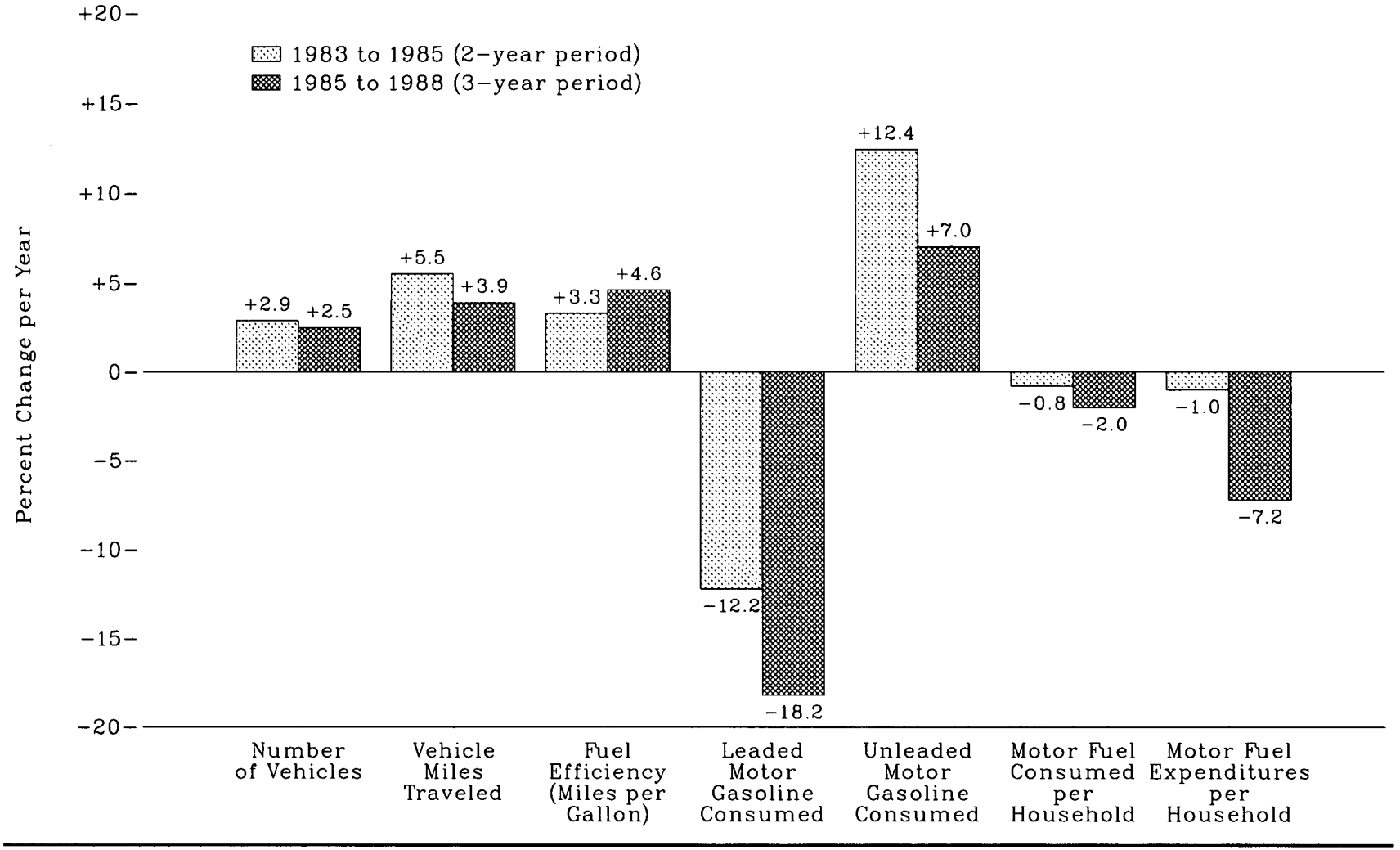
(s)=Less than 0.5.
Source: Table 21.

Table 21. Type of Heating in Occupied Housing Units, Selected Years, 1950-1989

Year	Coal [1]	Natural Gas	Liquefied Gas	Distillate Fuel Oil	Kerosene	Electricity	Wood	Solar	Other	None [2]	Total
	Million										
1950	14.48	11.12	0.98	9.46	([3])	0.28	4.17	NA	0.77	1.57	42.83
1960	6.46	22.85	2.69	17.16	([3])	0.93	2.24	NA	0.22	0.48	53.02
1970	1.82	35.01	3.81	16.47	([3])	4.88	0.79	NA	0.27	0.40	63.45
1973	0.80	38.46	4.42	17.24	([3])	7.21	0.60	NA	0.15	0.45	69.34
1974	0.74	39.47	4.14	16.84	([3])	8.41	0.66	NA	0.09	0.48	70.83
1975	0.57	40.93	4.15	16.30	([3])	9.17	0.85	NA	0.08	0.47	72.52
1976	0.48	41.22	4.24	16.45	([3])	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	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[6]	0.34	47.40	3.66	12.47	1.07	23.06	4.59	([4])	0.40	0.66	93.68
	Percent										
1950	33.8	26.0	2.3	22.1	([3])	0.6	9.7	0	1.8	3.7	100.0
1960	12.2	43.1	5.1	32.4	([3])	1.8	4.2	0	0.4	0.9	100.0
1970	2.9	55.2	6.0	26.0	([3])	7.7	1.3	0	0.4	0.6	100.0
1973	1.2	55.5	6.4	24.9	([3])	10.4	0.9	0	0.2	0.7	100.0
1974	1.0	55.7	5.8	23.8	([3])	11.9	0.9	0	0.1	0.7	100.0
1975	0.8	56.4	5.7	22.5	([3])	12.6	1.2	0	0.1	0.6	100.0
1976	0.7	55.7	5.7	22.2	([3])	13.7	1.2	0	0.1	0.6	100.0
1977	0.6	55.2	5.6	20.7	0.6	14.8	1.6	0	0.2	0.7	100.0
1978	0.5	55.1	5.4	20.3	0.5	15.9	1.4	0	0.2	0.8	100.0
1979	0.5	55.1	5.3	19.5	0.5	16.9	1.4	0	0.1	0.7	100.0
1980	0.4	55.4	5.2	18.1	0.5	17.7	1.7	0	0.1	0.8	100.0
1981	0.4	55.4	5.0	17.0	0.4	18.6	2.3	0	0.1	0.7	100.0
1983	0.5	55.2	4.6	14.9	0.5	18.5	4.8	0	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[6]	0.4	50.6	3.9	13.3	1.1	24.6	4.9	([5])	0.4	0.7	100.0

[1] Includes coal coke.
[2] Includes nonreporting units in 1950 and 1960 which totaled 997 and 2,000 units, respectively.
[3] Included in distillate fuel oil.
[4] Less than 0.05 million.
[5] Less than 0.1 percent.
[6] Data for 1982, 1984, 1986, and 1988 are not available. Since 1981, the *American Housing Survey for the United States* has been a biennial survey.
NA = Not available.
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. • Sum of components may not equal total 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 1989,* Table 2-5.

Figure 22. Household Motor Vehicle Data



Note: Percent changes are simple average annual percent changes; they may differ slightly from compound average annual percent changes.
Source: Table 22.

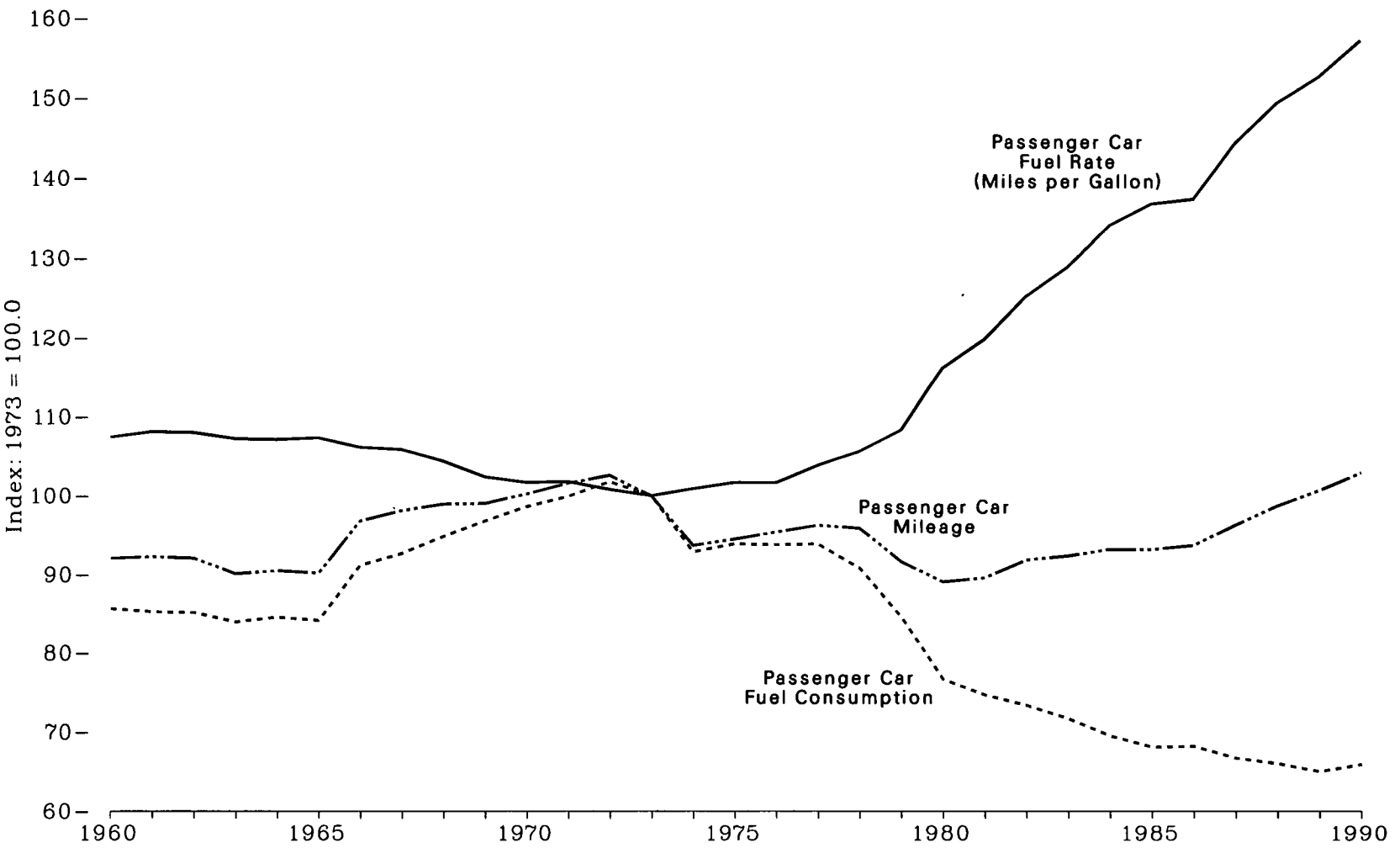
Table 22. Household Motor Vehicle Data, 1983, 1985, and 1988

Unit of Measure	Family Income								
	Less than $25,000			$25,000 or More			All Income Categories		
	1983	1985	1988	1983	1985	1988	1983	1985	1988
Households with Vehicles (millions)	42.9	43.3	38.9	30.5	34.5	42.2	73.4	77.7	81.3
Vehicles (millions)	66.7	65.4	58.7	63.0	71.9	88.8	129.7	137.3	147.5
Vehicle Miles Traveled (billions)	589	587	550	630	766	960	1,219	1,353	1,511
Motor Fuel Consumed (billion gallons)	40.8	38.2	31.4	39.8	45.7	51.0	80.5	83.9	82.4
Motor Gasoline Consumed (billion gallons)									
Leaded	19.2	13.5	5.4	13.2	11.0	5.8	32.4	24.5	11.1
Unleaded	20.9	24.2	25.7	25.3	33.7	44.3	46.3	57.8	69.9
Motor Fuel Expenditures (billion dollars)	48.1	44.8	30.7	47.3	54.3	50.3	95.4	99.1	81.1
Averages per Household with Vehicles									
Vehicles	1.6	1.5	1.5	2.1	2.1	2.1	1.8	1.8	1.8
Vehicle Miles Traveled	13,721	13,558	14,128	20,668	22,228	22,712	16,605	17,402	18,595
Motor Fuel Consumed (gallons)	950	883	807	1,305	1,326	1,205	1,097	1,079	1,014
Motor Fuel Expenditures (dollars)	1,121	1,035	789	1,552	1,575	1,191	1,300	1,274	998
Averages per Vehicle									
Vehicle Miles Traveled	8,837	8,972	9,383	9,996	10,658	10,816	9,400	9,855	10,246
Motor Fuel Consumed (gallons)	612	585	536	631	636	574	621	611	559
Motor Fuel Expenditures (dollars)	722	685	524	751	755	567	736	722	550
Fuel Efficiency (miles per gallon)	14.4	15.3	17.5	15.8	16.8	18.8	15.1	16.1	18.3
Price of Motor Gasoline (dollars per gallon)									
Leaded	1.14	1.11	0.90	1.14	1.11	0.90	1.14	1.11	0.90
Unleaded	1.22	1.20	0.99	1.22	1.21	1.00	1.22	1.21	1.00

Notes: • Included are automobiles, station wagons, passenger vans, cargo vans, motor homes, pickup trucks, and jeeps or similar vehicles. 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. • Sum of components may not equal total due to independent rounding.

Sources: **Fuel Efficiency:** •1983 and 1985—Energy Information Administration (EIA), "Residential Transportation Energy Consumption Survey" purchase diaries. •1988—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—Bureau of Labor Statistics Gasoline Pump Price Series and Lundberg Inc. price series. **All Other Data:** 1983, 1985, and 1988—EIA, Form EIA-876A/C, "Residential Transportation Energy Consumption Survey."

Figure 23. Passenger Car Efficiency, 1960-1990



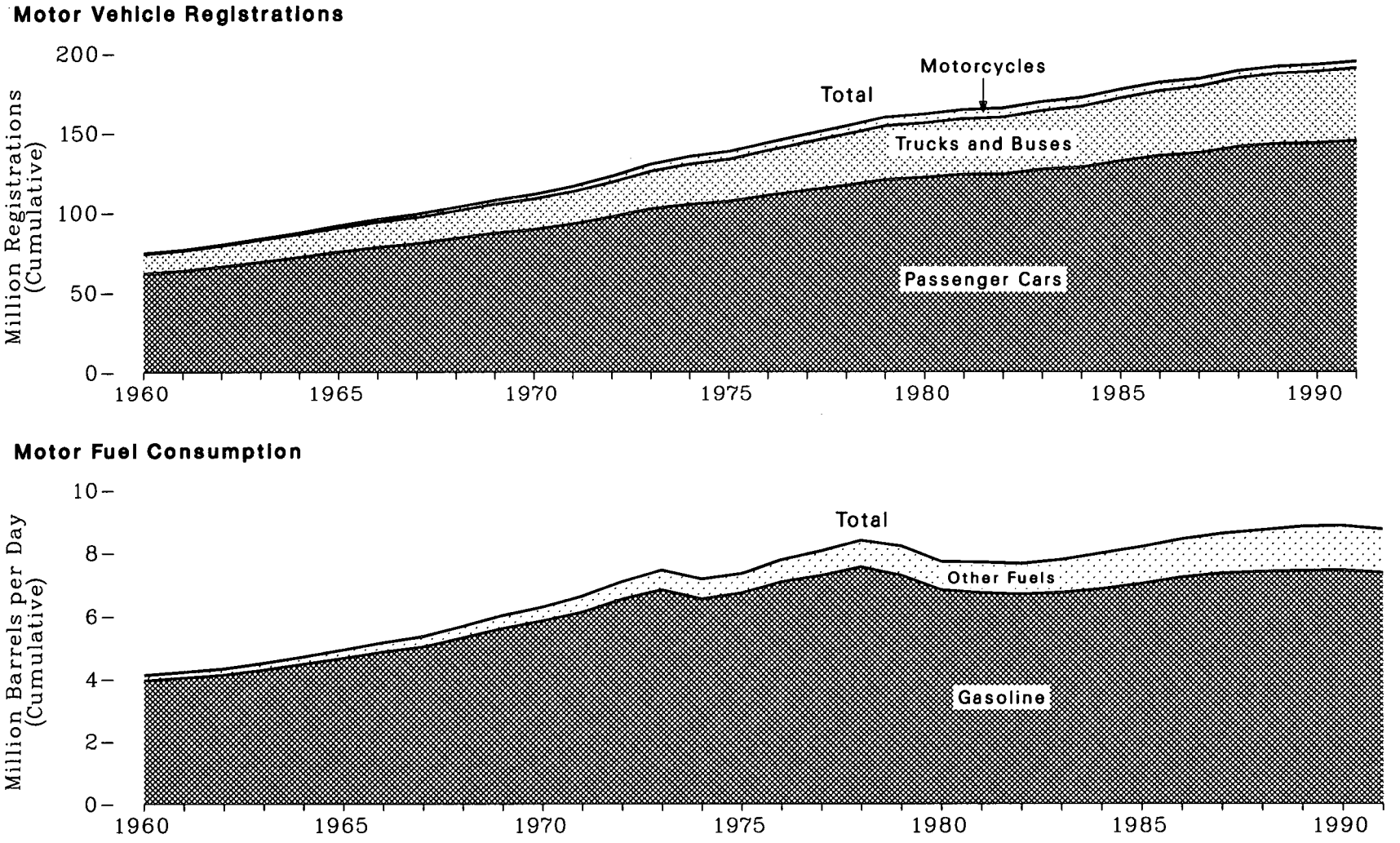
Source: Table 23.

Table 23. Motor Vehicle Efficiency, 1960-1990

Year	Passenger Cars [1]						All Motor Vehicles [2]					
	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[3]	10,556	102.9	505	65.5	20.92	157.3	11,132	110.2	682	80.2	16.32	137.3

[1] From 1960 to 1965, passenger cars also include motorcycles.
[2] Passenger cars, motorcycles, buses, and trucks.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Sources: • 1960-1985—Federal Highway Administration, *Highway Statistics Summary to 1985*, Table VM-201A. • 1986 forward—Federal Highway Administration, *Highway Statistics Annual*, Table VM-1.

Figure 24. Motor Vehicle Registrations and Motor Fuel Consumption, 1960-1991



Source: Table 24.

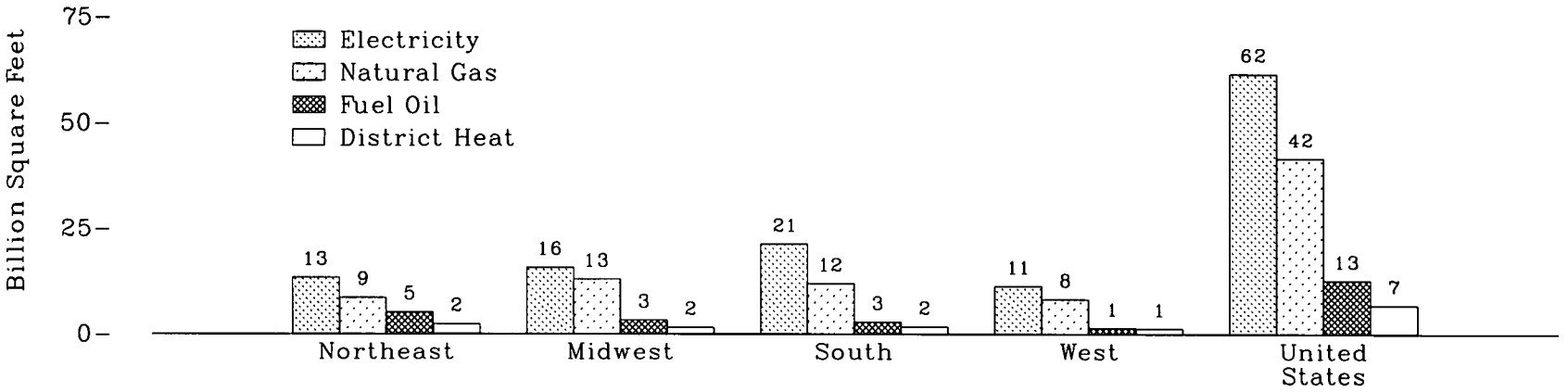
Table 24. Motor Vehicle Registrations and Motor Fuel Consumption, 1960-1991

Year	Motor Vehicle Registrations (millions)					Motor Fuel Consumption [1] (thousand barrels per day)		
	Passenger Cars	Motorcycles	Buses	Trucks	Total	Gasoline [2]	Other Fuels [3]	Total [4]
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	[5]	39.6	177.1	7,020	1,158	8,178
1986	135.4	5.3	[5]	40.8	181.5	7,229	1,202	8,431
1987	137.3	4.9	[5]	41.7	183.9	7,359	1,242	8,601
1988	141.3	4.6	[5]	43.1	189.0	7,405	1,306	8,711
1989	143.1	4.4	[5]	44.2	191.7	7,437	1,385	8,822
1990	143.5	4.3	[5]	45.1	192.9	7,453	1,396	8,849
1991[6]	145.0	4.2	[5]	45.7	194.9	7,375	1,360	8,736

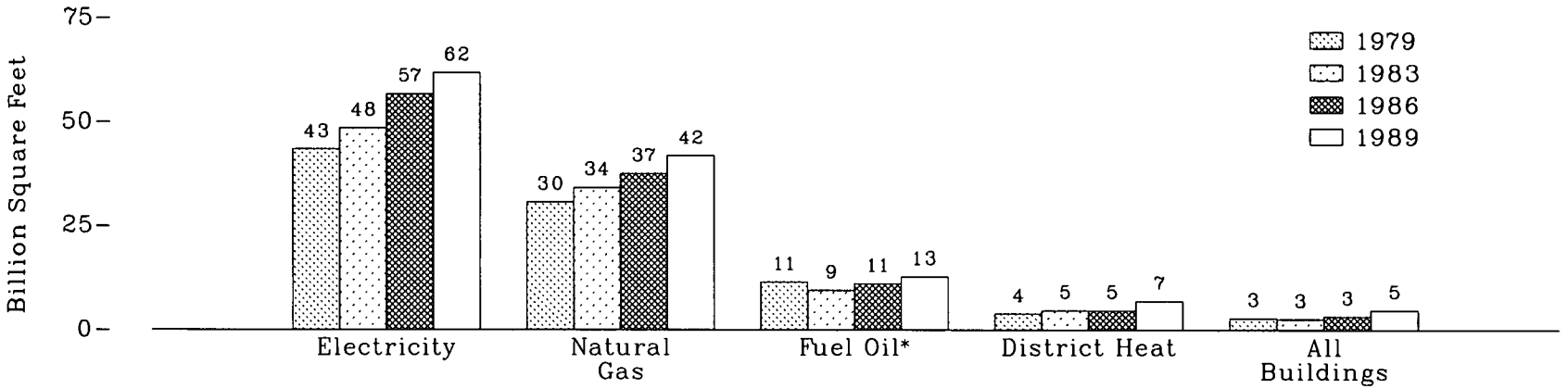
[1] Includes only motor fuel taxed at the prevailing tax rates in each State. Excludes motor fuel exempt from tax payment, subject to tax refund, or taxed at rates other than the prevailing tax rate. Experience has shown that the total motor fuel consumption quantity cited here equals more than 99.0 percent of gross reported motor fuel consumption.
[2] Motor gasoline, aviation gasoline, and gasohol.
[3] Distillate fuel oil (diesel oil), liquefied gases, and kerosene when they are used to operate vehicles on highways. Excludes jet fuel beginning in 1962.
[4] Excludes losses allowed for evaporation, handling, etc.
[5] Included in trucks.
[6] Previous-year data have been revised. Current-year data are estimated and will be revised in future publications.
Note: Sum of components may not equal total 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 1990.*

Figure 25. Commercial Buildings Characteristics by Energy Source

By Census Region, 1989



By Survey Year



*Distillate fuel oil, residual fuel oil, and kerosene.
Source: Table 25.

Table 25. Commercial Buildings Characteristics by Energy Source, Selected Years, 1979-1989

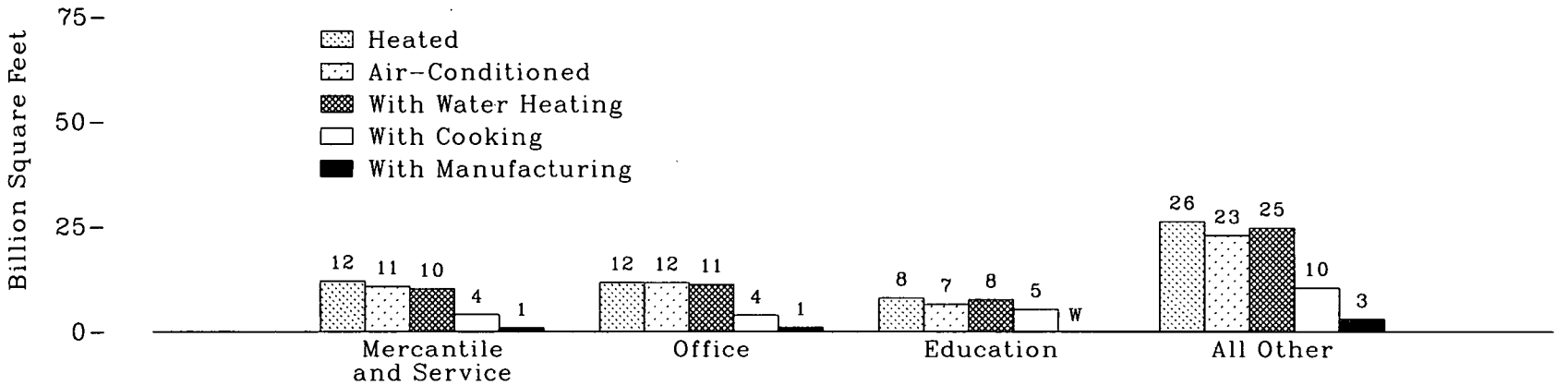
(Billion Square Feet)

Energy Source and Year	Square Footage Category			Principal Building Activity				Census Region [1]				All Buildings
	1,001 to 10,000	10,001 to 100,000	Over 100,000	Mercantile and Service	Office	Education	All Other	North-east	Mid-west	South	West	
All Buildings												
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
Electricity												
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
Natural Gas												
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
Fuel Oil [2]												
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
District Heat [3]												
1979	W	1.17	2.64	W	1.19	0.40	1.98	1.26	1.58	0.65	0.39	3.88
1983	W	1.39	3.16	W	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	W	2.32	1.13	3.02	2.24	1.51	1.58	1.25	6.58
Propane												
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	W	W	0.35	1.54	0.47	0.44	1.59	W	2.56
1986	1.08	1.61	0.52	0.64	W	0.37	2.10	0.78	0.66	1.35	0.42	3.21
1989	1.04	1.95	1.71	0.91	W	1.14	2.52	1.07	1.06	1.74	W	4.69

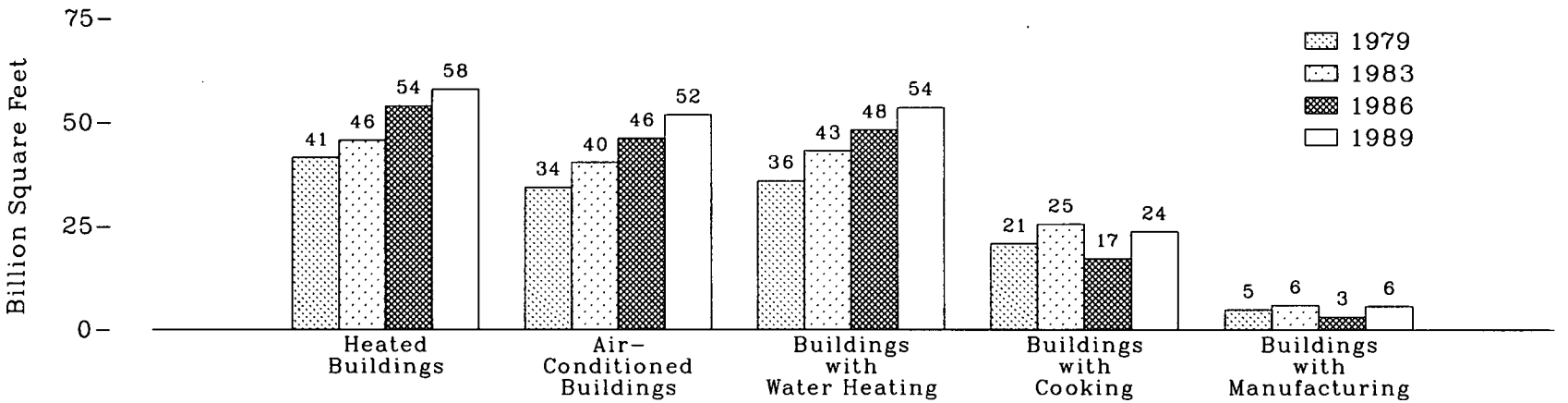
[1] See Appendix D for Census regions.
[2] Distillate fuel oil, residual fuel oil, and kerosene.
[3] For 1979 and 1983, includes only purchased steam. For 1986 and 1989, includes purchased and nonpurchased steam and purchased and nonpurchased hot water.
W = Data withheld either because the Relative Standard Error was more than 50 percent or because 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—EIA, Form EIA-871,"Commercial Buildings Energy Consumption Survey."

Figure 26. Commercial Buildings Characteristics by End Use

By Principal Building Activity, 1989



By Survey Year



W=Withheld. See Table 26 for definition.
Source: Table 26.

Table 26. Commercial Buildings Characteristics by End Use, Selected Years, 1979-1989

(Billion Square Feet)

Building Characteristics and Year	Square Footage Category			Principal Building Activity				Census Region [1]				All Buildings
	1,001 to 10,000	10,001 to 100,000	Over 100,000	Mercantile and Service	Office	Education	All Other	North-east	Mid-West	South	West	
All Buildings												
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
Heated Buildings												
1979	8.53	19.85	13.04	9.63	6.98	5.97	18.84	9.35	13.85	12.50	5.72	41.42
1983	8.14	20.57	16.97	9.75	8.19	5.82	21.92	9.54	14.50	15.00	6.64	45.68
1986	11.47	24.26	18.19	12.39	9.46	7.24	24.83	11.24	15.20	17.53	9.95	53.92
1989	11.38	25.85	20.64	12.04	11.68	8.02	26.13	12.97	15.07	19.17	10.66	57.87
Air-Conditioned Buildings												
1979	5.99	16.29	11.96	7.84	6.73	4.21	15.46	7.61	11.28	11.82	3.53	34.24
1983	6.18	18.05	15.96	8.58	7.99	4.58	19.04	8.09	12.43	14.73	4.94	40.18
1986	8.95	20.63	16.56	10.38	9.33	5.77	20.64	8.54	12.49	16.73	8.36	46.13
1989	9.37	23.05	19.35	10.80	11.63	6.50	22.83	10.33	13.16	18.96	9.32	51.77
Buildings With Water Heating												
1979	6.42	17.33	12.07	7.58	6.34	5.59	16.31	8.44	12.34	10.05	4.99	35.82
1983	6.89	19.34	16.85	8.62	7.90	5.78	20.78	9.15	13.79	13.78	6.36	43.08
1986	9.04	21.99	17.16	9.91	8.83	6.86	22.59	9.97	14.00	14.71	9.51	48.19
1989	9.28	24.10	20.21	10.16	11.20	7.62	24.60	12.45	14.21	16.92	10.00	53.58
Building With Cooking												
1979	2.82	9.12	8.76	3.27	2.84	4.38	10.21	5.27	6.83	6.12	2.48	20.71
1983	3.25	10.30	11.89	4.17	4.14	4.63	12.50	5.69	7.69	8.48	3.59	25.44
1986	1.54	5.82	9.69	2.72	2.28	3.98	8.08	4.02	4.64	5.33	3.06	17.05
1989	2.31	8.26	13.10	4.04	3.92	5.29	10.43	5.87	6.49	7.19	4.11	23.67
Buildings With Manufacturing												
1979	0.71	2.24	1.82	1.21	0.36	0.52	2.68	1.17	1.42	1.44	0.73	4.77
1983	0.87	2.85	2.11	1.25	0.71	0.40	3.47	1.39	1.93	1.61	0.90	5.83
1986	0.31	1.35	1.40	0.49	0.53	W	1.88	0.55	0.97	0.97	0.56	3.06
1989	0.49	2.59	2.52	0.85	0.97	W	2.99	1.03	1.54	1.73	1.30	5.60

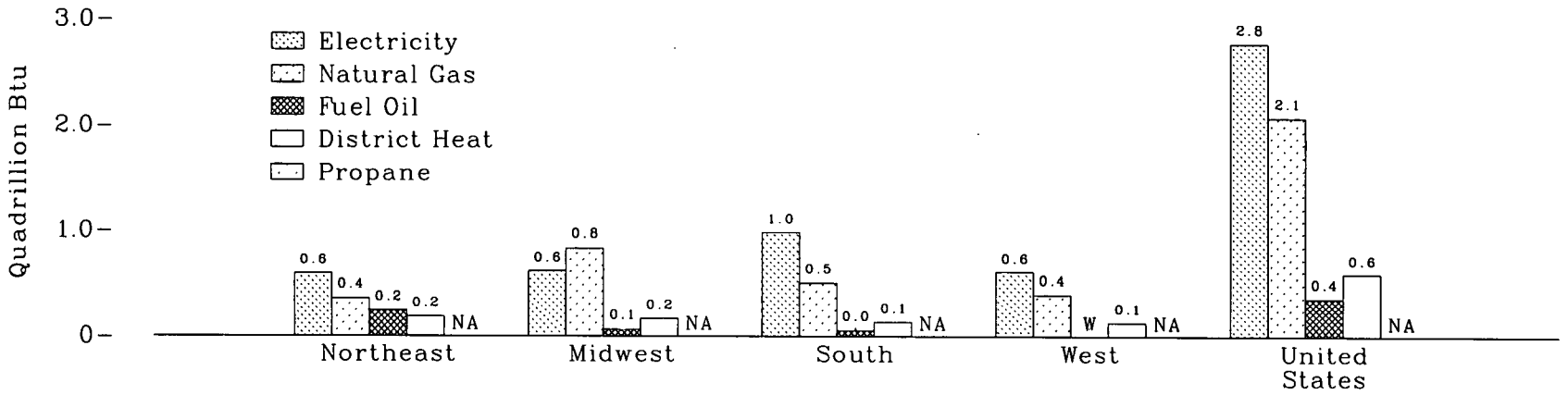
[1] See Appendix D for Census regions.

W = Data withheld either because the Relative Standard Error was more than 50 percent or because fewer than 20 buildings were sampled.

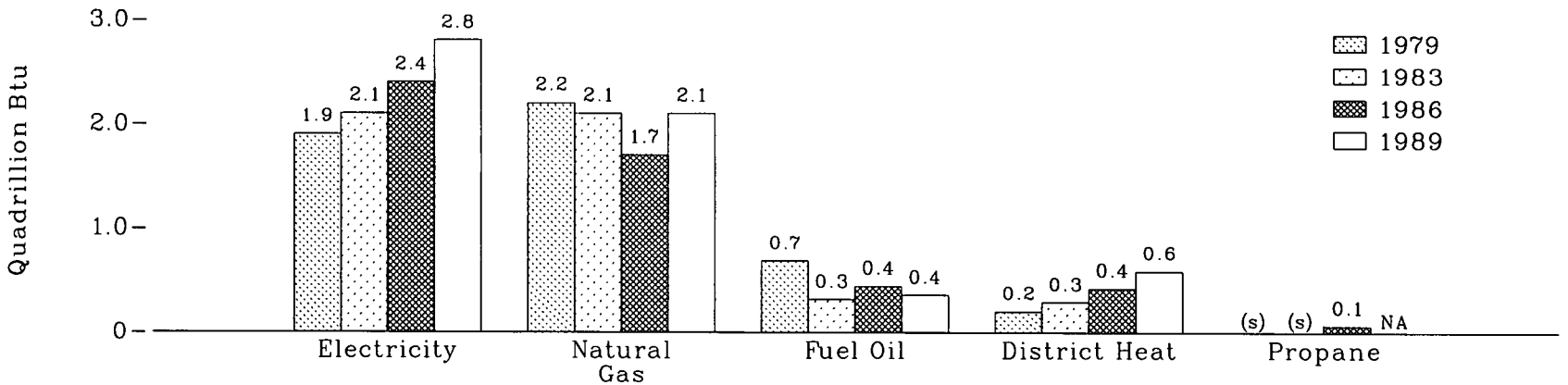
Sources: •1979—Energy Information Administration (EIA), Form EIA-143, "Nonresidential Buildings Energy Consumption Survey." •1983—EIA, Form EIA-788, "Nonresidential Buildings Energy Consumption Survey." •1986—EIA, Form EIA-871, "Nonresidential Buildings Energy Consumption Survey." •1989—EIA, Form EIA-871,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

Figure 27. Commercial Buildings Consumption by Energy Source

By Census Region, 1989



By Survey Year



NA=Not available. W=Withheld. See Table 27 for definitions. (s)=Less than 50 trillion Btu.
Source: Table 27.

Table 27. Commercial Buildings Consumption by Energy Source, Selected Years, 1979-1989

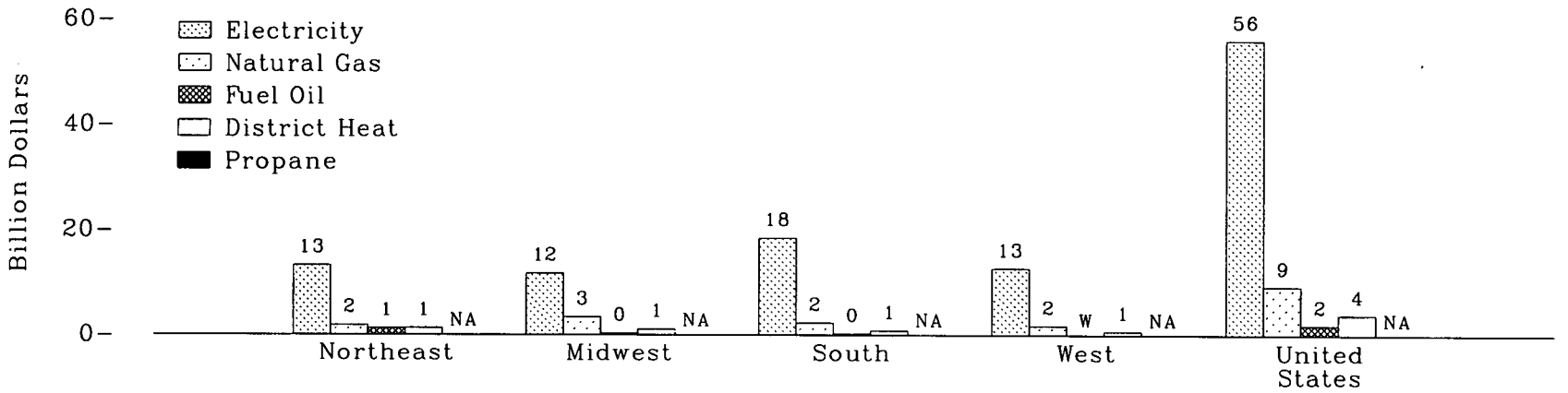
(Trillion Btu)

Energy Source and Year	Square Footage Category			Principal Building Activity				Census Region [1]				All Buildings
	1,001 to 10,000	10,001 to 100,000	Over 100,000	Mercantile and Service	Office	Education	All Other	North-east	Mid-west	South	West	
Major Sources [2]												
1979	1,254.87	2,202.11	1,507.75	893.53	860.79	511.16	2,699.24	1,216.88	1,826.47	1,395.20	526.17	4,964.73
1983	1,241.81	1,934.59	1,646.28	811.84	1,017.68	480.23	2,512.93	858.31	1,820.50	1,461.69	682.18	4,822.68
1986	1,273.19	2,007.53	1,696.22	985.45	1,008.28	632.50	2,350.71	1,037.29	1,584.59	1,459.28	895.77	4,976.94
1989	1,258.94	2,402.15	2,127.04	1,048.25	1,229.56	704.04	2,806.28	1,354.47	1,659.46	1,648.41	1,125.79	5,788.13
Electricity												
1979	428.52	872.29	607.67	360.61	423.66	162.78	961.43	425.35	593.38	662.32	227.43	1,908.48
1983	468.59	902.63	757.78	425.83	509.43	152.36	1,041.38	324.49	672.66	800.58	331.27	2,129.01
1986	653.77	927.31	809.30	535.95	640.76	178.93	1,034.74	429.52	583.72	866.88	510.26	2,390.38
1989	571.75	1,145.23	1,056.09	549.67	781.48	216.76	1,225.16	585.62	608.95	974.78	603.72	2,773.06
Natural Gas												
1979	645.58	996.40	532.42	422.38	272.28	213.89	1,265.85	442.76	1,006.52	469.81	255.31	2,174.40
1983	684.01	809.44	597.16	327.32	365.21	245.63	1,152.45	278.27	978.41	522.97	310.96	2,090.61
1986	484.73	715.33	522.77	331.91	258.26	253.64	879.03	243.78	741.89	425.76	311.40	1,722.84
1989	567.66	835.57	669.82	416.67	238.00	323.46	1,094.92	353.10	830.93	497.67	391.35	2,073.05
Fuel Oil [3]												
1979	176.90	272.35	231.47	103.07	106.69	107.16	363.81	284.83	133.42	236.70	25.76	680.72
1983	84.92	139.79	89.78	43.13	75.30	61.30	134.76	171.70	28.23	104.31	W	314.49
1986	114.40	206.12	121.19	105.42	38.74	103.23	194.31	269.64	63.16	86.10	22.80	441.70
1989	100.50	169.85	86.48	75.50	43.16	70.96	167.21	236.57	60.72	50.20	W	356.83
District Heat [4]												
1979	W	61.08	136.18	W	58.17	27.33	108.15	63.94	93.15	W	W	201.12
1983	W	82.73	201.56	W	67.74	20.94	184.34	83.85	141.18	33.83	29.71	288.58
1986	W	158.76	242.96	12.17	70.52	96.71	242.62	94.35	195.82	80.53	51.32	422.01
1989	19.02	251.50	314.66	W	166.92	W	318.99	179.19	158.86	125.76	121.38	585.18
Propane												
1979	23.21	15.20	4.89	10.01	W	2.24	29.19	W	15.72	14.55	9.71	43.30
1983	20.05	11.99	1.64	5.91	W	1.56	23.86	W	7.04	20.93	W	33.68
1986	43.83	18.27	1.13	16.93	W	2.53	42.11	8.84	18.83	25.78	W	63.23
1989 [5]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

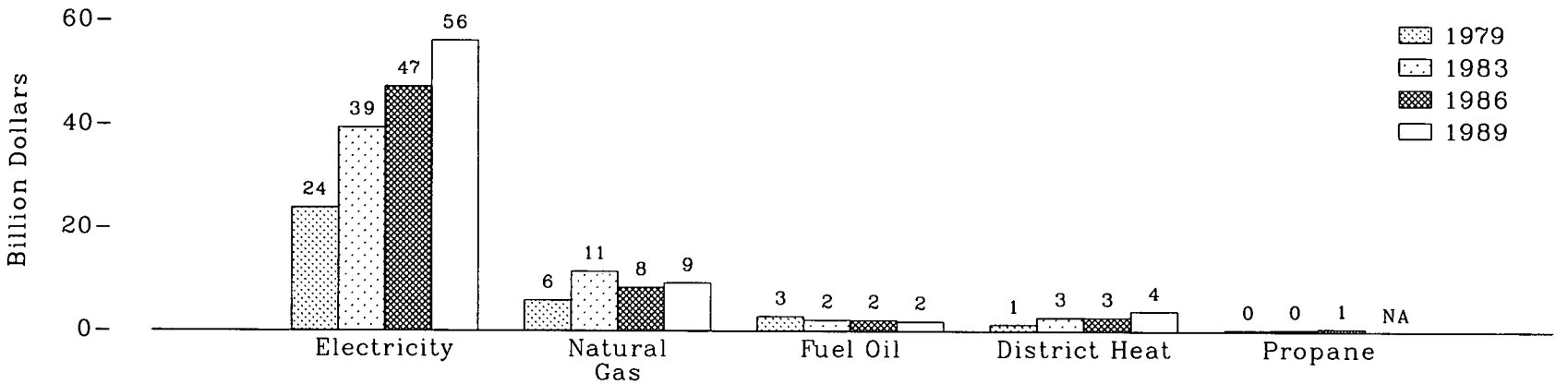
[1] See Appendix D for Census regions.
[2] Includes electricity, natural gas, fuel oil, and district heat.
[3] Distillate fuel oil, residual fuel oil, and kerosene.
[4] For 1979 and 1983, includes only purchased steam. For 1986 and 1989, includes purchased and nonpurchased steam and purchased and nonpurchased hot water.
[5] Not collected.
NA = Not available.
W = Data withheld either because the Relative Standard Error was more than 50 percent or because 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—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—EIA, Form EIA-871,"Commercial Buildings Energy Consumption Survey."

Figure 28. Commercial Buildings Expenditures by Energy Source

By Census Region, 1989



By Survey Year



NA=Not available. W=Withheld. See Table 28 for definitions.
Source: Table 28.

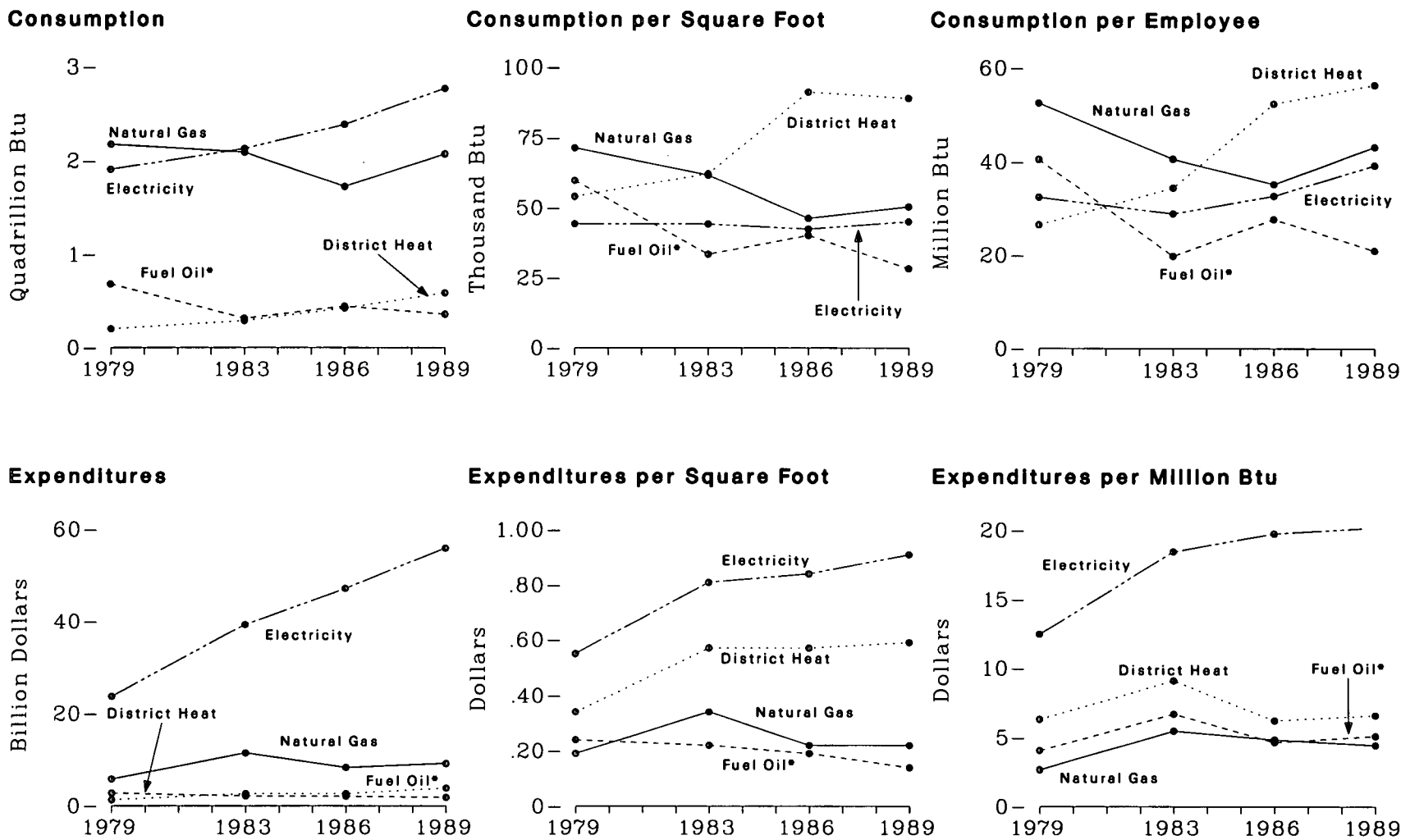
Table 28. Commercial Buildings Expenditures by Energy Source, Selected Years, 1979-1989

(Million Dollars)

Energy Source and Year	Square Footage Category			Principal Building Activity				Census Region [1]				All Buildings
	1,001 to 10,000	10,001 to 100,000	Over 100,000	Mercantile and Service	Office	Education	All Other	North-east	Mid-west	South	West	
Major Sources [2]												
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
Electricity												
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
Natural Gas												
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
Fuel Oil [3]												
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	W	1,822
District Heat [4]												
1979	W	355	885	W	405	169	652	444	535	163	124	1,267
1983	W	767	1,823	W	664	157	1,673	977	1,045	329	275	2,627
1986	W	953	1,530	88	507	519	1,506	639	1,170	516	294	2,620
1989	141	1,551	2,165	W	1,207	W	2,042	1,286	1,081	816	W	3,857
Propane												
1979	123	80	22	52	W	10	153	W	76	81	47	225
1983	190	109	14	56	W	12	222	W	62	201	W	313
1986	370	163	10	140	W	20	368	93	131	221	W	543
1989 [5]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[1] See Appendix D for Census regions.
[2] Includes electricity, natural gas, fuel oil, and district heat.
[3] Distillate fuel oil, residual fuel oil, and kerosene.
[4] For 1979 and 1983, includes only purchased steam. For 1986 and 1989, includes purchased and nonpurchased steam and purchased and nonpurchased hot water.
[5] Not collected.
NA = Not available.
W = Data withheld either because the Relative Standard Error was more than 50 percent or because 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—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—EIA, Form EIA-871,"Commercial Buildings Energy Consumption Survey."

Figure 29. Commercial Buildings Energy Consumption and Expenditure Indicators, Selected Years, 1979–1989



*Distillate fuel oil, residual fuel oil, and kerosene.

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

Source: Table 29.

Table 29. Commercial Buildings Energy Consumption and Expenditure Indicators, Selected Years, 1979-1989

Energy Source and Year	Building Characteristics [1]			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)	Per Building (thousand dollars)	Per Square Foot (dollars)	Per Million Btu (dollars)
Major Sources [2]											
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
Electricity											
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
Natural Gas											
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
Fuel Oil [3]											
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
District Heat [4]											
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
Propane											
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

[1] For major sources, includes all buildings. For specific energy sources, includes only buildings using that particular energy source.
[2] For 1979, 1983 and 1986, includes electricity, natural gas, fuel oil, district heat, and propane. For 1989, includes electricity, natural gas, fuel oil, and district heat. Propane consumption statistics were not collected in 1989.
[3] Distillate fuel oil, residual fuel oil, and kerosene.
[4] For 1979 and 1983, includes only purchased steam. For 1986 and 1989, 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 if that building uses no major fuel.
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—EIA, Form EIA-871, "Commercial Buildings Energy Consumption Survey."

3. Selected Financial Indicators

Fossil Fuel Prices Down From Record Levels

From the 1959 level of $1.12 per million Btu, real prices[1] of fossil fuels[2] trended downward to a low of $0.90 in 1969 (30).[3] Thereafter, prices began to escalate, sometimes abruptly. In 1974, the composite price of fossil fuels jumped from the 1973 level of $0.96 to $1.51, surpassing the 1959 level for the first time and registering the largest year-to-year increase (56 percent) of the 1959-to-1991 period. The peak of $3.48 was reached in 1981. Thereafter, the price declined each year through 1988, plunging 36 percent in 1986 alone. Although prices recovered somewhat in 1989 and 1990, in 1991 the composite price of fossil fuels was $1.42, 4 percent below the 1988 price.

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 $6.94, more than triple the price of natural gas and more than quadruple the price of nonanthracitic coal.

Energy Expenditures Up in 1989

The energy expenditure measure is the product of energy consumption and energy prices. In 1989 (the most recent year for which data are available), both energy prices and energy consumption increased, and energy expenditures rose from $408 billion in 1988 to $437 billion in 1989 (32).

End-use expenditures of $209 billion for petroleum products accounted for 48 percent of total energy expenditures. The year-to-year increase in petroleum expenditures was close to $19 billion, about two-thirds of the $29-billion increase in total energy expenditures. Sales of electricity (net of expenditures by electric utilities for most fuels used to generate electricity) totaled $130 billion. Nuclear fuel, wood, and waste used at electric utilities accounted for $4 billion. Expenditures for natural gas and coal were $65 billion and $28 billion, respectively.

[1]Real prices are expressed in 1987 dollars.

[2]Crude oil, natural gas, and coal.

[3]Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications.

Energy Industry Financial Performance

In 1990 (the most recent year for which data are available), the 23 major energy companies included in the Financial Reporting System (FRS)[4] accounted for 55 percent of U.S. crude oil and natural gas liquids production, 42 percent of dry natural gas production, and smaller shares of coal and uranium production (37). They also accounted for 69 percent of refinery capacity. The FRS companies continued to play a significant role in the U.S. economy in 1990, accounting for 23 percent of the profits and 19 percent of the assets of *Fortune's* 500 largest U.S. industrial corporations.[5]

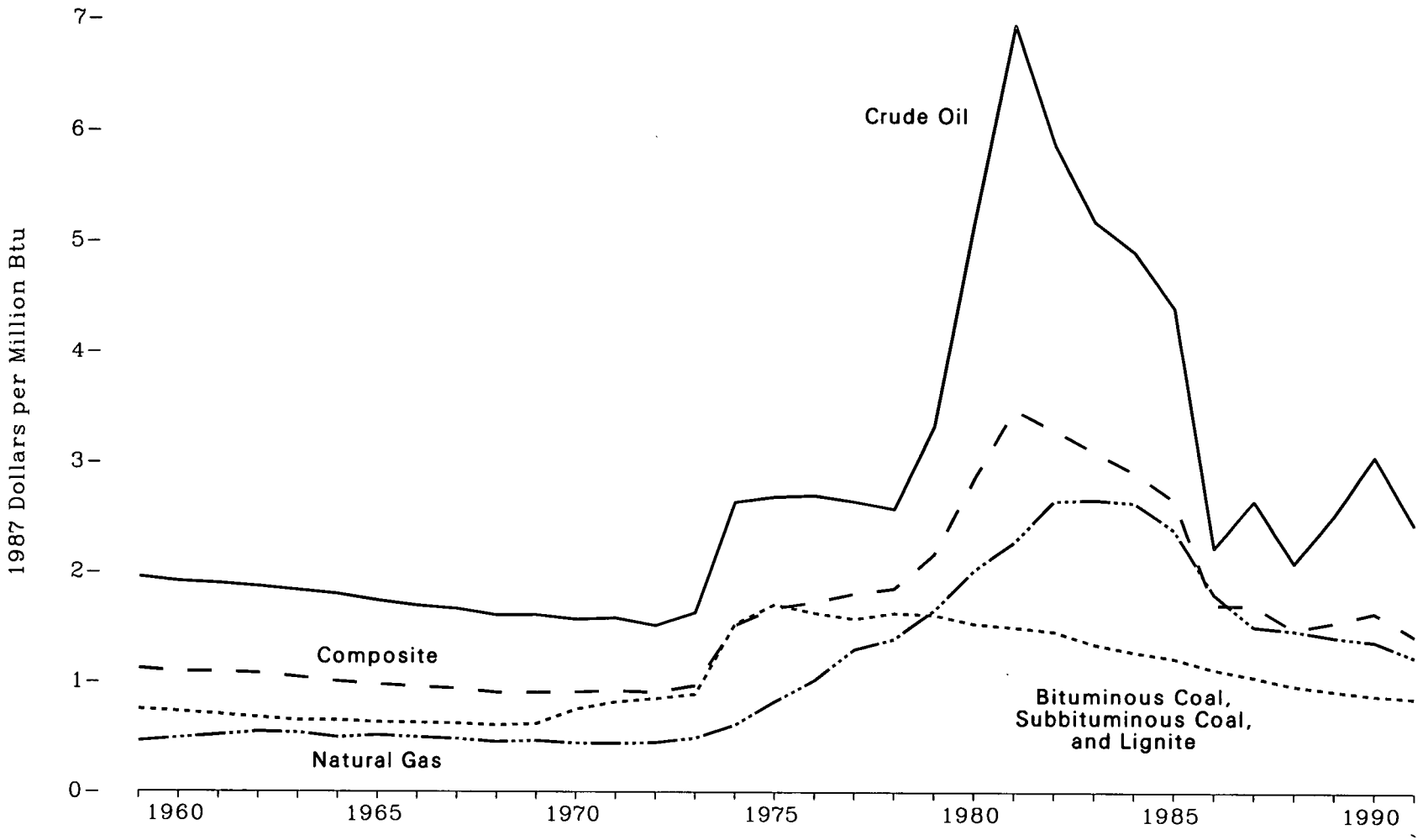
The Iraqi invasion of Kuwait in August 1990 led to higher oil prices in the second half of the year, and, despite the downturn in the domestic economy, the FRS companies reported a 9-percent increase in net income to $22 billion (37). Net income from petroleum and natural gas production rose from $8 billion in 1989 to $16 billion in 1990, and foreign refining and marketing operations rose from $1.8 billion to $2.8 billion (38). However, those gains were offset somewhat by a $2.3-billion decline in domestic refining and marketing net income, which occurred because prices of petroleum products did not rise as fast as overall input costs, and by a decline in net income from chemical operations, the FRS companies' primary non-energy business.

Most of the FRS companies' $46 billion in new investments was directed toward petroleum activities, particularly toward the development of oil and gas reserves and production both at home and abroad (40). Drilling in coalbed methane fields accounted for a good part of the increase in the number of oil and gas wells drilled. In turn, the increased drilling boosted U.S. reserve additions to 3.0 million barrels of crude oil equivalent (47).

[4]The FRS collects financial data from the major energy-producing companies. See Appendix E, Note 3.

[5]Energy Information Administration, *Performance Profiles of Major Energy Producers 1990*, DOE/EIA-0206(90) (Washington DC, December 1991), p. 4.

Figure 30. Fossil Fuel Prices, 1959-1991



Source: Table 30.

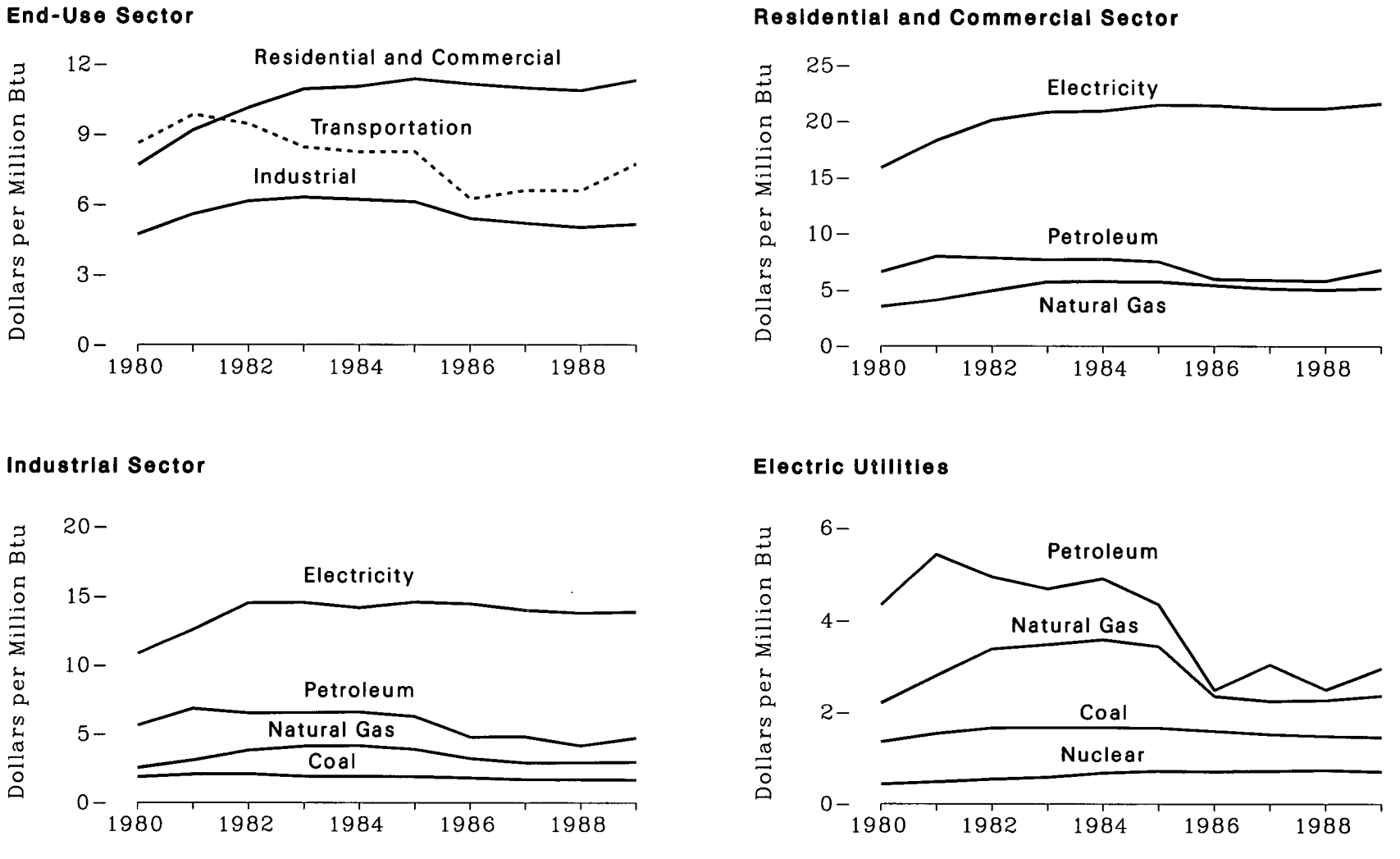
Table 30. Fossil Fuel Prices, 1949-1991

(Cents per Million Btu)

Year	Crude Oil [1]		Natural Gas [2]		Bituminous Coal, Subbituminous Coal, and Lignite		Anthracite		Composite [3]		
	Nominal	Real [4]	Nominal	Real [4]	Nominal	Real [4]	Nominal	Real [4]	Nominal	Real [4]	Percent Change
1949	43.8	NA	5.4	NA	19.5	NA	36.4	NA	26.2	NA	NA
1950	43.3	NA	6.3	NA	19.3	NA	37.9	NA	25.6	NA	NA
1951	43.6	NA	6.3	NA	19.6	NA	40.7	NA	25.9	NA	NA
1952	43.6	NA	7.2	NA	19.5	NA	39.3	NA	26.1	NA	NA
1953	46.2	NA	8.1	NA	19.5	NA	40.7	NA	27.3	NA	NA
1954	47.9	NA	9.0	NA	18.0	NA	36.1	NA	27.7	NA	NA
1955	47.8	NA	8.9	NA	17.8	NA	33.1	NA	27.1	NA	NA
1956	48.1	NA	9.9	NA	19.1	NA	34.9	NA	27.8	NA	NA
1957	53.3	NA	9.9	NA	20.1	NA	38.3	NA	29.9	NA	NA
1958	51.9	NA	10.8	NA	19.4	NA	38.0	NA	29.2	NA	NA
1959	50.0	195.3	11.7	45.7	19.1	74.6	35.9	140.2	28.6	111.7	NA
1960	49.7	191.2	12.6	48.5	18.8	72.3	33.8	130.0	28.3	108.8	- 2.6
1961	49.8	189.4	13.5	51.3	18.4	70.0	34.6	131.6	28.6	108.7	- 0.1
1962	50.0	186.6	14.5	54.1	18.0	67.2	33.6	125.4	28.8	107.5	- 1.1
1963	49.8	183.1	14.5	53.3	17.6	64.7	36.6	134.6	28.3	104.0	- 3.3
1964	49.7	179.4	13.6	49.1	17.9	64.6	38.0	137.2	27.7	100.0	- 3.8
1965	49.3	173.6	14.5	51.1	17.9	63.0	36.3	127.8	27.7	97.5	- 2.5
1966	49.7	169.0	14.5	49.3	18.4	62.6	34.8	118.4	28.0	95.2	- 2.4
1967	50.3	166.0	14.5	47.9	18.8	62.0	36.0	118.8	28.4	93.7	- 1.6
1968	50.7	159.9	14.3	45.1	19.1	60.3	39.2	123.7	28.5	89.9	- 4.1
1969	53.3	160.1	15.4	46.2	20.5	61.6	44.0	132.1	29.9	89.8	- 0.1
1970	54.8	156.1	15.4	43.9	26.2	74.6	48.8	139.0	31.7	90.3	0.6
1971	58.4	157.4	16.3	43.9	30.1	81.1	53.2	143.4	34.0	91.6	1.4
1972	58.4	150.5	17.3	44.6	32.7	84.3	55.3	142.5	35.0	90.2	- 1.5
1973	67.1	162.5	20.1	48.7	36.5	88.4	61.7	149.4	39.8	96.4	6.9
1974	118.4	263.7	27.3	60.8	68.2	151.9	102.2	227.6	67.6	150.6	56.2
1975	132.2	268.7	40.2	81.7	83.9	170.5	149.5	303.9	82.1	166.9	10.8
1976	141.2	270.0	53.1	101.5	85.0	162.5	153.9	294.3	90.2	172.5	3.4
1977	147.8	264.4	72.3	129.3	87.7	156.9	153.8	275.1	100.8	180.3	4.5
1978	155.2	257.4	83.6	138.6	97.9	162.4	152.7	253.2	111.6	185.1	2.7
1979	217.9	332.7	108.1	165.0	105.3	160.8	177.2	270.5	141.7	216.3	16.9
1980	372.2	519.1	144.8	202.0	109.4	152.6	185.9	259.3	204.2	284.8	31.7
1981	547.8	694.3	179.5	227.5	117.9	149.4	190.1	240.9	274.5	347.9	22.2
1982	491.7	586.8	222.2	265.2	122.1	145.7	214.0	255.4	275.7	329.0	- 5.4
1983	451.6	517.9	232.3	266.4	117.2	134.4	230.0	263.8	270.1	309.7	- 5.9
1984	446.2	490.3	239.9	263.6	115.9	127.4	208.7	229.3	264.6	290.8	- 6.1
1985	415.3	439.9	225.7	239.1	114.8	121.6	204.2	216.3	251.2	266.1	- 8.5
1986	215.7	222.6	174.8	180.4	108.2	111.7	191.1	197.2	165.3	170.6	- 35.9
1987	265.5	265.5	150.2	150.2	104.9	104.9	188.9	188.9	170.0	170.0	- 0.4
1988	216.9	208.8	152.4	146.7	100.8	97.0	189.8	182.7	153.3	147.5	- 13.2
1989	273.4	252.2	152.7	140.9	100.0	92.3	183.6	169.4	167.1	154.2	4.5
1990	345.3	305.8	154.6	136.9	99.5	88.1	174.5	154.6	184.3	163.2	5.8
1991[5]	284.5	243.2	143.8	122.9	100.3	85.7	182.7	156.2	165.7	141.6	- 13.2

[1] Includes lease condensate.
[2] Wet natural gas, prior to extraction of natural gas plant liquids.
[3] 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.
[4] In 1987 dollars, calculated using implicit GDP price deflators.
[5] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
NA = Not available.
Note: All fuel prices taken as close as possible to the point of production.
Sources: Tables 68, 81, and 90 and Appendices A and C.

Figure 31. Energy Price Estimates by Sector, 1980-1989



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 31.

Table 31. Energy Price Estimates by Sector, 1970, 1975, and 1980-1989

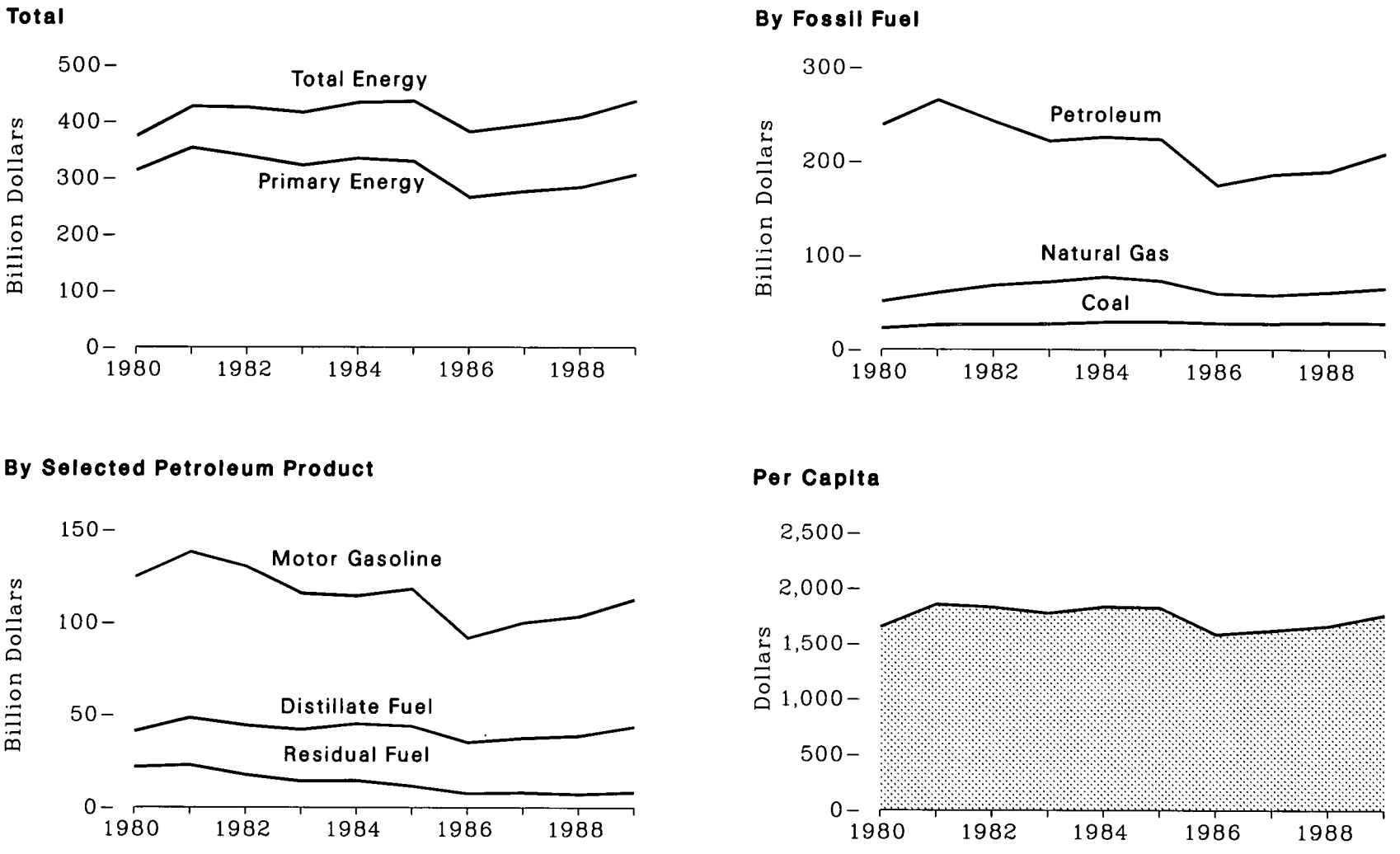
(Dollars per Million Btu)

Sector	1970	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Residential and Commercial Sector	**2.07**	**3.93**	**7.68**	**9.18**	**10.13**	**10.93**	**11.04**	**11.36**	**11.14**	**10.98**	**10.87**	**11.30**
Primary Energy	1.08	1.97	4.36	5.09	5.59	6.16	6.20	6.14	5.51	5.27	5.18	5.53
Coal	0.73	1.78	2.10	2.54	2.59	2.30	2.43	2.37	2.23	2.03	1.97	1.99
Natural Gas	0.96	1.56	3.50	4.09	4.93	5.72	5.75	5.73	5.42	5.12	5.03	5.16
Petroleum Products [1]	1.32	2.82	6.58	7.98	7.85	7.68	7.75	7.52	5.96	5.87	5.80	6.81
Distillate Fuel Oil	1.32	2.66	6.86	8.44	8.17	7.61	7.66	7.32	5.70	5.49	5.49	6.20
Liquefied Petroleum Gases	1.98	3.81	7.50	7.98	8.80	9.06	8.91	8.87	8.36	8.33	8.14	9.83
Motor Gasoline	2.86	4.66	9.77	10.96	10.44	9.13	8.94	9.01	6.77	7.22	7.33	8.03
Residual Fuel Oil	0.45	1.91	4.12	5.12	4.67	4.51	4.90	4.40	2.58	2.96	2.37	2.67
Electricity	6.33	10.21	15.86	18.29	20.11	20.83	20.93	21.50	21.45	21.18	21.19	21.64
Industrial Sector	**0.83**	**2.20**	**4.71**	**5.58**	**6.14**	**6.30**	**6.21**	**6.11**	**5.39**	**5.18**	**5.01**	**5.14**
Primary Energy	0.60	1.66	3.77	4.45	4.72	4.75	4.73	4.50	3.64	3.50	3.32	3.41
Coal	0.45	1.50	1.87	2.06	2.09	1.91	1.90	1.89	1.80	1.68	1.68	1.66
Coking Coal	0.45	1.65	2.10	2.34	2.43	2.14	2.09	2.03	1.90	1.74	1.79	1.78
Steam Coal	0.44	1.28	1.56	1.75	1.84	1.75	1.76	1.81	1.75	1.64	1.61	1.58
Natural Gas	0.38	0.95	2.52	3.07	3.80	4.10	4.13	3.87	3.20	2.88	2.90	2.94
Petroleum Products [2]	0.96	2.41	5.59	6.84	6.51	6.53	6.58	6.25	4.76	4.78	4.44	4.69
Asphalt and Road Oil	0.68	1.89	3.68	5.02	4.24	4.32	4.54	4.77	4.34	3.56	3.39	2.95
Distillate Fuel Oil	0.72	2.23	5.54	6.52	6.61	6.41	6.62	6.10	3.76	4.16	3.83	4.78
Liquefied Petroleum Gases	1.10	2.51	5.18	5.76	6.19	6.66	6.49	5.86	5.80	5.19	5.06	4.19
Lubricants	5.08	7.49	14.36	18.00	17.25	16.98	17.63	17.61	15.59	13.58	14.61	17.90
Residual Fuel Oil	0.46	1.91	3.69	4.48	4.46	4.38	4.68	4.17	2.38	2.78	2.17	2.50
Electricity	2.99	6.07	10.81	12.57	14.51	14.54	14.16	14.57	14.45	13.98	13.78	13.85
Transportation Sector	**2.31**	**4.02**	**8.61**	**9.84**	**9.43**	**8.44**	**8.24**	**8.25**	**6.23**	**6.59**	**6.58**	**7.23**
Primary Energy	2.31	4.02	8.60	9.83	9.42	8.43	8.23	8.25	6.23	6.58	6.57	7.22
Coal	0.41	1.26	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]
Petroleum Products [4]	2.31	4.02	8.60	9.83	9.42	8.43	8.23	8.25	6.23	6.58	6.57	7.22
Distillate Fuel Oil	1.31	2.80	7.19	8.55	8.14	7.56	7.61	7.50	6.36	6.75	6.59	7.16
Jet Fuel	0.73	2.05	6.36	7.57	7.23	6.51	6.24	5.91	3.92	4.03	3.80	4.39
Motor Gasoline	2.85	4.64	9.84	10.94	10.39	9.12	8.89	9.01	6.79	7.22	7.32	8.01
Residual Fuel Oil	0.38	1.72	3.31	4.44	4.54	4.42	4.67	4.41	2.25	2.62	2.23	2.47
Electricity	4.65	11.72	14.71	16.90	20.42	21.06	20.29	19.74	19.63	23.03	22.05	22.96
Electric Utilities	**0.32**	**0.96**	**1.75**	**2.00**	**2.01**	**1.98**	**1.97**	**1.85**	**1.55**	**1.51**	**1.45**	**1.48**
Coal	0.31	0.82	1.35	1.53	1.65	1.66	1.66	1.65	1.58	1.51	1.47	1.45
Natural Gas	0.28	0.75	2.20	2.80	3.37	3.47	3.58	3.43	2.35	2.24	2.26	2.36
Petroleum Products [5]	0.42	2.00	4.34	5.43	4.94	4.68	4.90	4.35	2.48	3.03	2.49	2.95
Heavy Oil [6]	0.41	1.99	4.25	5.32	4.83	4.60	4.82	4.24	2.42	2.97	2.41	2.85
Nuclear Fuel	0.18	0.24	0.43	0.48	0.54	0.58	0.67	0.71	0.70	0.71	0.73	0.70
Wood and Waste	0.65	0.92	1.74	1.24	1.28	1.12	1.28	0.79	0.32	0.95	0.87	0.82

[1] In addition to listed products, includes kerosene.
[2] In addition to listed products, includes jet fuel, kerosene, motor gasoline, still gas, special naphthas, petrochemical feedstocks, petroleum coke, wax, pentanes plus, and miscellaneous products.
[3] Not applicable.
[4] In addition to listed products, includes aviation gasoline, liquefied petroleum gases, and lubricants.
[5] In addition to listed products, includes distillate fuel oil, jet fuel, and petroleum coke.
[6] Heavy oil includes Grade Nos. 4, 5, and 6 fuel oils.

Sources: **Residential and Commercial Sector and 1981-1984:** Energy Information Administration (EIA), "State Energy Price and Expenditure Data System 1989." **All Other Data:** EIA, *State Energy Price and Expenditure Report 1989* (September 1991), p. 20.

Figure 32. Energy Expenditure Estimates, 1980–1989



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 32.

Table 32. Energy Expenditure Estimates, 1970, 1975, and 1980-1989

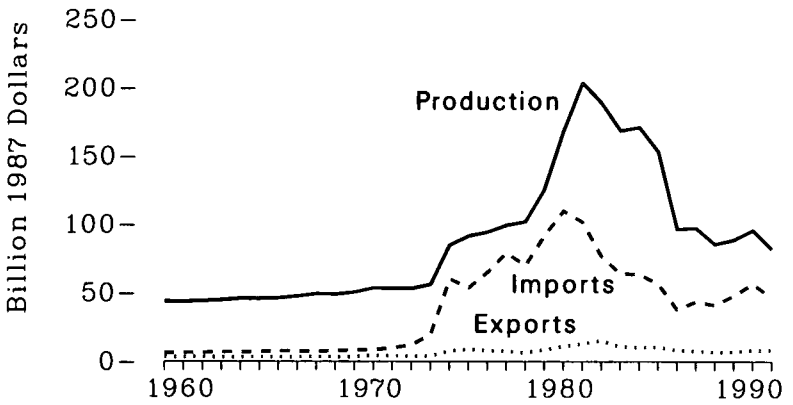
(Billion Dollars, Except as Noted)

Energy Source	1970	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Coal	**4.6**	**13.0**	**22.6**	**26.2**	**26.4**	**27.1**	**29.1**	**29.7**	**27.9**	**27.6**	**28.4**	**28.1**
Coking Coal	1.2	3.7	3.8	3.8	2.7	2.1	2.5	2.2	1.8	1.7	2.0	2.0
Steam Coal	3.4	9.4	18.9	22.4	23.8	24.9	26.6	27.5	26.1	25.9	26.4	26.1
Natural Gas	**10.9**	**20.1**	**51.1**	**60.5**	**68.3**	**72.0**	**77.2**	**72.9**	**59.7**	**58.0**	**61.1**	**65.4**
Petroleum Products	**48.1**	**103.9**	**238.4**	**265.1**	**242.4**	**221.5**	**225.9**	**223.7**	**174.8**	**186.7**	**189.4**	**208.5**
Asphalt and Road Oil	0.7	1.9	3.5	4.2	3.5	3.9	4.5	4.9	4.7	4.0	3.8	3.2
Aviation Gasoline	0.2	0.2	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.3	0.4	0.4
Distillate Fuel Oil	6.3	15.7	40.8	48.2	44.1	41.8	44.9	43.6	35.0	37.2	38.4	43.3
Jet Fuel	1.4	4.2	13.9	15.6	15.0	13.9	15.1	14.7	10.5	11.4	11.3	13.4
Kerosene	0.6	0.9	2.3	2.2	2.3	2.0	1.9	1.8	1.0	1.1	1.1	1.1
Liquefied Petroleum Gases	2.4	5.2	10.9	11.9	12.9	14.1	14.3	13.7	12.8	12.6	12.7	12.6
Lubricants	1.5	2.3	5.1	6.1	5.3	5.5	6.1	5.7	4.9	4.8	5.0	6.3
Motor Gasoline	31.6	59.4	124.4	138.1	130.3	115.8	114.4	118.0	91.5	99.8	103.2	112.6
Residual Fuel Oil	2.0	10.4	21.6	22.7	17.6	14.1	14.4	11.5	7.5	8.0	7.1	8.2
Other Petroleum Products [1]	1.2	3.6	15.3	15.5	10.8	9.8	9.9	9.2	6.3	7.3	6.4	7.3
Nuclear Fuel, Wood, and Waste Electricity Generation	(2)	**0.5**	**1.2**	**1.4**	**1.7**	**1.9**	**2.4**	**2.9**	**3.1**	**3.5**	**4.1**	**4.0**
Imports of Coal Coke	(2)	**0.2**	**0.1**	(2)	(2)	(2)	(2)	(2)	(2)	**0.1**	**0.2**	**0.2**
Exports of Coal Coke [3]	**- 0.1**	**- 0.1**	**- 0.1**	**- 0.1**	**- 0.1**	(2)	**- 0.1**	**- 0.1**	**- 0.1**	(2)	**- 0.1**	**- 0.1**
Total Primary Energy	**63.5**	**137.5**	**313.2**	**353.3**	**338.7**	**322.3**	**334.5**	**329.2**	**265.5**	**275.8**	**283.1**	**306.2**
Electric Utility Fuel [3]	- 4.3	- 16.4	- 37.4	- 43.3	- 41.3	- 41.3	- 43.4	- 42.6	- 35.8	- 36.7	- 37.4	- 38.9
Electricity Purchased by End Users [4]	23.4	50.7	98.1	116.5	127.4	134.7	142.4	149.2	151.8	154.7	162.1	169.3
Total Energy [5]	**82.6**	**171.8**	**373.9**	**426.4**	**424.8**	**415.7**	**433.6**	**435.9**	**381.5**	**393.8**	**407.7**	**436.6**
Total Energy per Capita (Dollars)	**406**	**797**	**1,650**	**1,857**	**1,831**	**1,775**	**1,833**	**1,825**	**1,582**	**1,617**	**1,658**	**1,759**

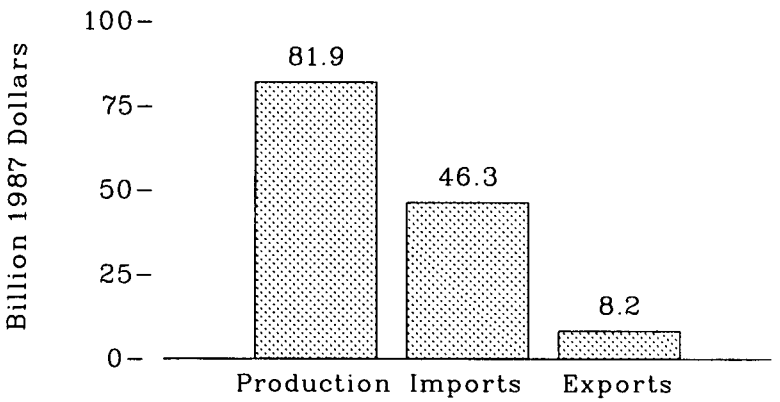
[1] Pentanes plus, petrochemical feedstocks, special naphthas, petroleum coke, still gas, wax, and miscellaneous products.
[2] Less than $0.05 billion.
[3] In determining total energy expenditures, this is a negative quantity.
[4] These are sales. In determining total energy expenditures, this is a positive quantity.
[5] There are no direct fuel costs for hydroelectric, geothermal, centralized solar, or wind energy. Wood and other biomass fuels are not included, except those consumed at the electric utilities.
Note: Sum of components may not equal total due to independent rounding.
Sources: **Expenditures, 1970, 1975, 1980, and 1985-1989:** Energy Information Administration (EIA), *State Energy Price and Expenditure Report (SEPER) 1989* (September 1991), p. 19. **Expenditures, 1981-1984:** EIA, "State Energy Price and Expenditure Data System 1989." **Total Energy per Capita:** EIA, *SEPER 1989* (September 1991), p. 5.

Figure 33. Value of Fossil Fuel Production

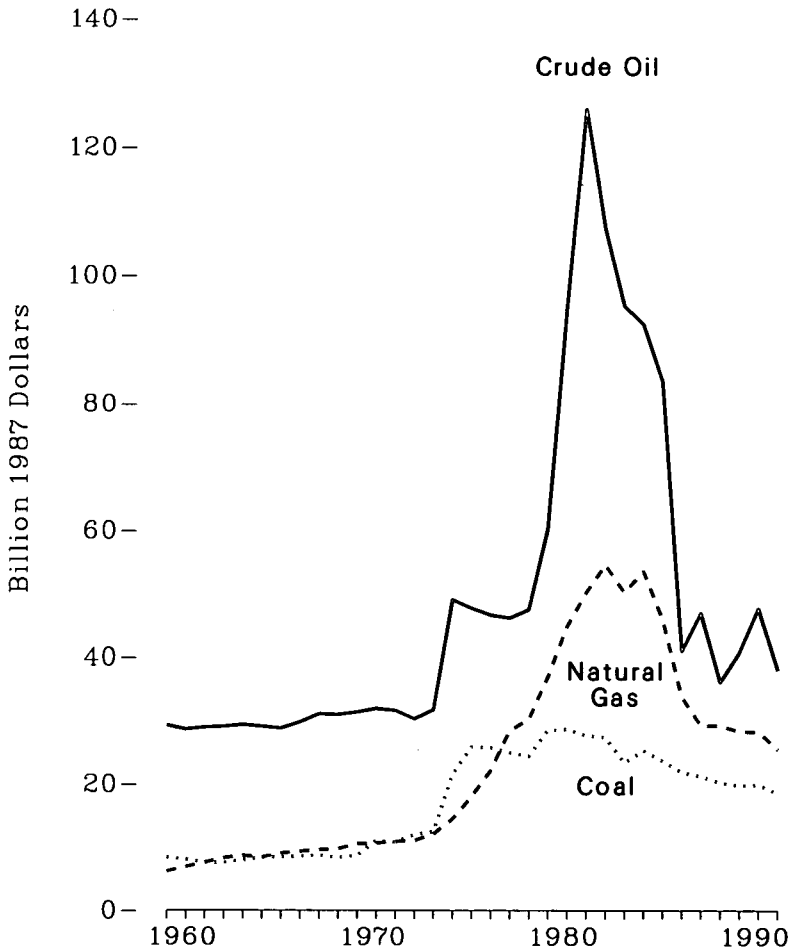
Overview, 1949-1991



Overview, 1991



Production by Fuel, 1949-1991



Note: Because vertical scales differ, graphs should not be compared.
Sources: Tables 33, 34, and 35.

Table 33. Value of Fossil Fuel Production, 1949-1991

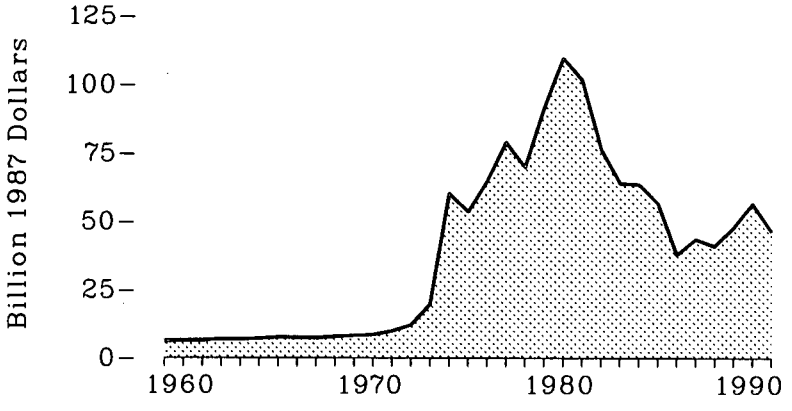
(Billion Dollars)

Year	Crude Oil [1]		Natural Gas (Marketed Production)		Coal						Total	
					Bituminous Coal, Subbituminous Coal, and Lignite		Anthracite		Total			
	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]
1949	4.68	NA	0.33	NA	2.14	NA	0.38	NA	2.52	NA	7.53	NA
1950	4.95	NA	0.44	NA	2.50	NA	0.41	NA	2.91	NA	8.30	NA
1951	5.69	NA	0.52	NA	2.63	NA	0.42	NA	3.05	NA	9.26	NA
1952	5.79	NA	0.64	NA	2.29	NA	0.39	NA	2.68	NA	9.11	NA
1953	6.32	NA	0.76	NA	2.25	NA	0.31	NA	2.56	NA	9.64	NA
1954	6.44	NA	0.87	NA	1.77	NA	0.25	NA	2.02	NA	9.33	NA
1955	6.88	NA	0.94	NA	2.09	NA	0.21	NA	2.30	NA	10.12	NA
1956	7.30	NA	1.11	NA	2.41	NA	0.24	NA	2.65	NA	11.06	NA
1957	8.09	NA	1.17	NA	2.50	NA	0.23	NA	2.73	NA	11.99	NA
1958	7.37	NA	1.32	NA	1.99	NA	0.19	NA	2.18	NA	10.87	NA
1959	7.47	29.18	1.57	6.13	1.97	7.70	0.18	0.70	2.15	8.40	11.19	43.71
1960	7.42	28.54	1.79	6.88	1.95	7.50	0.15	0.58	2.10	8.08	11.31	43.50
1961	7.58	28.82	1.99	7.57	1.85	7.03	0.14	0.53	1.99	7.56	11.56	43.95
1962	7.76	28.96	2.22	8.28	1.89	7.05	0.13	0.49	2.02	7.54	12.00	44.78
1963	7.96	29.26	2.36	8.68	2.01	7.39	0.16	0.59	2.17	7.98	12.49	45.92
1964	8.03	28.99	2.33	8.41	2.17	7.83	0.15	0.54	2.32	8.37	12.68	45.77
1965	8.15	28.70	2.57	9.05	2.27	7.99	0.13	0.46	2.40	8.45	13.12	46.20
1966	8.72	29.66	2.75	9.35	2.42	8.23	0.10	0.34	2.52	8.57	13.99	47.58
1967	9.39	30.99	2.91	9.60	2.55	8.42	0.10	0.33	2.65	8.75	14.95	49.34
1968	9.79	30.88	3.09	9.75	2.55	8.04	0.10	0.32	2.65	8.36	15.53	48.99
1969	10.42	31.29	3.52	10.57	2.80	8.41	0.10	0.30	2.90	8.71	16.84	50.57
1970	11.19	31.88	3.73	10.63	3.77	10.74	0.11	0.31	3.88	11.05	18.80	53.56
1971	11.71	31.56	4.05	10.92	3.90	10.51	0.11	0.30	4.01	10.81	19.77	53.29
1972	11.71	30.18	4.28	11.03	4.56	11.75	0.09	0.23	4.65	11.98	20.64	53.19
1973	13.07	31.65	4.98	12.06	5.05	12.23	0.09	0.22	5.14	12.45	23.19	56.16
1974	22.00	49.00	6.48	14.43	9.50	21.16	0.15	0.33	9.65	21.49	38.13	84.92
1975	23.45	47.66	8.85	17.99	12.47	25.35	0.20	0.41	12.67	25.76	44.97	91.41
1976	24.37	46.60	11.57	22.12	13.19	25.22	0.21	0.40	13.40	25.62	49.34	94.34
1977	25.79	46.14	15.82	28.30	13.70	24.51	0.20	0.36	13.90	24.87	55.51	99.31
1978	28.60	47.43	18.18	30.15	14.49	24.03	0.18	0.30	14.67	24.33	61.45	101.91
1979	39.45	60.23	24.16	36.89	18.36	28.03	0.20	0.31	18.56	28.34	82.17	125.46
1980	67.93	94.74	32.09	44.76	20.20	28.17	0.26	0.36	20.46	28.53	120.48	168.03
1981	99.40	125.98	39.51	50.08	21.51	27.26	0.24	0.30	21.75	27.56	160.66	203.62
1982	90.03	107.43	45.71	54.55	22.62	26.99	0.23	0.27	22.85	27.26	158.59	189.24
1983	83.05	95.24	43.73	50.15	20.11	23.06	0.21	0.24	20.32	23.30	147.10	168.69
1984	84.10	92.42	48.69	53.51	22.75	25.00	0.20	0.22	22.95	25.22	155.74	171.15
1985	78.88	83.56	43.35	45.92	22.06	23.37	0.22	0.23	22.28	23.60	144.51	153.08
1986	39.63	40.90	32.71	33.76	21.00	21.67	0.19	0.20	21.19	21.87	93.53	96.53
1987	46.93	46.93	29.11	29.11	21.05	21.05	0.16	0.16	21.21	21.21	97.25	97.25
1988	37.48	36.07	30.28	29.14	20.83	20.05	0.16	0.15	20.99	20.20	88.75	85.41
1989	44.07	40.65	30.58	28.21	21.27	19.62	0.14	0.13	21.41	19.75	96.06	88.61
1990	53.77	47.63	31.80	28.17	22.27	19.73	0.14	0.12	22.41	19.85	107.98	95.65
1991[3]	44.41	37.96	29.72	25.40	21.55	18.42	0.12	0.10	21.67	18.52	95.80	81.88

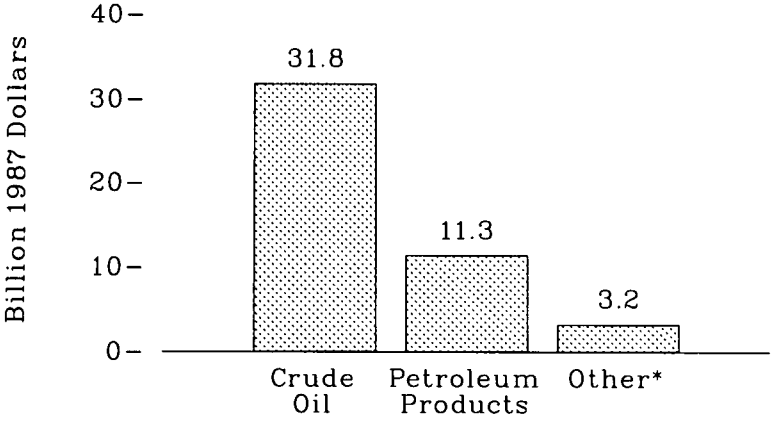
[1] Includes lease condensate.
[2] In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
NA = Not available.
Note: Value is based on fuel prices taken as close as possible to the point of production.
Sources: Tables 68, 75, 81, 84, and 90 and Appendix C.

Figure 34. Value of Fossil Fuel Imports

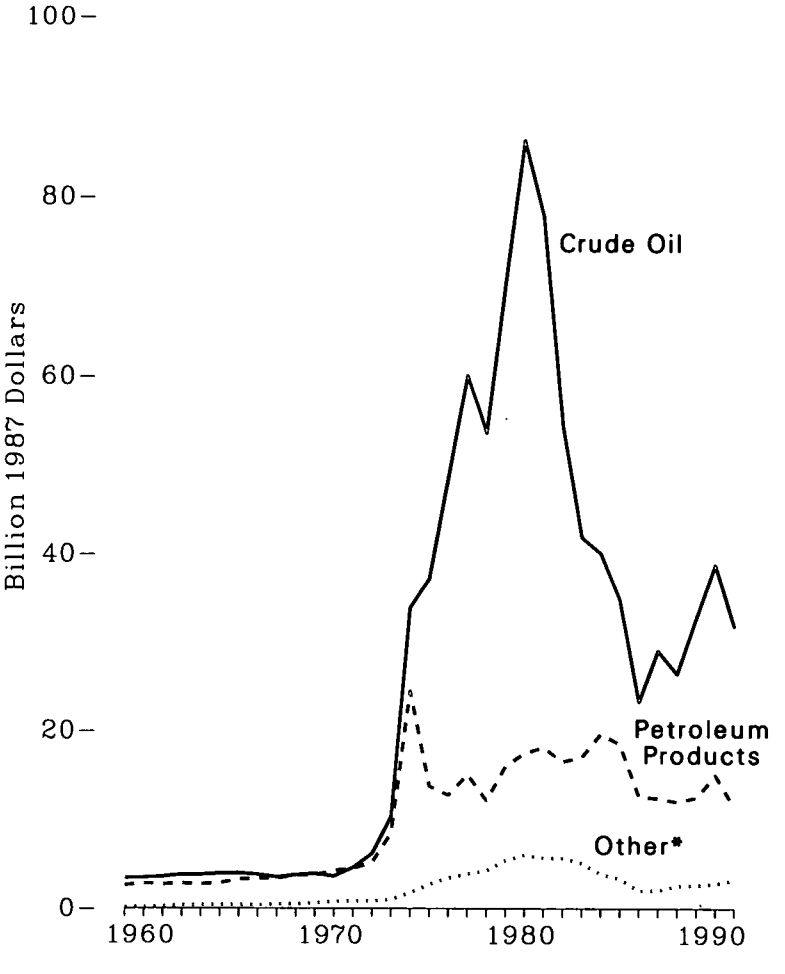
Total, 1959-1991



By Fuel, 1991



By Fuel, 1959-1991



*Coal, coal coke, and natural gas.
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 34.

Table 34. Value of Fossil Fuel Imports, 1949-1991

(Billion Dollars)

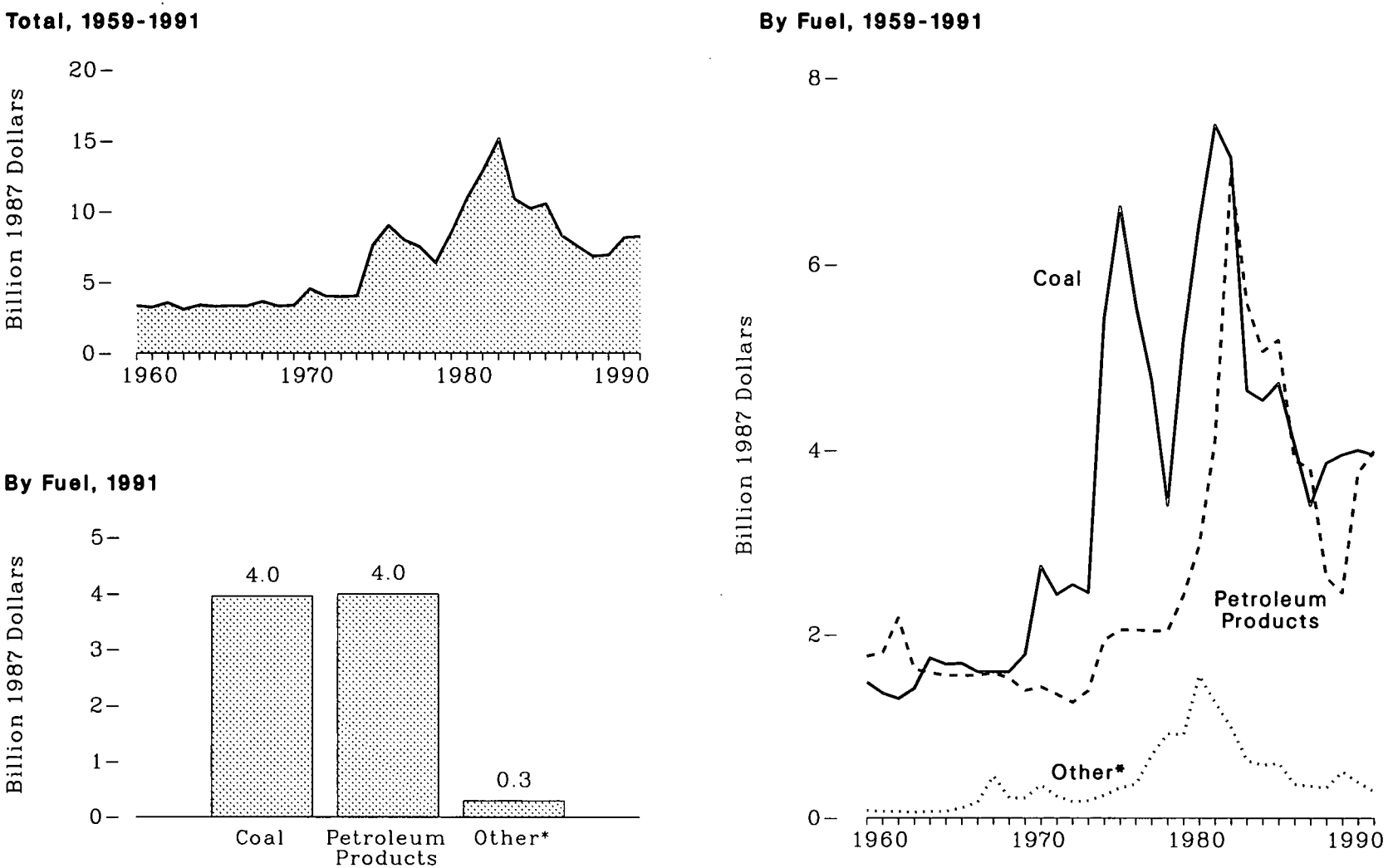
Year	Coal		Coal Coke		Natural Gas		Crude Oil [1]		Petroleum Products		Total	
	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]
1949	[3]	NA	[3]	NA	0	NA	0.30	NA	0.14	NA	0.45	NA
1950	[3]	NA	0.01	NA	0	NA	0.37	NA	0.21	NA	0.59	NA
1951	[3]	NA	[3]	NA	0	NA	0.37	NA	0.23	NA	0.61	NA
1952	[3]	NA	[3]	NA	[3]	NA	0.42	NA	0.25	NA	0.68	NA
1953	[3]	NA	[3]	NA	[3]	NA	0.51	NA	0.25	NA	0.77	NA
1954	[3]	NA	[3]	NA	[3]	NA	0.54	NA	0.28	NA	0.83	NA
1955	[3]	NA	[3]	NA	[3]	NA	0.65	NA	0.44	NA	1.10	NA
1956	[3]	NA	[3]	NA	[3]	NA	0.84	NA	0.45	NA	1.29	NA
1957	[3]	NA	[3]	NA	[3]	NA	0.98	NA	0.57	NA	1.56	NA
1958	[3]	NA	[3]	NA	0.02	NA	0.94	NA	0.68	NA	1.65	NA
1959	[3]	0.01	[3]	0.01	0.03	0.10	0.87	3.41	0.66	2.59	1.57	6.12
1960	[3]	0.01	[3]	0.01	0.03	0.11	0.90	3.44	0.73	2.81	1.66	6.38
1961	[3]	0.01	[3]	0.01	0.04	0.17	0.93	3.55	0.71	2.70	1.69	6.43
1962	[3]	0.01	[3]	0.01	0.09	0.32	1.01	3.78	0.75	2.81	1.86	6.92
1963	[3]	0.01	[3]	0.01	0.10	0.36	1.03	3.77	0.74	2.71	1.87	6.86
1964	[3]	0.01	[3]	0.01	0.10	0.36	1.08	3.90	0.78	2.83	1.97	7.10
1965	[3]	0.01	[3]	[3]	0.11	0.37	1.12	3.94	0.92	3.25	2.15	7.58
1966	[3]	0.01	[3]	0.01	0.11	0.36	1.12	3.79	0.99	3.36	2.21	7.52
1967	[3]	0.01	[3]	0.01	0.13	0.43	1.06	3.51	1.02	3.35	2.21	7.30
1968	[3]	0.01	[3]	0.01	0.15	0.46	1.18	3.74	1.16	3.67	2.50	7.88
1969	[3]	[3]	[3]	0.01	0.20	0.59	1.30	3.90	1.24	3.72	2.74	8.22
1970	[3]	[3]	[3]	0.01	0.26	0.73	1.26	3.59	1.48	4.22	3.00	8.56
1971	[3]	[3]	0.01	0.01	0.31	0.84	1.69	4.55	1.66	4.46	3.66	9.87
1972	[3]	[3]	[3]	0.01	0.31	0.81	2.37	6.11	1.99	5.13	4.68	12.06
1973	[3]	[3]	0.04	0.10	0.36	0.88	4.24	10.27	3.50	8.47	8.14	19.71
1974	0.06	0.13	0.19	0.43	0.53	1.18	15.25	33.97	11.01	24.53	27.05	60.24
1975	0.02	0.04	0.16	0.32	1.15	2.34	18.29	37.18	6.77	13.76	26.39	53.63
1976	0.02	0.03	0.11	0.21	1.66	3.17	25.46	48.67	6.65	12.72	33.90	64.81
1977	0.04	0.07	0.13	0.23	2.00	3.58	33.59	60.09	8.42	15.06	44.18	79.03
1978	0.07	0.12	0.41	0.68	2.06	3.42	32.30	53.56	7.30	12.11	42.15	69.89
1979	0.05	0.08	0.34	0.52	3.13	4.77	46.06	70.32	10.45	15.95	60.03	91.64
1980	0.03	0.04	0.05	0.07	4.21	5.88	61.90	86.33	12.54	17.49	78.74	109.81
1981	0.03	0.04	0.04	0.05	4.41	5.59	61.46	77.89	14.30	18.12	80.24	101.70
1982	0.02	0.03	0.01	0.01	4.69	5.60	45.72	54.56	13.86	16.54	64.31	76.74
1983	0.04	0.05	[3]	[3]	4.39	5.03	36.49	41.85	14.84	17.02	55.77	63.95
1984	0.05	0.05	0.05	0.05	3.44	3.78	36.44	40.05	17.87	19.63	57.84	63.56
1985	0.07	0.07	0.04	0.05	3.05	3.23	32.90	34.85	17.47	18.50	53.53	56.71
1986	0.08	0.08	0.03	0.03	1.82	1.88	22.61	23.33	12.18	12.57	36.72	37.89
1987	0.06	0.06	0.05	0.05	1.93	1.93	29.13	29.13	12.37	12.37	43.54	43.54
1988	0.06	0.06	0.19	0.19	2.38	2.29	27.55	26.51	12.43	11.97	42.62	41.02
1989	0.10	0.09	0.22	0.20	2.51	2.31	35.53	32.78	13.50	12.45	51.85	47.83
1990	0.09	0.08	0.07	0.06	2.97	2.63	43.78	38.78	16.90	14.97	63.83	56.53
1991[4]	0.11	0.10	0.09	0.08	3.53	3.02	37.15	31.75	13.24	11.31	54.13	46.26

[1] Includes imports into the Strategic Petroleum Reserve, which began in 1977.
[2] In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.
[3] Less than $5 million.
[4] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
NA = Not available.

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. • Sum of components may not equal total 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. • 1982-1990—EIA, *Natural Gas Monthly*. • 1991—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 forward—Bureau of the Census, *Advanced Report on U.S. Merchandise Trade*, FT900 Adv. (91-12).

Figure 35. Value of Fossil Fuel Exports



*Coal coke, natural gas, and crude oil.
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 35.

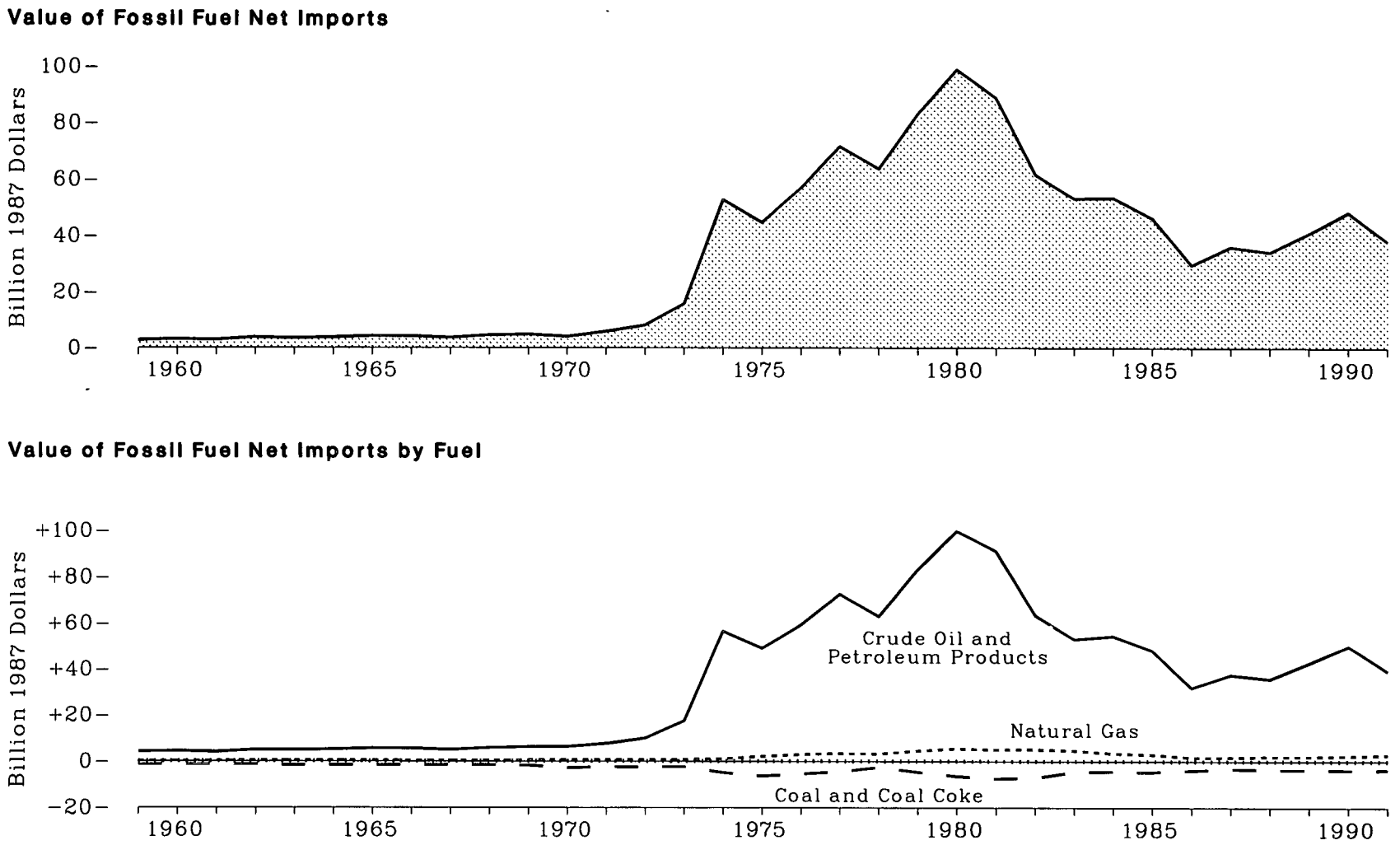
Table 35. Value of Fossil Fuel Exports, 1949-1991

(Billion Dollars)

Year	Coal		Coal Coke		Natural Gas		Crude Oil		Petroleum Products		Total	
	Nominal	Real [1]	Nominal	Real [1]	Nominal	Real [1]	Nominal	Real [1]	Nominal	Real [1]	Nominal	Real [1]
1949	0.30	NA	0.01	NA	[2]	NA	0.10	NA	0.46	NA	0.87	NA
1950	0.27	NA	0.01	NA	[2]	NA	0.10	NA	0.39	NA	0.78	NA
1951	0.59	NA	0.02	NA	[2]	NA	0.08	NA	0.70	NA	1.39	NA
1952	0.49	NA	0.01	NA	[2]	NA	0.08	NA	0.74	NA	1.33	NA
1953	0.34	NA	0.01	NA	[2]	NA	0.06	NA	0.63	NA	1.04	NA
1954	0.30	NA	0.01	NA	[2]	NA	0.05	NA	0.61	NA	0.97	NA
1955	0.48	NA	0.01	NA	0.01	NA	0.04	NA	0.60	NA	1.14	NA
1956	0.73	NA	0.01	NA	0.01	NA	0.09	NA	0.67	NA	1.51	NA
1957	0.83	NA	0.01	NA	0.01	NA	0.17	NA	0.81	NA	1.84	NA
1958	0.53	NA	0.01	NA	0.01	NA	0.01	NA	0.51	NA	1.07	NA
1959	0.38	1.48	0.01	0.03	0.01	0.02	0.01	0.03	0.45	1.76	0.85	3.33
1960	0.35	1.36	0.01	0.03	[2]	0.01	0.01	0.03	0.47	1.80	0.84	3.23
1961	0.34	1.30	0.01	0.03	[2]	0.01	0.01	0.03	0.57	2.18	0.93	3.55
1962	0.38	1.41	0.01	0.03	[2]	0.01	0.01	0.02	0.43	1.62	0.83	3.08
1963	0.47	1.74	0.01	0.03	[2]	0.02	[2]	0.02	0.43	1.58	0.92	3.38
1964	0.46	1.67	0.01	0.04	[2]	0.02	[2]	0.01	0.43	1.55	0.91	3.29
1965	0.48	1.68	0.02	0.06	0.01	0.03	[2]	0.02	0.44	1.55	0.95	3.33
1966	0.47	1.59	0.02	0.08	0.02	0.06	0.01	0.03	0.46	1.55	0.97	3.32
1967	0.48	1.59	0.02	0.05	0.03	0.11	0.09	0.30	0.48	1.58	1.10	3.64
1968	0.50	1.59	0.02	0.06	0.04	0.12	0.01	0.04	0.48	1.52	1.05	3.32
1969	0.59	1.78	0.04	0.12	0.03	0.08	0.01	0.02	0.46	1.39	1.13	3.38
1970	0.96	2.74	0.08	0.22	0.03	0.09	0.02	0.05	0.50	1.43	1.59	4.53
1971	0.90	2.43	0.04	0.12	0.04	0.10	0.01	0.02	0.50	1.35	1.49	4.02
1972	0.98	2.54	0.03	0.08	0.04	0.10	[2]	[2]	0.49	1.26	1.55	3.98
1973	1.01	2.45	0.03	0.08	0.04	0.10	[2]	0.01	0.57	1.39	1.66	4.03
1974	2.44	5.43	0.04	0.10	0.05	0.12	0.01	0.03	0.87	1.94	3.42	7.62
1975	3.26	6.62	0.07	0.15	0.09	0.18	[2]	[2]	1.01	2.05	4.43	9.01
1976	2.91	5.56	0.07	0.13	0.10	0.19	0.03	0.05	1.07	2.05	4.17	7.98
1977	2.66	4.75	0.07	0.13	0.11	0.19	0.21	0.37	1.14	2.04	4.18	7.48
1978	2.05	3.40	0.05	0.08	0.11	0.19	0.39	0.65	1.23	2.04	3.83	6.36
1979	3.40	5.19	0.08	0.12	0.13	0.19	0.39	0.60	1.58	2.42	5.58	8.53
1980	4.63	6.45	0.13	0.18	0.23	0.32	0.75	1.05	2.12	2.96	7.86	10.96
1981	5.92	7.50	0.07	0.09	0.35	0.44	0.58	0.73	3.24	4.10	10.16	12.87
1982	5.99	7.15	0.06	0.07	0.30	0.36	0.47	0.56	5.86	6.99	12.68	15.14
1983	4.06	4.65	0.05	0.05	0.28	0.32	0.22	0.26	4.88	5.59	9.48	10.87
1984	4.13	4.54	0.07	0.08	0.27	0.30	0.19	0.20	4.62	5.07	9.27	10.19
1985	4.47	4.73	0.08	0.08	0.26	0.28	0.23	0.24	4.90	5.19	9.93	10.52
1986	3.93	4.06	0.07	0.07	0.17	0.18	0.12	0.12	3.77	3.89	8.05	8.31
1987	3.40	3.40	0.05	0.05	0.17	0.17	0.13	0.13	3.80	3.80	7.54	7.54
1988	4.01	3.86	0.08	0.07	0.20	0.19	0.08	0.07	2.72	2.62	7.09	6.83
1989	4.29	3.95	0.08	0.07	0.27	0.25	0.21	0.19	2.65	2.45	7.49	6.91
1990	4.51	4.00	0.05	0.04	0.27	0.23	0.14	0.12	4.23	3.75	9.20	8.15
1991[3]	4.62	3.95	0.05	0.04	0.26	0.22	0.04	0.03	4.67	3.99	9.63	8.23

[1] In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.
[2] Less than $5 million.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
NA = Not available.
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. • Sum of components may not equal total 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. • 1982-1990—EIA, *Natural Gas Monthly*. • 1991—EIA estimates. **All Other Data:** • 1949-1988—Bureau of the Census, *U.S. Exports*, FT410. • 1989 forward—Bureau of the Census, *Advanced Report on U.S. Merchandise Trade*, FT900 Adv. (91-12).

Figure 36. Value of Fossil Fuel Net Imports, 1959-1991



Note: Negative net imports are net exports.
Source: Table 36.

Table 36. Value of Fossil Fuel Net Imports, 1949-1991

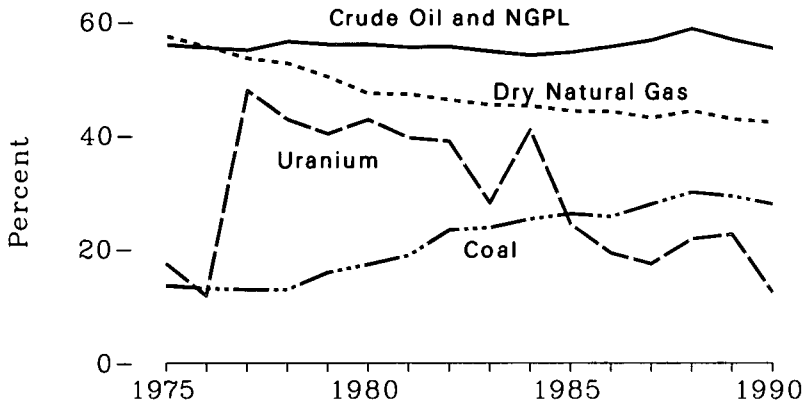
(Billion Dollars)

Year	Coal		Coal Coke		Natural Gas		Crude Oil		Petroleum Products		Total	
	Nominal	Real [1]	Nominal	Real [1]	Nominal	Real [1]	Nominal	Real [1]	Nominal	Real [1]	Nominal	Real [1]
1949	-0.29	NA	[2]	NA	[2]	NA	0.21	NA	-0.32	NA	-0.42	NA
1950	-0.27	NA	[2]	NA	[2]	NA	0.27	NA	-0.18	NA	-0.18	NA
1951	-0.58	NA	-0.02	NA	[2]	NA	0.29	NA	-0.47	NA	-0.78	NA
1952	-0.49	NA	-0.01	NA	[2]	NA	0.34	NA	-0.49	NA	-0.65	NA
1953	-0.33	NA	-0.01	NA	[2]	NA	0.45	NA	-0.38	NA	-0.27	NA
1954	-0.30	NA	[2]	NA	[2]	NA	0.50	NA	-0.32	NA	-0.14	NA
1955	-0.48	NA	-0.01	NA	-0.01	NA	0.62	NA	-0.16	NA	-0.04	NA
1956	-0.73	NA	-0.01	NA	-0.01	NA	0.75	NA	-0.22	NA	-0.22	NA
1957	-0.83	NA	-0.01	NA	-0.01	NA	0.81	NA	-0.24	NA	-0.28	NA
1958	-0.52	NA	-0.01	NA	0.01	NA	0.92	NA	0.17	NA	0.58	NA
1959	-0.38	-1.47	-0.01	-0.03	0.02	0.08	0.87	3.38	0.21	0.83	0.71	2.79
1960	-0.35	-1.35	-0.01	-0.02	0.02	0.10	0.89	3.41	0.26	1.02	0.82	3.15
1961	-0.34	-1.29	-0.01	-0.03	0.04	0.16	0.92	3.52	0.14	0.52	0.76	2.88
1962	-0.38	-1.40	-0.01	-0.02	0.08	0.31	1.01	3.76	0.32	1.20	1.03	3.84
1963	-0.47	-1.73	-0.01	-0.02	0.09	0.34	1.02	3.75	0.31	1.14	0.95	3.48
1964	-0.46	-1.66	-0.01	-0.03	0.10	0.34	1.08	3.89	0.35	1.27	1.06	3.81
1965	-0.48	-1.67	-0.01	-0.05	0.10	0.35	1.11	3.93	0.48	1.70	1.21	4.25
1966	-0.47	-1.59	-0.02	-0.07	0.09	0.30	1.11	3.76	0.53	1.81	1.24	4.21
1967	-0.48	-1.59	-0.01	-0.05	0.10	0.32	0.97	3.21	0.54	1.77	1.11	3.67
1968	-0.50	-1.58	-0.02	-0.05	0.11	0.34	1.17	3.70	0.68	2.15	1.45	4.56
1969	-0.59	-1.78	-0.04	-0.11	0.17	0.51	1.29	3.88	0.78	2.33	1.61	4.84
1970	-0.96	-2.74	-0.08	-0.21	0.23	0.65	1.24	3.54	0.98	2.80	1.41	4.03
1971	-0.90	-2.43	-0.04	-0.11	0.27	0.74	1.68	4.53	1.15	3.11	2.17	5.85
1972	-0.98	-2.53	-0.03	-0.07	0.28	0.71	2.37	6.10	1.50	3.87	3.13	8.08
1973	-1.01	-2.45	0.01	0.01	0.32	0.78	4.24	10.26	2.93	7.08	6.48	15.68
1974	-2.38	-5.30	0.15	0.33	0.48	1.06	15.24	33.94	10.14	22.58	23.63	52.62
1975	-3.24	-6.58	0.08	0.17	1.06	2.15	18.29	37.18	5.76	11.71	21.96	44.63
1976	-2.89	-5.53	0.04	0.08	1.56	2.98	25.43	48.62	5.58	10.67	29.72	56.83
1977	-2.62	-4.68	0.06	0.11	1.89	3.39	33.38	59.72	7.28	13.02	40.00	71.55
1978	-1.98	-3.28	0.36	0.60	1.95	3.23	31.91	52.92	6.07	10.07	38.31	63.54
1979	-3.35	-5.11	0.26	0.40	3.00	4.58	45.66	69.72	8.87	13.54	54.44	83.12
1980	-4.60	-6.41	-0.08	-0.11	3.98	5.56	61.15	85.28	10.42	14.53	70.88	98.85
1981	-5.89	-7.46	-0.03	-0.04	4.06	5.15	60.88	77.16	11.06	14.02	70.09	88.83
1982	-5.97	-7.12	-0.05	-0.06	4.39	5.24	45.25	54.00	8.00	9.55	51.63	61.61
1983	-4.01	-4.60	-0.04	-0.05	4.11	4.71	36.27	41.59	9.96	11.43	46.28	53.08
1984	-4.09	-4.49	-0.02	-0.02	3.17	3.48	36.26	39.85	13.25	14.56	48.57	53.37
1985	-4.39	-4.66	-0.03	-0.04	2.79	2.95	32.68	34.62	12.57	13.32	43.60	46.19
1986	-3.85	-3.97	-0.04	-0.04	1.65	1.70	22.49	23.21	8.42	8.68	28.67	29.58
1987	-3.35	-3.35	0.01	0.01	1.76	1.76	29.00	29.00	8.57	8.57	36.00	36.00
1988	-3.95	-3.80	0.12	0.11	2.18	2.10	27.47	26.44	9.71	9.35	35.53	34.19
1989	-4.19	-3.86	0.14	0.13	2.24	2.06	35.32	32.59	10.85	10.00	44.35	40.92
1990	-4.42	-3.91	0.02	0.02	2.71	2.40	43.65	38.66	12.67	11.22	54.63	48.39
1991[3]	-4.51	-3.85	0.04	0.04	3.27	2.80	37.12	31.72	8.57	7.33	44.50	38.03

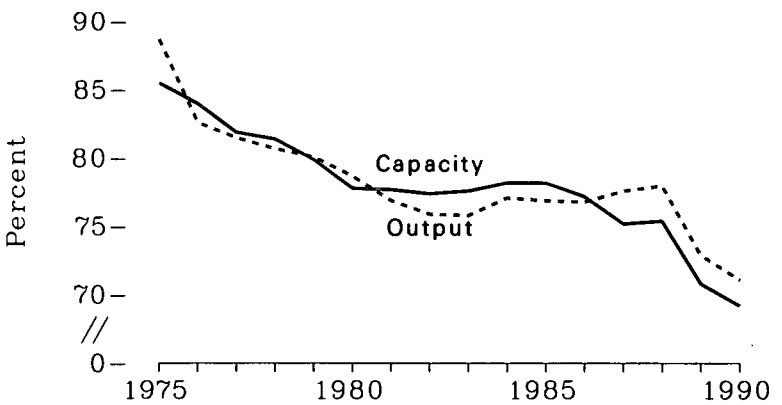
[1] In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.
[2] Less than $5 million.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
NA = Not available.
Notes: • Net imports = imports minus exports. • Sum of components may not equal total due to independent rounding. Data on this table may not equal data on Table 34 minus data on Table 35 due to independent rounding.
Sources: Tables 34 and 35.

Figure 37. FRS Companies' Operations, Selected Statistics, 1975-1990

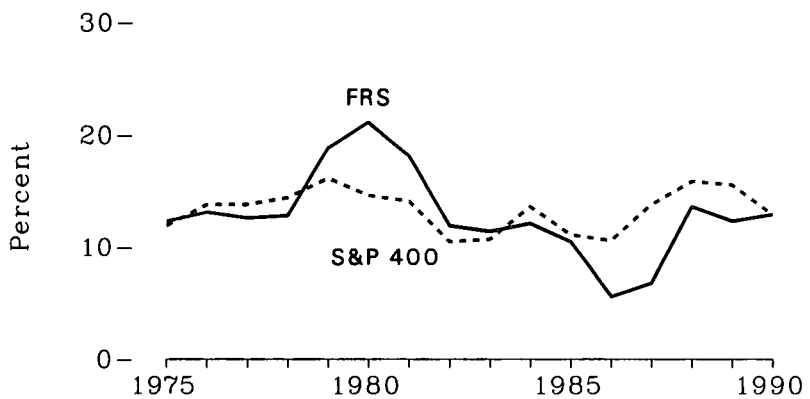
FRS Shares of U.S. Total Production



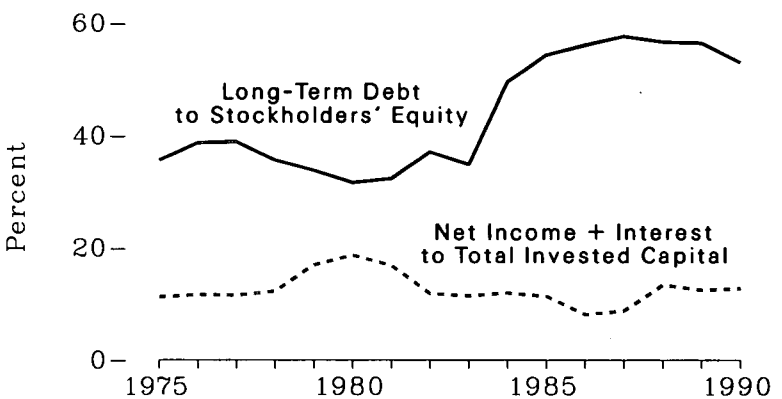
FRS Shares of U.S. Refining Capacity and Output



FRS Companies' Net Income to Stockholders' Equity



FRS Companies' Indicators



Notes: • FRS=Financial Reporting System (see Appendix E, Note 3). • Because vertical scales differ, graphs should not be compared.
Source: Table 37.

Table 37. FRS Companies' Operations, Selected Statistics, 1975-1990

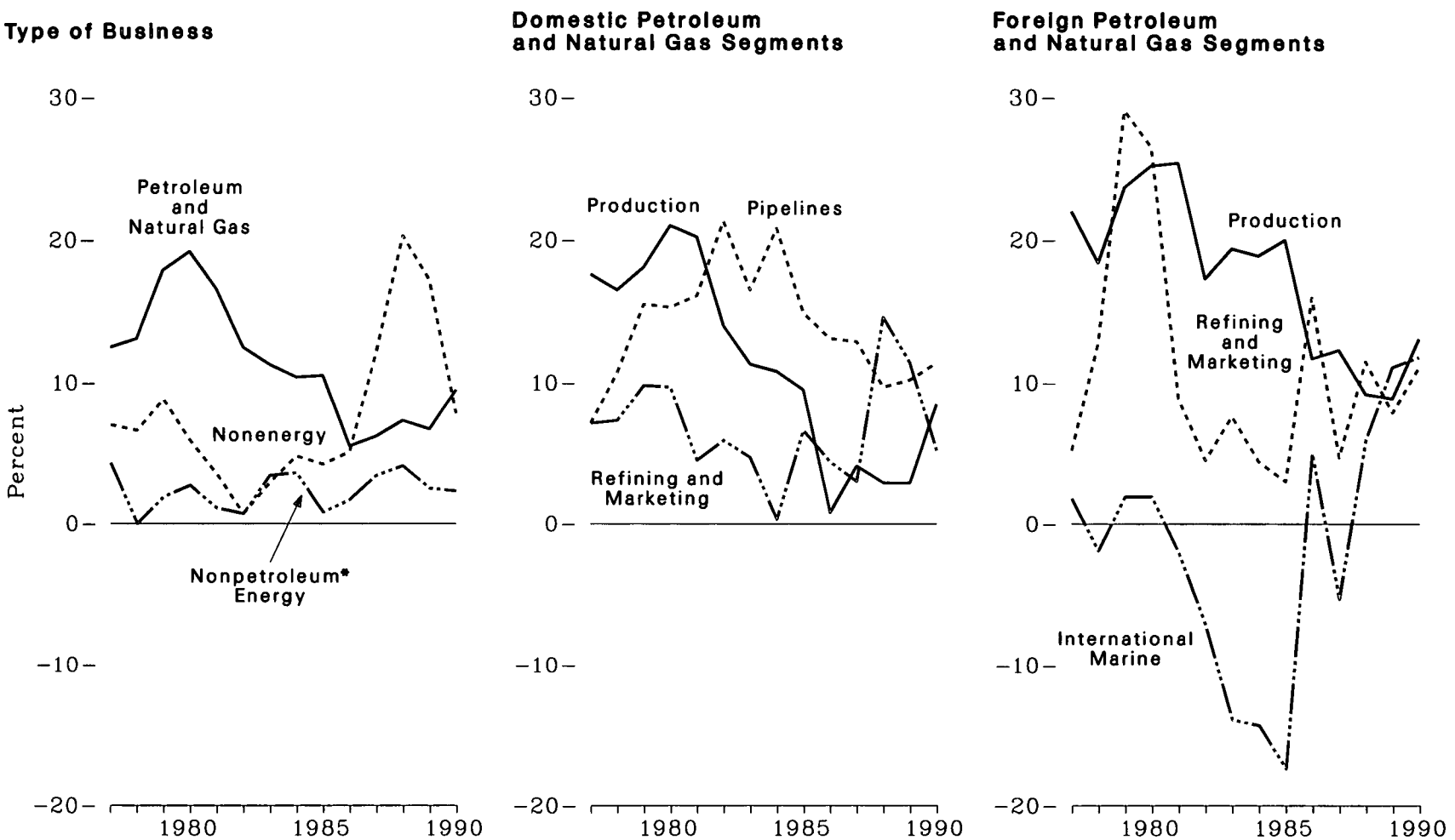
Year	Production				Refining		Financial Indicators				
	Crude Oil and Natural Gas Liquids	Dry Natural Gas	Coal [1]	Uranium	Capacity [2]	Output	Net Income	Net Income to Stockholders' Equity	Net Income to Stockholders' Equity for S&P 400 [3]	Net Income Plus Interest to Total Invested Capital	Long-Term Debt to Stockholders' Equity
	Million Barrels	Trillion Cubic Feet	Million Short Tons	Million Pounds of U_3O_8	Million Barrels per Day		Billion Dollars	Percent			
1975	2,049.9	11.0	88.1	4.3	13.4	12.8	10.3	12.3	11.9	11.3	35.6
1976	1,983.4	10.6	89.0	3.3	14.2	12.8	12.0	13.1	13.8	11.7	38.7
1977	1,991.2	10.3	89.1	16.0	14.6	13.6	12.7	12.6	13.8	11.6	38.9
1978	2,131.4	10.1	85.5	17.3	14.8	13.6	13.9	12.8	14.4	12.3	35.6
1979	2,081.7	9.9	123.3	16.7	14.4	13.3	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	11.2	30.0	18.1	14.1	16.8	32.2
1982	2,079.1	8.3	195.2	9.2	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	10.4	21.9	11.4	10.7	11.5	34.8
1984	2,088.8	7.9	226.0	4.1	12.8	11.0	21.3	12.1	13.6	12.0	49.5
1985	2,120.5	7.3	230.4	2.1	12.6	10.9	17.4	10.5	11.1	11.4	54.3
1986	2,089.6	7.1	227.6	1.6	12.5	11.5	9.2	5.6	10.6	8.1	56.0
1987	2,069.5	7.2	255.3	2.3	12.5	11.7	11.3	6.8	13.8	8.8	57.6
1988	2,102.1	7.6	285.3	2.9	12.3	12.0	22.3	13.6	15.8	13.4	56.6
1989	1,911.1	7.5	286.9	3.1	11.5	11.4	19.8	12.3	15.5	12.5	56.4
1990	1,814.0	7.6	282.0	1.1	11.4	11.3	21.6	12.9	12.9	12.8	53.0
	Percent of U.S. Total										
1975	55.9	57.4	13.6	17.5	85.5	88.7					
1976	55.4	55.6	13.1	11.8	84.0	82.6					
1977	55.0	53.6	12.9	47.9	81.9	81.5					
1978	56.5	52.7	12.9	42.8	81.4	80.7					
1979	56.0	50.3	15.9	40.3	79.9	80.1					
1980	56.0	47.4	17.3	42.8	77.8	78.7					
1981	55.5	47.3	18.9	39.6	77.7	76.9					
1982	55.6	46.3	23.4	39.0	77.4	75.9					
1983	54.8	45.4	23.8	28.1	77.6	75.8					
1984	54.1	45.2	25.3	41.0	78.2	77.1					
1985	54.6	44.3	26.2	24.4	78.2	76.9					
1986	55.6	44.2	25.7	19.3	77.2	76.8					
1987	56.7	43.1	27.9	17.4	75.2	77.6					
1988	58.7	44.3	30.0	21.8	75.4	78.0					
1989	56.8	42.9	29.3	22.6	70.8	72.9					
1990	55.3	42.3	27.4	12.4	69.2	71.1					

[1] Bituminous coal, subbituminous coal, and lignite.
[2] Operable capacity as of January 1 of the following year.
[3] Standard and Poors' 400.

Notes: • FRS = Financial Reporting System (see Appendix E, Note 3). • FRS Crude Oil and NGL and Natural Gas (Dry Marketed) production are on a net ownership interest basis (see Glossary).

Sources: **U.S. Total, Production: Crude Oil and NGL:** •1975 through 1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement Annual.* •1981 forward—EIA, *Petroleum Supply Annual.* **U.S. Total, Production: Dry Natural Gas:** •1975 and 1978—EIA, Energy Data Reports, *Natural Gas Annual.* •1979—EIA, *Natural Gas Production and Consumption.* •1980 forward—EIA, *Natural Gas Annual.* **U.S. Total, Production: Bituminous Coal and Lignite:** •1975 through 1979—EIA, Energy Data Report, *Bituminous Coal and Lignite Production and Mine Operations.* •1980—EIA, Energy Data Report, *Weekly Coal Report.* •1981 forward—EIA, *Weekly Coal Production.* **U.S. Total, Production: Uranium:** •1975 through 1981—U.S. Department of Energy, Grand Junction Office, *Statistical Data of the Uranium Industry,* Report No. GJO-100, annual. •1982 and 1983—EIA, *Survey of United States Uranium Marketing Activity.* •1984 forward—EIA, *Uranium Industry Annual* **U.S. Total, Refining:** •1975 through 1980—EIA, *Energy Company Development Patterns in the Postembargo Era,* Vol. 1. •1981 forward—EIA, *Petroleum Supply Annual.* **FRS Companies:** EIA, *Performance Profiles of Major Energy Producers.*

Figure 38. FRS Companies' Return on Investment by Type of Business, 1977–1990



*Coal, nuclear, and other energy.

Notes: • FRS=Financial Reporting System (see Appendix E, Note 3). • Return on investment=Net income as a percent of net investment in place.

Source: Tables 38 and 39.

Table 38. FRS Companies' Net Income, 1975-1990

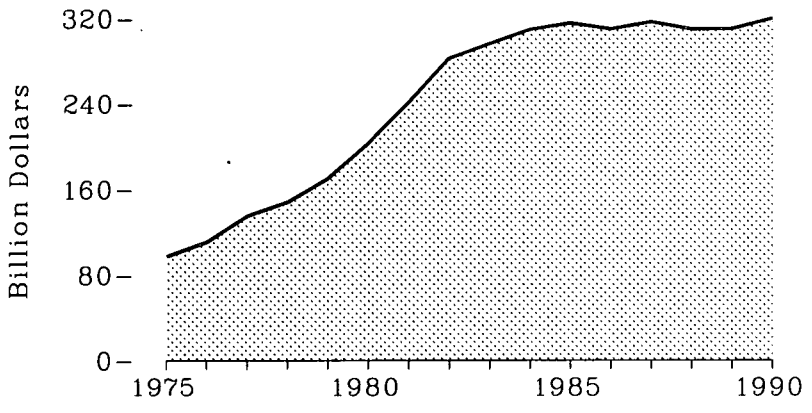
(Billion Dollars)

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 [1]	Production	Refining and Marketing	Rate Regulated Pipelines	Total [1]	Production	Refining and Marketing	International Marine	Total [1]
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	[2]	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	[2]	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	[2]	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	[2]	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	[2]	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	13.0	7.4	2.8	0.2	10.5

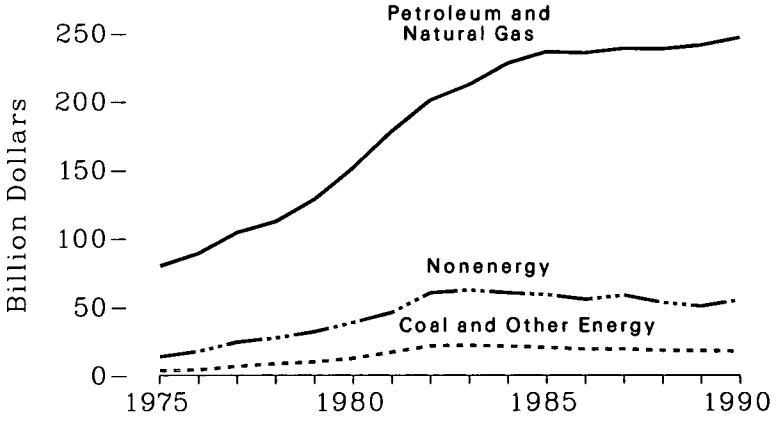
[1] Total is sum of components shown plus eliminations and nontraceables, which are defined in the glossary.
[2] Less than $50 million in absolute value.
NA = Not available.
Note: FRS is the Financial Reporting System (see Appendix E, Note 3).
Source: Energy Information Administration, *Performance Profiles of Major Energy Producers*, various issues.

Figure 39. FRS Companies' Net Investment in Place, 1975-1990

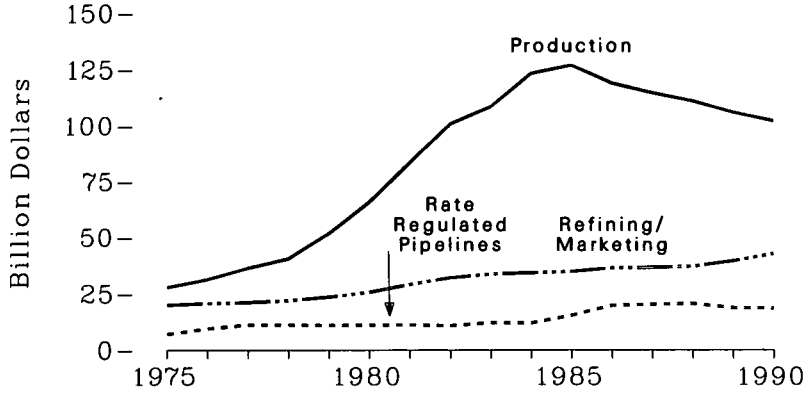
Total



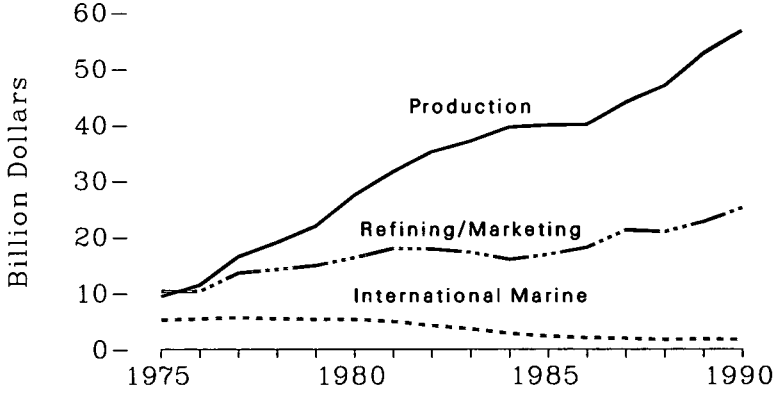
Type of Business by Fuel



Domestic Petroleum and Natural Gas



Foreign Petroleum and Natural Gas



Notes: • FRS=Financial Reporting System (see Appendix E, Note 3). • Because vertical scales differ, graphs should not be compared.
Source: Table 39.

Table 39. FRS Companies' Net Investment in Place, 1975-1990

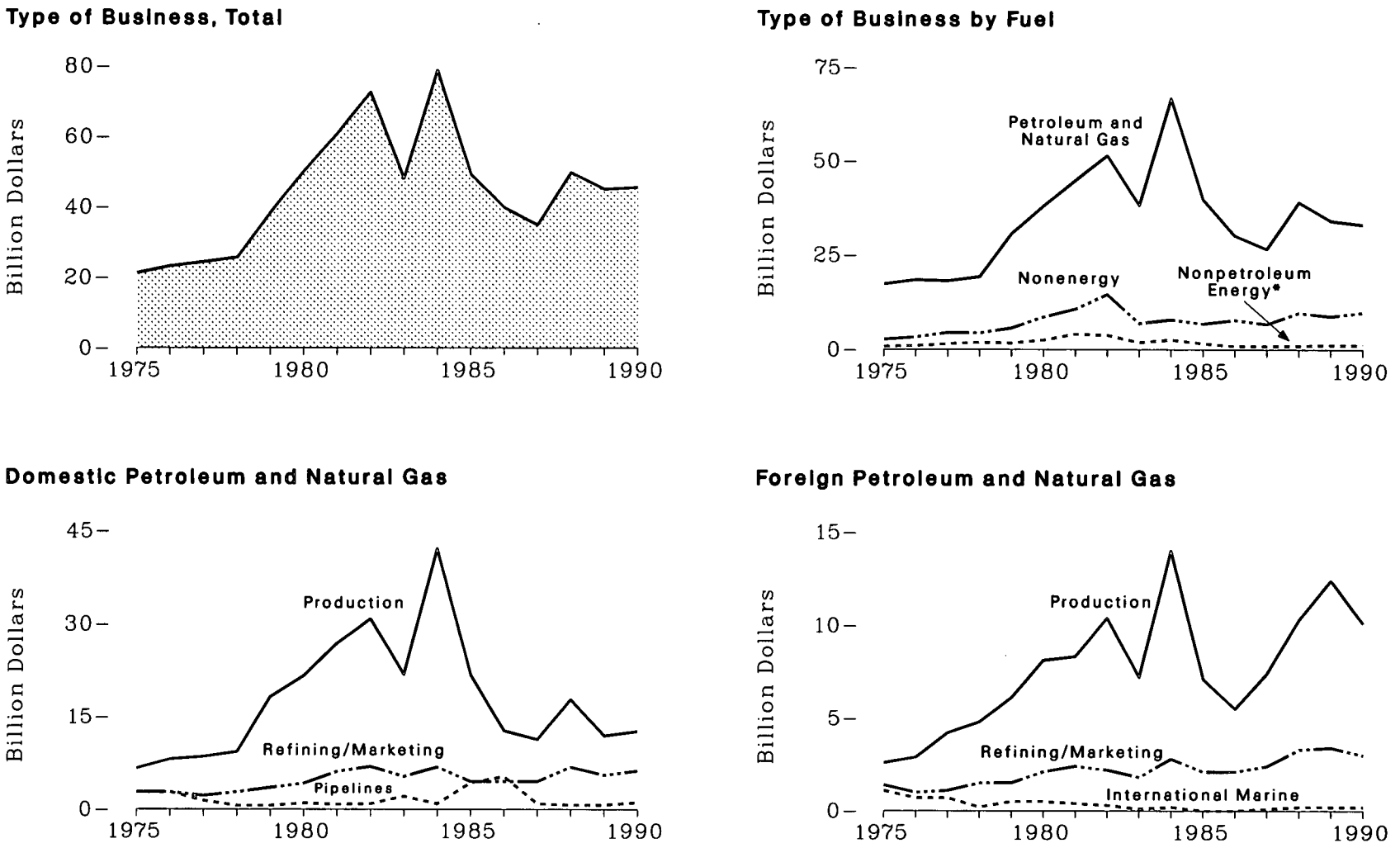
(Billion Dollars)

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
1975	79.8	1.6	0.8	13.7	1.0	97.3	27.8	20.0	7.0	54.8	9.4	10.3	5.2	24.9
1976	88.9	2.0	1.0	17.6	1.1	111.1	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	83.2	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	36.4	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	246.9	8.2	2.9	55.1	6.5	319.6	102.1	42.6	18.5	163.2	56.7	25.2	1.7	83.6

Notes: • FRS is the Financial Reporting System (see Appendix E, Note 3). • Net investment in place is net property, plant, and equipment plus investments and advances. • Sum of components may not equal total due to independent rounding.

Source: Energy Information Administration, *Performance Profiles of Major Energy Producers*, various issues.

Figure 40. FRS Companies' Additions to Investment in Place, 1975–1990



*Coal, nuclear and other energy.

Notes: • FRS=Financial Reporting System (see Appendix E, Note 3). • Because vertical scales differ, graphs should not be compared.

Source: Table 40.

Table 40. FRS Companies' Additions to Investment in Place, 1975-1990

(Billion Dollars)

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 [1]	Production	Refining and Marketing	Rate Regulated Pipelines	Total	Production	Refining and Marketing	International Marine	Total
1975	17.3	0.5	0.3	2.7	21.1	6.6	2.8	2.8	12.2	2.6	1.4	1.1	5.1
1976	18.4	0.5	0.5	3.3	23.1	8.1	2.8	2.8	13.8	2.9	1.0	0.7	4.6
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	1.0	0.9	4.4	25.6	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	(2)	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	(2)	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

[1] Total is sum of components shown plus nontraceables, which are defined in the glossary. Sum of components may not equal total due to independent rounding.
[2] Less than $50 million.
Notes: • FRS is the Financial Reporting System (see Appendix E, Note 3). • Additions to investment in place is property, plant, and equipment plus investments and advances.
Source: Energy Information Administration, *Performance Profiles of Major Energy Producers*, various issues.

4. Energy Resources

Crude Oil and Natural Gas Resources

The most recent U.S. Geological Survey assessment of U.S. undiscovered recoverable resources provides a mean estimate for 1987 of 49 billion barrels of crude oil (41).[1] Alaska, including its Federal offshore region, accounted for one-third of all U.S. crude oil resources. The Survey's mean estimate of natural gas resources was 399 trillion cubic feet. The Gulf Coast and the Federal offshore region in the Gulf of Mexico accounted for nearly one-half and Alaska's onshore and offshore regions accounted for nearly one-fifth of the U.S. total.

Exploring for Energy Resources

Exploration for oil and gas is closely tied to market conditions, particularly to the price of crude oil. When the price rose in 1981, three indicators of exploratory activity all rose to record levels: seismic crews working rose to 681, rotary rigs in operation rose to 3,970, and exploratory wells drilled rose to 17.5 thousand (43 and 44). Subsequently, prices declined and then collapsed, leading to drastic cutbacks in exploration. By 1991, seismic crews working had declined to 104, rotary rigs in operation had declined to 860, and exploratory wells drilled had declined to 3.9 thousand, the lowest levels in at least 43 years.

Exploration for uranium also reflects changes in energy markets. The number of exploratory and development holes drilled peaked in 1978 at 104 thousand (50). As uranium market conditions deteriorated after 1978, the number plunged to less than 4 thousand in 1985 and remained in the 3-to-5 thousand range through 1990.

[1]Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications.

Crude Oil and Natural Gas Proved Reserves

Proved reserves of crude oil, natural gas, and natural gas liquids combined increased every year from 1949 until 1968 (48), 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, falling to 62 billion barrels (crude oil equivalent) in 1990. At the end of 1970, 28 billion barrels of crude oil (including lease condensate) and 178 trillion cubic feet of natural gas remained as proved reserves (42). However, reserves of natural gas alone increased in 1990, largely due to growth in reserves in coalbed methane fields.

Through 1990, crude oil cumulative production of 162 billion barrels from 39 thousand fields equaled about 85 percent of estimated ultimate recovery, while natural gas cumulative production of 800 trillion cubic feet from 35 thousand fields equaled about 82 percent of ultimate recovery.

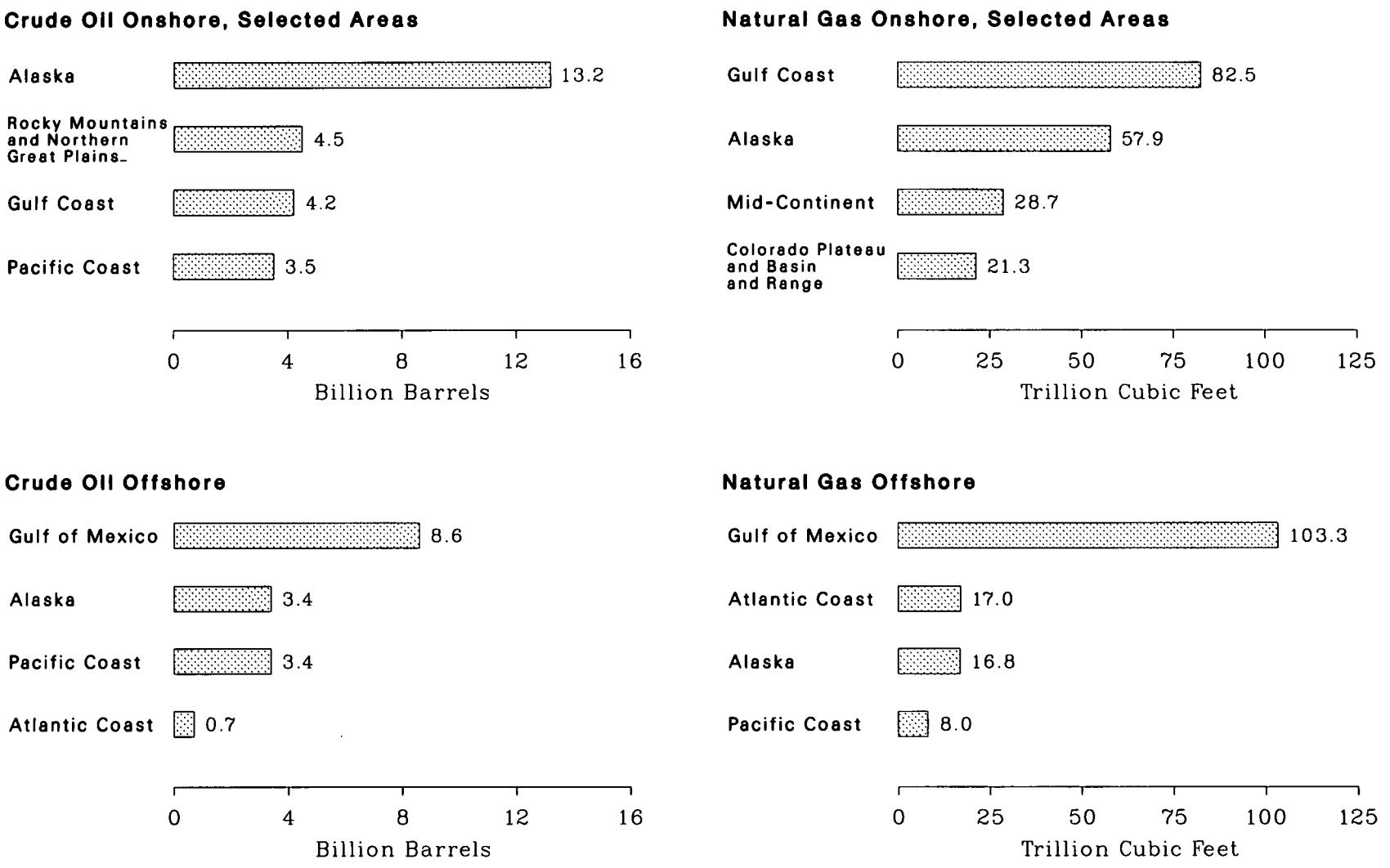
Coal Reserves: An Abundant Supply

The Energy Information Administration has estimated that the demonstrated reserve base of coal contained 470 billion short tons at the beginning of 1991 (49). Although recoverability rates differ from site to site, about one-half of the demonstrated reserve base is estimated to be recoverable.

Uranium Resources

At the end of 1990, reasonably assured uranium resources with forward costs (those yet to be incurred in production) of up to $30 per pound totaled 265 million pounds of uranium oxide (U_3O_8), almost one third of which was in New Mexico (51). Estimated additional resources and speculative resources in the $30-per-pound category in 1990 totaled 2.2 billion pounds and 1.3 billion pounds, respectively.

Figure 41. Crude Oil and Natural Gas Estimated Undiscovered Recoverable Resources, January 1, 1987



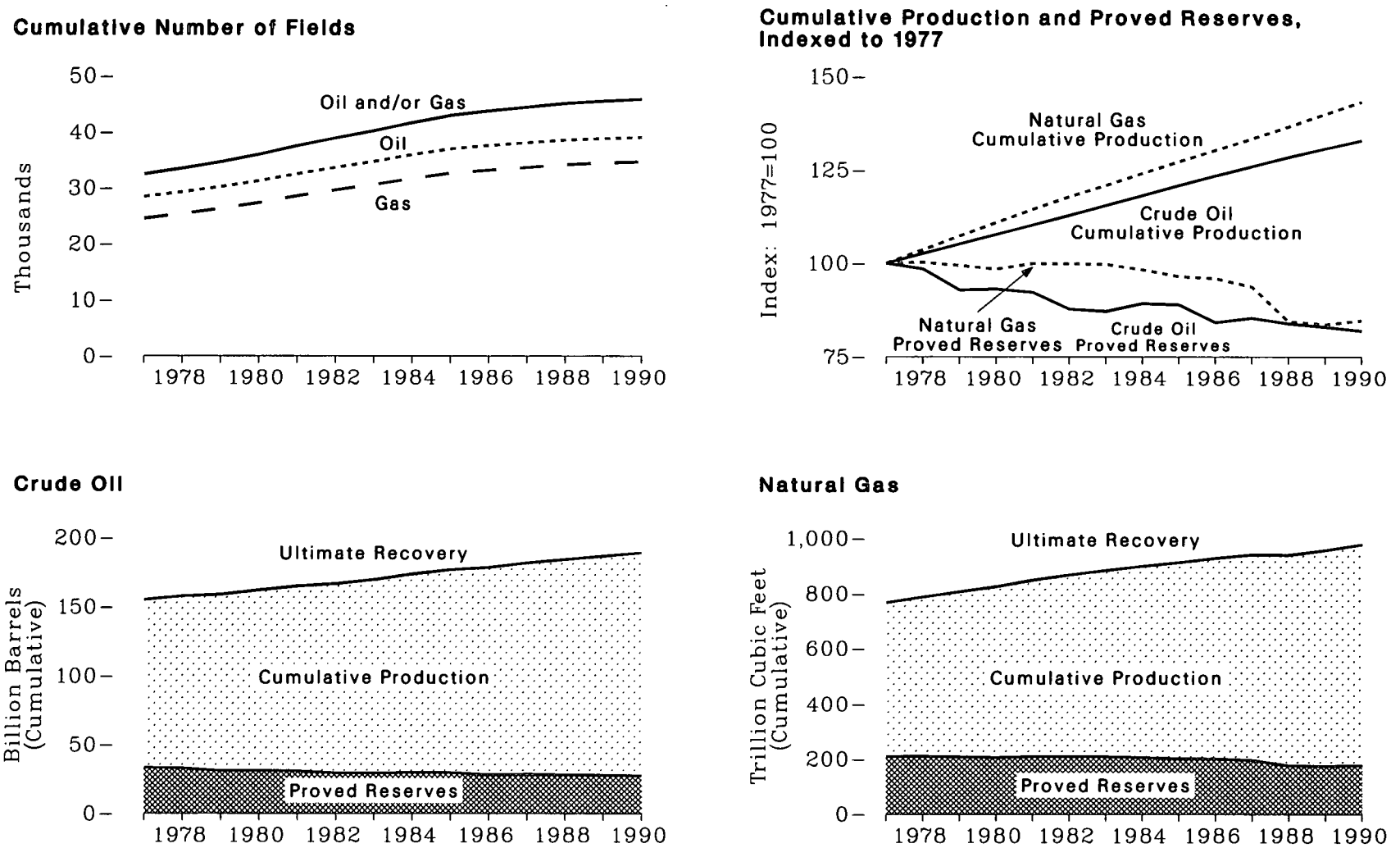
Note: Values plotted are the calculated means.
Source: Table 41.

Table 41. Crude Oil and Natural Gas Estimated Undiscovered Recoverable Resources, January 1, 1987

Region	Crude Oil (billion barrels)			Natural Gas (trillion cubic feet)		
		Estimated Range [1]			Estimated Range [1]	
	Mean [2]	Low	High	Mean [2]	Low	High
Onshore and State Waters	**33.3**	**19.6**	**51.9**	**254.0**	**178.7**	**346.7**
Alaska	13.2	3.6	31.3	57.9	15.6	138.6
Pacific Coast	3.5	1.5	6.6	11.0	5.5	19.1
Colorado Plateau and Basin and Range	1.5	0.5	3.4	21.3	9.6	39.3
Rocky Mountains and Northern Great Plains	4.5	2.7	6.9	15.2	7.0	27.8
West Texas and Eastern New Mexico	2.6	1.5	4.0	20.1	11.9	31.3
Gulf Coast	4.2	2.4	6.7	82.5	51.2	123.6
Mid-Continent	1.9	1.2	2.7	28.7	16.2	46.0
Eastern Interior [3]	1.8	1.3	2.4	17.2	10.8	25.7
Atlantic Coast	0.2	0.1	0.5	(4)	(4)	(4)
Federal Offshore [5]	**16.1**	**9.2**	**25.6**	**145.1**	**97.8**	**204.8**
Alaska [6]	3.4	0.6	9.4	16.8	4.7	39.4
Pacific Coast	3.4	0.9	8.3	8.0	3.5	15.1
Gulf of Mexico	8.6	4.9	13.6	103.3	63.0	156.9
Atlantic Coast	0.7	0.1	2.3	17.0	6.8	33.7
United States Total	**49.4**	**33.2**	**69.9**	**399.1**	**306.8**	**507.2**

[1] The low value of the range is the quantity associated with a 95 percent probability (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.
[2] The arithmetic average of all possible outcomes.
[3] Includes the Michigan Basin and Appalachians.
[4] Less than 0.1 trillion cubic feet.
[5] Includes only the area encompassed by the Federally Controlled Outer Continental Shelf.
[6] Includes quantities considered recoverable only if technology permits their exploitation beneath Arctic ice — a condition not yet met.
Note: The estimates are risked. The methodology computes the marginal 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. Department of the Interior, U.S. Geological Survey and Minerals Management Service, *Estimates of Undiscovered Recoverable Conventional Oil and Gas Resources in the United States - A Part of the Nation's Energy Endowment*, 1989.

Figure 42. Crude Oil and Natural Gas Field Counts, Cumulative Production, Proved Reserves, and Ultimate Recovery, 1977-1990



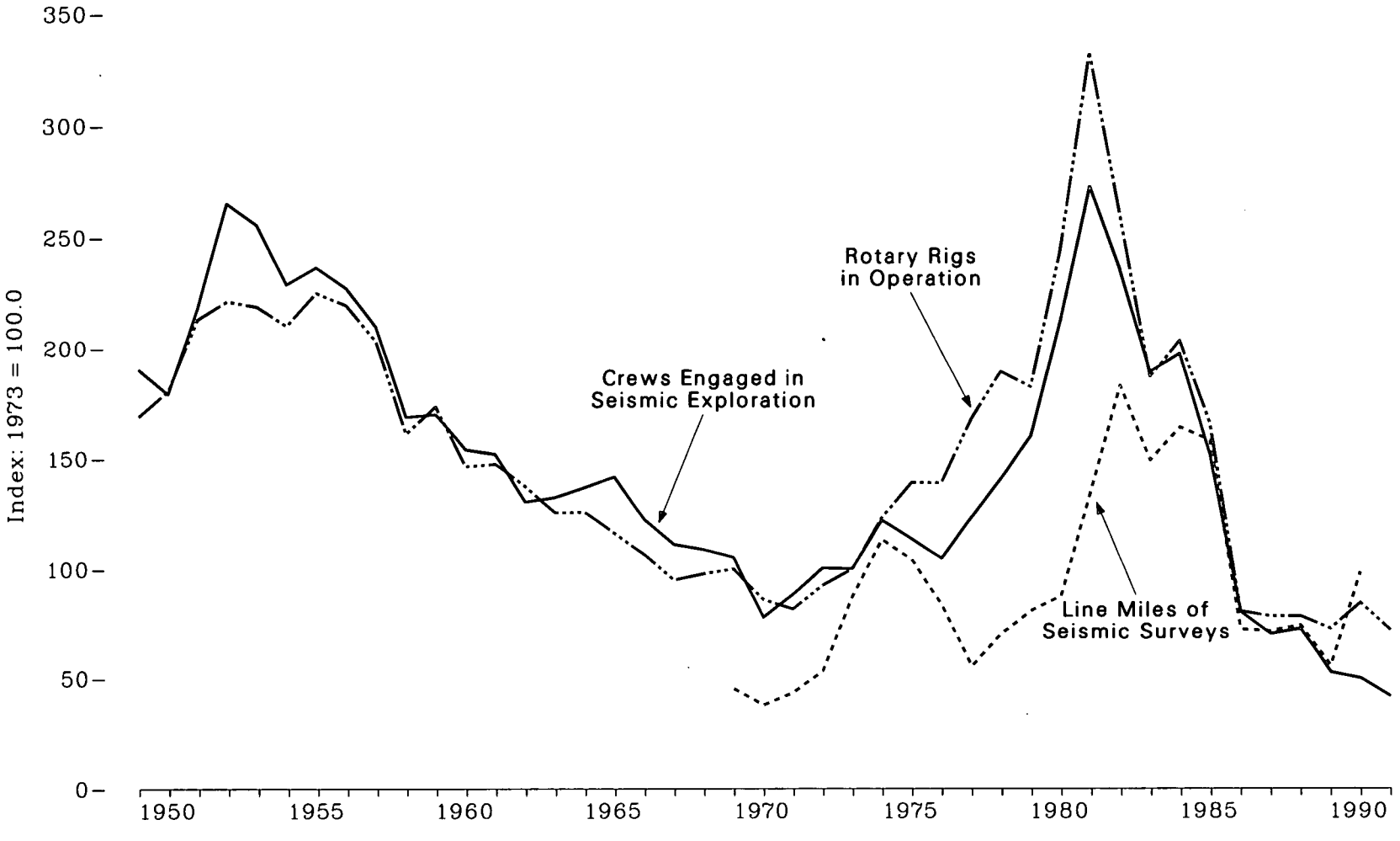
Notes: • Crude oil includes lease condensate. • Natural gas is wet, after lease separation.
Source: Table 42.

Table 42. Crude Oil and Natural Gas Field Counts, Cumulative Production, Proved Reserves, and Ultimate Recovery, 1977-1990

Year	Crude Oil [1] (billion barrels)					Natural Gas [2] (trillion cubic feet)				
	Cumulative Number of Fields with Oil and/or Gas [3]	Cumulative Number of Fields with Oil [3]	Cumulative Production	Proved Reserves	Ultimate Recovery	Cumulative Number of Fields with Gas [3]	Cumulative Production	Proved Reserves	Ultimate Recovery
1977	32,470	28,450	121.4	33.6	155.0	24,512	558.3	209.5	767.8
1978	33,511	29,272	124.6	33.1	157.6	25,373	578.4	210.1	788.5
1979	34,657	30,192	127.7	31.2	158.9	26,344	599.1	208.3	807.4
1980	35,966	31,249	130.8	31.3	162.2	27,373	619.4	206.3	825.6
1981	37,506	32,505	133.9	31.0	165.0	28,567	639.4	209.4	848.9
1982	38,895	33,665	137.1	29.5	166.6	29,598	658.1	209.3	867.4
1983	40,206	34,730	140.3	29.3	169.6	30,574	675.1	209.0	884.1
1984	41,671	35,931	143.5	30.0	173.5	31,664	693.5	206.0	899.5
1985	42,935	36,958	146.8	29.9	176.7	32,633	710.9	202.2	913.1
1986	43,703	37,559	150.0	28.3	178.3	33,175	727.8	201.1	928.9
1987	44,388	38,074	153.0	28.7	181.7	33,679	745.4	196.4	941.8
1988	45,065	38,572	156.0	28.2	184.2	34,187	763.4	177.0	940.4
1989	45,457	38,847	158.8	27.9	186.7	34,462	781.7	175.4	957.1
1990	45,801	39,064	161.5	27.6	189.0	34,659	800.4	177.6	978.0

[1] Includes lease condensate.
[2] Wet, after lease separation.
[3] Re-determinations of the limits of distinct oil and gas fields and improved information concerning their discovery dates cause frequent revisions in the field-count historical series.
Sources: **1989:** Energy Information Administration (EIA), Office of Oil and Gas, Oil and Gas Integrated Field File (OGIFF), (August 1991). **1977-1988 and 1990:** • Crude Oil Cumulative Production—EIA, *Petroleum Supply Annual 1990* (May 1991). • Natural Gas Cumulative Production—EIA, *Natural Gas Annual 1990* (December 1991). • Proved Reserves—EIA, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 1990 Annual Report* (September 1991). • Field Counts—EIA, *Oil and Gas Field Code Master List 1991* (December 1991) and OGIFF.

Figure 43. Seismic Crews, Line Miles, and Rotary Rigs, 1949-1991



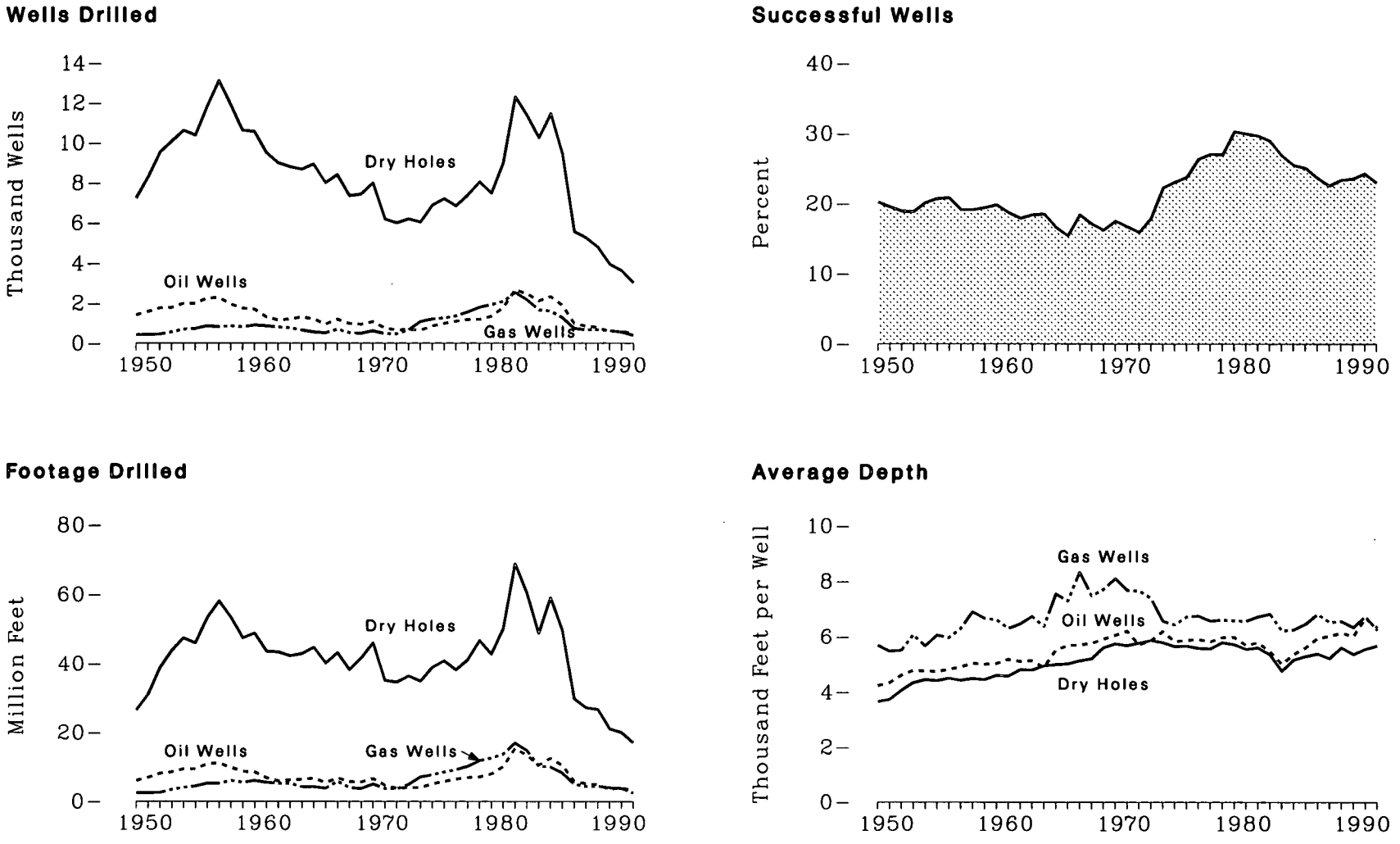
Source: Table 43.

Table 43. Seismic Crews, Line Miles, and Rotary Rigs, 1949-1991

Year	Crews Engaged in Seismic Exploration				Line Miles of Seismic Surveys (thousand)				Rotary Rigs in Operation [1]	
	Offshore	Onshore	Total	Index [2]	Offshore	Onshore	Total	Index [2]	Total	Index [2]
1949	NA	NA	476	190.4	NA	NA	NA	NA	2,017	168.9
1950	NA	NA	448	179.2	NA	NA	NA	NA	2,154	180.4
1951	NA	NA	545	218.0	NA	NA	NA	NA	2,543	213.0
1952	NA	NA	663	265.2	NA	NA	NA	NA	2,641	221.2
1953	NA	NA	639	255.6	NA	NA	NA	NA	2,613	218.8
1954	NA	NA	572	228.8	NA	NA	NA	NA	2,508	210.1
1955	NA	NA	591	236.4	NA	NA	NA	NA	2,686	225.0
1956	NA	NA	568	227.2	NA	NA	NA	NA	2,620	219.4
1957	NA	NA	524	209.6	NA	NA	NA	NA	2,426	203.2
1958	NA	NA	422	168.8	NA	NA	NA	NA	1,922	161.0
1959	NA	NA	425	170.0	NA	NA	NA	NA	2,071	173.5
1960	NA	NA	385	154.0	NA	NA	NA	NA	1,748	146.4
1961	NA	NA	380	152.0	NA	NA	NA	NA	1,761	147.5
1962	NA	NA	326	130.4	NA	NA	NA	NA	1,641	137.4
1963	NA	NA	331	132.4	NA	NA	NA	NA	1,499	125.5
1964	NA	NA	342	136.8	NA	NA	NA	NA	1,501	125.7
1965	36	318	354	141.6	NA	NA	NA	NA	1,388	116.2
1966	38	268	306	122.4	NA	NA	NA	NA	1,272	106.5
1967	29	249	278	111.2	NA	NA	NA	NA	1,135	95.1
1968	20	252	272	108.8	NA	NA	NA	NA	1,169	97.9
1969	16	247	263	105.2	NA	NA	199.9	51.8	1,194	100.0
1970	10	185	195	78.0	NA	NA	167.3	43.3	1,028	86.1
1971	10	211	221	88.4	NA	NA	191.7	49.7	976	81.7
1972	12	239	251	100.4	NA	NA	235.7	61.0	1,107	92.7
1973	23	227	250	100.0	258.9	127.2	386.1	100.0	1,194	100.0
1974	31	274	305	122.0	341.8	158.6	500.4	129.6	1,472	123.3
1975	30	254	284	113.6	309.3	150.7	460.0	119.1	1,660	139.0
1976	25	237	262	104.8	226.3	142.9	369.2	95.6	1,658	138.9
1977	27	281	308	123.2	124.7	120.1	244.7	63.4	2,001	167.6
1978	25	327	352	140.8	174.6	135.9	310.5	80.4	2,259	189.2
1979	30	370	400	160.0	193.2	163.9	357.1	92.5	2,177	182.3
1980	37	493	530	212.0	202.7	184.1	386.8	100.2	2,909	243.6
1981	44	637	681	272.4	338.2	256.2	594.4	153.9	3,970	332.5
1982	57	531	588	235.2	558.5	248.5	806.9	209.0	3,105	260.1
1983	47	426	473	189.2	469.2	188.5	657.7	170.3	2,232	186.9
1984	49	445	494	197.6	538.5	185.9	724.4	187.6	2,428	203.4
1985	45	333	378	151.2	557.7	140.0	697.7	180.7	1,980	165.8
1986	24	176	201	80.4	252.6	67.6	320.2	82.9	964	80.7
1987	24	153	176	70.4	263.7	52.7	316.5	82.0	936	78.4
1988	29	153	182	72.8	248.6	79.5	328.1	85.0	936	78.4
1989	23	109	132	52.8	197.4	48.0	245.5	63.6	869	72.8
1990	23	102	125	50.0	300.2	134.2	434.5	112.5	1,010	84.6
1991	19	85	104	41.6	NA	NA	NA	NA	860	72.0

[1] 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.
[2] Index: 1973 = 100.0.
NA = Not available.
Note: Sum of components may not equal total due to independent rounding.
Sources: **Crews Engaged in Seismic Exploration** and **Line Miles of Seismic Surveys:** Society of Exploration Geophysicists, *SEG News Release,* and *Geophysics: The Leading Edge of Exploration,* monthly. **Rotary Rigs in Operation:** Hughes Tool Company, *Rotary Rigs Running—By State.*

Figure 44. Oil and Gas Exploratory Wells, 1949-1991



Source: Table 44.

Table 44. Oil and Gas Exploratory Wells, 1949-1991

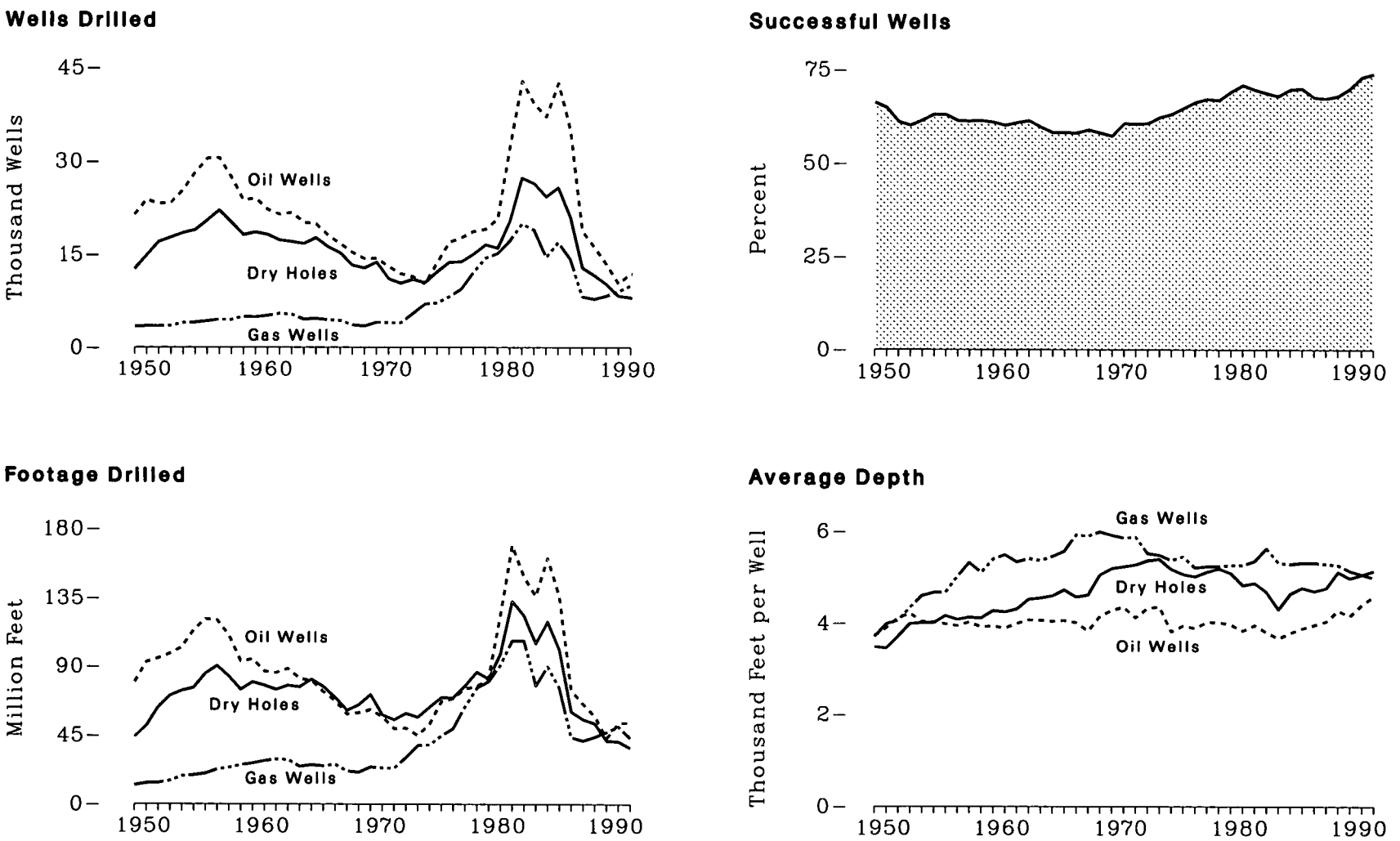
Year	Wells Drilled (thousands)				Successful Wells (percent)	Footage Drilled (million feet)				Average Depth (feet per well)			
	Oil	Gas	Dry Holes	Total		Oil	Gas	Dry Holes	Total	Oil	Gas	Dry Holes	Total
1949	1.41	0.42	7.23	9.06	20.2	6.0	2.4	26.4	34.8	4,232	5,682	3,658	3,842
1950	1.58	0.43	8.29	10.31	19.5	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	5,975	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	13.4	14.8	60.5	88.7	5,447	6,819	5,334	5,553
1983	2.11	1.66	10.26	14.03	26.9	10.5	10.3	48.7	69.5	4,997	6,211	4,746	4,957
1984	2.33	1.60	11.46	15.39	25.5	12.5	10.0	59.1	81.5	5,355	6,248	5,154	5,298
1985	1.88	1.28	9.42	12.58	25.1	10.5	8.3	49.7	68.5	5,603	6,452	5,278	5,446
1986	0.99	0.74	5.56	7.29	23.7	5.9	5.0	29.9	40.8	5,949	6,820	5,371	5,597
1987[1]	0.86	0.68	5.25	6.78	22.6	5.2	4.4	27.3	36.9	6,021	6,522	5,204	5,438
1988[1]	0.80	0.67	4.79	6.25	23.4	4.9	4.4	26.8	36.1	6,138	6,557	5,601	5,771
1989[1]	0.58	0.64	3.94	5.16	23.6	3.5	4.0	21.1	28.6	6,012	6,328	5,351	5,547
1990[1]	0.60	0.56	3.62	4.78	24.3	4.0	3.8	20.1	27.9	6,667	6,737	5,548	5,828
1991[1]	0.50	0.40	3.02	3.92	23.0	3.2	2.5	17.1	22.8	6,334	6,231	5,674	5,815

[1] Data for these years are preliminary. See Appendix E, Note 4.

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 Appendix E, Note 4. • Sum of components may not equal total 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.

Figure 45. Oil and Gas Exploratory and Development Wells, 1949-1991



Source: Table 45.

Table 45. Oil and Gas Exploratory and Development Wells, 1949-1991

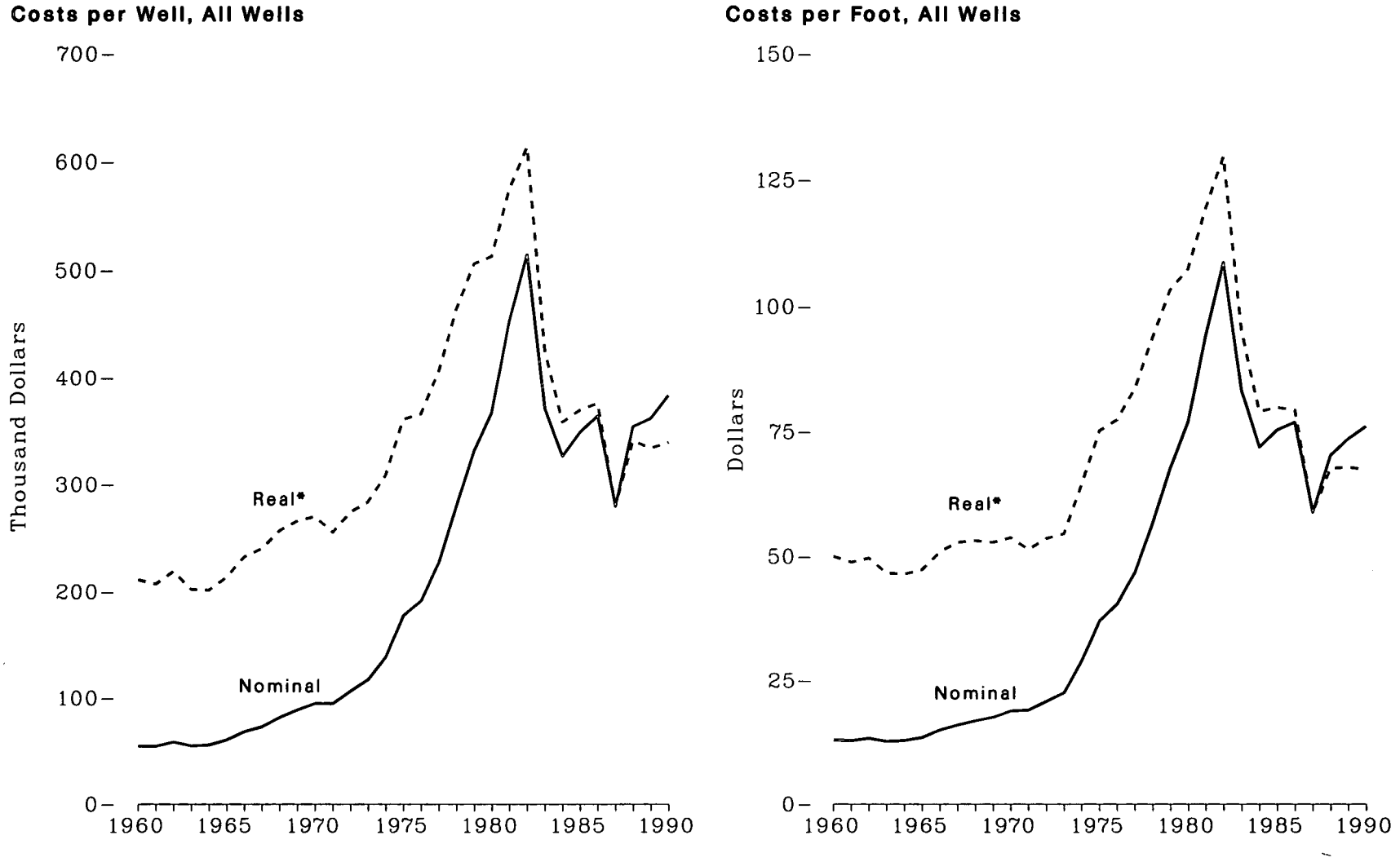
Year	Wells Drilled (thousands)				Successful Wells (percent)	Footage Drilled (million feet)				Average Depth (feet per well)			
	Oil	Gas	Dry Holes	Total		Oil	Gas	Dry Holes	Total	Oil	Gas	Dry Holes	Total
1949	21.35	3.36	12.60	37.31	66.2	79.4	12.4	43.8	135.6	3,720	3,698	3,473	3,635
1950	23.81	3.44	14.80	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	39.13	18.94	26.38	84.45	68.8	148.6	106.5	123.3	378.4	3,798	5,621	4,674	4,481
1983	37.12	14.53	24.30	75.95	68.0	136.2	77.2	104.7	318.1	3,669	5,316	4,306	4,188
1984	42.51	16.99	25.73	85.23	69.8	161.0	89.8	119.4	370.2	3,787	5,288	4,640	4,343
1985	34.94	14.23	21.09	70.26	70.0	135.7	75.6	100.5	311.8	3,882	5,314	4,765	4,437
1986	18.76	8.20	12.85	39.81	67.7	74.3	43.6	60.3	178.1	3,959	5,314	4,691	4,474
1987[1]	16.22	7.82	11.63	35.68	67.4	65.5	41.4	55.3	162.2	4,036	5,286	4,758	4,546
1988[1]	13.42	8.33	10.25	31.99	68.0	57.4	43.8	52.5	153.7	4,281	5,266	5,119	4,806
1989[1]	10.33	9.10	8.32	27.74	70.0	43.0	46.8	41.4	131.2	4,160	5,144	4,980	4,729
1990[1]	11.90	9.97	8.06	29.92	73.1	52.5	50.5	40.8	143.7	4,407	5,065	5,060	4,802
1991[1]	11.64	8.62	7.11	27.37	74.0	53.3	43.1	36.6	132.9	4,581	4,993	5,142	4,856

[1] Data for these years are estimated. See Appendix E, Note 4.

Notes: • Includes exploratory and development wells; excludes service wells, stratigraphic tests, and core tests. • 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 Appendix E, Note 4. • Sum of components may not equal total 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.

Figure 46. Costs of Wells Drilled, 1960-1990



*In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.
Source: Table 46.

Table 46. Costs of Oil and Gas Wells Drilled, 1960-1990

Year	Costs per Well (thousand dollars)					Costs per Foot (dollars)				
	Oil	Gas	Dry Holes	All		Oil	Gas	Dry Holes	All	
	(nominal)	(nominal)	(nominal)	(nominal)	(real) [1]	(nominal)	(nominal)	(nominal)	(nominal)	(real) [1]
1960	52.2	102.7	44.0	54.9	211.3	13.22	18.57	10.56	13.01	50.04
1961	51.3	94.7	45.2	54.5	207.3	13.11	17.65	10.56	12.85	48.86
1962	54.2	97.1	50.8	58.6	218.8	13.41	18.10	11.20	13.31	49.66
1963	51.8	92.4	48.2	55.0	202.3	13.20	17.19	10.58	12.69	46.65
1964	50.6	104.8	48.5	55.8	201.5	13.12	18.57	10.64	12.86	46.43
1965	56.6	101.9	53.1	60.6	213.5	13.94	18.35	11.21	13.44	47.32
1966	62.2	133.8	56.9	68.4	232.6	15.04	21.75	12.34	14.95	50.85
1967	66.6	141.0	61.5	72.9	240.6	16.61	23.05	12.87	15.97	52.71
1968	79.1	148.5	66.2	81.5	257.0	18.63	24.05	12.88	16.83	53.09
1969	86.5	154.3	70.2	88.6	265.9	19.28	25.58	13.23	17.56	52.73
1970	86.7	160.7	80.9	94.9	270.3	19.29	26.75	15.21	18.84	53.68
1971	78.4	166.6	86.8	94.7	255.3	18.41	27.70	16.02	19.03	51.29
1972	93.5	157.8	94.9	106.4	274.3	20.77	27.78	17.28	20.76	53.51
1973	103.8	155.3	105.8	117.2	283.7	22.54	27.46	19.22	22.50	54.48
1974	110.2	189.2	141.7	138.7	308.9	27.82	34.11	26.76	28.93	64.43
1975	138.6	262.0	177.2	177.8	361.4	34.17	46.23	33.86	36.99	75.18
1976	151.1	270.4	190.3	191.6	366.4	37.35	49.78	36.94	40.46	77.36
1977	170.0	313.5	230.2	227.2	406.4	41.16	57.57	43.49	46.81	83.74
1978	208.0	374.2	281.7	280.0	464.3	49.72	68.37	52.55	56.63	93.91
1979	243.1	443.1	339.6	331.4	505.9	58.29	80.66	64.60	67.70	103.36
1980	272.1	536.4	376.5	367.7	512.8	66.36	95.16	73.70	77.02	107.42
1981	336.3	698.6	464.0	453.7	575.0	80.40	122.17	90.03	94.30	119.52
1982	347.4	864.3	515.4	514.4	613.8	86.34	146.20	104.09	108.73	129.75
1983	283.8	608.1	366.5	371.7	426.3	72.65	108.37	79.10	83.34	95.57
1984	262.1	489.8	329.2	326.5	358.8	66.32	88.80	67.18	71.90	79.01
1985	270.4	508.7	372.3	349.4	370.1	66.78	93.09	73.69	75.35	79.82
1986	284.9	522.9	389.2	364.6	376.2	68.35	93.02	76.53	76.88	79.34
1987	246.0	380.4	259.1	279.6	279.6	58.35	69.55	51.05	58.71	58.71
1988	279.4	460.3	366.4	354.7	341.4	62.28	84.65	66.96	70.23	67.59
1989	282.3	457.8	355.4	362.2	334.2	64.92	86.86	67.61	73.55	67.85
1990	321.8	471.3	367.5	383.6	339.8	69.17	90.73	67.49	76.07	67.38

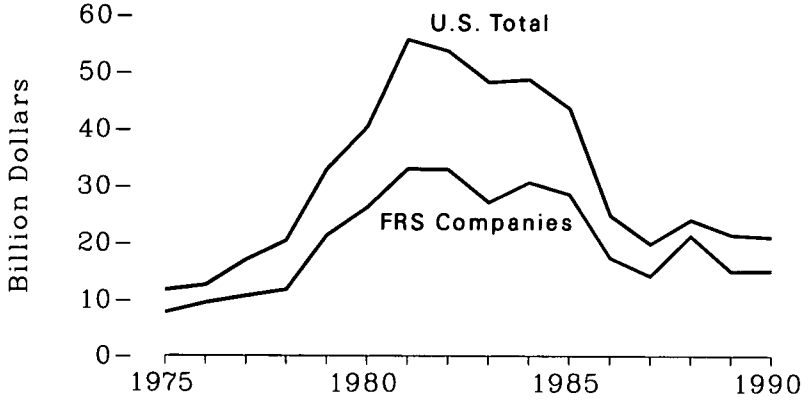
[1] In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.

Notes: • The information reported for 1965 and prior years is not strictly comparable with 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.

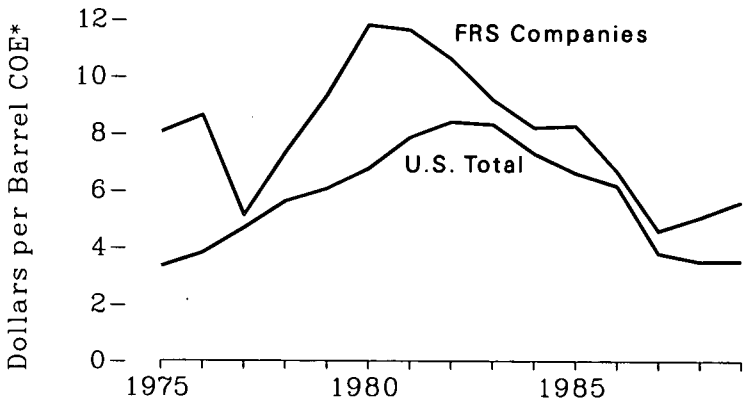
Source: American Petroleum Institute, Independent Petroleum Association of America, Mid-Continent Oil and Gas Association, *1990 Joint Association Survey on Drilling Costs.*

Figure 47. 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

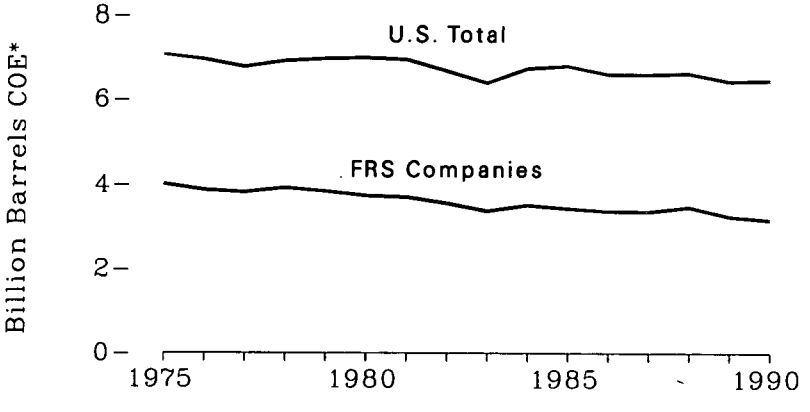
Exploration and Development Expenditures, 1975-1990



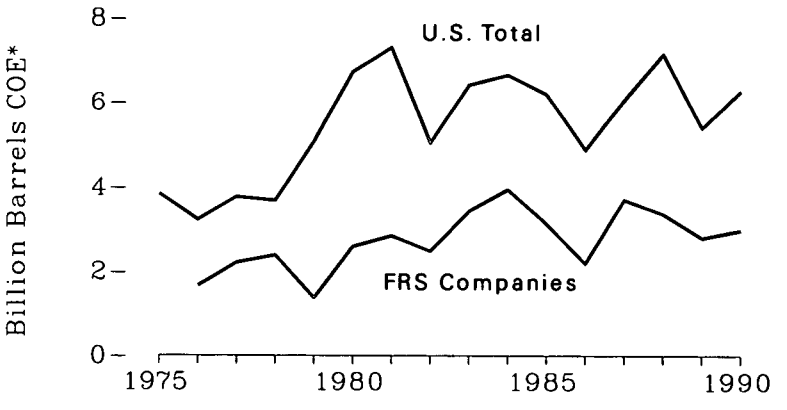
Expenditures per Barrel of Gross Reserve Additions, 1975-1989 (3-year weighted average)



Production, 1975-1990



Gross Additions to Proved Reserves, 1975-1990



*COE=Crude Oil Equivalent.
Note: FRS=Financial Reporting System (see Appendix E, Note 3).
Source: Table 47.

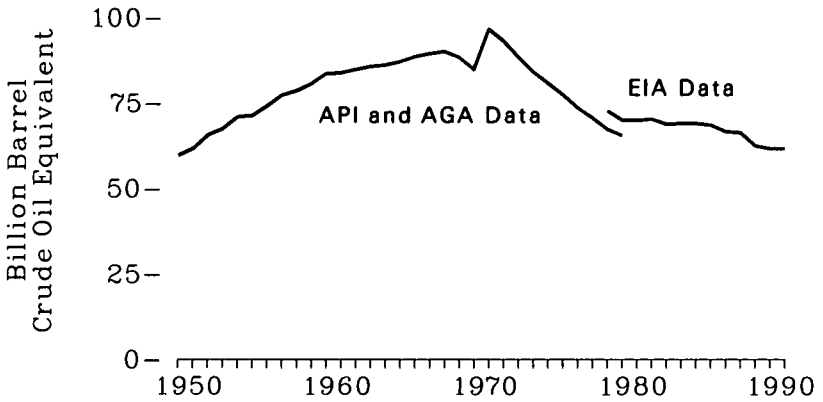
Table 47. U.S. Exploration and Development Expenditures, Gross Additions to Proved Reserves, and Production of Liquid and Gaseous Hydrocarbons by FRS Companies and U.S. Industry, 1975-1990

Year	Exploration and Development Expenditures (billion dollars)		Gross Additions to Proved Reserves [1] of Liquid and Gaseous Hydrocarbons [2] (million barrels COE [3])		Expenditures per Barrel of Reserve Additions, Three-Year Weighted Average (dollars per barrel COE [3])		Production of Liquid and Gaseous Hydrocarbons [2] (million barrels COE [3])	
	FRS Companies [4]	U.S. Total	FRS Companies [5,6]	U.S. Total [6]	FRS Companies [4,5]	U.S. Total	FRS Companies [5]	U.S. Total
1975	7.8	11.7	NA	3,846	8.05	3.34	4,006	7,071
1976	9.5	12.6	1,663	3,224	8.64	3.81	3,863	6,958
1977	10.7	17.0	2,210	3,765	5.12	4.68	3,809	6,777
1978	11.8	20.4	2,383	3,679	7.34	5.62	3,916	6,918
1979	21.3	32.9	1,378	5,071	9.34	6.06	3,834	6,970
1980	26.2	40.4	2,590	6,723	11.80	6.76	3,727	6,995
1981	33.0	55.7	2,848	7,304	11.63	7.86	3,694	6,954
1982	32.9	53.7	2,482	5,030	10.62	8.41	3,551	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	2,187	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	6,624
1989	15.0	21.4	2,798	5,385	5.60	3.52	3,243	6,437
1990	15.1	21.0	2,979	6,275	NA	NA	3,163	6,457

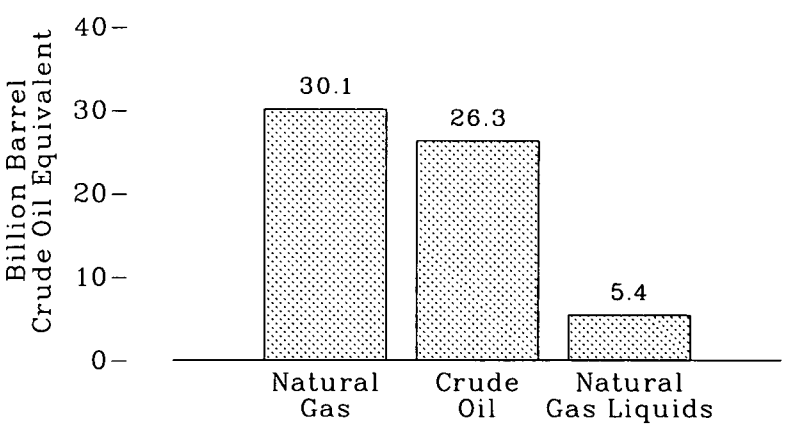
[1] Gross additions to proved reserves equal annual change in proved reserves plus annual production.
[2] Liquid and gaseous hydrocarbons include crude oil, natural gas liquids, and natural gas.
[3] Crude oil equivalent: converted to Btu based on annual average conversion factors. See Appendix A.
[4] FRS data for 1982 and 1984 are adjusted to exclude purchases of proved reserves associated with mergers among the FRS Companies.
[5] Based on net ownership interest (see Glossary).
[6] Downward revisions of Alaska North Slope natural gas reserves are excluded.
NA = Not available.
Notes: • FRS = Financial Reporting System (see Appendix E, Note 3). • Data in this table are for U.S. domestic operations only.
Sources: **FRS Companies:** Energy Information Administration (EIA), Form EIA-28, "Financial Reporting System." **U.S. Total, Exploration and Development Expenditures:** • 1975-1982—Bureau of the Census, *Annual Survey of Oil and Gas.* • 1983 forward—American Petroleum Institute, *Survey on Oil and Gas Expenditures 1990,* November 1991. **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, 1990 Annual Report* (September 1991). **U.S. Total, Production of Liquid and Gaseous Hydrocarbons:** Tables 52 and 74.

Figure 48. Liquid and Gaseous Hydrocarbon Proved Reserves, End of Year

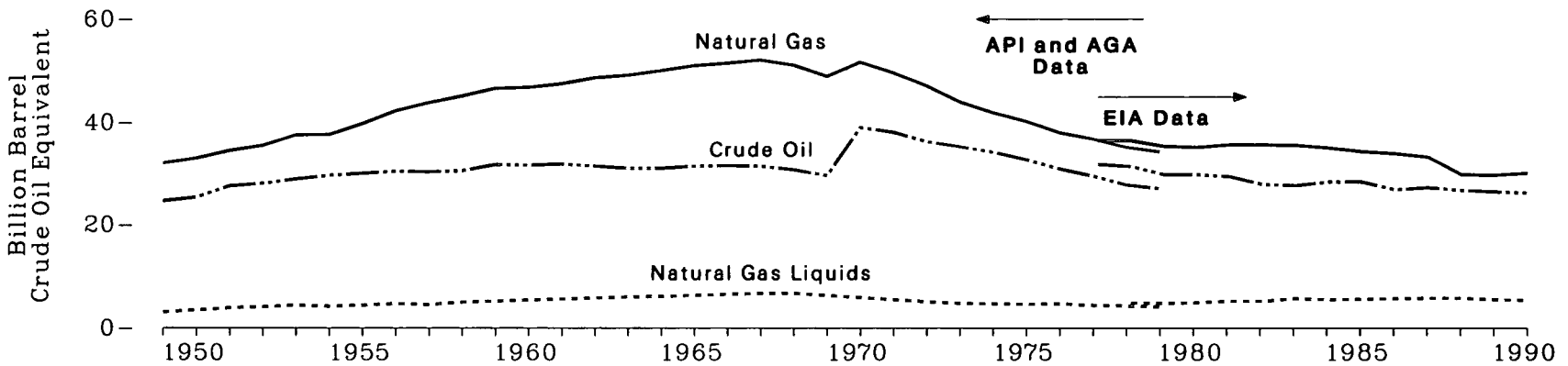
Total, 1949-1990



By Type, 1990



By Type, 1949-1990



Notes: • API=American Petroleum Institute AGA=American Gas Association EIA=Energy Information Administration • Because vertical scales differ, graphs should not be compared.
Source: Table 48.

Table 48. Liquid and Gaseous Hydrocarbon Proved Reserves, End of Year 1949-1990

Year	Crude Oil	Natural Gas		Natural Gas Liquids		Total
	Billion Barrels	Trillion Cubic Feet [1]	Billion Barrels COE [2]	Billion Barrels	Billion Barrels COE [2]	Billion Barrels COE
	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

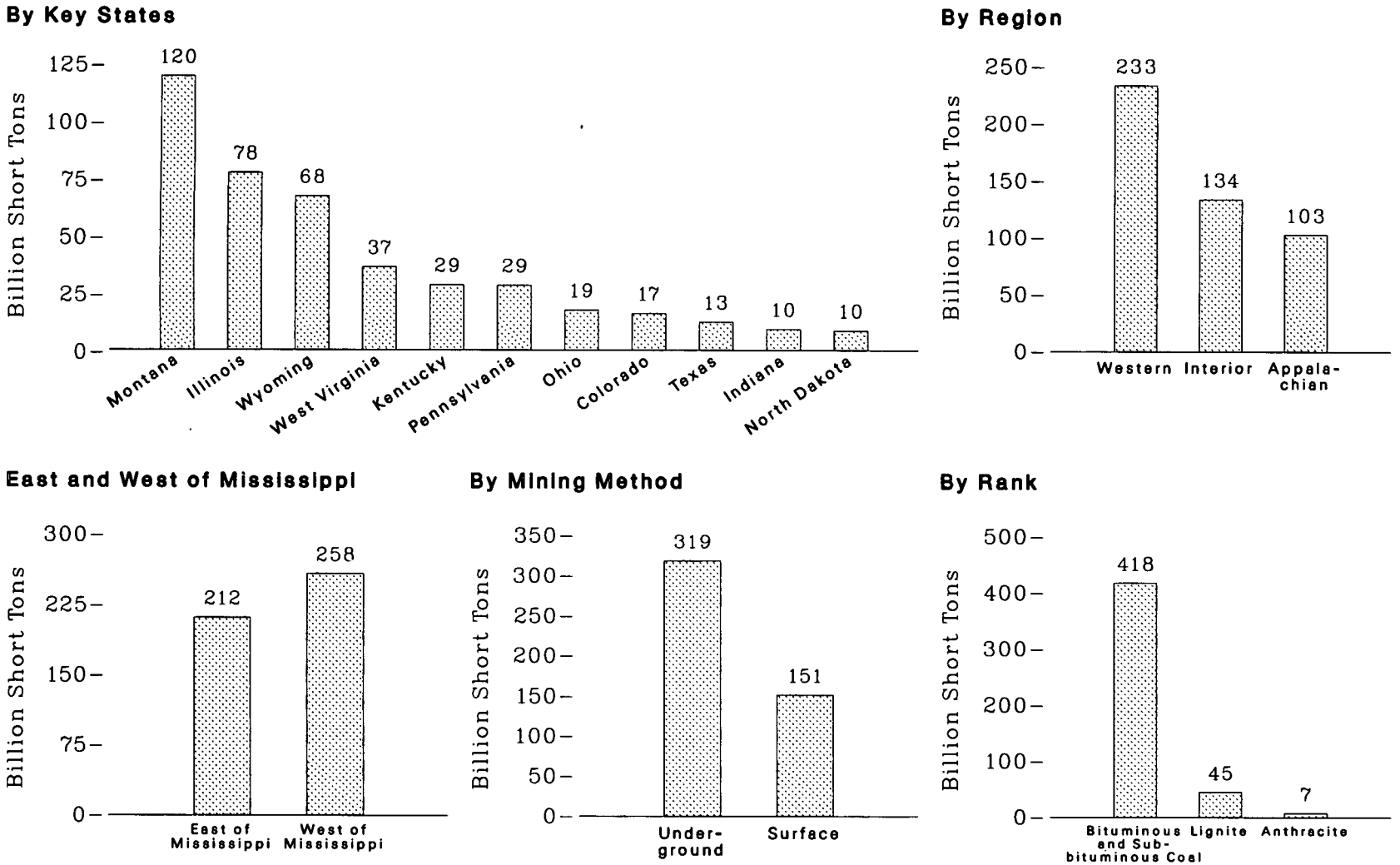
[1] The American Gas Association estimates of natural gas proved reserves include volumes of gas held in underground storage. In 1979, this volume amounted to 4.9 trillion cubic feet. Energy Information Administration data do not include gas in underground storage.

[2] Crude oil equivalent; converted to Btu based on 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**—Energy Information Administration, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1990 Annual Report* (September 1991), Table 1.

Figure 49. Coal Demonstrated Reserve Base, January 1, 1991



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 49.

Table 49. Coal Demonstrated Reserve Base, January 1, 1991

(Billion Short Tons)

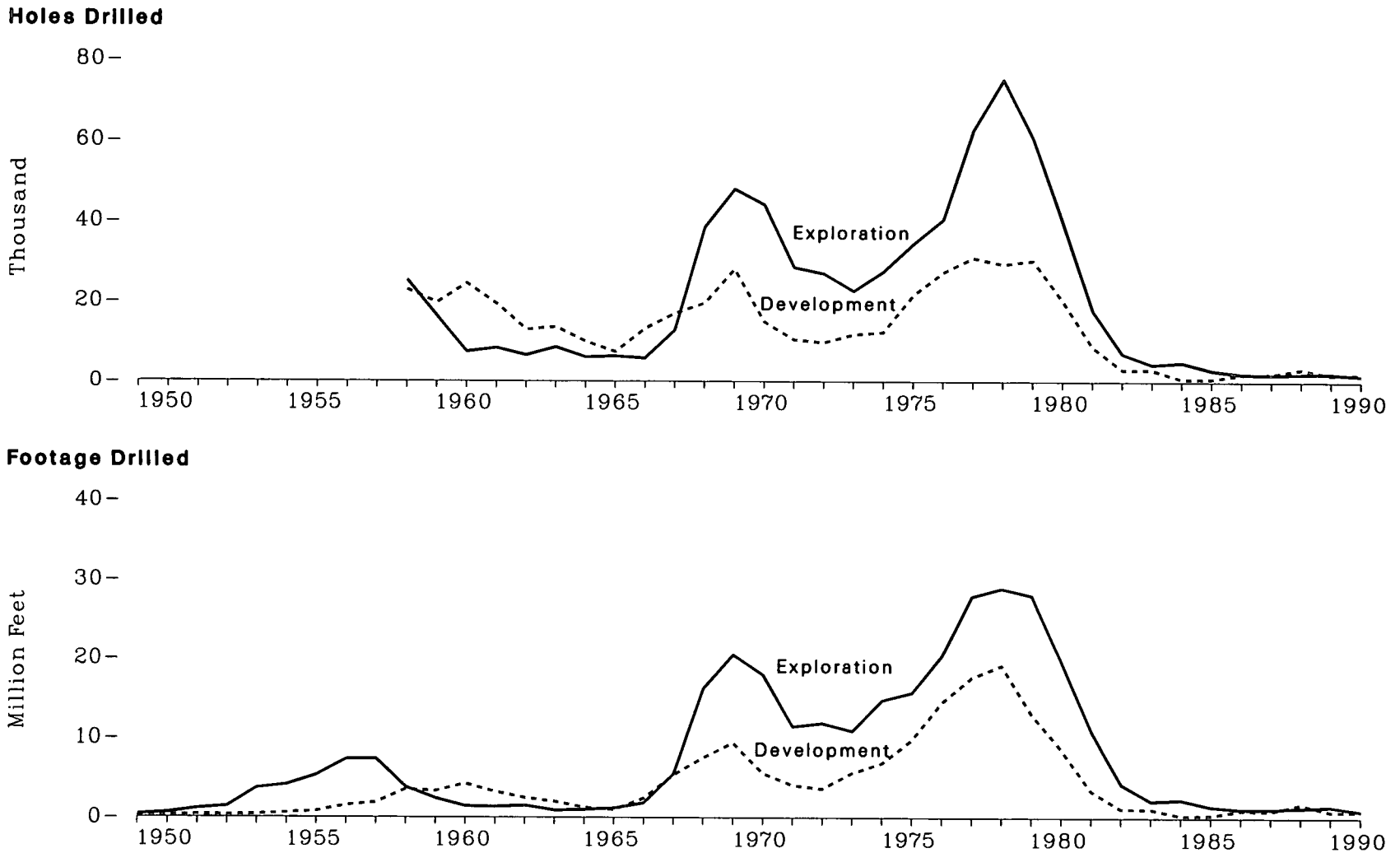
Region and State	Anthracite	Bituminous Coal [1]		Lignite	Total		
	Underground and Surface [2]	Underground	Surface	Surface [3]	Underground	Surface	Total
Appalachian	**7.2**	**77.8**	**17.0**	**1.1**	**84.9**	**17.8**	**102.7**
Alabama	0	1.5	2.2	1.1	1.5	3.3	4.8
Kentucky, Eastern	0	7.4	1.6	0	7.4	1.6	9.0
Ohio	0	12.8	5.7	0	12.8	5.7	18.5
Pennsylvania	7.1	20.9	1.2	0	27.8	1.3	29.1
Virginia	0.1	1.8	0.7	0	1.9	0.7	2.6
West Virginia	0	32.3	4.8	0	32.3	4.8	37.1
Other [4]	0	1.2	0.4	0	1.2	0.4	1.6
Interior	**0.1**	**93.0**	**27.0**	**13.8**	**93.1**	**40.7**	**133.8**
Illinois	0	62.8	15.4	0	62.8	15.4	78.2
Indiana	0	8.9	1.3	0	8.9	1.3	10.2
Iowa	0	1.7	0.5	0	1.7	0.5	2.2
Kentucky, Western	0	16.5	3.8	0	16.5	3.8	20.3
Missouri	0	1.5	4.5	0	1.5	4.5	6.0
Oklahoma	0	1.2	0.4	0	1.2	0.4	1.6
Texas	0	0	0	13.3	0	13.3	13.3
Other [5]	0.1	0.3	1.1	0.5	0.4	1.6	2.0
Western	**(6)**	**140.5**	**62.9**	**30.0**	**140.5**	**92.9**	**233.4**
Alaska	0	5.4	0.7	(6)	5.4	0.7	6.1
Colorado	(6)	12.1	0.6	4.2	12.1	4.8	17.0
Montana	0	71.0	33.2	15.8	71.0	49.0	120.0
New Mexico	(6)	2.1	2.3	0	2.1	2.3	4.5
North Dakota	0	0	0	9.6	0	9.6	9.6
Utah	0	5.9	0.3	0	5.9	0.3	6.1
Washington	0	1.3	0.1	(6)	1.3	0.1	1.4
Wyoming	0	42.5	25.5	0	42.5	25.5	68.0
Other [7]	0	0.1	0.2	0.4	0.1	0.5	0.6
U.S. Total	**7.3**	**311.3**	**106.4**	**44.9**	**318.5**	**151.4**	**469.9**
States East of the Mississippi River	7.2	166.2	37.1	1.1	173.3	38.3	211.6
States West of the Mississippi River	0.1	145.1	69.3	43.8	145.2	113.1	258.4

[1] Includes subbituminous coal.
[2] Includes 117.4 million short tons of surface mine reserves, of which 101.9 million tons are in Pennsylvania and 15.5 million tons are in Arkansas.
[3] There are no underground demonstrated coal reserves of lignite.
[4] Georgia, Maryland, North Carolina, and Tennessee.
[5] Arkansas, Kansas, Louisiana, and Michigan.
[6] Less than 0.05 billion short tons.
[7] Arizona, Idaho, Oregon, and South Dakota.

Notes: • Includes measured and indicated resource categories representing 100 percent of the coal in place. Recoverability varies from less than 40 percent to more than 90 percent for individual deposits. About one-half of the demonstrated reserve base of coal in the United States is estimated to be recoverable. • Sum of components may not equal total due to independent rounding.

Source: Energy Information Administration, *Coal Production 1990* (November 1991), Tables A2, A3, and A4.

Figure 50. Uranium Exploration and Development Drilling, 1949-1990



Source: Table 50.

Table 50. Uranium Exploration and Development Drilling, 1949-1990

Year	Exploration [1]		Development [2]		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	1.96
1988	2.03	1.28	3.18	1.73	5.21	3.01
1989	2.09	1.43	1.75	0.80	3.84	2.22
1990	1.51	0.87	1.91	0.81	3.42	1.68

[1] 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.

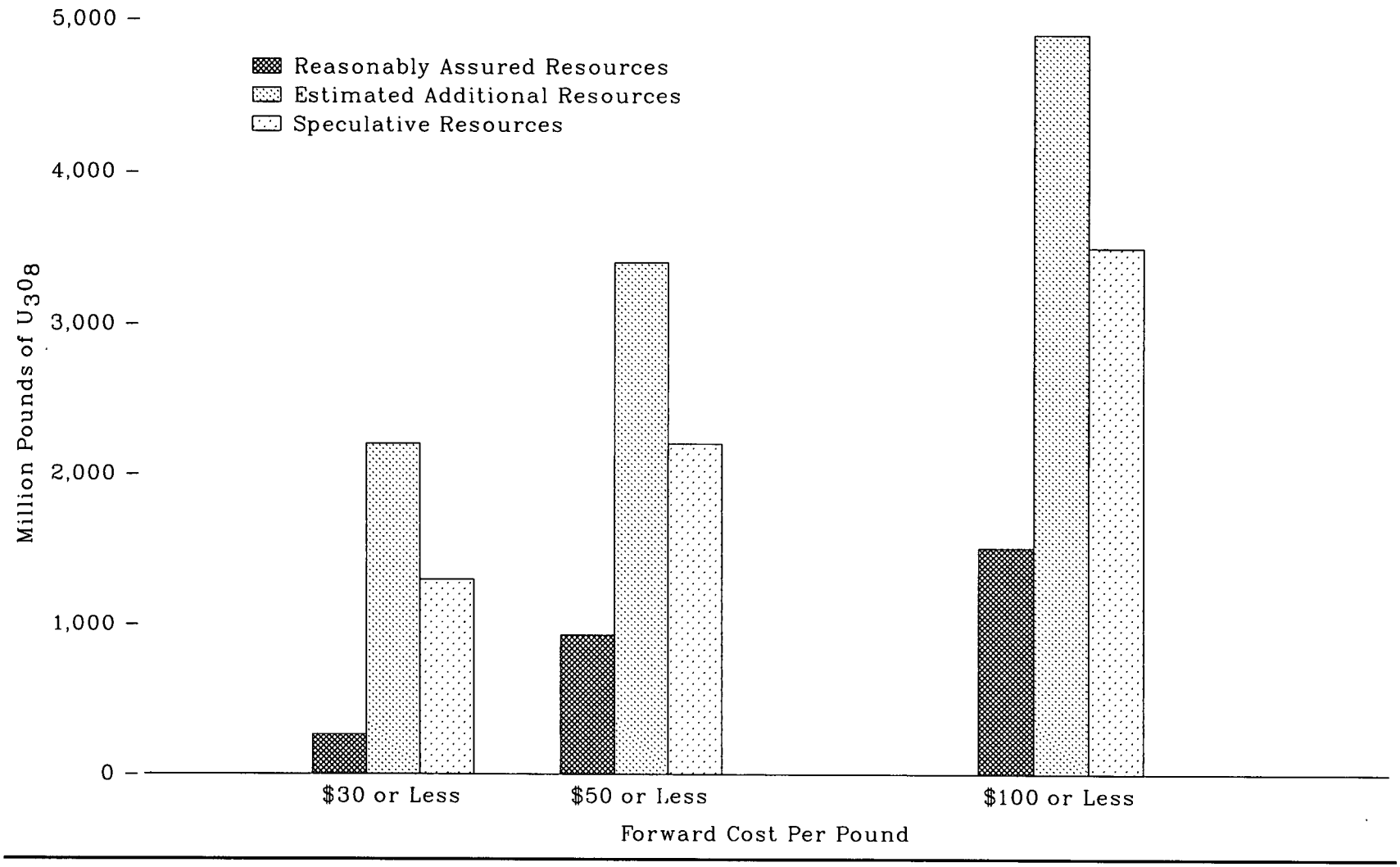
[2] Includes all surface drilling on an ore deposit to determine more precisely size, grade, and configuration subsequent to the time that commercial exploitation is deemed feasible.

NA = Not available.

Note: Sum of components may not equal total due to independent rounding.

Sources: • 1949-1973—U.S. Department of Energy, Grand Junction Office, *Statistical Data of the Uranium Industry*, January 1, 1983, Report No. GJO-100 (annual). • 1974 forward—Energy Information Administration, *Uranium Industry Annual 1990* (September 1991), Tables 2 and 3.

Figure 51. Uranium Resources, December 31, 1990



Source: Table 51.

Table 51. Uranium Resources, December 31, 1990

(Million Pounds, U_3O_8)

Resource Category	Forward Cost Category (dollars per pound) [1]		
	$30 or Less	$50 or Less	$100 or Less
Discovered Resources			
Reasonably Assured Resources	**265**	**926**	**1,511**
New Mexico	85	351	589
Wyoming	71	330	579
Texas	23	47	71
Arizona, Colorado, Utah	43	125	173
Others [2]	43	73	99
Potential Resources			
Estimated Additional Resources	2,240	3,380	4,920
Speculative Resources	1,310	2,240	3,490

[1] 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.

[2] California, Idaho, Montana, Nebraska, Nevada, North Dakota, Oregon, South Dakota, and Washington.

Source: Energy Information Administration, *Uranium Industry Annual 1990* (September 1991), Tables 11 and 15.

5. Petroleum

Fluctuations in the Price of Crude Oil

After successive price hikes had brought the real price[1] of crude oil to a peak in 1981, oil prices began trending downward in 1982, and then plummeted in 1986 (71).[2] The average annual composite refiner acquisition cost of a barrel of crude oil fell from $28.34 in 1985 to $15.02 in 1986. Of the several factors contributing to the unprecedented decline in crude oil prices during 1986, the most important was excess 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 $19.68. In 1991, oil producing nations' ability to replace Iraqi and Kuwaiti oil, when coupled with an economic recession that restrained petroleum demand, caused the real price to decline to $16.28 per barrel.

The swings in crude oil prices often were reflected (though in attenuated form) in changes in the retail prices of petroleum products. For example, the average annual price per gallon, in real terms, of unleaded regular motor gasoline declined from $1.27 in 1985 to $0.96 in 1986 (73). However, crude oil price is not the only component of motor gasoline price; refining and distribution costs and taxation are also major determinants of the retail price. In 1991, the real price per gallon of unleaded regular motor gasoline fell 6 percent from the 1990 level, while the composite refiner acquisition cost of crude oil fell 17 percent (71).

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 million barrels per day (52). In 1974, however, marked increases in the price of crude oil, coupled with a petroleum supply interruption, resulted in a 3.8-percent decline in petroleum consumption. Although demand recovered during the late 1970's, peaking at 19 million barrels per day in 1978, by 1983 it had declined to 15 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 16.6 million barrels per day in 1991.

[1]Real prices are expressed in 1987 dollars.

[2]Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications.

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 (67). The first sales of SPR crude oil occurred following the August 1990 Iraqi invasion of Kuwait. At the end of 1991, the SPR held 569 million barrels.

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. In 1991, the measure was 86 days.

At the end of 1991, SPR stocks plus 324 million barrels of privately held crude oil stocks totaled 893 million barrels (66). Private stocks of crude oil were less than the 341-million-barrel level recorded in 1977, when filling of the SPR began, and, at 723 million barrels, private stocks of petroleum products in 1991 remained considerably below the record level of 964 million barrels recorded in 1977.

Consumption of all major petroleum products except liquefied petroleum gases was lower in 1991 than in 1990 (62). Consumption of motor gasoline, which consistently accounts for the largest share of all petroleum products supplied, fell 0.6 percent to 7.2 million barrels per day. Both the economic recession and gains in fuel efficiency tended to restrain motor gasoline demand.

Distillate fuel oil consumption fell 3 percent to 2.9 million barrels per day in 1991. The decline was due to lower industrial production, which caused a decline in demand for transportation use of diesel fuel, and to warm winter weather, which depressed residential and commercial demand for heating oil.

Residual fuel oil consumption fell 7 percent to 1.2 million barrels per day. Fuel-switching to natural gas by electric utilities and the industrial sector, as well as warm winter weather and the economic recession, caused the decline.

Jet fuel consumption fell 3 percent to 1.5 million barrels per day. The end of the Persian Gulf war and gains in fuel efficiency both contributed to the decline.

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 prorationing 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 (53). Increases in Alaskan production at the end of the 1970's and through 1988 partially counteracted declines in Lower-48 production. In 1989 and 1990, however, even Alaskan production declined and total domestic production fell to 7.4 million barrels per day in 1990. In 1991, higher production in the first quarter of the year compensated for low production in the fourth quarter and total domestic production for the year remained at 7.4 million barrels per day.

Of total U.S. production in 1991, 84 percent came from onshore wells and 16 percent from offshore. The 614 thousand producing wells attained an average productivity of 12 barrels per day per well, down 2 percent from the 1990 level and 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 (52). 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. Those factors, as well as stockbuilding, resulted in an increase in net imports in 1986 to 5.4 million barrels per day. Subsequently, with prices significantly below peak levels, daily net imports rose to 7.2 million barrels per day in 1989.

In 1990 and 1991, higher petroleum prices and lower demand 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.

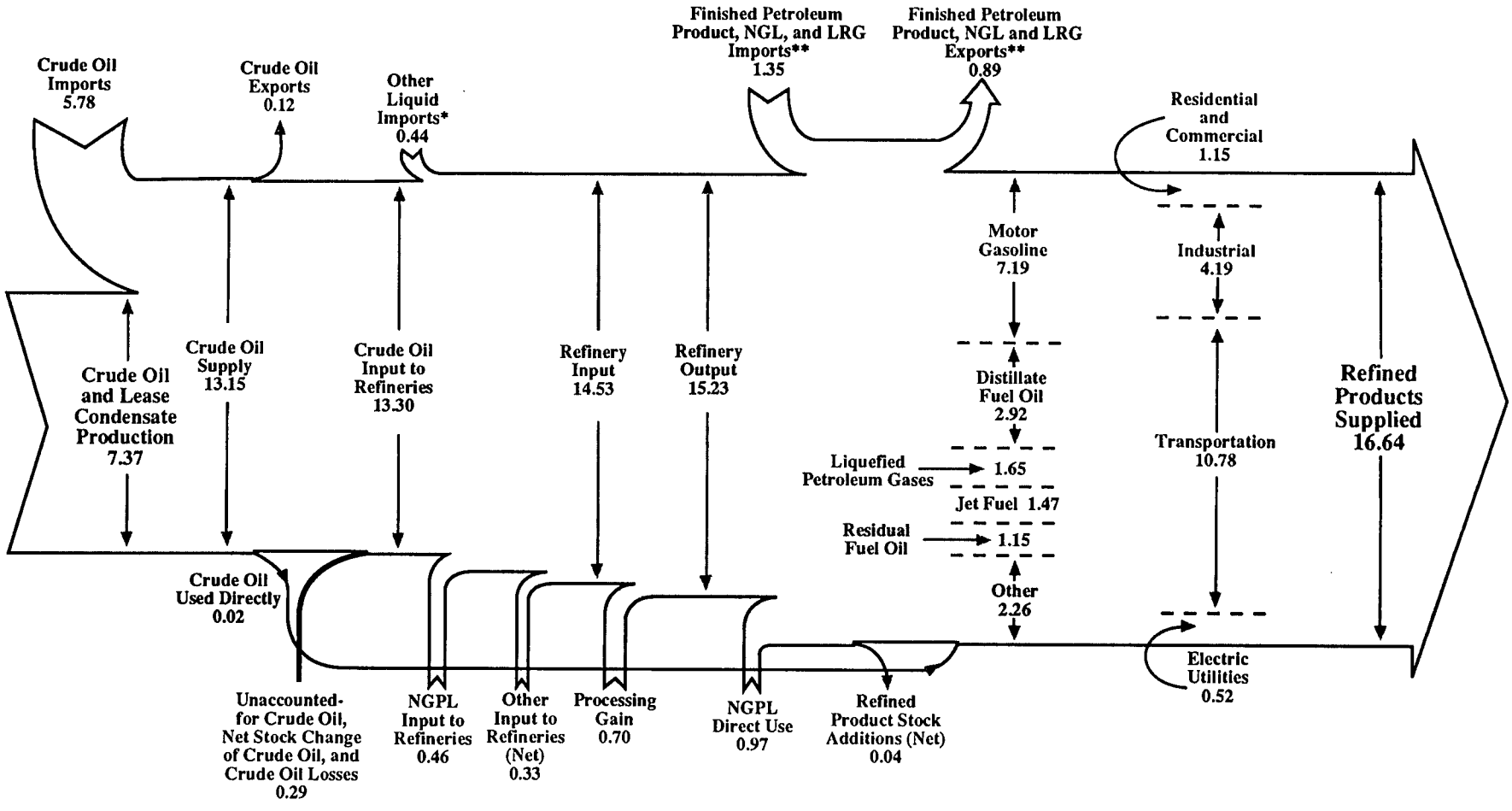
U.S. dependence on petroleum net imports peaked at 47 percent of consumption in 1977, then fell in 1985 to 27 percent, the lowest level since 1971 (58). By 1990, dependence on petroleum net imports had risen to 42 percent. In 1991, a record level of petroleum product exports, lower petroleum net imports, and restrained petroleum consumption lowered U.S. dependence on petroleum net imports to 40 percent. That year, Saudi Arabia, Venezuela, Canada, Nigeria, and Mexico were the primary foreign suppliers of petroleum to the United States.

The Refining Industry in a Changing Market

The average daily output from U.S. refineries trended upward from 1949 through 1978, when it peaked at 16 million barrels per day (59). 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 1991, it averaged 15 million barrels per day.

The rate of refinery utilization fell below 80 percent in 1980 through 1985, but improved thereafter (60). In 1986, the utilization rate was 83 percent, well above its nadir of 69 percent in 1981. In 1987 through 1990, strong product demand contributed to even higher utilization rates, which reached 87 percent in 1990. In 1991, the utilization rate was 86 percent.

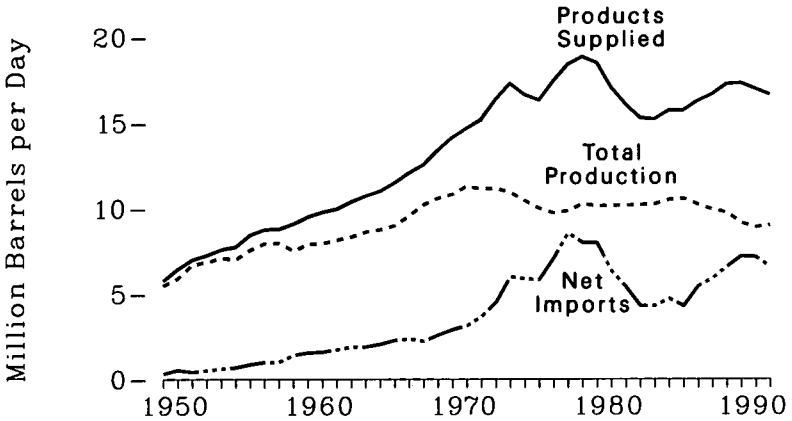
Diagram 2. Petroleum Flow, 1991
(Million Barrels per Day)



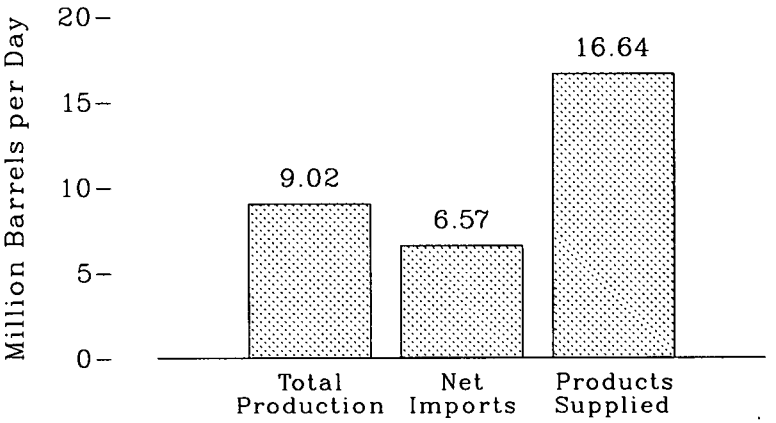
*Unfinished oils, motor gasoline and aviation gasoline blending components, and other hydrocarbons/alcohol.
**Natural gas liquids and liquid refinery gas.
Notes: • Data are preliminary. • Sum of components may not equal total due to independent rounding.
Sources: Tables 52, 56, 59, 62, and 63, and *Petroleum Supply Monthly*, February 1992, Table 3.

Figure 52. Petroleum Overview

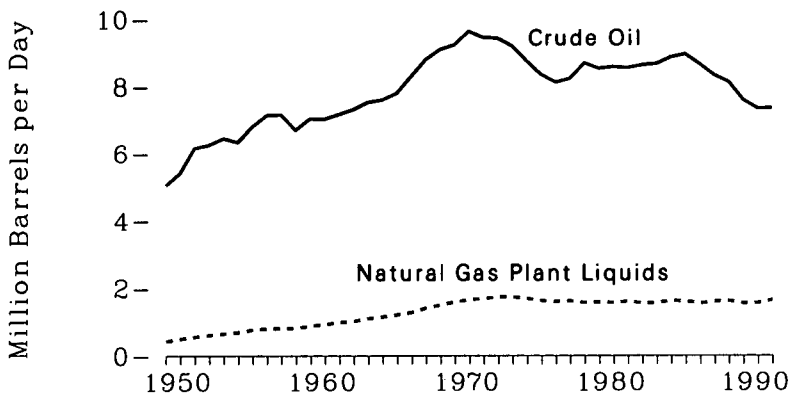
Overview, 1949-1991



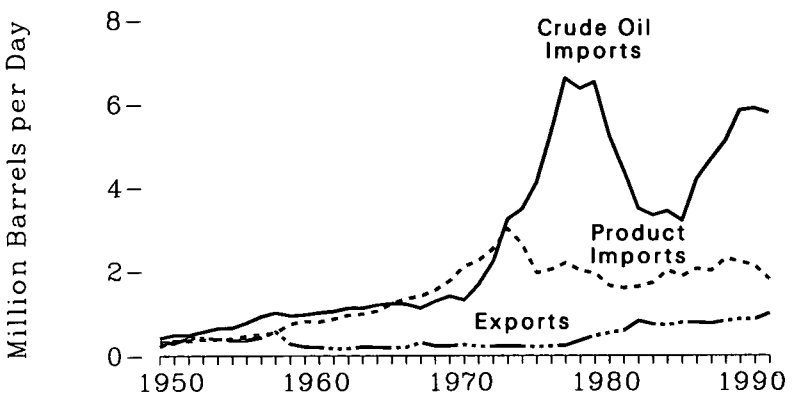
Overview, 1991



Production, 1949-1991



Trade, 1949-1991



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 52.

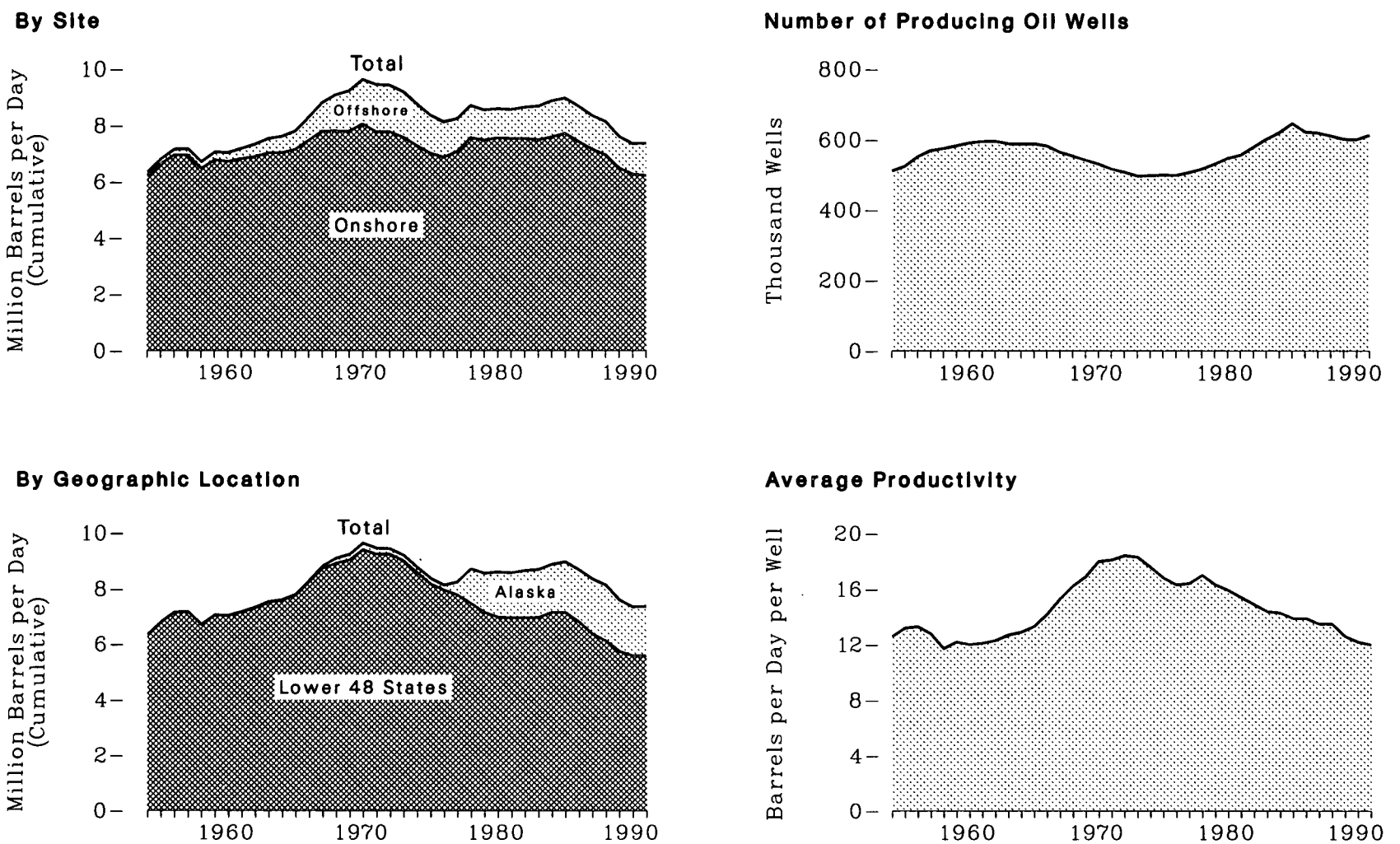
Table 52. Petroleum Overview, 1949-1991

(Million Barrels per Day)

Year	Production			Other Domestic Supply [2]	Foreign Trade							
					Imports							
	Crude Oil [1]	Natural Gas Plant Liquids	Total Production		Crude Oil [3]	Petroleum Products [4]	Total Imports	Exports	Net Imports [5]	Crude Oil Losses	Change in Stocks [6]	Petroleum Products Supplied
1949	5.05	0.43	5.48	(7)	0.42	0.22	0.65	0.33	0.32	0.04	0.01	5.76
1950	5.41	0.50	5.91	(7)	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	(7)	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	(7)	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	(7)	-0.16	16.06
1982	8.65	1.55	10.20	0.65	3.49	1.63	5.11	0.82	4.30	(7)	0.15	15.30
1983	8.69	1.56	10.25	0.65	3.33	1.72	5.05	0.74	4.31	(7)	0.02	15.23
1984	8.88	1.63	10.51	0.78	3.43	2.01	5.44	0.72	4.72	(7)	-0.28	15.73
1985	8.97	1.61	10.58	0.76	3.20	1.87	5.07	0.78	4.29	(7)	0.10	15.73
1986	8.68	1.55	10.23	0.81	4.18	2.05	6.22	0.78	5.44	(7)	-0.20	16.28
1987	8.35	1.60	9.94	0.85	4.67	2.00	6.68	0.76	5.91	(7)	-0.04	16.67
1988	8.14	1.62	9.76	0.90	5.11	2.30	7.40	0.82	6.59	(7)	0.03	17.28
1989	7.61	1.55	9.16	0.92	5.84	2.22	8.06	0.86	7.20	(7)	0.04	17.33
1990	7.36	1.56	8.91	1.02	5.89	2.12	8.02	0.86	7.16	(7)	0.11	16.99
1991[8]	7.37	1.65	9.02	1.02	5.78	1.79	7.58	1.00	6.57	(7)	-0.02	16.64

[1] Includes lease condensate. [2] Includes benzol, other hydrocarbons, hydrogen, alcohol, processing gains, and unaccounted-for crude oil. [3] Includes imports for the Strategic Petroleum Reserve, which began in 1977. [4] For 1981 forward, includes motor gasoline blending components, and aviation gasoline blending components. [5] Net trade = imports minus exports. [6] 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. [7] Less than 5,000 barrels per day. [8] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications. Note: Sum of components may not equal total 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.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly,* February 1992.

Figure 53. Crude Oil and Lease Condensate Production and Oil Well Productivity, 1954-1991



Source: Table 53.

Table 53. Crude Oil and Lease Condensate Production and Oil Well Productivity, 1954-1991

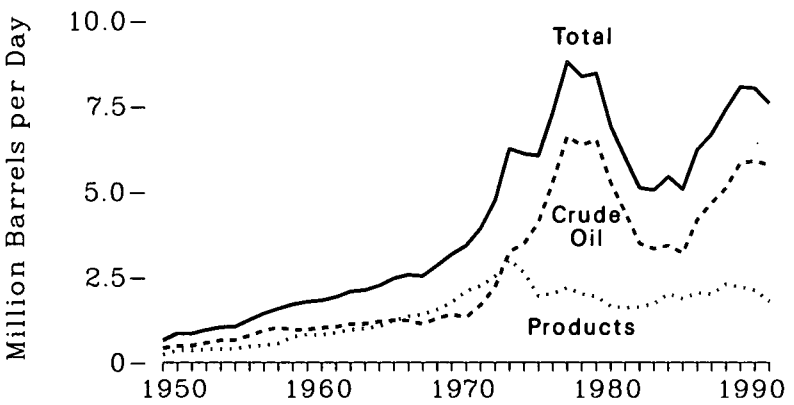
(Thousand Barrels per Day, Except as Noted)

Year	Geographic Location		Site		Type			Oil Well Productivity	
	Lower 48	Alaska	Onshore	Offshore	Crude Oil	Lease Condensate	Total Production	Producing Wells [1] (thousands)	Average Productivity [2] (barrels per day per well)
1954	6,342	0	6,209	133	6,342	[3]	6,342	511	12.6
1955	6,807	0	6,645	162	6,807	[3]	6,807	524	13.2
1956	7,151	0	6,951	201	7,151	[3]	7,151	551	13.3
1957	7,170	0	6,940	229	7,170	[3]	7,170	569	12.8
1958	6,710	0	6,473	236	6,710	[3]	6,710	575	11.7
1959	7,053	1	6,779	274	7,054	[3]	7,054	583	12.2
1960	7,034	2	6,716	319	7,035	[3]	7,035	591	12.0
1961	7,166	17	6,817	365	7,183	[3]	7,183	595	12.1
1962	7,304	28	6,888	444	7,332	[3]	7,332	596	12.3
1963	7,512	29	7,026	515	7,542	[3]	7,542	589	12.7
1964	7,584	30	7,027	587	7,614	[3]	7,614	588	12.9
1965	7,774	30	7,140	665	7,804	[3]	7,804	589	13.3
1966	8,256	39	7,473	823	8,295	[3]	8,295	583	14.2
1967	8,730	80	7,802	1,009	8,810	[3]	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	[3]	8,688	603	14.4
1984	7,157	1,722	7,596	1,283	8,879	[3]	8,879	621	14.3
1985	7,146	1,825	7,722	1,250	8,971	[3]	8,971	647	13.9
1986	6,814	1,867	7,426	1,254	8,680	[3]	8,680	623	13.9
1987	6,387	1,962	7,153	1,196	8,349	[3]	8,349	620	13.5
1988	6,123	2,017	6,949	1,191	8,140	[3]	8,140	612	13.5
1989	5,739	1,874	6,486	1,127	7,613	[3]	7,613	603	12.6
1990	5,582	1,773	6,273	1,082	7,355	[3]	7,355	602	12.2
1991[4]	5,575	1,798	6,224	1,150	7,373	[3]	7,373	614	12.0

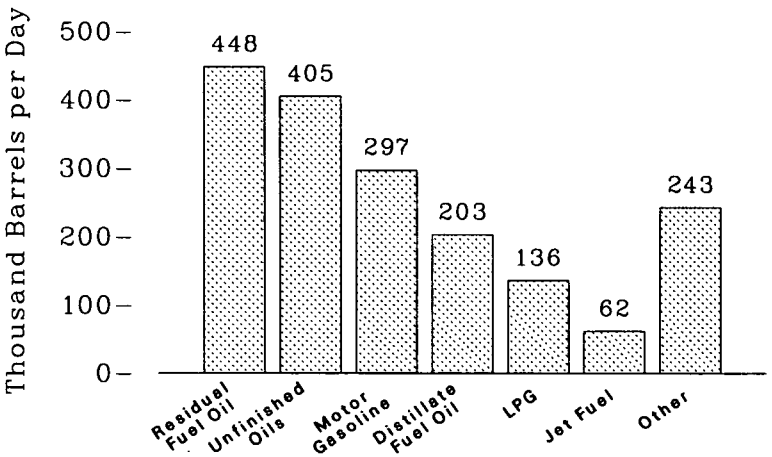
[1] As of December 31.
[2] For 1954-1976, average productivity is based on the average number of producing wells. For 1977 forward, average productivity is based on the number of wells producing at end of year.
[3] Included in crude oil.
[4] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Note: Sum of components may not equal total 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.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly,* February 1992. **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.* • 1981-1990— Independent Petroleum Association of America, *The Oil Producing Industry in Your State.* • 1991—*World Oil,* February 1992. **All Other Data:** • 1954-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1976-1980—EIA, Energy Data Reports, *Petroleum Statement, Annual.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly,* February 1992.

Figure 54. Petroleum Imports by Type

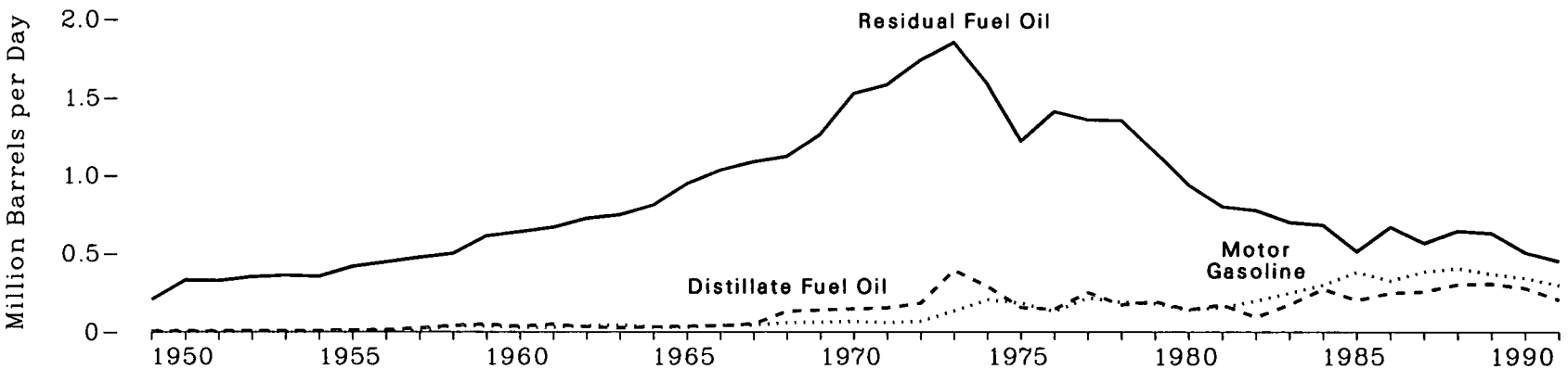
Total, 1949-1991



By Product, 1991



By Selected Product, 1949-1991



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 54.

Table 54. Petroleum Imports by Type, 1949-1991

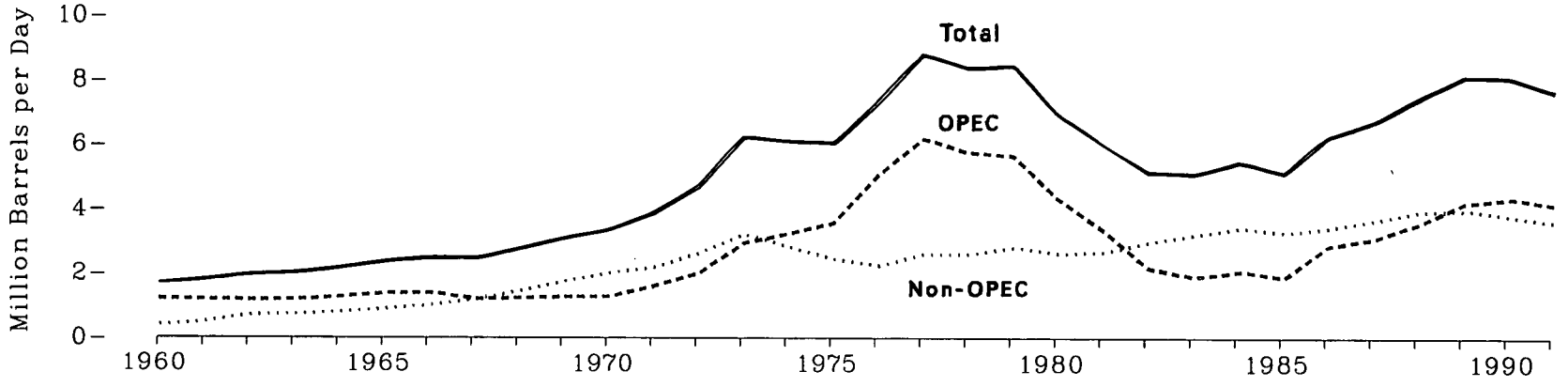
(Thousand Barrels per Day)

Year	Crude Oil [1]	Petroleum Products								Total Petroleum
		Distillate Fuel Oil	Jet Fuel [2]	Liquefied Petroleum Gases	Motor Gasoline [3]	Residual Fuel Oil	Unfinished Oils	Other Products [4]	Total	
1949	421	5	NA	0	0	206	10	3	224	645
1950	487	7	NA	0	([5])	329	21	6	363	850
1951	491	5	NA	0	1	326	14	7	354	844
1952	573	7	NA	0	5	351	9	7	380	952
1953	648	9	NA	0	1	360	9	7	386	1,034
1954	656	9	NA	0	3	354	21	9	396	1,052
1955	782	12	NA	0	13	417	15	9	466	1,248
1956	934	14	21	0	5	445	7	10	502	1,436
1957	1,023	23	25	0	8	475	3	18	552	1,574
1958	953	41	57	0	38	499	92	21	747	1,700
1959	965	48	37	0	37	610	63	19	814	1,780
1960	1,015	35	34	4	27	637	45	17	799	1,815
1961	1,045	48	28	5	29	666	69	26	872	1,917
1962	1,126	32	30	6	38	724	89	36	955	2,082
1963	1,131	25	41	7	44	747	87	41	992	2,123
1964	1,198	32	33	11	29	808	89	58	1,060	2,259
1965	1,238	36	81	21	28	946	92	27	1,229	2,468
1966	1,225	38	86	29	43	1,032	97	24	1,348	2,573
1967	1,128	51	89	27	42	1,085	97	20	1,409	2,537
1968	1,291	132	105	32	59	1,120	80	22	1,549	2,840
1969	1,409	139	125	35	62	1,265	106	25	1,757	3,166
1970	1,324	147	144	52	67	1,528	108	49	2,095	3,419
1971	1,681	153	180	70	59	1,583	124	76	2,245	3,926
1972	2,216	182	194	89	68	1,742	125	126	2,525	4,741
1973	3,244	392	212	132	134	1,853	137	152	3,012	6,256
1974	3,477	289	163	123	204	1,587	121	148	2,635	6,112
1975	4,105	155	133	112	184	1,223	36	108	1,951	6,056
1976	5,287	146	76	130	131	1,413	32	97	2,026	7,313
1977	6,615	250	75	161	217	1,359	31	99	2,193	8,807
1978	6,356	173	86	123	190	1,355	27	53	2,008	8,363
1979	6,519	193	78	217	181	1,151	59	58	1,937	8,456
1980	5,263	142	80	216	140	939	55	76	1,646	6,909
1981	4,396	173	38	244	157	800	112	76	1,599	5,996
1982	3,488	93	29	226	197	776	174	131	1,625	5,113
1983	3,329	174	29	190	247	699	234	147	1,722	5,051
1984	3,426	272	62	195	299	681	231	272	2,011	5,437
1985	3,201	200	39	187	381	510	318	232	1,866	5,067
1986	4,178	247	57	242	326	669	250	254	2,045	6,224
1987	4,674	255	67	190	384	565	299	243	2,004	6,678
1988	5,107	302	90	209	405	644	360	285	2,295	7,402
1989	5,843	306	106	181	369	629	348	280	2,217	8,061
1990	5,894	278	108	188	342	504	413	291	2,123	8,018
1991[6]	5,782	203	62	136	297	448	405	243	1,794	7,576

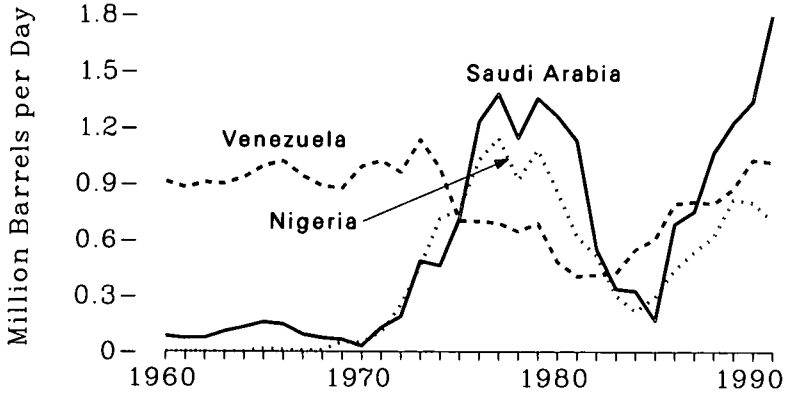
[1] Includes imports for the Strategic Petroleum Reserve, which began in 1977.
[2] Prior to 1965, imports of kerosene-type jet fuel were included with kerosene, which is listed under "Other Products."
[3] Excludes motor gasoline blending components after 1980. Prior to 1964, motor gasoline data were for total gasoline, including motor gasoline, aviation gasoline, and special naphtha.
[4] Aviation gasoline, motor gasoline blending components, aviation gasoline blending components, kerosene, petrochemical feedstocks, special naphthas, lubricants, wax, asphalt, petroleum coke, pentanes plus, and miscellaneous products.
[5] Less than 500 barrels per day.
[6] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
NA = Not available.
Notes: • Includes imports from U.S. possessions and territories. • Sum of components may not equal total 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.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly,* February 1992.

Figure 55. Petroleum Imports by Country of Origin, 1960-1991

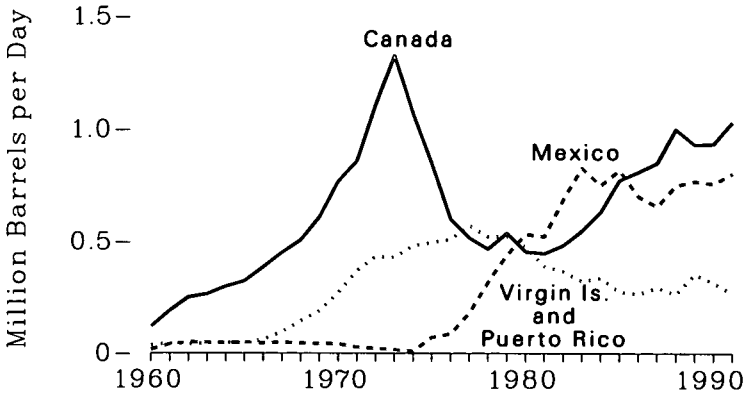
Total, OPEC, and Non-OPEC



Selected OPEC Countries



Selected Non-OPEC Countries



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 55.

Table 55. Petroleum Imports by Country of Origin, 1960-1991

(Thousand Barrels per Day)

	OPEC [1]								Non-OPEC					
Year	Algeria	Indonesia	Nigeria	Saudi Arabia	Venezuela	Other [2]	Total [3]	Arab OPEC [4]	Canada	Mexico	United Kingdom	Virgin Is. and Puerto Rico	Other	Total
1960	1	77	0	84	911	241	1,314	292	120	16	(5)	36	328	1,815
1961	0	62	0	73	879	272	1,286	284	190	40	1	44	357	1,917
1962	0	69	0	74	906	216	1,265	241	250	49	2	41	475	2,082
1963	1	63	0	108	900	211	1,283	258	265	48	3	44	480	2,123
1964	6	68	0	131	933	223	1,361	293	299	47	(5)	47	505	2,259
1965	9	63	15	158	994	237	1,476	324	323	48	(5)	47	574	2,468
1966	4	53	11	147	1,018	238	1,471	300	384	45	6	61	606	2,573
1967	5	66	5	92	938	153	1,259	177	450	49	11	96	673	2,537
1968	6	73	9	74	886	255	1,302	272	506	45	28	145	814	2,840
1969	2	88	49	65	875	256	1,336	276	608	43	20	189	971	3,166
1970	8	70	50	30	989	197	1,343	196	766	42	11	271	985	3,419
1971	15	111	102	128	1,020	296	1,673	327	857	27	10	368	991	3,926
1972	92	164	251	190	959	406	2,063	530	1,108	21	9	432	1,108	4,741
1973	136	213	459	486	1,135	564	2,993	915	1,325	16	15	429	1,479	6,256
1974	190	300	713	461	979	635	3,280	752	1,070	8	8	481	1,265	6,112
1975	282	390	762	715	702	750	3,601	1,383	846	71	14	496	1,026	6,056
1976	432	539	1,025	1,230	700	1,140	5,066	2,424	599	87	31	510	1,019	7,313
1977	559	541	1,143	1,380	690	1,880	6,193	3,185	517	179	126	571	1,221	8,807
1978	649	573	919	1,144	646	1,821	5,751	2,963	467	318	180	522	1,126	8,363
1979	636	420	1,080	1,356	690	1,456	5,637	3,058	538	439	202	523	1,116	8,456
1980	488	348	857	1,261	481	865	4,300	2,551	455	533	176	476	969	6,909
1981	311	366	620	1,129	406	491	3,323	1,848	447	522	375	389	939	5,996
1982	170	248	514	552	412	250	2,146	854	482	685	456	366	979	5,113
1983	240	338	302	337	422	223	1,862	632	547	826	382	322	1,111	5,051
1984	323	343	216	325	548	294	2,049	819	630	748	402	336	1,273	5,437
1985	187	314	293	168	605	264	1,830	472	770	816	310	275	1,066	5,067
1986	271	318	440	685	793	329	2,837	1,162	807	699	350	265	1,267	6,224
1987	295	285	535	751	804	390	3,060	1,274	848	655	352	294	1,469	6,678
1988	300	205	618	1,073	794	529	3,520	1,839	999	747	315	264	1,557	7,402
1989	269	183	815	1,224	873	776	4,140	2,130	931	767	215	353	1,654	8,061
1990	280	114	800	1,339	1,025	738	4,296	2,244	934	755	189	315	1,529	8,018
1991[6]	252	111	702	1,795	1,014	187	4,060	2,055	1,031	801	136	269	1,279	7,576

[1] Organization of Petroleum Exporting Countries. See Glossary for membership.

[2] Ecuador, Gabon, Iran, Iraq, Kuwait, Libya, Qatar, and United Arab Emirates. Prior to 1988, imports from the Neutral Zone between Kuwait and Saudi Arabia are included in imports from Saudi Arabia. From 1988 forward, those imports are included in imports from "Other."

[3] Ecuador, Gabon, Indonesia, Iran, Nigeria, and Venezuela, as well as the Arab members. 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.

[4] Algeria, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, and United Arab Emirates. Imports from the Neutral Zone are included in imports from "Arab OPEC."

[5] Less than 500 barrels per day.

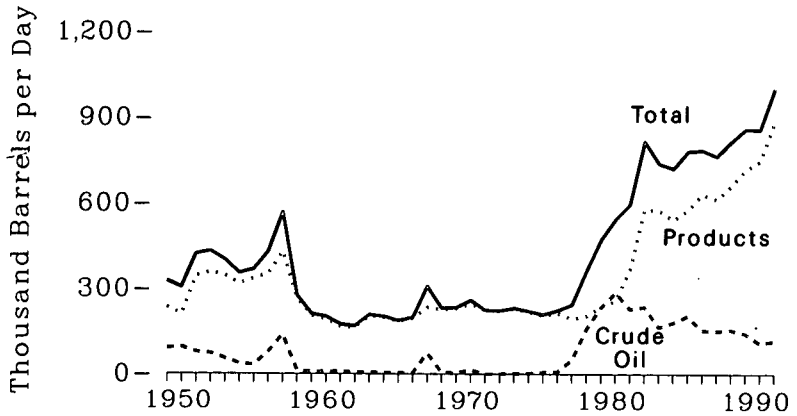
[6] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Notes: • Data include imports for the Strategic Petroleum Reserve, which began in 1977. • Sum of components may not equal total due to independent rounding.

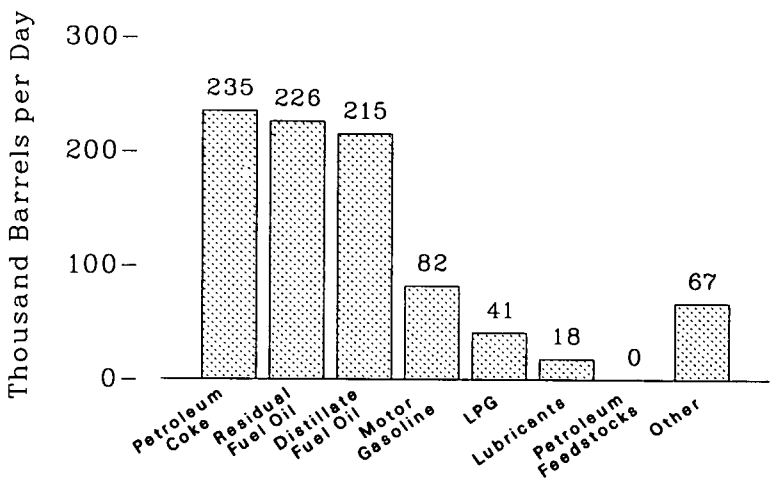
Sources: • 1960-1975—Bureau of Mines, *Minerals Yearbook*, "Crude Petroleum and Petroleum Products" Chapter. • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *P.A.D. Districts Supply/Demand, Annual.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly*, February 1992.

Figure 56. Petroleum Exports by Type

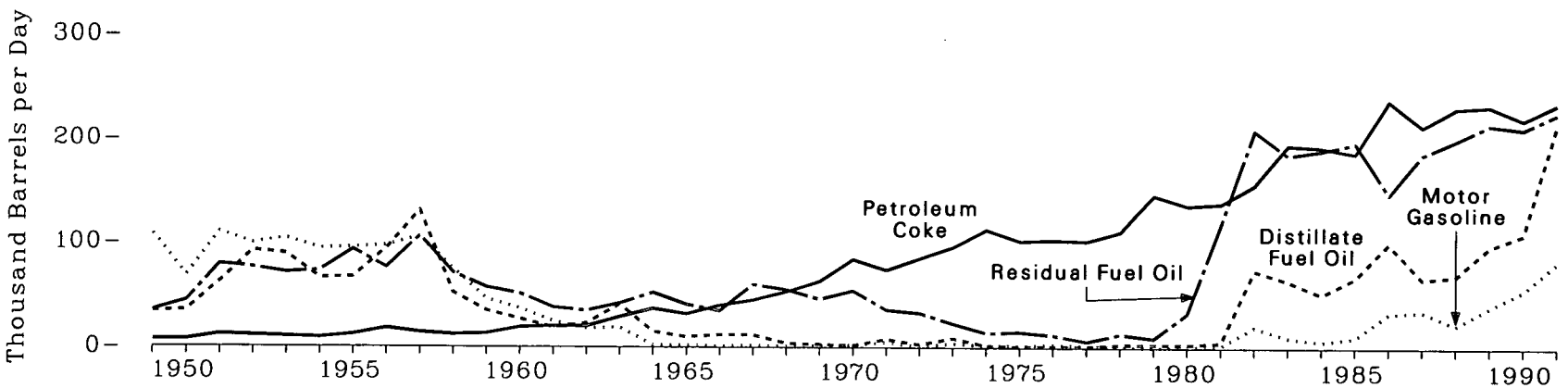
Total, 1949-1991



By Product, 1991



By Selected Product, 1949-1991



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 56.

Table 56. Petroleum Exports by Type, 1949-1991

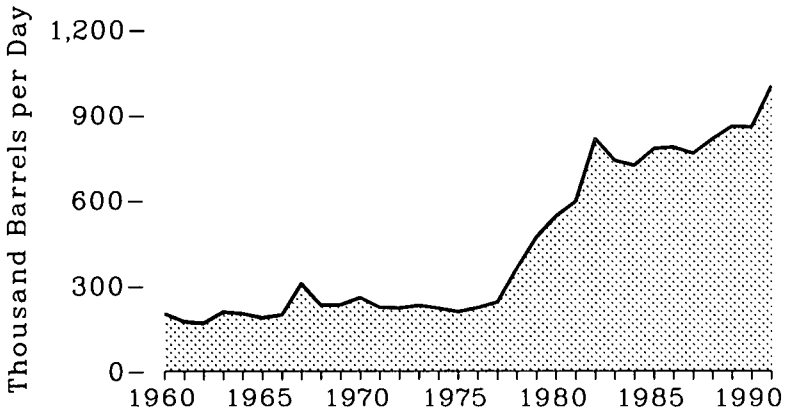
(Thousand Barrels per Day)

Year	Crude Oil	Petroleum Products									Total Petroleum
		Distillate Fuel Oil	Liquefied Petroleum Gases	Lubricants	Motor Gasoline[1]	Petroleum Coke	Petrochemical Feedstocks	Residual Fuel Oil	Other Products[2]	Total	
1949	91	34	4	35	108	7	0	35	15	236	327
1950	95	35	4	39	68	7	0	44	12	210	305
1951	78	62	6	48	110	12	0	79	27	344	422
1952	73	92	7	44	99	11	0	76	31	359	432
1953	55	89	8	36	104	10	0	71	29	347	402
1954	37	66	11	41	94	9	0	73	23	318	355
1955	32	67	12	39	95	12	0	93	18	336	368
1956	78	94	12	38	97	18	0	76	17	352	430
1957	138	131	12	38	106	14	0	106	23	430	568
1958	12	52	8	36	75	12	0	71	11	264	276
1959	7	35	6	38	46	13	0	57	9	204	211
1960	8	27	8	43	37	19	0	51	9	193	202
1961	9	19	10	47	25	20	0	38	7	165	174
1962	5	23	11	48	18	20	0	35	8	163	168
1963	5	41	13	50	19	29	0	42	9	203	208
1964	4	15	15	50	2	37	0	52	28	198	202
1965	3	10	21	45	2	32	5	41	27	184	187
1966	4	12	22	47	1	40	7	35	29	194	198
1967	73	12	25	51	2	45	8	60	31	234	307
1968	5	4	29	49	1	53	8	55	27	226	231
1969	4	3	35	45	2	63	11	46	24	229	233
1970	14	2	27	44	2	84	10	54	21	245	259
1971	1	8	26	43	5	74	14	36	17	223	224
1972	1	3	31	41	1	85	13	33	15	222	222
1973	2	9	27	35	4	96	19	23	16	229	231
1974	3	2	25	33	2	113	15	14	14	218	221
1975	6	1	26	25	2	102	22	15	11	204	209
1976	8	1	25	26	3	103	30	12	15	215	223
1977	50	1	18	26	2	102	24	6	12	193	243
1978	158	3	20	27	1	111	23	13	6	204	362
1979	235	3	15	23		146	31	9	9	236	471
1980	287	3	21	23	1	136	29	33	10	258	544
1981	228	5	42	19	2	138	26	118	17	367	595
1982	236	74	65	16	20	156	24	209	15	579	815
1983	164	64	73	16	10	195	20	185	12	575	739
1984	181	51	48	15	6	193	21	190	17	541	722
1985	204	67	62	15	10	187	19	197	19	577	781
1986	154	100	42	23	33	238	22	147	26	631	785
1987	151	66	38	23	35	213	20	186	33	613	764
1988	155	69	49	26	22	231	23	200	41	661	815
1989	142	97	35	19	39	233	26	215	54	717	859
1990	109	109	40	20	55	220	26	211	67	748	857
1991[3]	116	215	41	18	82	235	0	226	67	885	1,001

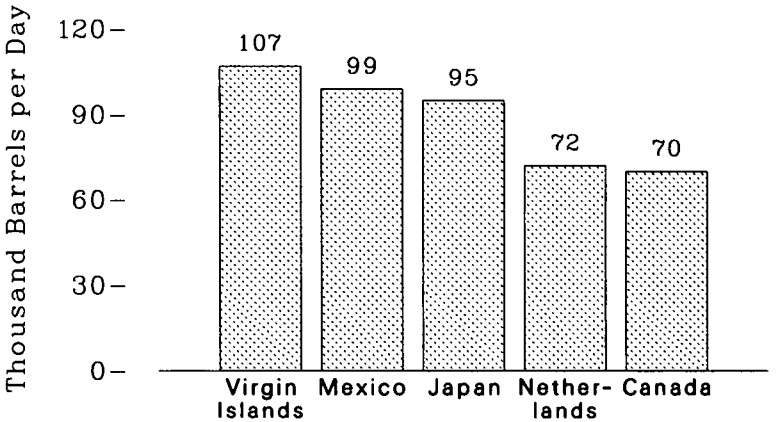
[1] Includes aviation gasoline for the years 1949-1963.
[2] Aviation gasoline (for 1964 forward), jet fuel, kerosene, special naphthas, wax, asphalt, pentanes plus, and miscellaneous products.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Notes: • Includes exports to U.S. possessions and territories. • Sum of components may not equal total 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.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly,* February 1992.

Figure 57. Petroleum Exports by Country of Destination

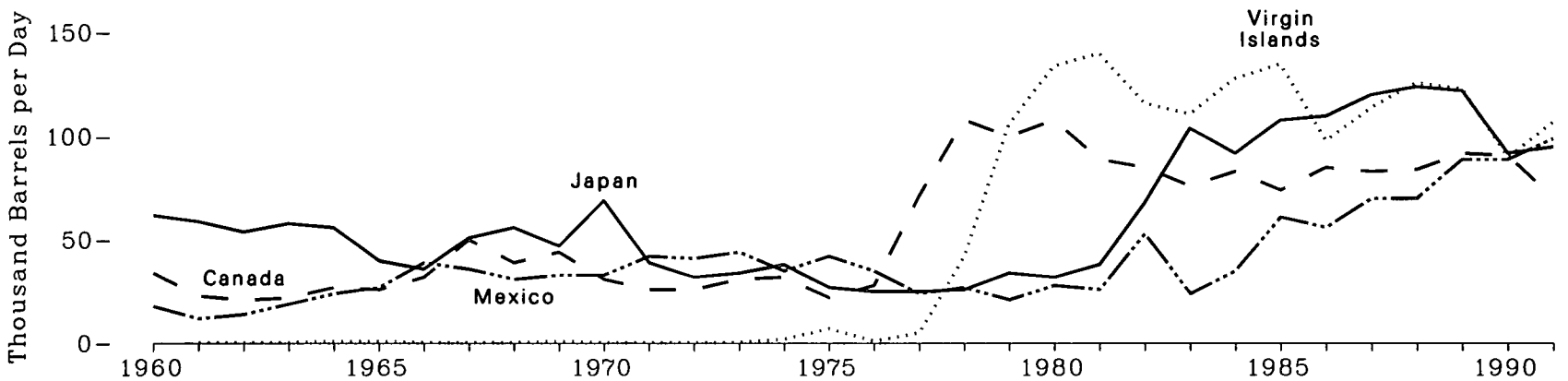
Total, 1960-1991



By Selected Countries, 1991



By Selected Countries, 1960-1991



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 57.

Table 57. Petroleum Exports by Country of Destination, 1960-1991

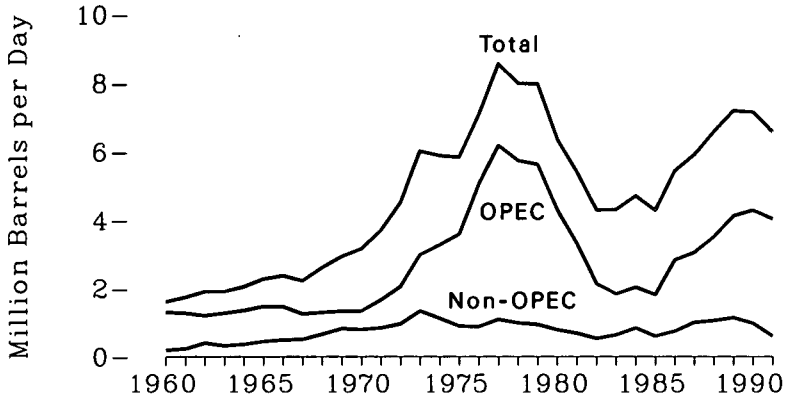
(Thousand Barrels per Day)

Year	Canada	Mexico	Japan	Netherlands	Belgium[1]	Italy	United Kingdom	France	Brazil	Puerto Rico	Virgin Islands	Other	Total
1960	34	18	62	6	3	6	12	4	4	1	NA	52	202
1961	23	12	59	4	4	5	10	4	4	1	[2]	48	174
1962	21	14	54	5	3	5	8	3	5	1	[2]	50	168
1963	22	19	58	13	9	8	11	4	4	1	[2]	59	208
1964	27	24	56	9	4	8	10	4	4	1	1	55	202
1965	26	27	40	10	3	7	12	3	3	1	1	54	187
1966	32	39	36	9	3	7	12	4	4	3	[2]	49	198
1967	50	36	51	13	5	9	62	3	6	7	[2]	65	307
1968	39	31	56	10	4	8	14	4	8	2	[2]	55	231
1969	44	33	47	9	4	9	13	4	7	2	1	59	233
1970	31	33	69	15	5	10	12	5	7	1	[2]	71	259
1971	26	42	39	11	7	8	9	5	9	3	[2]	67	224
1972	26	41	32	12	13	9	10	5	9	3	[2]	63	222
1973	31	44	34	13	15	9	9	5	8	3	[2]	60	231
1974	32	35	38	17	13	9	6	4	9	4	2	52	221
1975	22	42	27	23	9	10	7	6	6	5	7	44	209
1976	28	35	25	22	12	10	13	6	7	21	1	43	223
1977	71	24	25	17	16	10	9	9	6	6	5	44	243
1978	108	27	26	18	15	10	7	9	8	44	42	47	362
1979	100	21	34	28	19	15	7	13	7	64	106	57	471
1980	108	28	32	23	20	14	7	11	4	86	134	79	544
1981	89	26	38	42	12	22	5	15	1	81	140	124	595
1982	85	53	68	85	17	32	14	24	8	95	116	216	815
1983	76	24	104	49	22	35	8	23	2	33	111	251	739
1984	83	35	92	37	21	39	14	18	1	24	128	229	722
1985	74	61	108	44	26	30	14	11	3	26	135	248	781
1986	85	56	110	58	30	39	8	11	3	14	98	273	785
1987	83	70	120	39	17	42	6	12	2	22	114	236	764
1988	84	70	124	26	25	29	9	12	3	21	126	286	815
1989	92	89	122	36	23	37	9	11	5	18	123	294	859
1990	91	89	92	54	20	48	11	17	2	11	90	332	857
1991[3]	70	99	95	72	22	55	13	27	13	10	107	418	1,001

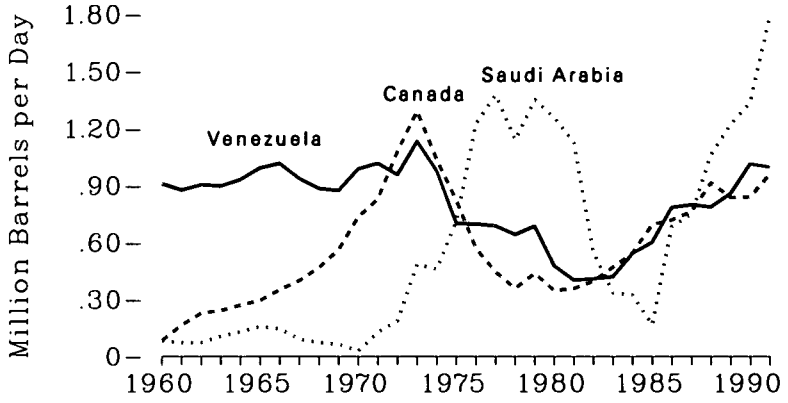
[1] Including Luxembourg.
[2] Less than 500 barrels per day.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
NA = Not available.
Note: Sum of components may not equal total due to independent rounding.
Sources: • 1960-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly,* February 1992.

Figure 58. Petroleum Net Imports by Country of Origin, 1960-1991

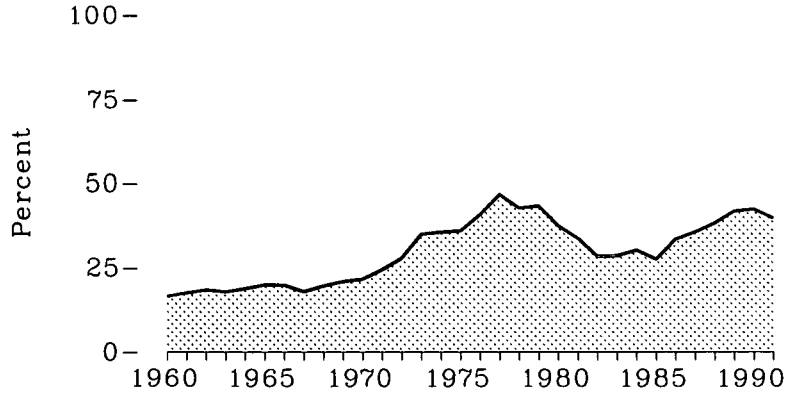
Total, OPEC, and Non-OPEC



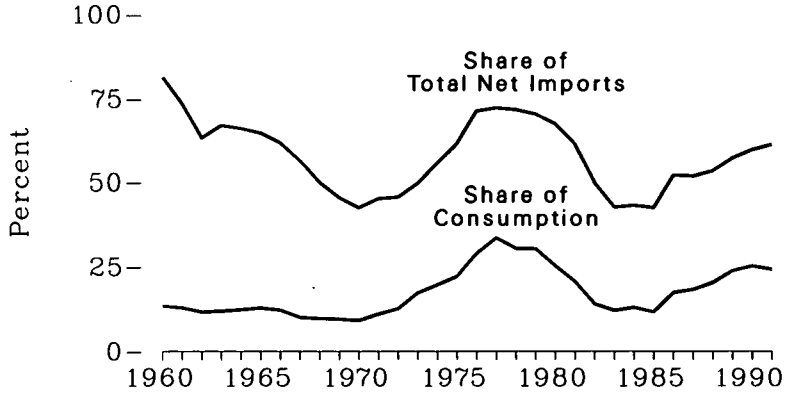
By Selected Country



Share of Consumption



Net Imports from OPEC



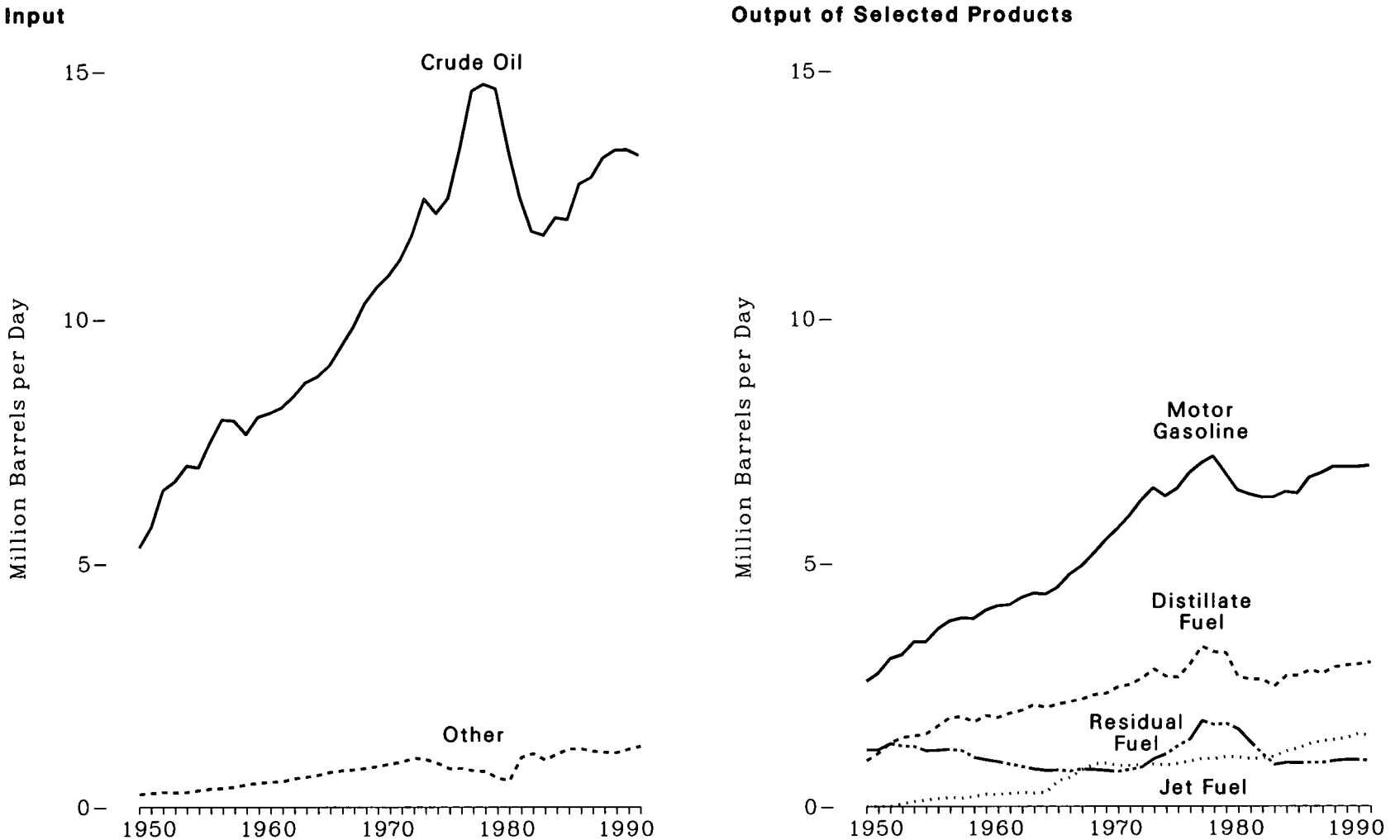
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 58.

Table 58. Petroleum Net Imports by Country of Origin, 1960-1991

Year	OPEC [1]						Non-OPEC					Total Net Imports	Total Net Imports Share of Consumption [5]	Net Imports from OPEC	
	Nigeria	Saudi Arabia	Venezuela	Other [2]	Total [3]	Arab OPEC [4]	Canada	Mexico	United Kingdom	Virgin Is. and Puerto Rico	Other			Share of Total Net Imports [6]	Share of Consumption [7]
	Thousand Barrels per Day													Percent	
1960	0	84	910	317	1,311	292	86	-2	-12	34	195	1,613	16.5	81.3	13.4
1961	0	73	878	333	1,283	284	167	27	-10	42	232	1,743	17.5	73.6	12.9
1962	0	74	905	232	1,210	241	229	35	-6	40	405	1,913	18.4	63.3	11.6
1963	0	108	899	274	1,282	258	243	29	-7	43	325	1,915	17.8	67.0	11.9
1964	0	131	932	296	1,359	293	272	23	-9	45	368	2,057	18.7	66.1	12.3
1965	15	158	994	308	1,475	324	297	21	-11	45	454	2,281	19.8	64.7	12.8
1966	11	147	1,018	295	1,470	291	352	6	-6	58	494	2,375	19.7	61.9	12.2
1967	5	92	937	224	1,258	177	400	13	-51	89	521	2,230	17.8	56.4	10.0
1968	9	74	886	332	1,302	272	468	15	13	143	668	2,609	19.5	49.9	9.7
1969	49	65	875	346	1,336	276	564	10	7	186	831	2,933	20.8	45.5	9.5
1970	50	30	989	274	1,343	196	736	9	-1	270	804	3,161	21.5	42.5	9.1
1971	102	128	1,019	422	1,671	327	831	-14	1	365	848	3,701	24.3	45.2	11.0
1972	251	189	959	662	2,061	529	1,082	-20	-1	428	969	4,519	27.6	45.6	12.6
1973	459	485	1,134	913	2,991	914	1,294	-28	[8]	426	1,343	6,025	34.8	49.6	17.3
1974	713	461	978	1,125	3,277	752	1,038	-27	1	475	1,127	5,892	35.4	55.6	19.7
1975	762	714	702	1,421	3,599	1,382	824	29	7	484	904	5,846	35.8	61.6	22.1
1976	1,025	1,229	699	2,110	5,063	2,423	571	53	24	488	891	7,090	40.6	71.4	29.0
1977	1,143	1,379	689	2,978	6,190	3,184	446	155	117	560	1,097	8,565	46.5	72.3	33.6
1978	919	1,142	644	3,042	5,747	2,962	359	291	173	436	996	8,002	42.5	71.8	30.5
1979	1,080	1,354	688	2,510	5,633	3,054	438	418	196	353	948	7,985	43.1	70.5	30.4
1980	857	1,259	478	1,699	4,293	2,549	347	506	169	256	794	6,365	37.3	67.5	25.2
1981	620	1,128	403	1,165	3,315	1,844	358	497	370	169	693	5,401	33.6	61.4	20.6
1982	512	551	409	663	2,136	852	397	632	442	154	538	4,298	28.1	49.7	14.0
1983	299	336	420	788	1,843	630	471	802	374	178	644	4,312	28.3	42.7	12.1
1984	215	324	544	953	2,037	817	547	714	388	184	847	4,715	30.0	43.2	13.0
1985	293	167	602	759	1,821	470	696	755	295	114	605	4,286	27.3	42.5	11.6
1986	440	685	788	915	2,828	1,160	721	642	342	152	753	5,439	33.4	52.0	17.4
1987	535	751	801	968	3,055	1,273	765	585	346	158	1,006	5,914	35.5	51.7	18.3
1988	618	1,064	790	1,041	3,513	1,837	916	677	306	117	1,058	6,587	38.1	53.3	20.3
1989	815	1,224	861	1,224	4,124	2,128	839	678	206	212	1,143	7,202	41.6	57.3	23.8
1990	800	1,339	1,016	1,130	4,285	2,243	843	666	179	213	976	7,161	42.2	59.8	25.2
1991[9]	702	1,789	999	543	4,033	2,048	961	702	123	152	604	6,575	39.5	61.3	24.2

[1] Organization of Petroleum Exporting Countries. See Glossary for membership.
[2] Algeria, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Qatar, and United Arab Emirates. Prior to 1988, imports from the Neutral Zone between Kuwait and Saudi Arabia are included in imports from Saudi Arabia. From 1988 forward, those imports are included in imports from "Other."
[3] Ecuador, Gabon, Indonesia, Iran, Nigeria, and Venezuela, as well as the Arab members. 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.
[4] Algeria, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, and United Arab Emirates. Imports from the Neutral Zone are included in imports from "Arab OPEC."
[5] Calculated by dividing total net petroleum imports by total U.S. petroleum products supplied (consumption).
[6] Calculated by dividing net petroleum imports from OPEC countries by total net petroleum imports.
[7] Calculated by dividing net petroleum imports from OPEC countries by total U.S. petroleum product supplied (consumption).
[8] Less than 500 barrels per day.
[9] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
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. • Sum of components may not equal total 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.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly*, February 1992.

Figure 59. Refinery Input and Output, 1949-1991



Source: Table 59.

Table 59. Refinery Input and Output, 1949-1991

(Million Barrels per Day)

Year	Input				Output							
	Crude Oil	Natural Gas Plant Liquids	Other Liquids [1]	Total Input	Motor Gasoline [2]	Jet Fuel [2]	Distillate Fuel Oil	Residual Fuel Oil	Liquefied Petroleum Gases	Other Products [3]	Total Output	Processing Gain
1949	5.33	0.23	0.03	5.59	2.57	NA	0.93	1.16	0.06	0.85	5.59	(4)
1950	5.74	0.26	0.02	6.02	2.74	NA	1.09	1.16	0.08	0.95	6.02	(4)
1951	6.49	0.27	0.03	6.80	3.04	NA	1.30	1.29	0.09	1.09	6.80	0.01
1952	6.67	0.28	0.01	6.97	3.12	0.06	1.42	1.24	0.08	1.06	6.97	0.01
1953	7.00	0.30	(4)	7.31	3.38	0.10	1.45	1.23	0.09	1.08	7.33	0.02
1954	6.96	0.32	0.02	7.30	3.38	0.13	1.49	1.14	0.09	1.10	7.32	0.02
1955	7.48	0.34	0.03	7.86	3.65	0.16	1.65	1.15	0.12	1.17	7.89	0.03
1956	7.94	0.37	0.01	8.32	3.82	0.18	1.82	1.17	0.14	1.24	8.36	0.04
1957	7.92	0.41	(4)	8.33	3.88	0.17	1.83	1.14	0.15	1.20	8.37	0.04
1958	7.64	0.37	0.09	8.11	3.87	0.20	1.73	1.00	0.16	1.22	8.17	0.06
1959	7.99	0.42	0.07	8.48	4.04	0.25	1.86	0.95	0.19	1.28	8.57	0.09
1960	8.07	0.45	0.06	8.58	4.13	0.24	1.82	0.91	0.21	1.42	8.73	0.15
1961	8.18	0.46	0.06	8.71	4.15	0.26	1.91	0.86	0.22	1.49	8.89	0.18
1962	8.41	0.50	0.08	8.99	4.30	0.28	1.97	0.81	0.21	1.59	9.16	0.18
1963	8.69	0.52	0.09	9.30	4.39	0.27	2.09	0.76	0.26	1.72	9.50	0.20
1964	8.81	0.58	0.07	9.46	4.37	0.29	2.03	0.73	0.29	1.97	9.68	0.22
1965	9.04	0.62	0.09	9.75	4.51	0.52	2.10	0.74	0.29	1.81	9.97	0.22
1966	9.44	0.65	0.09	10.18	4.77	0.59	2.15	0.72	0.29	1.90	10.43	0.25
1967	9.82	0.67	0.09	10.58	4.94	0.75	2.20	0.76	0.31	1.92	10.87	0.29
1968	10.31	0.71	0.08	11.10	5.20	0.86	2.29	0.75	0.32	1.99	11.42	0.32
1969	10.63	0.72	0.11	11.46	5.47	0.88	2.32	0.73	0.34	2.06	11.79	0.34
1970	10.87	0.76	0.12	11.75	5.70	0.83	2.45	0.71	0.35	2.08	12.11	0.36
1971	11.20	0.78	0.14	12.12	5.97	0.83	2.50	0.75	0.36	2.09	12.50	0.38
1972	11.70	0.83	0.17	12.69	6.28	0.85	2.63	0.80	0.36	2.17	13.08	0.39
1973	12.43	0.82	0.15	13.40	6.53	0.86	2.82	0.97	0.37	2.30	13.85	0.45
1974	12.13	0.75	0.14	13.02	6.36	0.84	2.67	1.07	0.34	2.23	13.50	0.48
1975	12.44	0.71	0.07	13.23	6.52	0.87	2.65	1.24	0.31	2.10	13.68	0.46
1976	13.42	0.73	0.06	14.20	6.84	0.92	2.92	1.38	0.34	2.28	14.68	0.48
1977	14.60	0.67	0.07	15.35	7.03	0.97	3.28	1.75	0.35	2.49	15.87	0.52
1978	14.74	0.64	0.09	15.47	7.17	0.97	3.17	1.67	0.35	2.64	15.97	0.50
1979	14.65	0.51	0.08	15.24	6.84	1.01	3.15	1.69	0.34	2.74	15.76	0.53
1980	13.48	0.46	0.08	14.02	6.49	1.00	2.66	1.58	0.33	2.56	14.62	0.60
1981	12.47	0.52	0.49	13.48	6.40	0.97	2.61	1.32	0.31	2.37	13.99	0.51
1982	11.77	0.52	0.57	12.86	6.34	0.98	2.61	1.07	0.27	2.13	13.39	0.53
1983	11.69	0.46	0.50	12.65	6.34	1.02	2.46	0.85	0.33	2.14	13.14	0.49
1984	12.04	0.50	0.58	13.13	6.45	1.13	2.68	0.89	0.36	2.16	13.68	0.55
1985	12.00	0.51	0.68	13.19	6.42	1.19	2.69	0.88	0.39	2.18	13.75	0.56
1986	12.72	0.48	0.71	13.91	6.75	1.29	2.80	0.89	0.42	2.37	14.52	0.62
1987	12.85	0.47	0.67	13.99	6.84	1.34	2.73	0.89	0.45	2.38	14.63	0.64
1988	13.25	0.51	0.61	14.37	6.96	1.37	2.86	0.93	0.50	2.42	15.02	0.66
1989	13.40	0.50	0.61	14.51	6.96	1.40	2.90	0.95	0.55	2.40	15.17	0.66
1990	13.41	0.47	0.71	14.59	6.96	1.49	2.92	0.95	0.50	2.45	15.27	0.68
1991[5]	13.30	0.46	0.78	14.53	6.98	1.44	2.96	0.93	0.50	2.42	15.23	0.70

[1] Prior to 1981, includes unfinished oils (net), hydrogen, and hydrocarbons not included elsewhere. 1981 forward includes unfinished oils (net), motor gasoline blending components (net), aviation gasoline blending components (net), hydrogen, other hydrocarbons, and alcohol. See Appendix E, Note 5.

[2] Prior to 1964, motor gasoline data were for total gasoline, including motor gasoline, aviation gasoline, and special naphtha. Prior to 1965, kerosene-type jet fuel was included in kerosene.

[3] Kerosene, petrochemical feedstocks, lubricants, wax, petroleum coke, asphalt, road oil, still gas, and miscellaneous products. Since 1964, aviation gasoline and special naphthas are included.

[4] Less than 5,000 barrels per day.

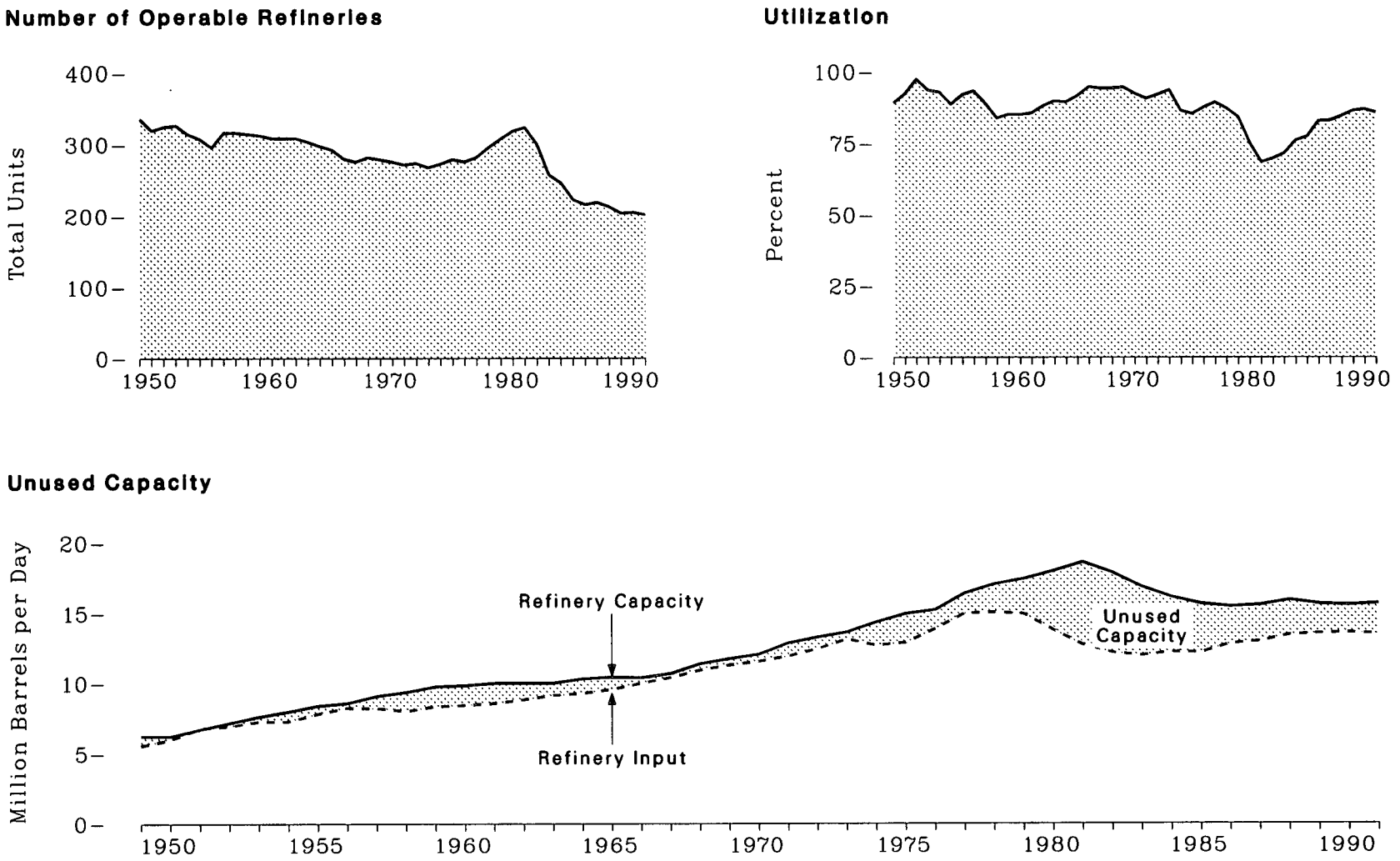
[5] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

NA = Not available.

Note: Sum of components may not equal total 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.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly,* February 1992.

Figure 60. Refinery Capacity and Utilization, 1949-1991



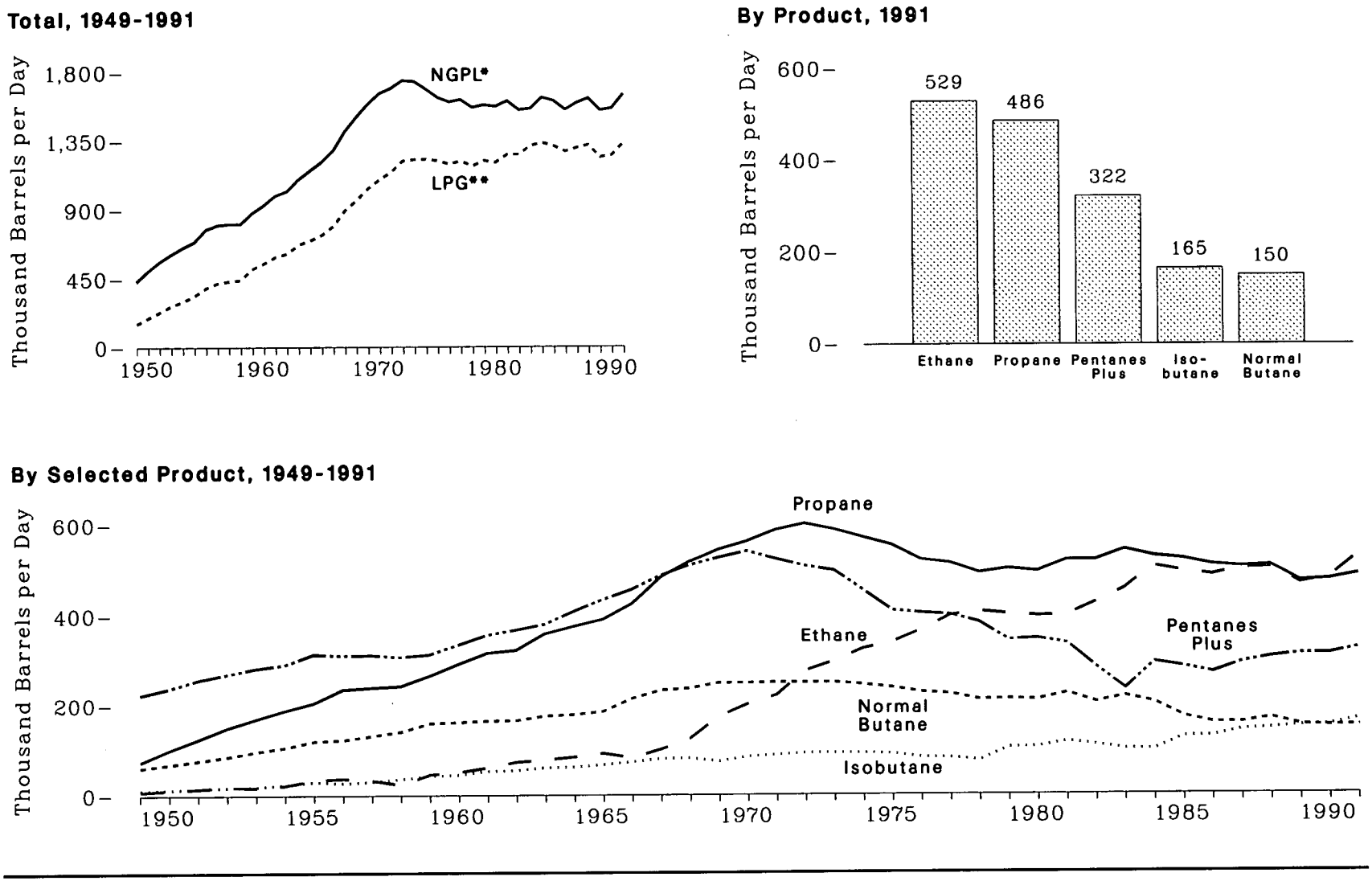
Source: Table 60.

Table 60. Refinery Capacity and Utilization, 1949-1991

Year	Operable Refineries		Gross Input to Distillation Units [3] (million barrels per day)	Utilization [4] (percent)
	Number [1]	Capacity [2] (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[5]	202	15.68	13.50	85.9

[1] Prior to 1956, the number of refineries includes only those in operation on January 1. For 1957 forward, the number of refineries includes all operable refineries on January 1 (see Glossary). [2] Capacity in million barrels per calendar day on January 1. [3] See Appendix E, Note 6. [4] 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 is derived by averaging reported monthly utilization. [5] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications. Note: Data are for refineries in the United States, excluding the Hawaiian Foreign Trade Zone. Sources: **Operable Refineries:** • 1949-1977—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.* **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.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly,* February 1992. **Utilization:** • 1949-1980—calculated. • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA *Petroleum Supply Monthly,* February 1992.

Figure 61. Natural Gas Plant Liquids Production



*Natural gas plant liquids. **Liquefied petroleum gases.
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 61.

Table 61. Natural Gas Plant Liquids Production, 1949-1991

(Thousand Barrels per Day)

Year	Liquefied Petroleum Gases					Pentanes Plus [3]	Finished Petroleum Products [4]	Total
	Ethane [1]	Propane [1,2]	Normal Butane [2]	Isobutane	Total			
1949	8	74	61	11	155	223	53	430
1950	12	101	69	13	195	238	66	499
1951	15	125	77	15	232	256	73	561
1952	19	150	86	18	273	269	70	611
1953	17	169	97	19	301	282	71	654
1954	22	188	106	24	339	290	61	691
1955	34	205	120	30	390	313	68	771
1956	37	235	123	27	422	310	68	800
1957	33	239	132	30	434	311	63	808
1958	23	242	141	36	442	307	58	808
1959	46	265	159	43	514	312	54	879
1960	51	291	161	45	549	333	47	929
1961	61	315	164	53	593	355	43	991
1962	73	321	165	55	614	367	41	1,021
1963	78	358	175	61	672	380	47	1,098
1964	84	375	178	62	699	408	48	1,154
1965	92	390	185	67	734	434	41	1,210
1966	82	424	214	73	792	456	37	1,284
1967	101	482	232	80	895	486	29	1,409
1968	125	517	236	81	960	509	35	1,504
1969	173	543	248	74	1,037	526	27	1,590
1970	201	561	248	84	1,095	540	25	1,660
1971	221	586	249	88	1,144	523	25	1,693
1972	275	600	249	92	1,215	507	21	1,744
1973	296	587	249	92	1,225	497	16	1,738
1974	323	569	244	92	1,227	454	7	1,688
1975	337	552	237	90	1,217	409	7	1,633
1976	365	521	227	82	1,195	403	6	1,604
1977	397	513	223	81	1,214	399	5	1,618
1978	406	491	210	75	1,182	382	3	1,567
1979	400	500	212	104	1,216	342	26	1,584
1980	396	494	210	105	1,205	345	23	1,573
1981	397	519	224	117	1,256	334	18	1,609
1982	426	519	204	109	1,258	282	11	1,550
1983	456	541	217	100	1,314	233	12	1,559
1984	505	527	203	99	1,334	292	4	1,630
1985	493	521	171	127	1,313	282	14	1,609
1986	485	508	157	128	1,277	269	4	1,551
1987	499	503	157	141	1,300	291	4	1,595
1988	501	506	167	144	1,319	302	4	1,625
1989	466	471	151	149	1,237	309	(5)	1,546
1990	477	474	149	151	1,250	309	(5)	1,559
1991[6]	529	486	150	165	1,329	322	(5)	1,651

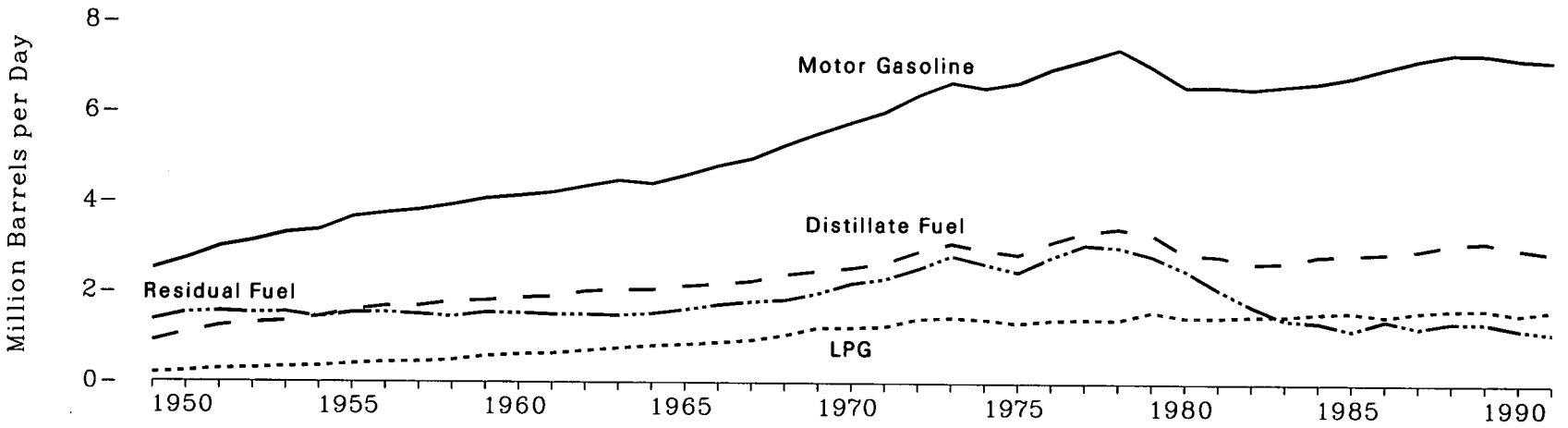
[1] Reported production of ethane-propane mixtures have been allocated 70 percent ethane and 30 percent propane.
[2] Reported production of butane-propane mixtures have been allocated 60 percent butane and 40 percent propane.
[3] Prior to 1984, this category was reported separately as natural gasoline, isopentane, and plant condensate.
[4] Motor gasoline, aviation gasoline, special naphthas, distillate fuel oil, and miscellaneous products.
[5] Beginning in 1989, finished petroleum products production from natural gas processing plants was no longer available.
[6] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Note: Sum of components may not equal total due to independent rounding.

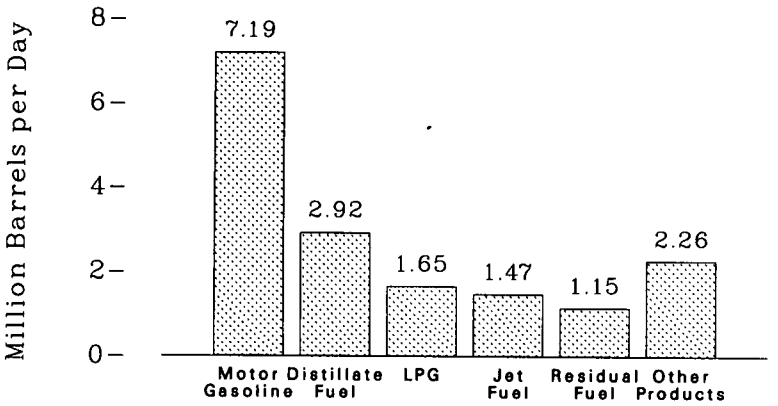
Sources: • 1949-1968—Bureau of Mines, *Minerals Yearbook*, "Crude Petroleum and Petroleum Products" chapter. • 1969-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual*. • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual*. • 1981-1990—EIA, *Petroleum Supply Annual*. • 1991—EIA, *Petroleum Supply Monthly*, February 1992.

Figure 62. Petroleum Products Supplied by Type

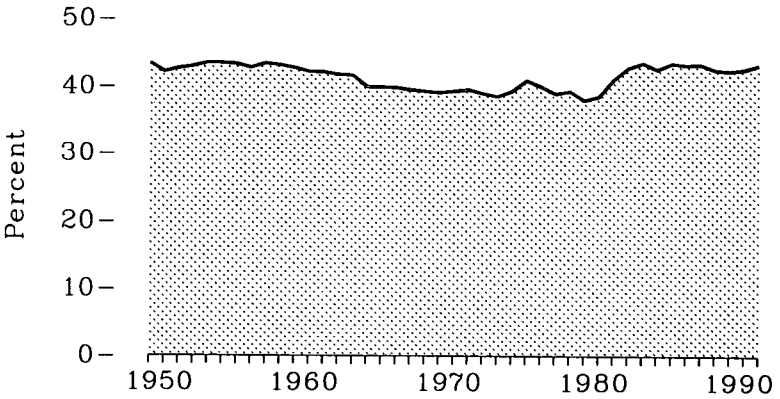
By Selected Product, 1949-1991



By Product, 1991



Motor Gasoline's Share of Total Petroleum Products Supplied, 1949-1991



Source: Table 62.

Table 62. Petroleum Products Supplied by Type, 1949-1991

(Million Barrels per Day)

Year	Motor Gasoline [1]	Jet Fuel	Distillate Fuel Oil	Residual Fuel Oil	Liquefied Petroleum Gases	Other Products [2]	Total Products	Percentage Change from Previous Year [3]
1949	2.50	NA	0.90	1.36	0.19	0.81	5.76	—
1950	2.72	NA	1.08	1.52	0.23	0.90	6.46	12.1
1951	2.99	NA	1.23	1.55	0.28	0.98	7.02	8.6
1952	3.12	0.05	1.30	1.52	0.30	0.98	7.27	3.9
1953	3.30	0.09	1.34	1.54	0.33	1.00	7.60	4.3
1954	3.37	0.13	1.44	1.43	0.35	1.03	7.76	2.1
1955	3.66	0.15	1.59	1.53	0.40	1.12	8.46	9.0
1956	3.75	0.20	1.68	1.54	0.44	1.16	8.78	4.1
1957	3.82	0.20	1.69	1.50	0.45	1.15	8.81	0.1
1958	3.93	0.26	1.79	1.45	0.49	1.19	9.12	3.5
1959	4.07	0.29	1.81	1.54	0.58	1.24	9.53	4.5
1960	4.13	0.28	1.87	1.53	0.62	1.36	9.80	3.1
1961	4.20	0.29	1.90	1.50	0.64	1.44	9.98	1.5
1962	4.34	0.31	2.01	1.50	0.70	1.55	10.40	4.2
1963	4.47	0.32	2.05	1.48	0.76	1.68	10.74	3.3
1964	4.40	0.32	2.05	1.52	0.81	1.92	11.02	2.9
1965	4.59	0.60	2.13	1.61	0.84	1.74	11.51	4.2
1966	4.81	0.67	2.18	1.72	0.89	1.82	12.08	5.0
1967	4.96	0.82	2.24	1.79	0.94	1.81	12.56	3.9
1968	5.26	0.95	2.39	1.83	1.05	1.91	13.39	6.9
1969	5.53	0.99	2.47	1.98	1.22	1.95	14.14	5.3
1970	5.78	0.97	2.54	2.20	1.22	1.98	14.70	4.0
1971	6.01	1.01	2.66	2.30	1.25	1.98	15.21	3.5
1972	6.38	1.05	2.91	2.53	1.42	2.08	16.37	7.9
1973	6.67	1.06	3.09	2.82	1.45	2.21	17.31	5.5
1974	6.54	0.99	2.95	2.64	1.41	2.13	16.65	-3.8
1975	6.67	1.00	2.85	2.46	1.33	2.00	16.32	-2.0
1976	6.98	0.99	3.13	2.80	1.40	2.16	17.46	7.3
1977	7.18	1.04	3.35	3.07	1.42	2.37	18.43	5.3
1978	7.41	1.06	3.43	3.02	1.41	2.51	18.85	2.3
1979	7.03	1.08	3.31	2.83	1.59	2.67	18.51	-1.8
1980	6.58	1.07	2.87	2.51	1.47	2.57	17.06	-7.6
1981	6.59	1.01	2.83	2.09	1.47	2.08	16.06	-6.1
1982	6.54	1.01	2.67	1.72	1.50	1.86	15.30	-4.7
1983	6.62	1.05	2.69	1.42	1.51	1.94	15.23	-0.4
1984	6.69	1.18	2.84	1.37	1.57	2.07	15.73	3.5
1985	6.83	1.22	2.87	1.20	1.60	2.01	15.73	-0.3
1986	7.03	1.31	2.91	1.42	1.51	2.09	16.28	3.5
1987	7.21	1.38	2.98	1.26	1.61	2.22	16.67	2.4
1988	7.34	1.45	3.12	1.38	1.66	2.34	17.28	4.0
1989	7.33	1.49	3.16	1.37	1.67	2.31	17.33	-0.0
1990	7.23	1.52	3.02	1.23	1.56	2.43	16.99	-1.9
1991[4]	7.19	1.47	2.92	1.15	1.65	2.26	16.64	-2.0

[1] Prior to 1964, motor gasoline data were for total gasoline, including motor gasoline, aviation gasoline, and special naphtha.

[2] Kerosene, petrochemical feedstocks, lubricants, wax, petroleum coke, asphalt, road oil, still gas, pentanes plus, and miscellaneous products. Since 1964, aviation gasoline and special naphthas are 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 also includes crude oil burned as fuel.

[3] Percent change from previous year calculated from data prior to rounding.

[4] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

— = Not applicable.

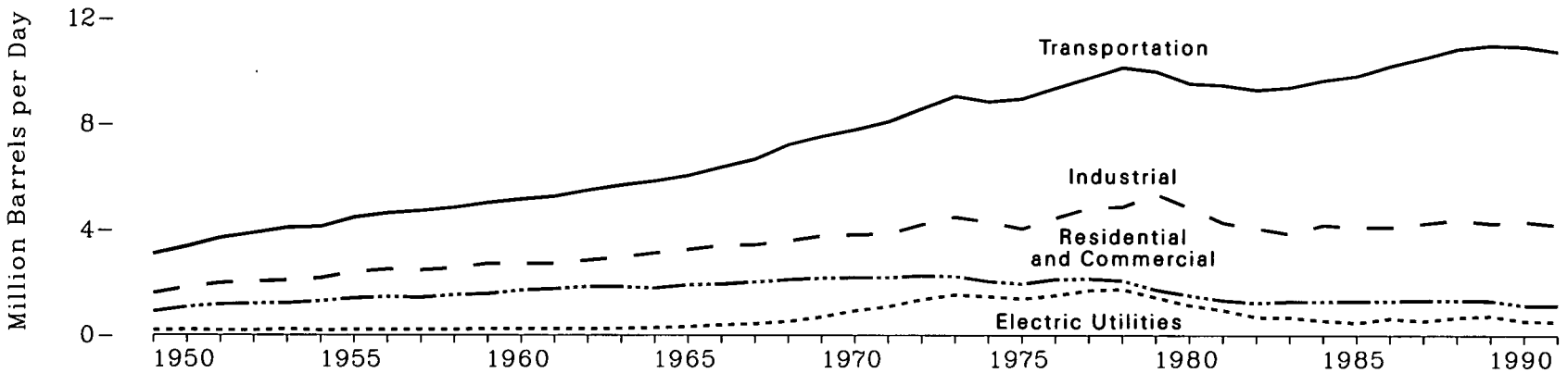
NA = Not available.

Notes: • For the definition of petroleum products supplied, see Appendix E, Notes 5, 7, and 8. • Sum of components may not equal total due to independent rounding.

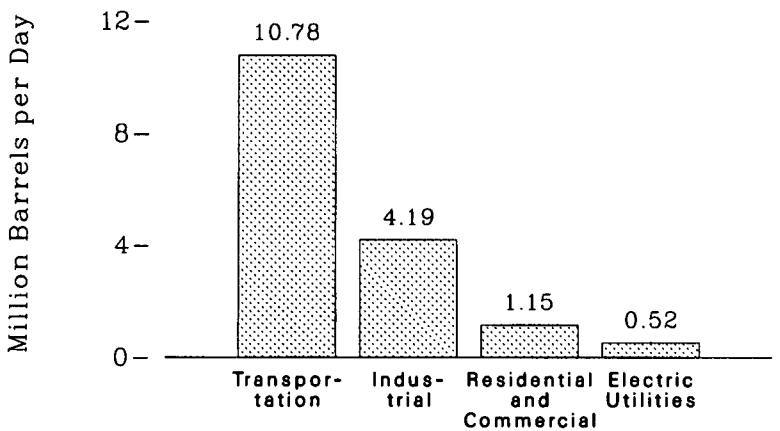
Sources: • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly,* February 1992.

Figure 63. Petroleum Products Supplied by Sector

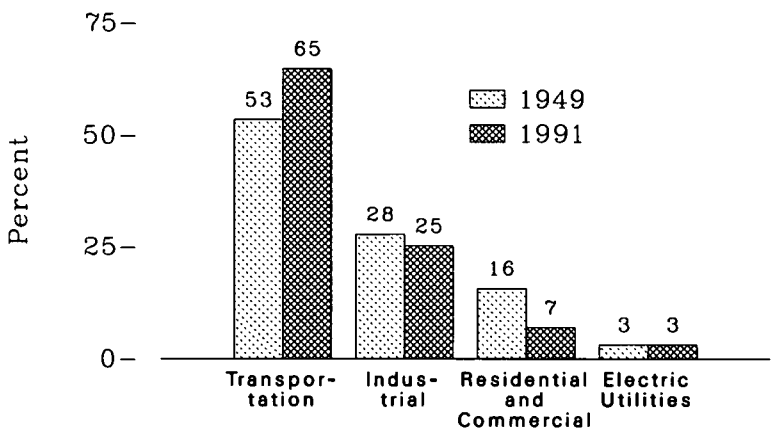
By Sector, 1949-1991



By Sector, 1991



Shares by Sector, 1949 and 1991



Source: Table 63.

Table 63. Petroleum Products Supplied by Sector, 1949-1991

(Million Barrels per Day)

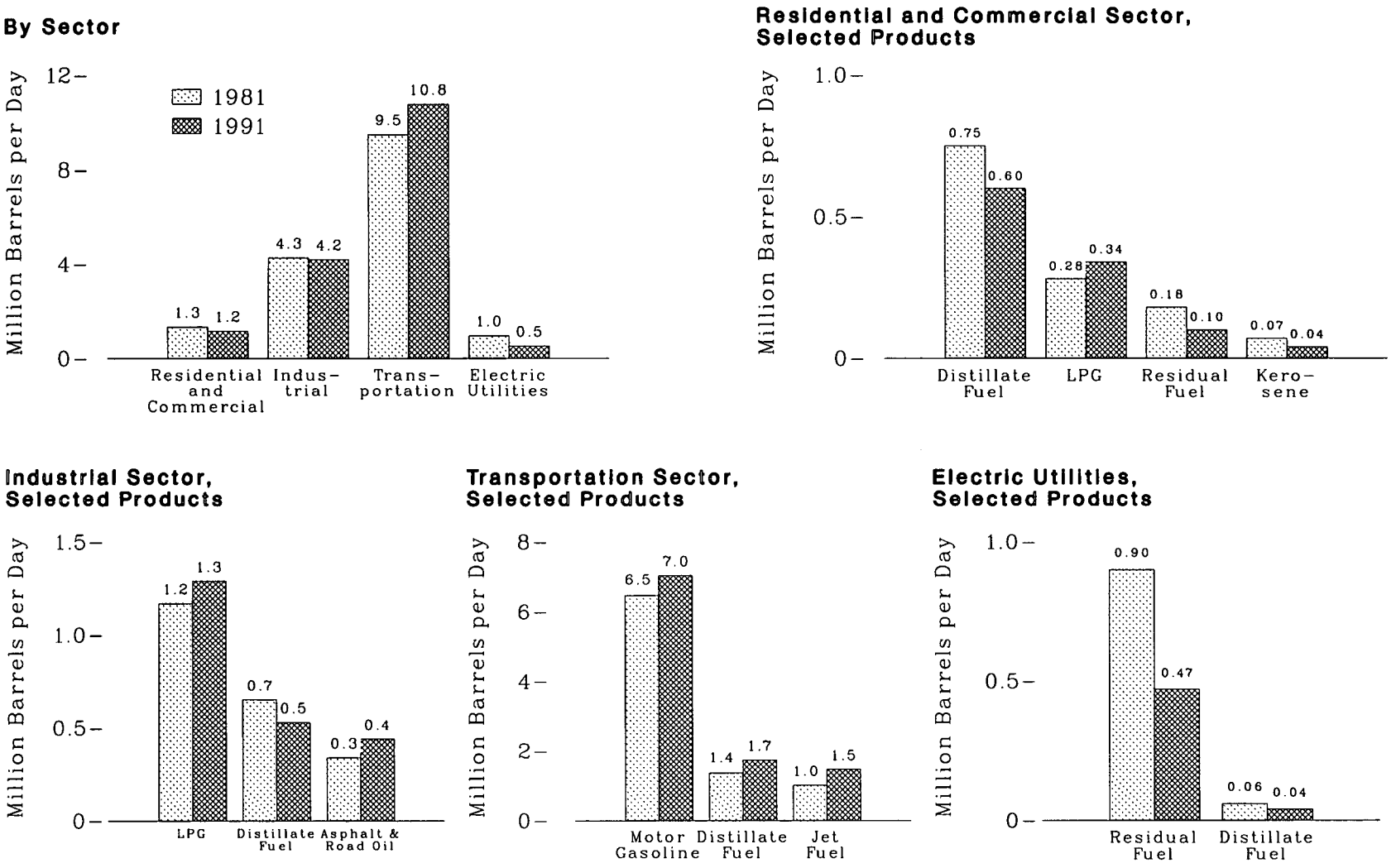
Year	Residential and Commercial	Industrial	Transportation	Electric Utilities	Total
1949	0.90	1.60	3.08	0.18	5.76
1950	1.07	1.82	3.36	0.21	6.46
1951	1.17	1.98	3.69	0.18	7.02
1952	1.20	2.02	3.87	0.18	7.27
1953	1.22	2.08	4.07	0.23	7.60
1954	1.30	2.16	4.11	0.18	7.76
1955	1.40	2.39	4.46	0.21	8.46
1956	1.46	2.49	4.62	0.20	8.78
1957	1.43	2.46	4.71	0.22	8.81
1958	1.53	2.54	4.83	0.21	9.12
1959	1.57	2.71	5.01	0.24	9.53
1960	1.71	2.71	5.14	0.24	9.80
1961	1.76	2.72	5.25	0.24	9.98
1962	1.84	2.84	5.48	0.24	10.40
1963	1.84	2.96	5.68	0.26	10.74
1964	1.79	3.12	5.83	0.28	11.02
1965	1.91	3.25	6.04	0.32	11.51
1966	1.94	3.40	6.36	0.39	12.08
1967	2.02	3.43	6.66	0.44	12.56
1968	2.10	3.58	7.20	0.52	13.39
1969	2.16	3.76	7.52	0.69	14.14
1970	2.18	3.81	7.78	0.93	14.70
1971	2.18	3.84	8.09	1.09	15.21
1972	2.25	4.19	8.57	1.36	16.37
1973	2.23	4.48	9.05	1.54	17.31
1974	2.04	4.30	8.84	1.48	16.65
1975	1.95	4.04	8.95	1.39	16.32
1976	2.12	4.45	9.37	1.52	17.46
1977	2.14	4.82	9.76	1.71	18.43
1978	2.07	4.87	10.16	1.75	18.85
1979	1.73	5.34	10.01	1.44	18.51
1980	1.52	4.84	9.55	1.15	17.06
1981	1.33	4.27	9.49	0.96	16.06
1982	1.24	4.06	9.31	0.69	15.30
1983	1.29	3.85	9.41	0.68	15.23
1984	1.29	4.19	9.68	0.56	15.73
1985	1.30	4.10	9.85	0.48	15.73
1986	1.31	4.11	10.23	0.64	16.28
1987	1.34	4.25	10.53	0.55	16.67
1988	1.34	4.39	10.87	0.68	17.28
1989	1.32	4.26	11.01	0.74	17.33
1990	1.15	4.32	10.97	0.55	16.99
1991[1]	1.15	4.19	10.78	0.52	16.64

[1] Previous-year data have been revised. Current-year data are estimated and will be revised in future publications.

Notes: • For the definition of petroleum products supplied, see Appendix E, Note 7. • Sum of components may not equal total due to independent rounding.

Sources: **Total:** • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly,* February 1992. **All Other Data:** • 1949-1959—EIA estimates. • 1960-1990—EIA, State Energy Data System 1990. • 1991—EIA, Integrated Modeling Data System output for the *Monthly Energy Review,* March 1992.

Figure 64. Petroleum Products Supplied by Type and Sector, 1981 and 1991



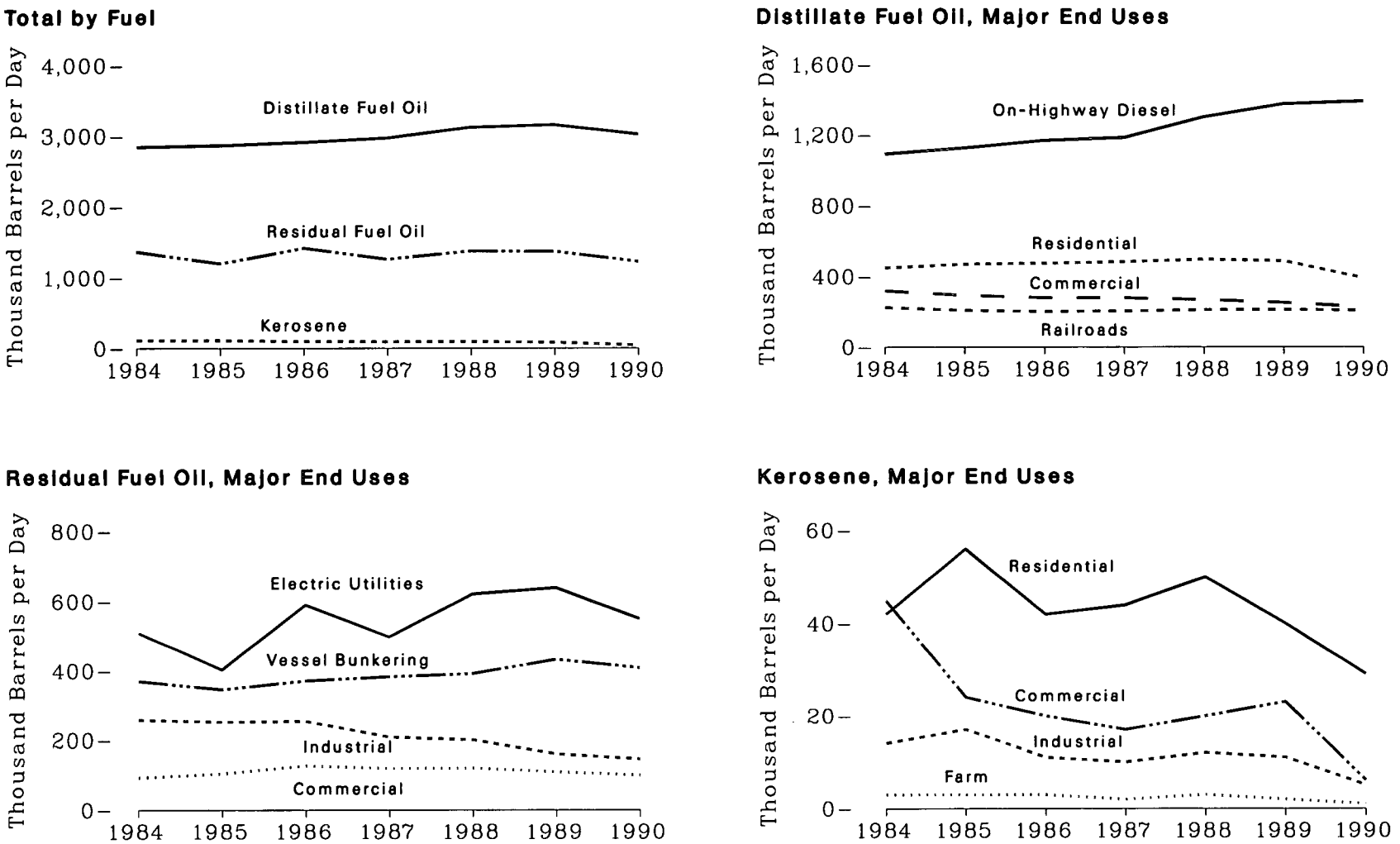
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 64.

Table 64. Petroleum Products Supplied by Type and Sector, 1981 and 1991

Year and Refined Product	Residential and Commercial		Industrial		Transportation		Electric Utilities		Total	
	Million Barrels per Day	Quadrillion Btu	Million Barrels per Day	Quadrillion Btu	Million Barrels per Day	Quadrillion Btu	Million Barrels per Day	Quadrillion Btu	Million Barrels per Day	Quadrillion Btu
Total, 1981	**1.33**	**2.63**	**4.27**	**8.29**	**9.49**	**18.81**	**0.96**	**2.20**	**16.06**	**31.93**
Asphalt and Road Oil	0	0	0.34	0.83	0	0	0	0	0.34	0.83
Aviation Gasoline	0	0	0	0	0.03	0.06	0	0	0.03	0.06
Distillate Fuel Oil	0.75	1.60	0.65	1.39	1.36	2.90	0.06	0.12	2.83	6.01
Jet Fuel	0	0	0	0	1.01	2.06	[1]	[1]	1.01	2.06
Kerosene	0.07	0.15	0.05	0.11	0	0	0	0	0.13	0.26
Liquefied Petroleum Gases	0.28	0.37	1.17	1.55	0.02	0.03	0	0	1.47	1.95
Lubricants	0	0	0.08	0.17	0.07	0.16	0	0	0.15	0.34
Motor Gasoline	0.05	0.09	0.08	0.16	6.46	12.38	0	0	6.59	12.63
Residual Fuel Oil	0.18	0.42	0.47	1.08	0.53	1.22	0.90	2.07	2.09	4.79
Other [2]	0	0	1.43	3.00	0	0	[1]	[1]	1.43	3.00
Total, 1991 [3]	**1.15**	**2.17**	**4.19**	**7.96**	**10.78**	**21.41**	**0.52**	**1.18**	**16.64**	**32.72**
Asphalt and Road Oil	0	0	0.44	1.07	0	0	0	0	0.44	1.07
Aviation Gasoline	0	0	0	0	0.02	0.04	0	0	0.02	0.04
Distillate Fuel Oil	0.60	1.29	0.53	1.13	1.74	3.70	0.04	0.08	2.92	6.20
Jet Fuel	0	0	0	0	1.47	3.01	0	0	1.47	3.01
Kerosene	0.04	0.08	0.01	0.01	0	0	0	0	0.05	0.10
Liquefied Petroleum Gases	0.34	0.45	1.29	1.70	0.02	0.02	0	0	1.65	2.18
Lubricants	0	0	0.07	0.17	0.07	0.16	0	0	0.15	0.32
Motor Gasoline	0.06	0.11	0.10	0.18	7.04	13.50	0	0	7.19	13.79
Residual Fuel Oil	0.10	0.23	0.16	0.36	0.43	0.98	0.47	1.07	1.15	2.64
Other [2]	0	0	1.59	3.34	0	0	0.01	0.02	1.60	3.36

[1] Less than 5 thousand barrels per day, or less than 5 trillion Btu.
[2] Other in the industrial sector is petrochemical feedstocks, special naphthas, waxes, petroleum coke, still gas, natural gasoline, pentanes plus, crude oil, and miscellaneous products. Other for electric utilities is petroleum coke.
[3] Estimated.
Notes: • For the definition of petroleum products supplied, see Appendix E, Notes 5, 7, and 8. • Sum of components may not equal total due to independent rounding.
Sources: •1981—Energy Information Administration (EIA), State Energy Data System 1990. •1991—EIA, Integrated Modeling Data System output for the *Monthly Energy Review*, March 1992.

Figure 65. Fuel Oil and Kerosene Adjusted Sales, 1984-1990



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 65.

Table 65. Fuel Oil and Kerosene Adjusted Sales, 1984-1990

(Thousand Barrels per Day)

Year	Residential	Commercial	Industrial	Oil Companies	Farm	Electric Utilities	Railroads	Vessel Bunkering	On-Highway Diesel	Military	Off-Highway Diesel	All Other	Total
						Distillate Fuel							
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	[1]	3,021
						Residual Fuel							
1984	—	92	258	76	—	509	[1]	370	—	14	—	50	1,369
1985[2]	—	103	252	71	—	403	[3]	346	—	13	—	15	1,202
1986[2]	—	126	254	51	—	590	[3]	371	—	12	—	15	1,418
1987[2]	—	118	208	42	—	498	[3]	383	—	12	—	3	1,264
1988[2]	—	119	200	34	—	621	[3]	392	—	E 9	—	4	1,378
1989[2]	—	108	160	22	—	639	[3]	432	—	7	—	2	1,370
1990	—	98	145	21	—	550	[3]	408	—	5	—	2	1,229
						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

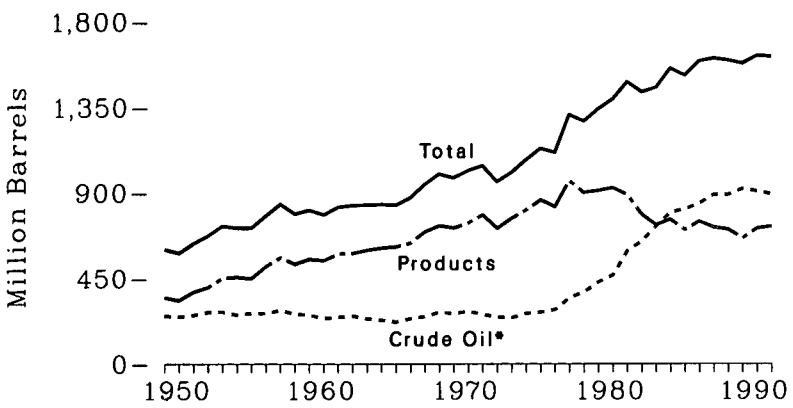
[1] Less than 0.5 thousand barrels per day.
[2] Revised since the *Annual Energy Review 1990*, Table 64.
[3] Included in "All Other".
E = Annual estimate based on eleven months of data.
— = Not applicable.

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 product 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 product supplied. Additional information is available in EIA's report *Fuel Oil and Kerosene Sales 1990* (October 1991). • Sum of components may not equal total due to independent rounding.

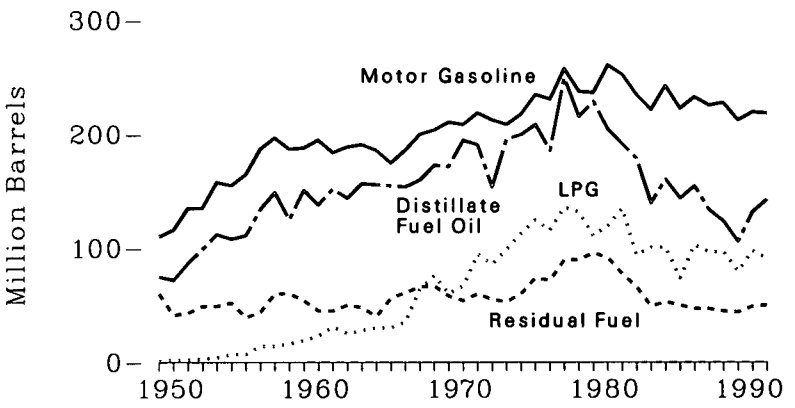
Sources: **Distillate Fuel Oil and Kerosene:** • 1984—EIA, *Petroleum Marketing Annual 1988*, Tables A13 and A15. • 1985—EIA, *Fuel Oil and Kerosene Sales 1989* (January 1991), Tables 13 and 15. • 1986 forward—EIA, *Fuel Oil and Kerosene Sales 1990* (October 1991), Tables 13 and 15. **Residual Fuel Oil:** • 1984—EIA, *Petroleum Marketing Annual 1988*, Table A14. • 1985 forward—EIA, *Fuel Oil and Kerosene Sales 1990* (October 1991), Tables 14 and A1.

Figure 66. Petroleum Primary Stocks by Type, End of Year

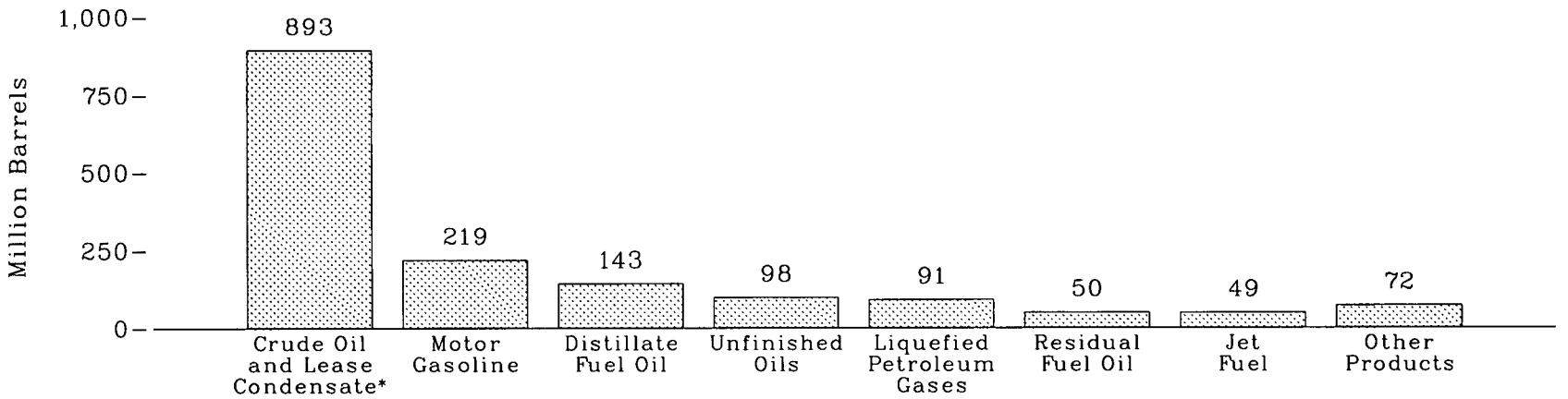
Total, 1949-1991



By Selected Product, 1949-1991



By Type, 1991



*Includes crude oil stored in the Strategic Petroleum Reserve.
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 66.

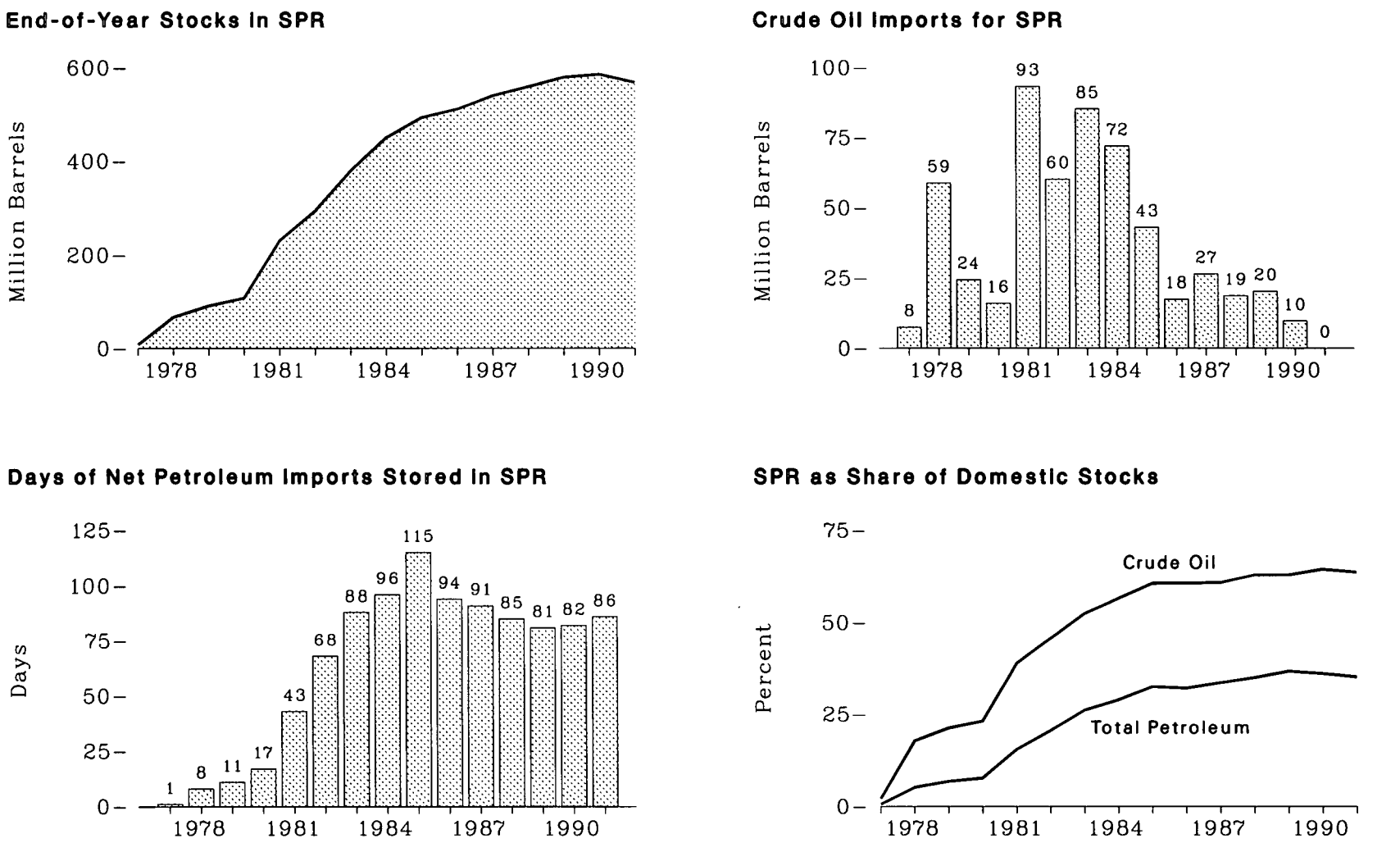
Table 66. Petroleum Primary Stocks by Type, End of Year 1949-1991

(Million Barrels)

Year	Crude Oil and Lease Condensate [1]	Petroleum Products										
						Liquefied Petroleum Gases						
		Motor Gasoline [2]	Jet Fuel	Distillate Fuel Oil	Residual Fuel Oil	Propane [3]	Other [4]	Total	Unfinished Oils	Other Products [5]	Total Products	Total Petroleum
1949	253	110	NA	75	60	([6])	([6])	1	66	37	350	603
1950	248	116	NA	72	41	([6])	([6])	2	70	34	334	583
1951	256	135	NA	87	43	([6])	([6])	2	67	45	378	634
1952	272	135	2	99	49	([6])	([6])	3	62	53	402	674
1953	274	158	3	112	49	([6])	([6])	4	69	56	451	726
1954	258	155	3	108	52	([6])	([6])	7	74	57	457	715
1955	266	165	3	111	39	([6])	([6])	7	68	55	449	715
1956	266	187	5	134	44	([6])	([6])	14	67	63	514	780
1957	282	197	5	149	60	([6])	([6])	14	69	66	560	841
1958	263	187	6	125	60	([6])	([6])	16	70	63	526	789
1959	257	188	8	151	54	([6])	([6])	19	67	66	552	809
1960	240	195	7	138	45	([6])	([6])	23	62	76	545	785
1961	245	184	8	152	45	([6])	([6])	31	79	81	580	825
1962	252	189	10	144	50	([6])	([6])	25	82	83	582	834
1963	237	191	9	157	48	([6])	([6])	28	82	85	598	836
1964	230	186	19	156	40	([6])	([6])	30	87	92	609	839
1965	220	175	19	155	56	([6])	([6])	30	89	92	616	836
1966	238	186	19	154	61	([6])	([6])	35	89	91	636	874
1967	249	200	22	160	66	([6])	([6])	64	90	93	695	944
1968	272	204	24	173	67	([6])	([6])	76	93	89	727	1,000
1969	265	211	28	172	58	([6])	([6])	60	98	88	715	980
1970	276	209	28	195	54	([6])	([6])	67	99	89	741	1,018
1971	260	219	28	191	60	([6])	([6])	95	101	92	784	1,044
1972	246	213	25	154	55	([6])	([6])	86	95	84	713	959
1973	242	209	29	196	53	([6])	([6])	99	99	80	766	1,008
1974	265	218	29	200	60	([6])	([6])	113	106	82	809	1,074
1975	271	235	30	209	74	([6])	([6])	125	106	82	862	1,133
1976	285	231	32	186	72	([6])	([6])	116	110	78	826	1,112
1977	348	258	35	250	90	([6])	([6])	136	113	82	964	1,312
1978	376	238	34	216	90	([6])	([6])	132	109	82	901	1,278
1979	430	237	39	229	96	([6])	([6])	111	118	82	911	1,341
1980	466	261	42	205	92	([6])	([6])	120	124	82	926	1,392
1981	594	253	41	192	78	([6])	([6])	135	111	80	890	1,484
1982	644	235	37	179	66	([6])	([6])	94	105	70	786	1,430
1983	723	222	39	140	49	([6])	([6])	101	108	72	731	1,454
1984	796	243	42	161	53	58	43	101	94	67	760	1,556
1985	814	223	40	144	50	39	34	74	107	67	705	1,519
1986	843	233	50	155	47	63	40	103	94	68	750	1,593
1987	890	226	50	134	47	48	49	97	93	70	718	1,607
1988	890	228	44	124	45	50	47	97	100	70	707	1,597
1989	921	213	41	106	44	32	49	80	106	70	660	1,581
1990	908	220	52	132	49	49	49	98	99	63	712	1,621
1991[7]	893	219	49	143	50	47	44	91	98	72	723	1,616

[1] Includes crude oil stored in the Strategic Petroleum Reserve, which began in 1977. [2] 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. [3] Includes propylene. [4] Ethane, ethylene, normal butane, butylene, and isobutane. [5] Kerosene, petrochemical feedstocks, lubricants, wax, petroleum coke, asphalt, road oil, pentanes plus, and miscellaneous products. Since 1964, aviation gasoline and special naphthas are included. For 1981 forward, includes aviation gasoline blending components, hydrogen, other hydrocarbons, and alcohol. [6] Included in liquefied petroleum gases total. [7] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications. NA = Not available. Note: Sum of components may not equal total 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.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly,* February 1992.

Figure 67. Strategic Petroleum Reserve, 1977-1991



Notes: • SPR=Strategic Petroleum Reserve. • Because vertical scales differ, graphs should not be compared.
Source: Table 67.

Table 67. Strategic Petroleum Reserve, 1977-1991

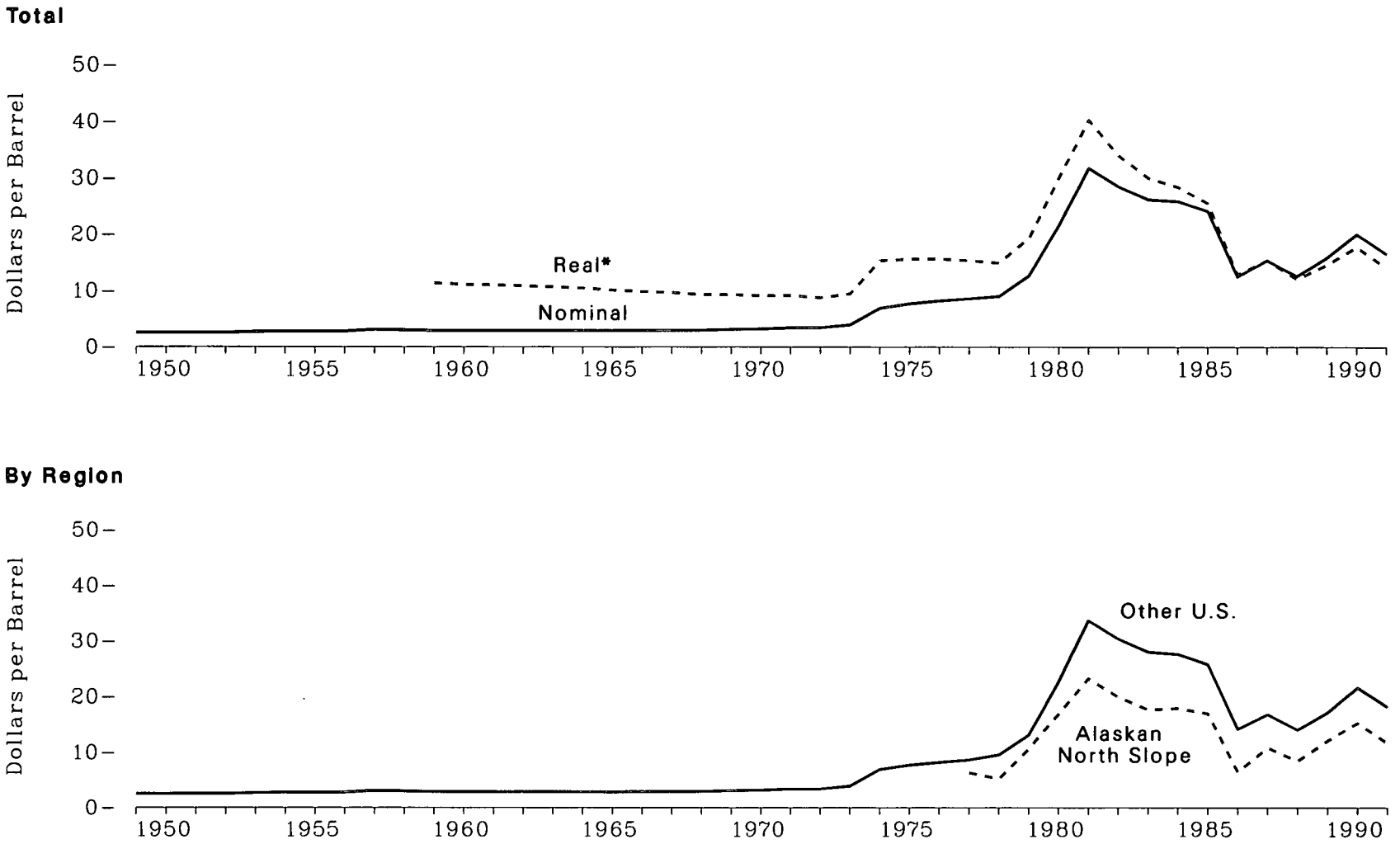
(Million Barrels, Except as Noted)

Year	Crude Oil Imports	Domestic Crude Oil Deliveries	Domestic Crude Oil Sales	End-of-Year Stocks			Days of Net Petroleum Imports [3]
				Quantity [1]	Share of Crude Oil [2] Stocks (percent)	Share of Total Petroleum Stocks (percent)	
1977	7.54	[4] 0.37	0	7.46	2.1	0.6	1
1978	58.80	0	0	66.86	17.8	5.2	8
1979	24.43	[5]	0	91.19	21.2	6.8	11
1980	16.07	1.30	0	107.80	23.1	7.7	17
1981	93.30	28.79	0	230.34	38.8	15.5	43
1982	60.19	3.79	0	293.83	45.7	20.5	68
1983	85.29	0.42	0	379.09	52.4	26.1	88
1984	72.04	0.05	0	450.51	56.6	28.9	96
1985	43.12	0.17	0	493.32	60.6	32.5	115
1986	17.56	1.21	0	511.57	60.7	32.1	94
1987	26.52	2.69	0	540.65	60.8	33.6	91
1988	18.76	[5]	0	559.52	62.9	35.0	85
1989	20.35	0	0	579.86	62.9	36.7	81
1990	9.77	0	3.91	585.69	64.5	36.1	82
1991	0	0	17.22	568.51	63.7	35.2	86

[1] Stocks do not include imported quantities in transit to Strategic Petroleum Reserve terminals, pipeline fill, and above-ground storage.
[2] Including lease condensate stocks.
[3] Derived by dividing end-of-year strategic petroleum reserve stocks by annual average daily net imports of all petroleum. Calculated prior to rounding.
[4] The quantity of domestic fuel oil which was in storage prior to injection of foreign crude oil.
[5] 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.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly,* February 1992.

Figure 68. Crude Oil Domestic First Purchase Prices, 1949-1991



*In 1987 dollars, calculated using implicit GDP deflators. See Appendix C.
Source: Table 68.

Table 68. Crude Oil Domestic First Purchase Prices, 1949-1991

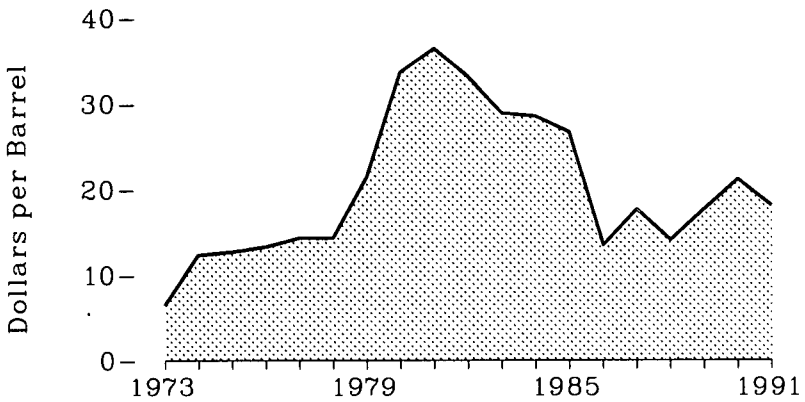
(Dollars per Barrel)

Year	Alaska North Slope (nominal)	Other U.S. (nominal)	U.S. Average (nominal)	U.S. Average (real) [1]
1949	—	2.54	2.54	NA
1950	—	2.51	2.51	NA
1951	—	2.53	2.53	NA
1952	—	2.53	2.53	NA
1953	—	2.68	2.68	NA
1954	—	2.78	2.78	NA
1955	—	2.77	2.77	NA
1956	—	2.79	2.79	NA
1957	—	3.09	3.09	NA
1958	—	3.01	3.01	NA
1959	—	2.90	2.90	11.33
1960	—	2.88	2.88	11.08
1961	—	2.89	2.89	10.99
1962	—	2.90	2.90	10.82
1963	—	2.89	2.89	10.63
1964	—	2.88	2.88	10.40
1965	—	2.86	2.86	10.07
1966	—	2.88	2.88	9.80
1967	—	2.92	2.92	9.64
1968	—	2.94	2.94	9.27
1969	—	3.09	3.09	9.28
1970	—	3.18	3.18	9.06
1971	—	3.39	3.39	9.14
1972	—	3.39	3.39	8.74
1973	—	3.89	3.89	9.42
1974	—	6.87	6.87	15.30
1975	—	7.67	7.67	15.59
1976	—	8.19	8.19	15.66
1977	[2] 6.32	[2] 8.63	8.57	15.33
1978	5.21	9.56	9.00	14.93
1979	10.57	13.01	12.64	19.30
1980	16.87	22.65	21.59	30.11
1981	23.23	33.71	31.77	40.27
1982	19.92	30.43	28.52	34.03
1983	17.69	28.00	26.19	30.03
1984	17.91	27.59	25.88	28.44
1985	16.98	25.74	24.09	25.52
1986	6.45	14.13	12.51	12.91
1987	10.83	16.83	15.40	15.40
1988	8.43	13.97	12.58	12.11
1989	12.00	17.13	15.86	14.63
1990	15.23	21.57	20.03	17.74
1991[3]	11.58	18.10	16.50	14.10

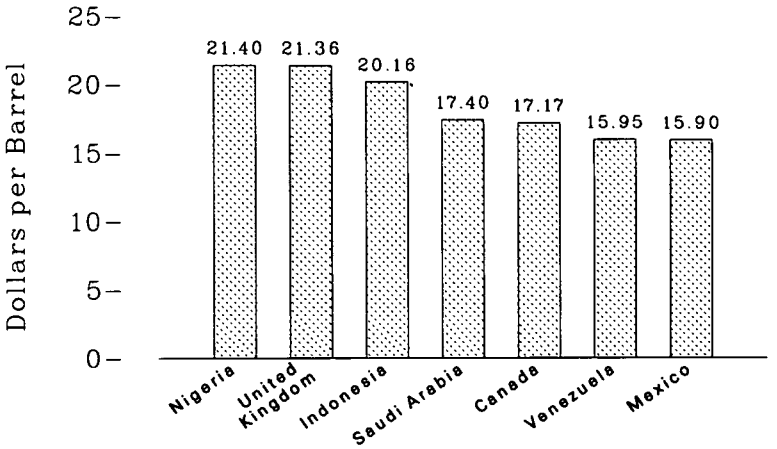
[1] In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.
[2] Average for July through December only.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
— = Not applicable.
NA = Not available.
Note: For the definition of crude oil domestic first purchase prices, see Appendix E, Note 9.
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 69. Landed Costs of Crude Oil Imports from Selected Countries

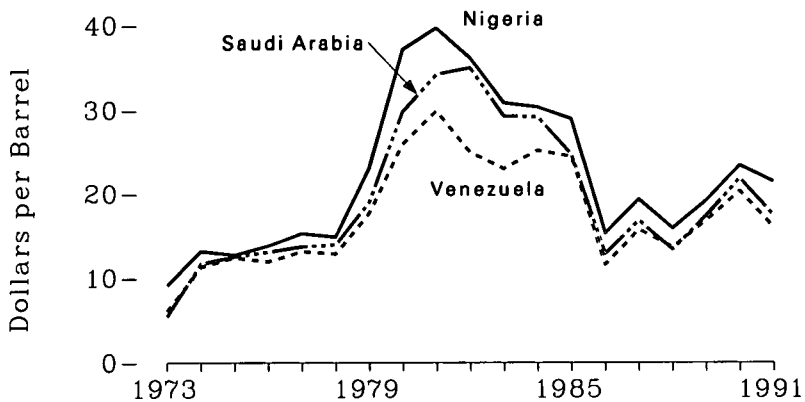
Total, 1973*-1991



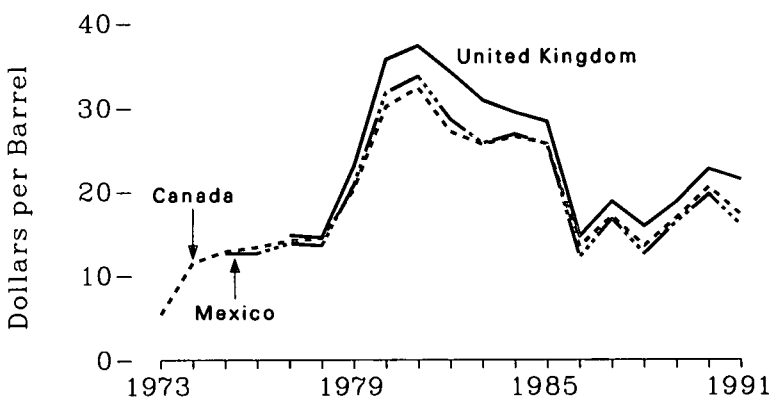
By Selected Country, 1991



By Selected OPEC Country, 1973*-1991



By Selected Non-OPEC Country, 1973*-1991



*1973 data are based on October, November, and December data only.
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 69.

Table 69. Landed Costs of Crude Oil Imports from Selected Countries, 1973-1991

(Dollars per Barrel)

Year	OPEC [1]								Non-OPEC				
	Algeria	Indonesia	Nigeria	Saudi Arabia	Venezuela	Other [2]	Total [3]	Arab OPEC [4]	Canada	Mexico	United Kingdom	Other	Total
1973[5]	8.39	7.22	9.08	5.37	5.99	6.55	6.85	5.92	5.33	NA	NA	7.51	6.41
1974	13.97	13.20	13.16	11.63	11.25	12.61	12.49	12.39	11.48	W	NA	12.98	12.32
1975	12.86	13.83	12.70	12.50	12.36	12.66	12.70	12.71	12.84	12.61	NA	12.41	12.70
1976	13.90	13.85	13.81	13.06	11.89	13.16	13.32	13.31	13.36	12.64	W	13.48	13.32
1977	15.24	14.65	15.29	13.69	13.11	14.25	14.35	14.30	14.13	13.82	14.83	14.70	14.36
1978	14.93	14.65	14.88	13.94	12.84	14.31	14.34	14.36	14.41	13.56	14.53	14.74	14.35
1979	21.88	20.63	22.97	18.95	17.65	23.12	21.29	20.79	20.22	20.77	22.97	23.21	21.45
1980	37.92	33.92	37.15	29.80	25.92	36.08	33.56	32.97	30.11	31.77	35.68	36.16	33.67
1981	40.46	37.31	39.66	34.20	29.91	39.06	36.60	36.22	32.32	33.70	37.29	38.08	36.47
1982	35.35	36.70	36.16	34.99	24.93	34.13	34.81	35.15	27.15	28.63	34.25	33.87	33.18
1983	31.26	31.57	30.85	29.27	22.94	29.29	29.84	29.87	25.63	25.78	30.87	29.87	28.93
1984	29.06	30.87	30.36	29.20	25.19	28.85	29.06	29.10	26.56	26.85	29.45	29.33	28.54
1985	27.51	28.67	28.96	24.72	24.43	26.58	26.86	25.90	25.71	25.63	28.36	27.47	26.67
1986	14.82	14.63	15.29	12.84	11.52	13.42	13.46	13.14	13.43	12.17	14.63	14.49	13.49
1987	17.87	18.49	19.32	16.81	15.76	18.12	17.64	17.32	17.04	16.69	18.78	18.43	17.65
1988	W	15.15	15.88	13.37	13.66	13.83	14.18	13.60	13.50	12.58	15.82	14.88	14.08
1989	19.13	18.35	19.19	17.34	16.78	17.56	17.78	17.41	16.81	16.35	18.74	18.51	17.68
1990	W	22.50	23.33	21.82	20.31	18.65	21.23	20.64	20.48	19.64	22.65	21.96	21.13
1991[6]	W	20.16	21.40	17.40	15.95	18.92	18.18	17.63	17.17	15.90	21.36	19.90	18.08

[1] Organization of Petroleum Exporting Countries. See Glossary for membership.

[2] Ecuador, Gabon, Iran, Iraq, Kuwait, Libya, Qatar, and United Arab Emirates. Prior to 1988, imports from the Neutral Zone between Kuwait and Saudi Arabia are included in imports from Saudi Arabia. From 1988 forward, those imports are included in imports from "Other."

[3] Ecuador, Gabon, Indonesia, Iran, Nigeria, and Venezuela, as well as the Arab members. 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.

[4] Algeria, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, and United Arab Emirates. Imports from the Neutral Zone are included in imports from "Arab OPEC."

[5] Based on October, November, and December data only.

[6] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

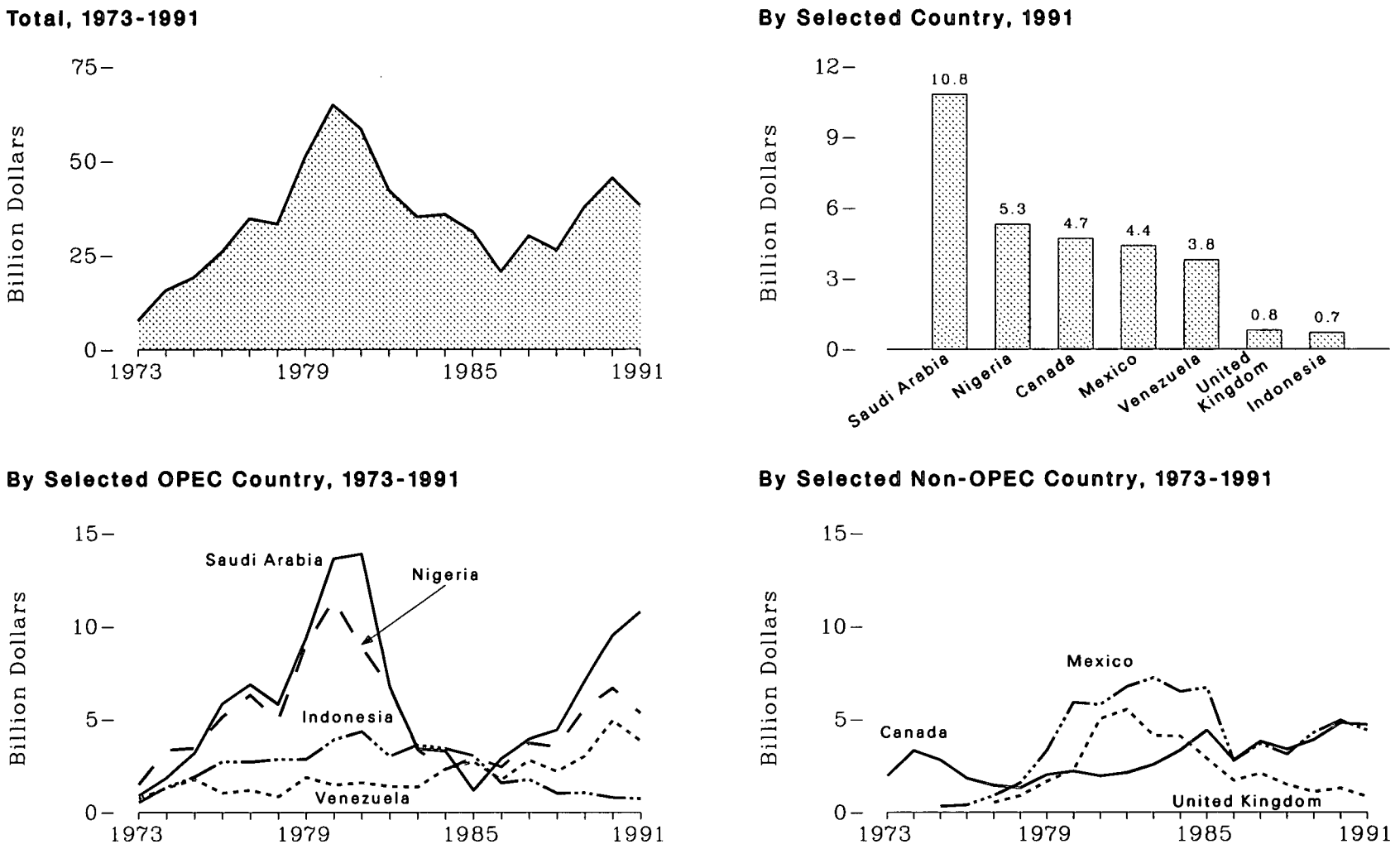
W = Value withheld to avoid disclosure of individual company data.

NA = Not available, included in "Other Non-OPEC."

Notes: • Data include imports for the Strategic Petroleum Reserve, which began in 1977. • Sum of components may not equal total 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 70. Value of Crude Oil Imports from Selected Countries



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 70.

Table 70. Value of Crude Oil Imports from Selected Countries, 1973-1991

(Billion Dollars)

Year	OPEC [1]								Non-OPEC				
	Algeria	Indonesia	Nigeria	Saudi Arabia	Venezuela	Other [2]	Total [3]	Arab OPEC [4]	Canada	Mexico	United Kingdom	Other	Total [5]
1973	0.4	0.5	1.5	0.9	0.8	1.2	5.2	1.8	1.9	NA	NA	0.4	7.6
1974	0.9	1.4	3.3	1.9	1.3	2.9	11.6	3.2	3.3	W	NA	0.7	15.6
1975	1.2	1.9	3.5	3.2	1.8	3.4	14.9	6.2	2.8	0.3	NA	1.0	19.0
1976	2.1	2.7	5.1	5.8	1.0	5.4	22.2	11.6	1.8	0.4	W	1.3	25.8
1977	3.0	2.7	6.3	6.9	1.2	9.6	29.6	16.4	1.4	0.9	0.5	2.2	34.7
1978	3.5	2.9	4.9	5.8	0.8	9.3	27.1	15.4	1.3	1.6	0.9	2.4	33.3
1979	4.9	2.9	9.0	9.3	1.9	12.0	39.7	22.8	2.0	3.3	1.7	4.2	51.0
1980	6.3	3.9	11.4	13.6	1.5	11.2	47.5	30.2	2.2	5.9	2.3	6.9	64.9
1981	3.9	4.3	8.8	13.9	1.6	6.7	39.0	23.4	1.9	5.8	5.0	6.5	58.5
1982	1.2	3.0	6.7	6.8	1.4	2.8	22.0	9.4	2.1	6.7	5.5	5.6	42.2
1983	2.0	3.6	3.4	3.4	1.4	2.1	16.1	5.8	2.6	7.2	4.1	4.9	35.2
1984	2.1	3.4	2.3	3.3	2.3	2.6	16.1	6.7	3.3	6.5	4.1	5.8	35.8
1985	0.8	3.1	3.0	1.2	2.7	2.1	12.9	2.8	4.4	6.7	2.9	4.3	31.2
1986	0.4	1.6	2.4	2.9	1.8	1.3	10.4	4.1	2.8	2.8	1.7	2.9	20.6
1987	0.7	1.8	3.7	3.9	2.8	2.4	15.5	6.1	3.8	3.7	2.1	5.1	30.1
1988	W	1.0	3.5	4.4	2.2	2.5	14.0	7.0	3.4	3.1	1.5	4.4	26.3
1989	0.4	1.1	5.6	7.1	3.0	4.8	21.9	11.4	3.9	4.3	1.1	6.5	37.7
1990	W	0.8	6.7	9.5	4.9	4.8	27.2	14.0	4.8	4.9	1.3	7.2	45.5
1991[6]	W	0.7	5.3	10.8	3.8	1.2	22.4	11.3	4.7	4.4	0.8	5.8	38.2

[1] Organization of Petroleum Exporting Countries. See Glossary for membership.

[2] Ecuador, Gabon, Iran, Iraq, Kuwait, Libya, Qatar, and United Arab Emirates. Prior to 1988, imports from the Neutral Zone between Kuwait and Saudi Arabia are included in imports from Saudi Arabia. From 1988 forward, those imports are included in imports from "Other."

[3] Ecuador, Gabon, Indonesia, Iran, Nigeria, and Venezuela, as well as the Arab members. 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.

[4] Algeria, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, and United Arab Emirates. Imports from the Neutral Zone are included in imports from "Arab OPEC."

[5] Data shown here represent landed value; they differ from Table 34, which are data from U.S. Customs that represent crude oil value at the port of loading.

[6] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

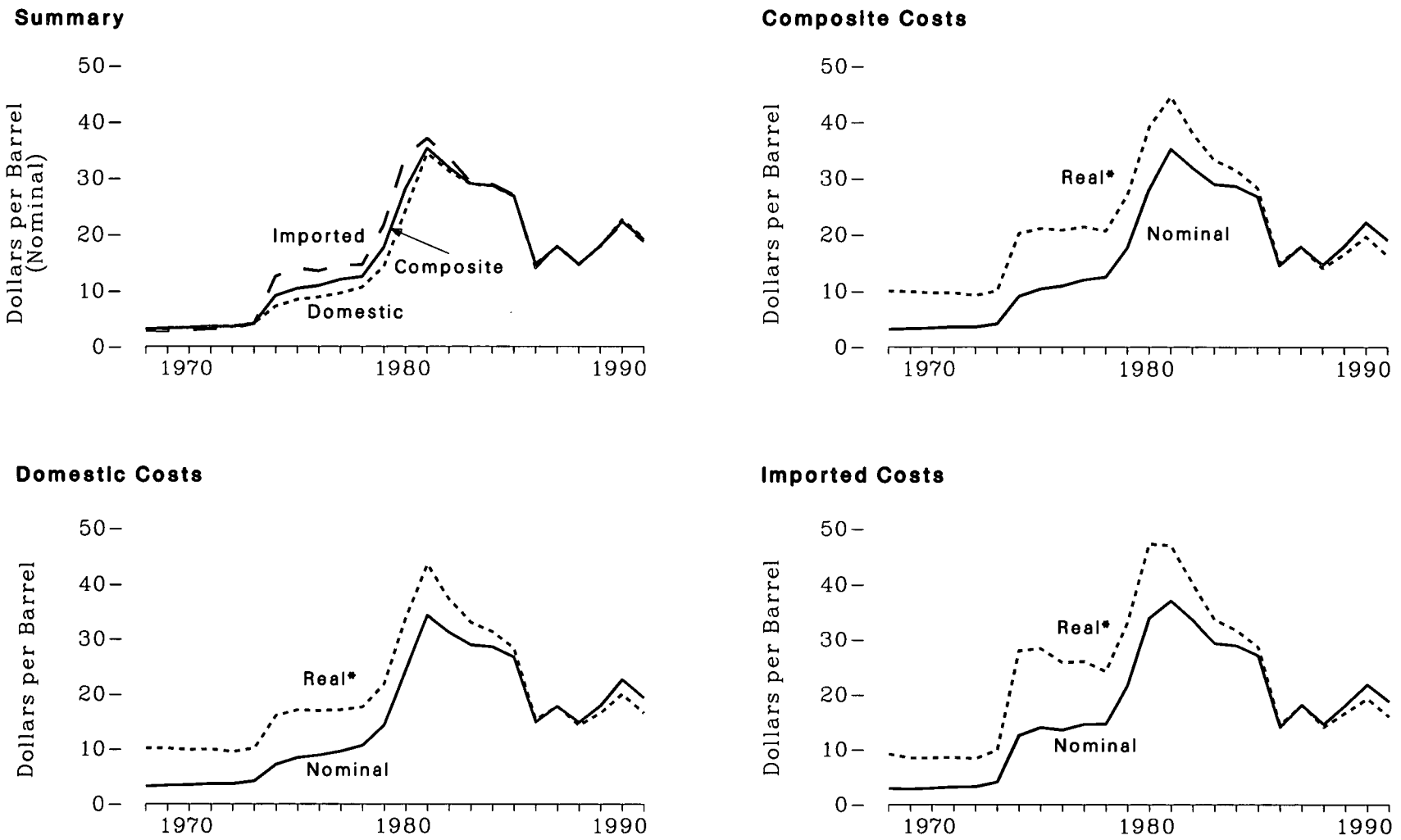
W = Value withheld to avoid disclosure of individual company data.

NA = Not available, included in "Other Non-OPEC."

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 using prices on Table 69 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.* • 1981-1990—EIA, *Petroleum Supply Annual.* • 1991—EIA, *Petroleum Supply Monthly,* February 1992.

Figure 71. Crude Oil Refiner Acquisition Costs, 1968-1991



*In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.
Source: Table 71.

Table 71. Crude Oil Refiner Acquisition Costs, 1968-1991

(Dollars per Barrel)

Year	Domestic		Imported		Composite	
	Nominal	Real [1]	Nominal	Real [1]	Nominal	Real [1]
1968	3.21	10.13	2.90	9.15	3.17	10.00
1969	3.37	10.12	2.80	8.41	3.29	9.88
1970	3.46	9.86	2.96	8.43	3.40	9.69
1971	3.68	9.92	3.17	8.54	3.60	9.70
1972	3.67	9.46	3.22	8.30	3.58	9.23
1973	4.17	10.10	4.08	9.88	4.15	10.05
1974	7.18	15.99	12.52	27.88	9.07	20.20
1975	8.39	17.05	13.93	28.31	10.38	21.10
1976	8.84	16.90	13.48	25.77	10.89	20.82
1977	9.55	17.08	14.53	25.99	11.96	21.40
1978	10.61	17.60	14.57	24.16	12.46	20.66
1979	14.27	21.79	21.67	33.08	17.72	27.05
1980	24.23	33.79	33.89	47.27	28.07	39.15
1981	34.33	43.51	37.05	46.96	35.24	44.66
1982	31.22	37.26	33.55	40.04	31.87	38.03
1983	28.87	33.11	29.30	33.60	28.99	33.25
1984	28.53	31.35	28.88	31.74	28.63	31.46
1985	26.66	28.24	26.99	28.59	26.75	28.34
1986	14.82	15.29	14.00	14.45	14.55	15.02
1987	17.76	17.76	18.13	18.13	17.90	17.90
1988	14.74	14.19	14.56	14.01	14.67	14.12
1989	17.87	16.49	18.08	16.68	17.97	16.58
1990	22.59	20.01	21.76	19.27	22.22	19.68
1991[2]	19.33	16.52	18.70	15.98	19.05	16.28

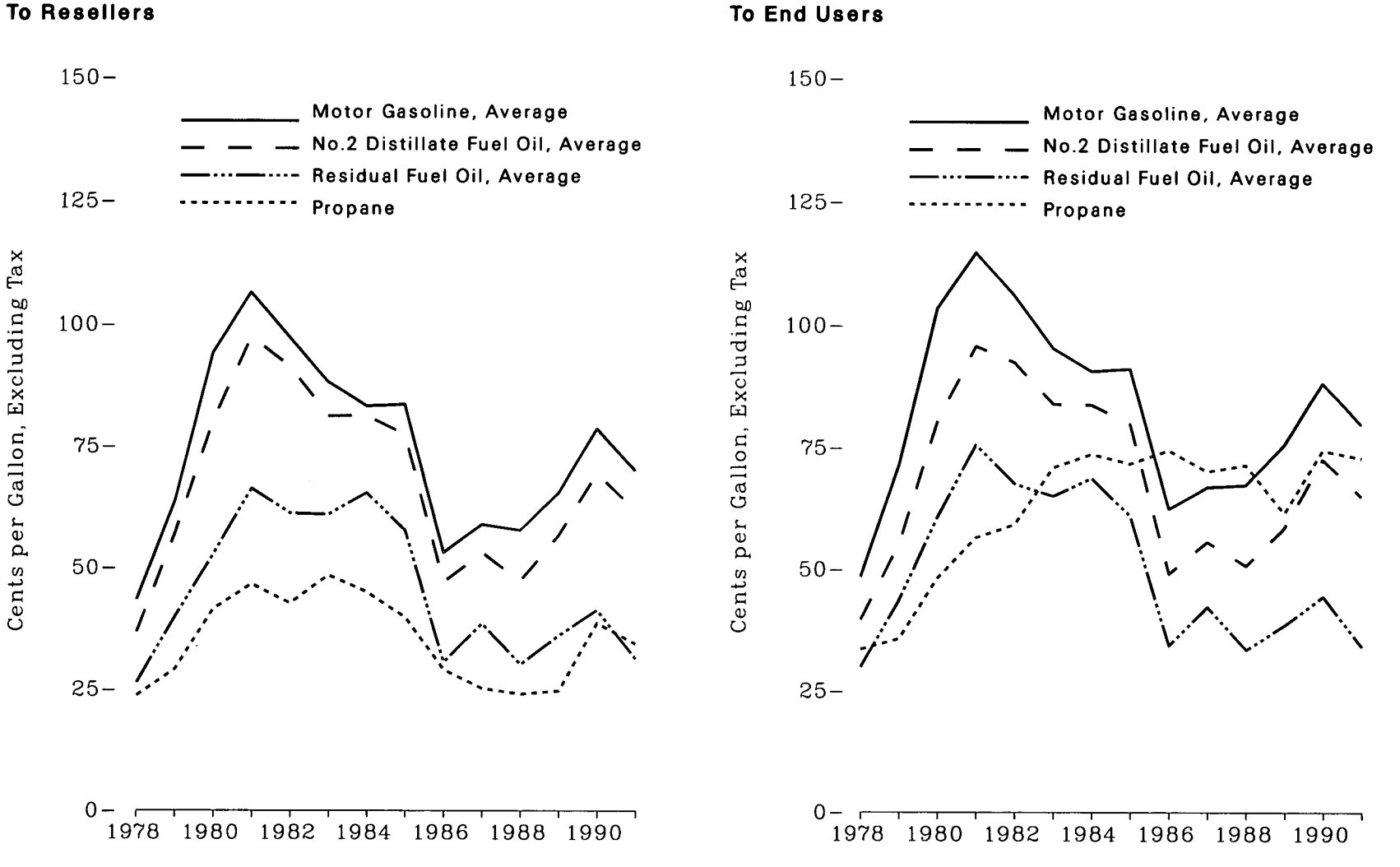
[1] In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.

[2] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

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 Appendix E, Note 10. • 1974-January 1976—Federal Energy Administration (FEA), Form FEO-96, "Monthly Cost Allocation Report." • February 1976-September 1977—FEA, Form FEA-P110-M-1, "Refiners' Monthly Cost Allocation Report." • October 1977-June 1978—Energy Information Administration (EIA), Form FEA-P110-M-1, "Refiners' Monthly Cost Allocation Report." • July 1978-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 72. Refiner Sales Prices of Selected Petroleum Products, 1978–1991



Source: Table 72.

Table 72. Refiner Sales Prices and Refiner Margins of Selected Petroleum Products, 1978-1991

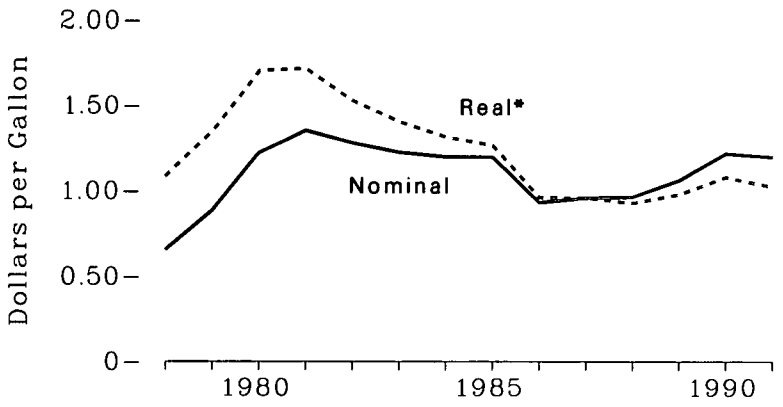
(Cents per Gallon, Excluding Taxes)

Product	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 [1]
Sales Prices to Resellers: [2]														
Aviation Gasoline	53.7	72.1	112.8	125.0	122.8	117.8	116.5	113.0	91.2	85.9	85.0	95.0	106.3	100.1
Motor Gasoline	43.4	63.7	94.1	106.4	97.3	88.2	83.2	83.5	53.1	58.9	57.7	65.4	78.6	69.9
Leaded Regular	NA	NA	NA	NA	NA	85.0	79.5	79.3	50.1	56.5	54.8	63.1	75.4	65.7
Unleaded Regular	NA	NA	NA	NA	NA	89.5	84.2	84.3	52.2	56.9	54.8	61.8	75.8	67.2
Unleaded Midgrade	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	68.6	81.4	73.3
Premium	NA	NA	NA	NA	NA	96.4	91.6	92.2	61.0	67.1	67.2	74.9	87.4	79.2
Kerosene	40.4	62.4	86.4	106.6	101.8	89.2	91.6	87.4	60.6	59.2	54.9	66.9	83.9	72.0
Jet Fuel, Kerosene-Type	38.6	66.0	86.8	101.2	95.3	85.4	83.0	79.4	49.5	53.8	49.5	58.3	77.3	65.0
No. 1 Distillate Fuel Oil	40.6	58.3	88.0	107.1	103.8	89.6	89.2	86.3	57.9	59.9	54.9	66.8	83.8	73.0
No. 2 Distillate Fuel Oil	36.7	57.1	80.2	97.4	91.4	81.2	81.3	77.4	47.0	53.1	47.3	56.6	69.5	61.8
No. 2 Fuel Oil	36.9	56.9	80.3	97.6	91.4	81.5	82.1	77.6	48.6	52.7	47.3	56.5	69.7	62.2
No. 2 Diesel Oil	36.5	57.4	80.1	97.2	91.4	80.8	80.3	77.2	45.2	53.4	47.3	56.7	69.4	61.5
No. 4 Distillate Fuel Oil [3]	30.5	47.0	67.0	78.3	73.7	72.6	70.7	67.2	40.9	46.2	42.5	48.0	59.0	55.6
Residual Fuel Oil	26.3	39.9	52.8	66.3	61.2	60.9	65.4	57.7	30.5	38.5	30.0	36.0	41.3	31.2
1% or Less Sulfur Content	29.3	45.0	60.8	74.8	69.5	64.3	68.5	61.0	32.8	41.2	33.3	40.7	47.2	36.1
Greater than 1% Sulfur Content	24.5	36.6	47.9	62.2	57.2	59.1	63.9	56.0	28.9	36.2	27.1	33.1	37.2	34.0
Propane (Consumer Grade)	23.7	29.1	41.5	46.6	42.7	48.4	45.0	39.8	29.0	25.2	24.0	24.7	38.6	34.8
Sales Prices to End Users: [2]														
Aviation Gasoline	51.6	68.9	108.4	130.3	131.2	125.5	123.4	120.1	101.1	90.7	89.1	99.5	112.0	104.7
Motor Gasoline	48.4	71.3	103.5	114.7	106.0	95.4	90.7	91.2	62.4	66.9	67.3	75.6	88.3	79.7
Leaded Regular	NA	NA	NA	NA	NA	90.6	84.8	84.2	57.3	61.8	61.9	71.0	83.1	71.5
Unleaded Regular	NA	NA	NA	NA	NA	97.0	91.5	91.7	61.6	65.0	64.1	71.4	84.9	76.1
Unleaded Midgrade	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	79.2	92.1	84.3
Premium	NA	NA	NA	NA	NA	105.7	101.5	102.3	73.7	78.4	78.8	86.7	98.5	90.7
Kerosene	42.1	58.5	90.2	112.3	108.9	96.1	103.6	103.0	79.0	77.0	73.8	70.9	92.3	83.6
Jet Fuel, Kerosene-Type	38.7	54.7	86.8	102.4	96.3	87.8	84.2	79.6	52.9	54.3	51.3	59.2	76.6	65.3
No. 1 Distillate Fuel Oil	40.9	57.2	83.4	103.9	102.3	96.2	92.7	88.0	62.0	60.4	56.4	66.1	81.9	74.0
No. 2 Distillate Fuel Oil	39.6	55.1	80.4	95.8	92.5	83.9	83.7	79.9	49.1	55.6	50.7	58.5	72.6	65.0
No. 2 Fuel Oil	40.0	51.6	78.8	91.4	90.5	91.6	91.6	84.9	56.0	58.1	54.4	58.7	73.4	66.7
No. 2 Diesel Oil	37.7	58.5	81.8	99.5	94.2	82.6	82.3	78.9	47.8	55.1	50.0	58.5	72.5	64.8
No. 4 Distillate Fuel Oil [3]	31.1	47.9	68.2	79.7	75.0	76.6	79.6	77.3	48.9	51.3	46.1	51.2	62.2	58.0
Residual Fuel Oil	29.8	43.6	60.7	75.6	67.6	65.1	68.7	61.0	34.3	42.3	33.4	38.5	44.4	34.0
1% or Less Sulfur Content	31.4	46.8	67.5	82.9	74.7	69.5	72.0	64.4	37.2	44.7	37.2	43.6	50.5	40.2
Greater than 1% Sulfur Content	27.5	38.9	52.3	67.3	61.1	61.1	65.9	58.2	31.7	39.6	30.0	34.4	40.0	30.6
Propane (Consumer Grade)	33.5	35.7	48.2	56.5	59.2	70.9	73.7	71.7	74.5	70.1	71.4	61.5	74.5	72.9
Refiner Margins [4]														
Motor Gasoline	13.7	21.5	27.3	22.5	21.4	19.2	15.1	19.8	18.4	16.3	22.8	22.6	25.7	24.5
Jet Fuel	8.9	23.8	20.0	17.3	19.4	16.4	14.9	15.8	14.9	11.2	14.6	15.5	24.4	19.6
Distillate Fuel	7.0	14.9	13.4	13.5	15.5	12.2	13.1	13.8	12.4	10.4	12.4	13.8	16.6	16.4
Residual Fuel	-3.4	-2.3	-14.0	-17.6	-14.7	-8.1	-2.8	-6.0	-4.1	-4.1	-5.0	-6.8	-11.6	-14.2
Composite [5]	11.5	19.4	22.4	19.4	19.4	16.0	13.7	17.0	15.8	13.8	18.7	18.8	22.1	20.9

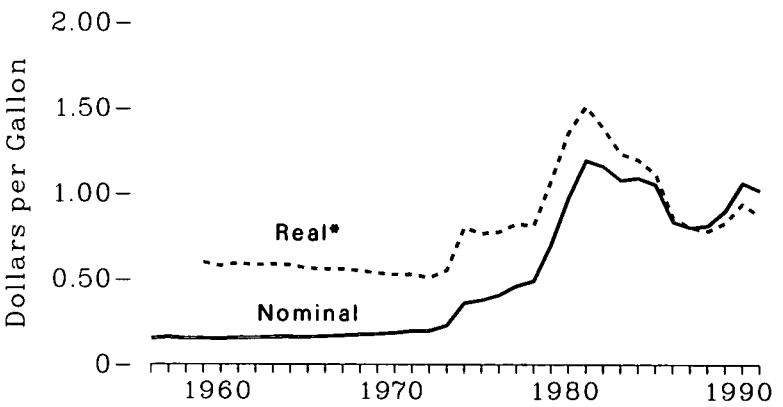
[1] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
[2] Sales for resale, that is, wholesale sales, are those made to purchasers who are other than ultimate consumers. Sales to end users are those made directly to the ultimate consumer, including bulk customers such as agriculture, industry, and utilities, as well as residential and commercial customers.
[3] Includes No. 4 fuel oil and No. 4 diesel fuel.
[4] On this table, refiner margin is the difference between the composite refiner acquisition price and the price to resellers.
[5] Composite of aviation gasoline, kerosene-type jet fuel, kerosene, motor gasoline, distillate fuel nos. 1, 2, and 4, and residual fuel.
NA = Not available.
Sources: • 1978-1982—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 73. Motor Gasoline and Residential Heating Oil Retail Prices

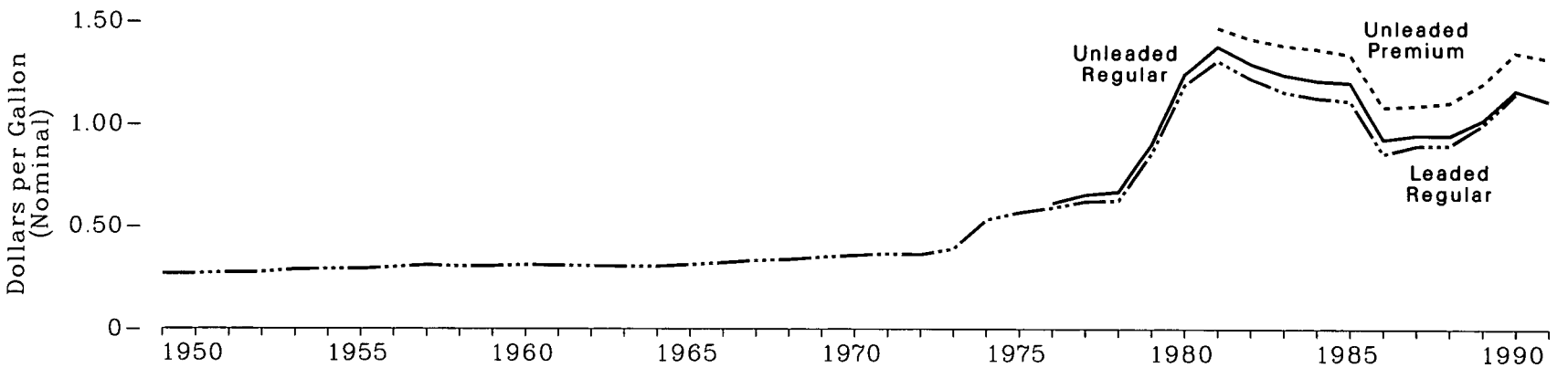
Motor Gasoline, All Types, 1978-1991



Residential Heating Oil, 1956-1991



Motor Gasoline by Type, 1949-1991



*In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.

Notes: • Taxes are included except for residential heating oil from 1978 forward. • Because vertical scales differ, graphs should not be compared.

Source: Table 73.

Table 73. Motor Gasoline and Residential Heating Oil Retail Prices, 1949-1991

(Cents per Gallon)

Year	Motor Gasoline (Including Taxes)								Residential Heating Oil [2]	
	Leaded Regular [1]		Unleaded Regular [1]		Unleaded Premium		All Types			
	Nominal	Real [3]	Nominal	Real [3]	Nominal	Real [3]	Nominal	Real [3]	Nominal	Real [3]
1949	26.8	NA	NA	NA	NA	NA	NA	NA	NA	NA
1950	26.8	NA	NA	NA	NA	NA	NA	NA	NA	NA
1951	27.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
1952	27.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
1953	28.7	NA	NA	NA	NA	NA	NA	NA	NA	NA
1954	29.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
1955	29.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
1956	29.9	NA	NA	NA	NA	NA	NA	NA	15.2	NA
1957	31.0	NA	NA	NA	NA	NA	NA	NA	16.0	NA
1958	30.4	NA	NA	NA	NA	NA	NA	NA	15.1	NA
1959	30.5	119.1	NA	NA	NA	NA	NA	NA	15.3	59.8
1960	31.1	119.6	NA	NA	NA	NA	NA	NA	15.0	57.7
1961	30.8	117.1	NA	NA	NA	NA	NA	NA	15.6	59.3
1962	30.6	114.2	NA	NA	NA	NA	NA	NA	15.6	58.2
1963	30.4	111.8	NA	NA	NA	NA	NA	NA	16.0	58.8
1964	30.4	109.7	NA	NA	NA	NA	NA	NA	16.1	58.1
1965	31.2	109.9	NA	NA	NA	NA	NA	NA	16.0	56.3
1966	32.1	109.2	NA	NA	NA	NA	NA	NA	16.4	55.8
1967	33.2	109.6	NA	NA	NA	NA	NA	NA	16.9	55.8
1968	33.7	106.3	NA	NA	NA	NA	NA	NA	17.4	54.9
1969	34.8	104.5	NA	NA	NA	NA	NA	NA	17.8	53.5
1970	35.7	101.7	NA	NA	NA	NA	NA	NA	18.5	52.7
1971	36.4	98.1	NA	NA	NA	NA	NA	NA	19.6	52.8
1972	36.1	93.0	NA	NA	NA	NA	NA	NA	19.7	50.8
1973	38.8	93.9	NA	NA	NA	NA	NA	NA	22.8	55.2
1974	53.2	118.5	NA	NA	NA	NA	NA	NA	36.0	80.2
1975	56.7	115.2	NA	NA	NA	NA	NA	NA	37.7	76.6
1976	59.0	112.8	61.4	117.4	NA	NA	NA	NA	40.6	77.6
1977	62.2	111.3	65.6	117.4	NA	NA	NA	NA	46.0	82.3
1978	62.6	103.8	67.0	111.1	NA	NA	65.2	108.1	49.0	81.3
1979	85.7	130.8	90.3	137.9	NA	NA	88.2	134.7	70.4	107.5
1980	119.1	166.1	124.5	173.6	NA	NA	122.1	170.3	97.4	135.8
1981	131.1	166.2	137.8	174.7	[4] 147.0	[4] 186.3	135.3	171.5	119.4	151.3
1982	122.2	145.8	129.6	154.7	141.5	168.9	128.1	152.9	116.0	138.4
1983	115.7	132.7	124.1	142.3	138.3	158.6	122.5	140.5	107.8	123.6
1984	112.9	124.1	121.2	133.2	136.6	150.1	119.8	131.6	109.1	119.9
1985	111.5	118.1	120.2	127.3	134.0	141.9	119.6	126.7	105.3	111.5
1986	85.7	88.4	92.7	95.7	108.5	112.0	93.1	96.1	83.6	86.3
1987	89.7	89.7	94.8	94.8	109.3	109.3	95.7	95.7	80.3	80.3
1988	89.9	86.5	94.6	91.0	110.7	106.5	96.3	92.7	81.3	78.2
1989	99.8	92.1	102.1	94.2	119.7	110.4	106.0	97.8	90.0	83.0
1990	114.9	101.8	116.4	103.1	134.9	119.5	121.7	107.8	106.3	94.2
1991	NA	NA	114.0	97.4	132.1	112.9	119.6	102.2	[5] 101.8	[5] 87.0

[1] 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. [2] 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 and forward exclude all taxes. [3] In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C. [4] Based on September through December data only. [5] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications. 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." • 1978-1990—EIA, *Petroleum Marketing Annual 1990* (October 1991), Table 16. • 1991—EIA estimates.

6. Natural Gas

Price Changes in a Regulated Market

Due to different Federal and State rate structures, there are many price categories for natural gas. In addition, prices to consumers vary by region; for example, prices are lower in main producing areas, where transmission costs are lower. Estimated data indicate that the average wellhead price of all categories of natural gas fell from $1.71 per thousand cubic feet in 1990 to $1.59 in 1991 (81).[1] In real terms,[2] the average wellhead price per thousand cubic feet declined from $1.51 to $1.36.

When wellhead prices change, savings or price increases are sometimes passed on to consumers differentially. In 1991, the average wellhead price fell 7 percent (81). Similarly, the price per thousand cubic feet of natural gas sold to industrial consumers (excluding lease and plant fuel) declined 9 percent, to $2.68 per thousand cubic feet (82). In contrast, the price per thousand cubic feet of natural gas sold to residential consumers rose 0.3 percent to $5.82, and the price to commercial consumers rose 1.9 percent to $4.91.

Sectoral Patterns of Demand

Throughout the 1950's and 1960's, the market for natural gas expanded as low prices encouraged demand (79). 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. 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 production curtailments in many producing 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 6-trillion-cubic-foot reduction from 1972 through 1986, and lower use at electric utilities accounted for close to one-fourth.

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 1990-1991 heating season (October through March), net withdrawals from storage supplied nearly 12 percent of total natural gas consumption.[3]

Natural gas in storage at the end of the year increased throughout the period of the 1970's when local shortages resulted in curtailments to some consumers (80). Underground storage of working gas (that in excess of the base gas needed to maintain optimum reservoir pressure) equaled 7 percent of annual consumption in 1969 and 14 percent in 1991 (74 and 80). At the end of 1991, working gas in storage was 2.8 trillion cubic feet and base gas was 4.0 trillion cubic feet.

[3]Energy Information Administration, *Monthly Energy Review* March 1992, DOE EIA-0035(92/03) (Washington, DC, March 1992), Tables 4.3 and 4.4.

[1]Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications.

[2]Real prices are expressed in 1987 dollars. Prices are nominal unless specifically noted as real.

The 1986 low point in natural gas consumption was followed by 3 consecutive years of growth. In 1990, however, mild weather in the first and fourth quarters of the year restrained residential and commercial demand, and natural gas consumption remained at about 19 trillion cubic feet. In 1991, despite the economic recession, consumption of natural gas rose to 20 trillion cubic feet, the highest level since 1980.

During the 1980's, some consumers began to purchase natural gas directly from producers and to arrange for pipeline and distribution companies to deliver it to them for a fee. In 1990, natural gas delivered for the account of others reached 6.3 trillion cubic feet (78). Such deliveries accounted for 64 percent of total deliveries to industrial customers, 51 percent of total deliveries to electric utilities, and 15 percent of total deliveries to commercial customers.

Natural Gas Production and Productivity

In 1991, gross withdrawals of natural gas from wells totaled 22 trillion cubic feet, about the same as the year before but considerably below the level during the early 1970's, when well withdrawals averaged 24 trillion cubic feet per year (75). Texas, Louisiana, and Oklahoma, the largest producers of natural gas, accounted for 67 percent of the U.S. total in 1991 (77). Most withdrawals came from onshore wells and State offshore wells, but 5 trillion cubic feet were Federal offshore withdrawals. The 22 trillion cubic feet of gross withdrawals in 1991 yielded 19 trillion cubic feet of marketed production (75). Reservoir repressuring, removal of nonhydrocarbon gases, and venting and flaring accounted for 3 trillion cubic feet.

The U.S. total of natural gas gross well withdrawals includes a small but rapidly growing amount of methane produced from coalbeds. In 1990, gross withdrawals of coalbed methane reached 196 billion cubic feet, over 1 percent of the U.S. total, compared with 91 billion cubic feet in 1989.[4] Most of the coalbed methane produced in 1990 came from the San Juan Basin of Colorado and New Mexico and the Black Warrior Basin of Alabama. Two additional basins, the Piceance of Colorado and the Powder River of Wyoming, are in the initial stages of development.

About 273 thousand gas wells were in operation during 1991 (77). Withdrawals from those wells accounted for three-fourths of all gross withdrawals, while oil wells supplied the remainder (75). After peaking at 435 thousand cubic feet per day in 1971 (77), average gas well productivity declined. Although productivity rose 4 percent from 1983 to 1984 to 181 thousand cubic feet per day, thereafter productivity remained below 165 thousand cubic feet per day. The lower productivity of the 1985-to-1991 period is attributable to excess production capacity. During that period, new wells were added at a slower rate and, because older wells tend to produce less, the average production per well declined. Excess capacity also influenced producers to produce less natural gas overall, further lowering productivity.

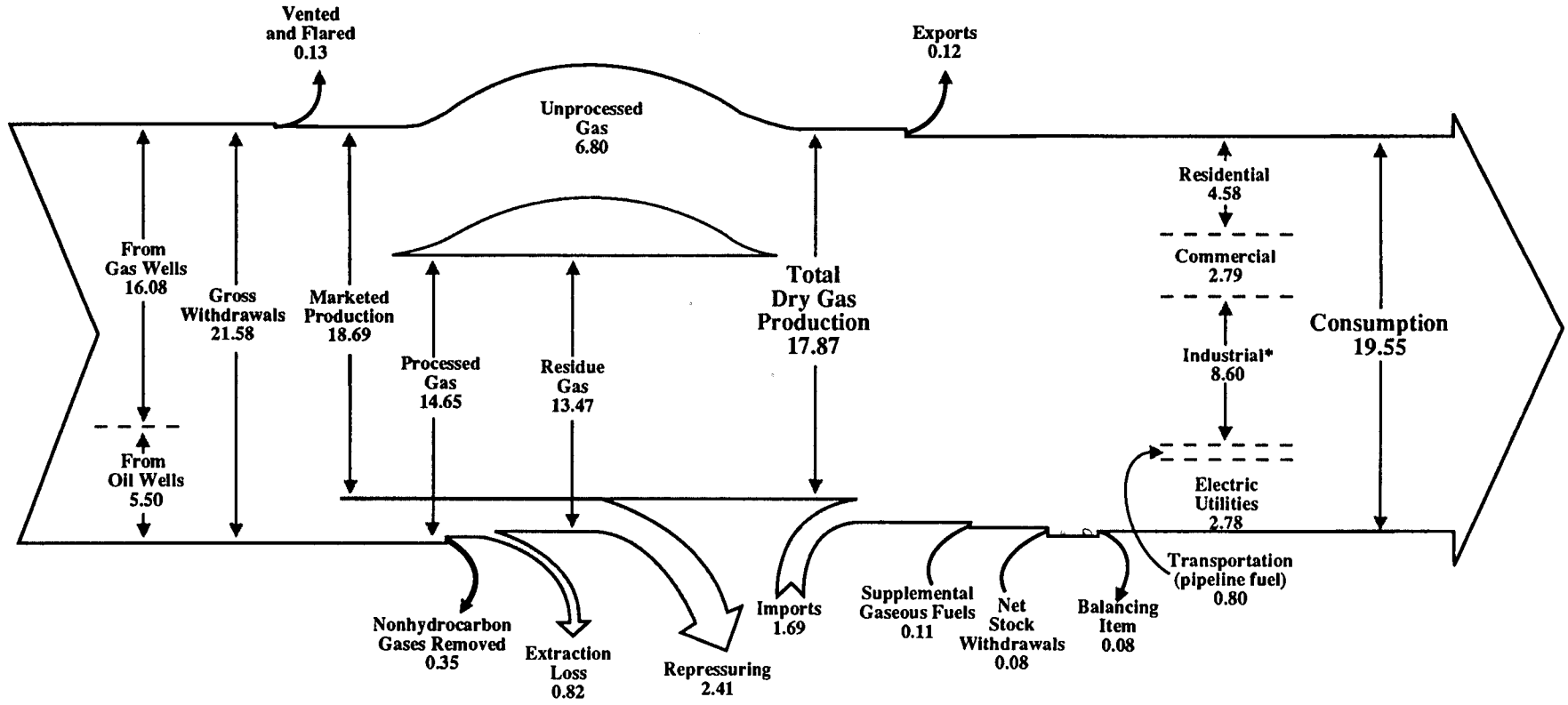
Imports and Exports

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 (76). In 1991, U.S. net imports of natural gas by all routes totaled 1.6 trillion cubic feet, up 9 percent from 1990 net imports and the equivalent of 8.0 percent of domestic consumption, up from 7.7 percent in 1990.

Historically, Canada has been the major supplier of U.S. natural gas imports, with Algeria supplying smaller amounts. In 1991, Canada supplied net imports of 1.6 trillion cubic feet and Algeria supplied 67 billion cubic feet. From 1970 through 1990, Japan was the primary purchaser of U.S. natural gas. Although shipments of liquefied natural gas from Alaska to Japan totaled 51 billion cubic feet in 1991, shipments of natural gas to Mexico more than tripled from the 1990 level and reached 58 billion cubic feet in 1991.

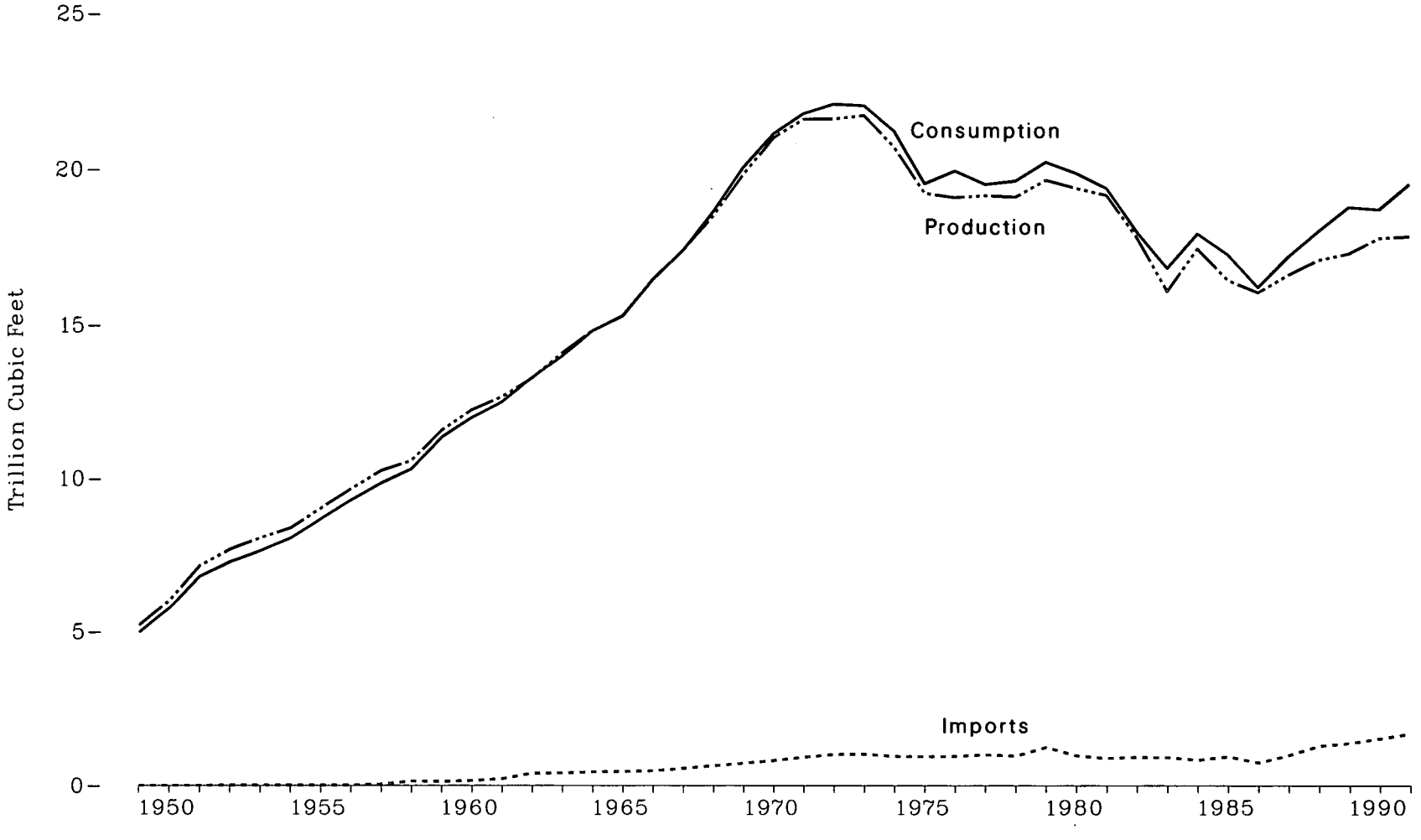
[4]Energy Information Administration, *Natural Gas Annual 1990, Volume 1*, DOE/EIA-0131(90)/1 (Washington, DC, December 1991), pp. 2 and 3.

Diagram 3. Natural Gas Flow, 1991
(Trillion Cubic Feet)



*Includes lease and plant fuel.
Notes: • Data are preliminary. • Sum of components may not equal totals due to independent rounding.
Sources: Tables 74, 75, 79, and Energy Information Administration estimate for processed gas.

Figure 74. Natural Gas Overview, 1949-1991



Source: Table 74.

Table 74. Natural Gas Overview, 1949-1991

(Trillion Cubic Feet)

Year	Total Dry Gas Production	Supplemental Gaseous Fuels	Imports	Exports	Withdrawals from Storage [1]	Additions to Storage [1]	Balancing Item [2]	Consumption
1949	5.20	NA	0	0.02	0.11	0.17	- 0.14	4.97
1950	6.02	NA	0	0.03	0.18	0.23	- 0.18	5.77
1951	7.16	NA	0	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	2.00	2.52	- 0.14	18.72
1991 [3]	17.87	0.11	1.69	0.12	2.37	2.29	- 0.08	19.55

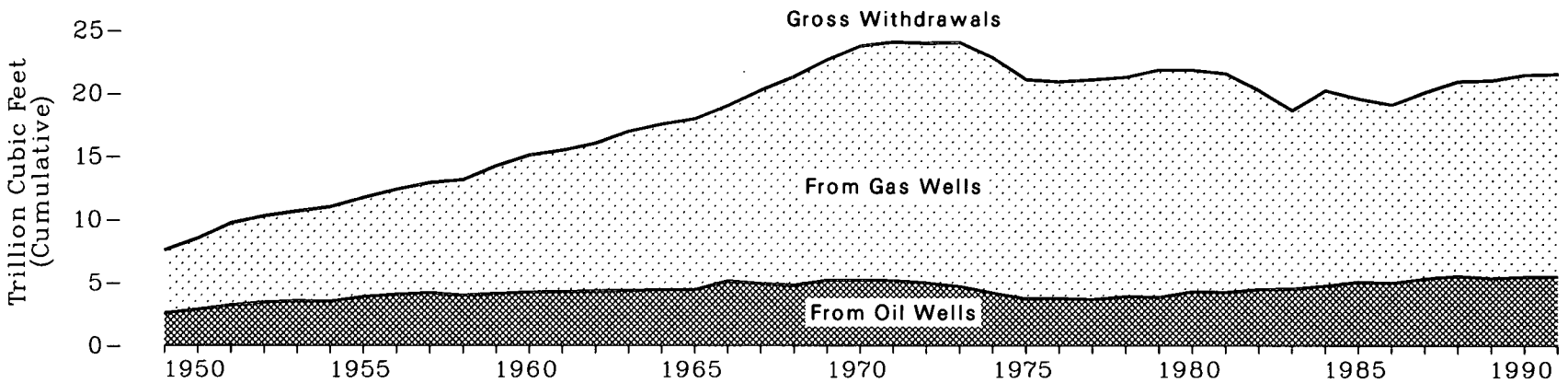
[1] Beginning with 1980, includes liquefied natural gas (LNG) storage in above ground tanks.
[2] Quantities lost and imbalances in data due to differences among data sources. Excludes intransit shipments 1980 forward.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
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 is 14.65 p.s.i.a. at 60 °F. • Sum of components may not equal total due to independent rounding.

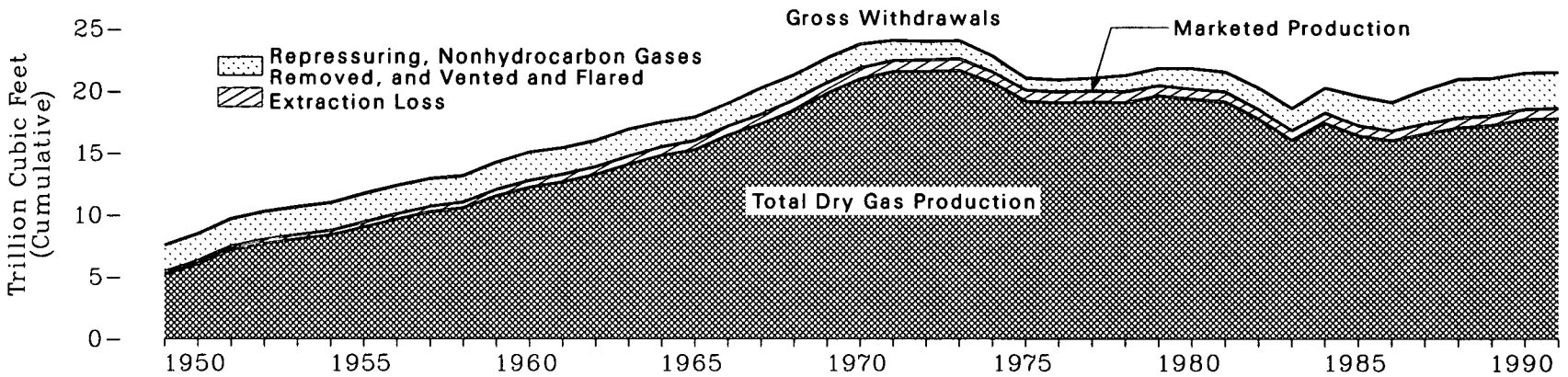
Sources: **1949-1989:** • Supplemental Gaseous Fuels—Energy Information Administration (EIA), *Natural Gas Annual 1990, Volume 2* (December 1991), Table 12. • All Other Data—EIA, *Natural Gas Annual 1990, Volume 2* (December 1991), Table 2. **1990 and 1991:** EIA, *Natural Gas Monthly*, March 1992, Table 2.

Figure 75. Natural Gas Production, 1949-1991

Gross Withdrawals by Well Type



Natural Gas Production by Phase



Source: Table 75.

Table 75. Natural Gas Production, 1949-1991

(Trillion Cubic Feet)

Year	Gross Withdrawals			Repressuring	Non-hydrocarbon Gases Removed	Vented and Flared	Marketed Production	Extraction Loss [1]	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[2]	16.08	5.50	21.58	2.41	0.35	0.13	18.69	0.82	17.87

[1] Volume reduction resulting from the removal of natural gas plant liquids. Natural gas plant liquids are transferred to petroleum supply.

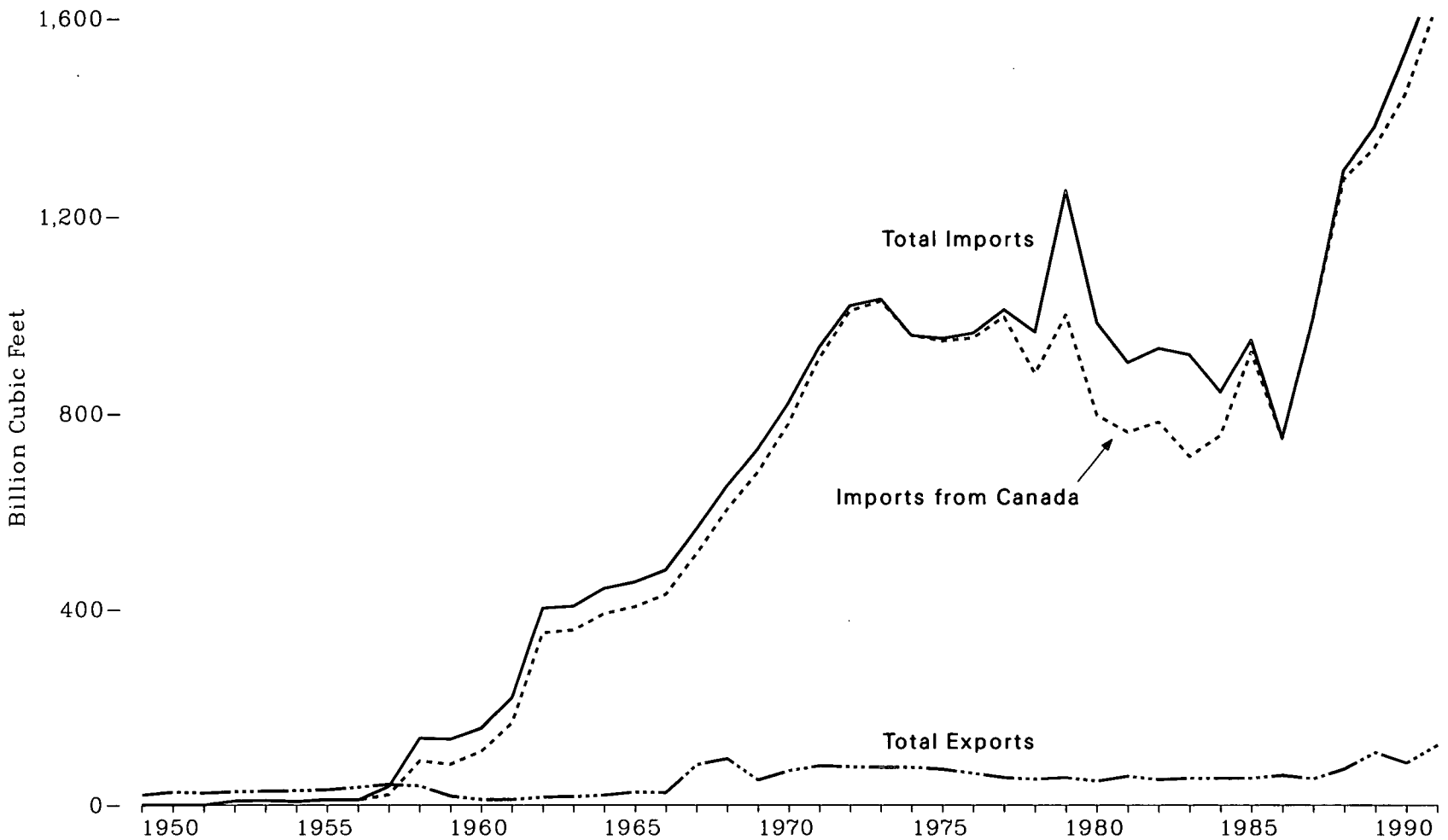
[2] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

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 is 14.65 p.s.i.a. at 60 °F. • Sum of components may not equal total due to independent rounding.

Sources: **From Gas Wells and From Oil Wells:** • 1949-1966—Bureau of Mines, *Minerals Yearbook*, "Natural Gas" chapter. • 1967-1981—Energy Information Administration (EIA), *Natural Gas Annual 1990, Volume 2* (December 1991), Table 5. • 1982-1990—EIA, Form EIA-627, "Annual Quantity and Value of Natural Gas Report." • 1991—EIA, estimated data. **All Other Data:** • 1949-1989— EIA, *Natural Gas Annual 1990, Volume 2* (December 1991), Tables 1 and 5. • 1990 and 1991—EIA, *Natural Gas Monthly*, March 1992, Table 1.

Figure 76. Natural Gas Imports and Exports, 1949-1991



Source: Table 76.

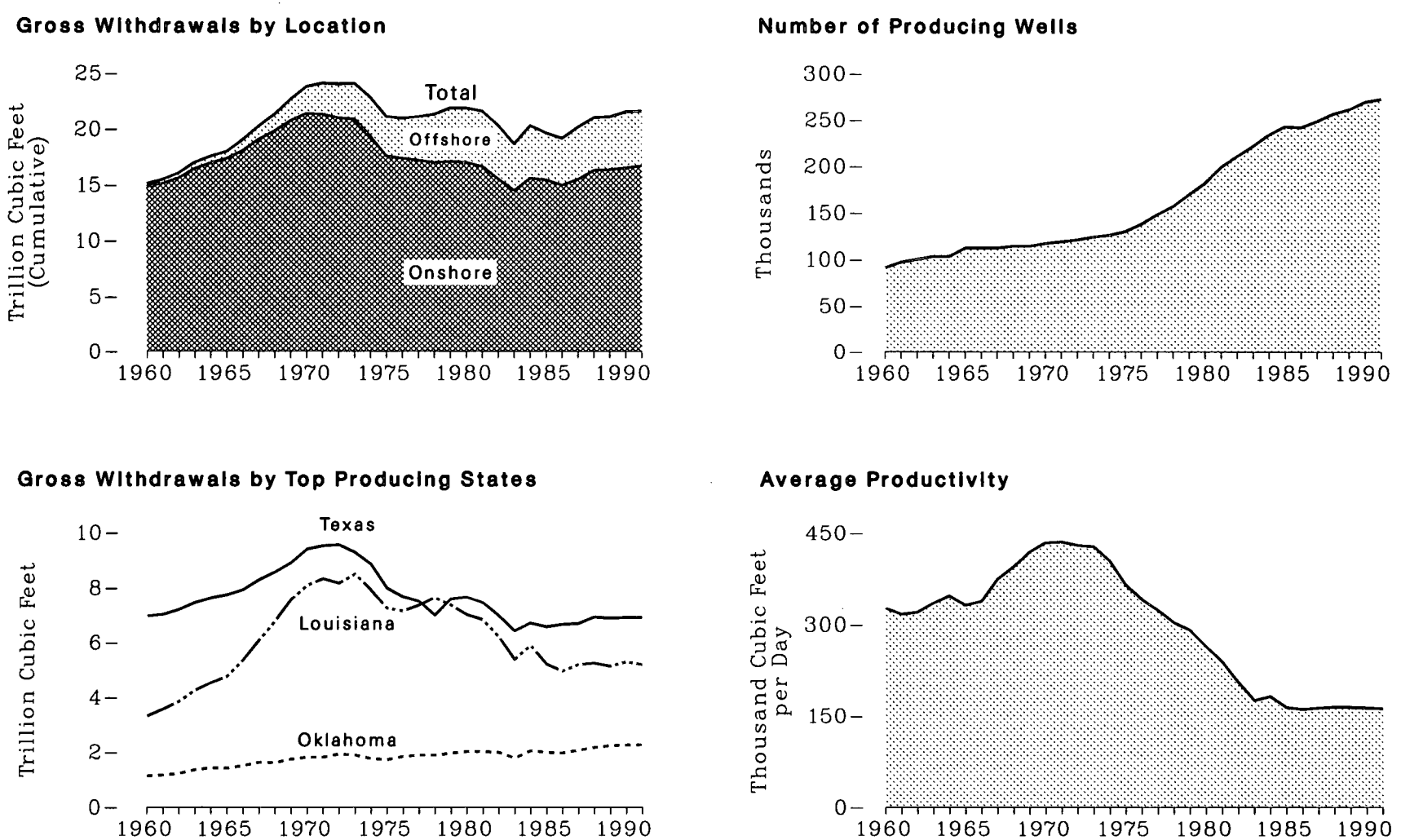
Table 76. Natural Gas Imports, Exports, and Net Imports, 1949-1991

(Billion Cubic Feet, Except as Noted)

Year	Imports by Country of Origin					Exports by Country of Destination				Net Imports [1]	
	Canada	Mexico	Algeria [2]	Indonesia	Total	Canada	Mexico	Japan [2]	Total	Total	Percent of U.S. Consumption
1949	0	0	0	0	0	([3])	20	0	20	- 20	([4])
1950	0	0	0	0	0	3	23	0	26	- 26	([4])
1951	0	0	0	0	0	4	21	0	24	- 24	([4])
1952	8	([3])	0	0	8	6	22	0	27	- 20	([4])
1953	9	0	0	0	9	6	22	0	28	- 19	([4])
1954	7	0	0	0	7	6	23	0	29	- 22	([4])
1955	11	([3])	0	0	11	11	20	0	31	- 20	([4])
1956	10	([3])	0	0	10	17	19	0	36	- 26	([4])
1957	21	17	0	0	38	31	11	0	42	- 4	([4])
1958	90	46	0	0	136	32	7	0	39	97	0.9
1959	83	51	0	0	134	12	7	0	18	116	1.0
1960	109	47	0	0	156	6	6	0	11	144	1.2
1961	167	52	0	0	219	6	5	0	11	208	1.7
1962	350	51	0	0	402	6	10	0	16	386	2.9
1963	356	50	0	0	406	7	10	0	17	389	2.8
1964	391	53	0	0	443	10	10	0	20	424	2.9
1965	405	52	0	0	456	18	8	0	26	430	2.8
1966	430	50	0	0	480	20	4	0	25	455	2.8
1967	513	51	0	0	564	70	11	0	82	483	2.8
1968	604	47	0	0	652	82	12	0	94	558	3.0
1969	680	47	0	0	727	35	13	3	51	676	3.4
1970	779	41	1	0	821	11	15	44	70	751	3.6
1971	912	21	1	0	935	14	16	50	80	854	3.9
1972	1,009	8	2	0	1,019	16	15	48	78	941	4.3
1973	1,028	2	3	0	1,033	15	14	48	77	956	4.3
1974	959	([3])	0	0	959	13	13	50	77	882	4.2
1975	948	0	5	0	953	10	9	53	73	880	4.5
1976	954	0	10	0	964	8	7	50	65	899	4.5
1977	997	2	11	0	1,011	([3])	4	52	56	955	4.9
1978	881	0	84	0	966	([3])	4	48	53	913	4.7
1979	1,001	0	253	0	1,253	([3])	4	51	56	1,198	5.9
1980	797	102	86	0	985	([3])	4	45	49	936	4.7
1981	762	105	37	0	904	([3])	3	56	59	845	4.4
1982	783	95	55	0	933	([3])	2	50	52	882	4.9
1983	712	75	131	0	918	([3])	2	53	55	864	5.1
1984	755	52	36	0	843	([3])	2	53	55	788	4.4
1985	926	0	24	0	950	([3])	2	53	55	894	5.2
1986	749	0	0	2	750	9	2	50	61	689	4.2
1987	993	0	0	0	993	3	2	49	54	939	5.5
1988	1,276	0	17	0	1,294	20	2	52	74	1,220	6.8
1989	1,339	0	42	0	1,382	38	17	51	107	1,275	6.8
1990	1,448	0	84	0	1,532	17	16	53	86	1,447	7.7
1991[5]	1,626	0	67	0	1,693	13	58	51	122	1,571	8.0

[1] Net imports = imports minus exports.
[2] Imports from Algeria and exports to Japan are liquefied natural gas.
[3] Less than 0.5 billion cubic feet.
[4] Not meaningful because there were net exports during this year.
[5] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Note: Sum of components may not equal total due to independent rounding.
Sources: • 1949-1954—Energy Information Administration (EIA), Office of Oil and Gas, Reserves and Natural Gas Division, unpublished data. • 1955-1990—EIA, *Natural Gas Monthly*, August 1991, Tables FE4, FE5, and unpublished revisions. • 1991—EIA estimates.

Figure 77. Natural Gas Gross Withdrawals by State and Location and Gas Well Productivity, 1960-1991



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 77.

Table 77. Natural Gas Gross Withdrawals by State and Location and Gas Well Productivity, 1960-1991

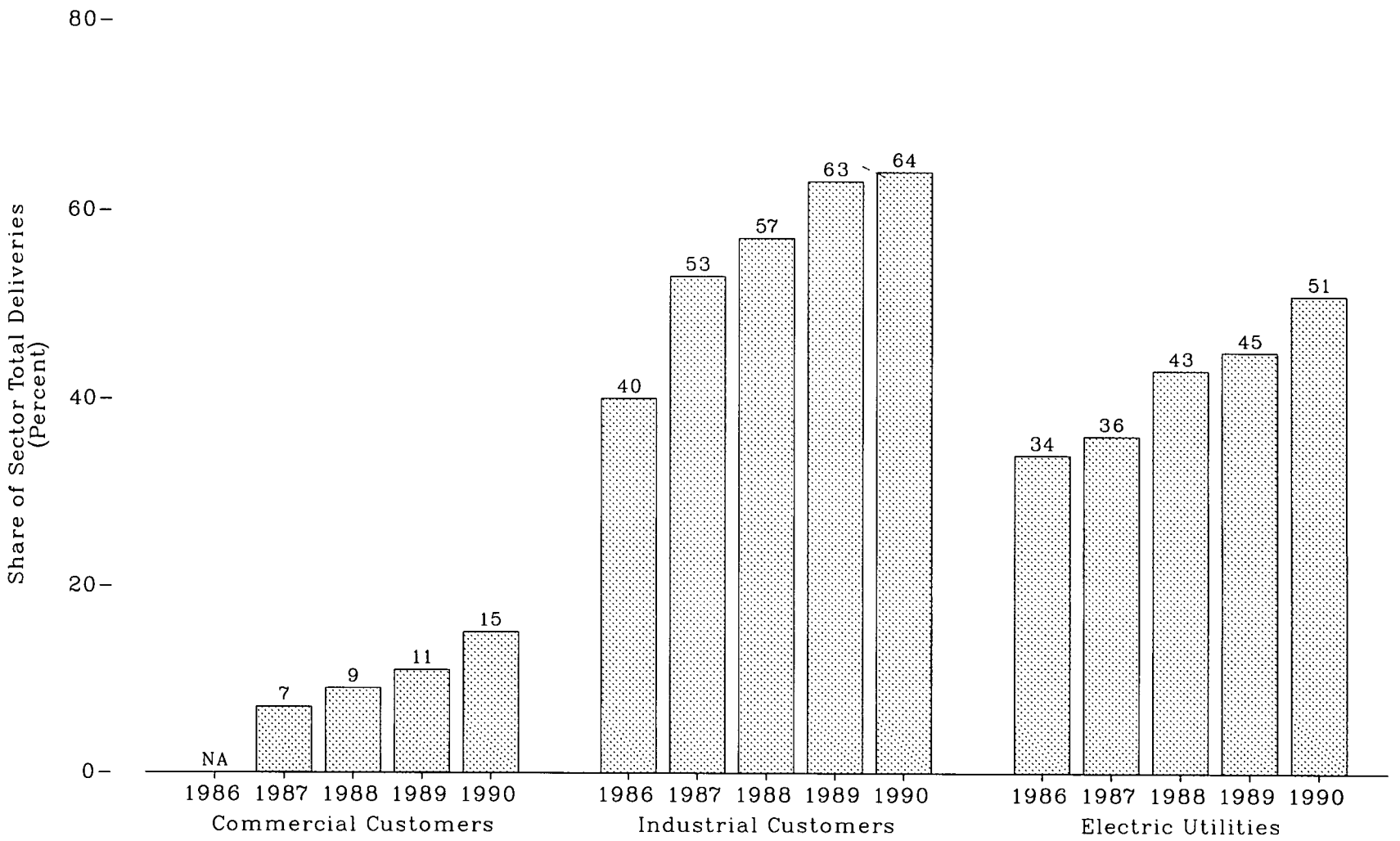
(Trillion Cubic Feet, Except as Noted)

Year	State				Location			Gas Well [1] Productivity		
	Texas	Louisiana	Oklahoma	Other	Onshore [2]	Offshore [3]	Gross Withdrawals from Oil and Gas Wells	Gross Withdrawals from Gas Wells	Thousands of Producing Wells [4]	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	270	163.0
1991[5]	6.91	5.20	2.27	7.20	16.65	4.94	21.58	16.08	273	161.7

[1] See Glossary.
[2] Includes State offshore gross withdrawals.
[3] Excludes State offshore gross withdrawals, includes Federal offshore (Outer Continental Shelf) gross withdrawals.
[4] As of December 31.
[5] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

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 forward—Energy Information Administration (EIA), *Natural Gas Annual 1990, Volume 1* (December 1991), Table 4. **Gross Withdrawals:** • 1960-1966—Bureau of Mines, *Minerals Yearbook,* "Natural Gas" chapter. • 1967-1981—EIA, *Natural Gas Annual 1990, Volume 2* (December 1991), Table 5. • 1982-1990—EIA, Form EIA-627, "Annual Quantity and Value of Natural Gas Report." • 1991—EIA, estimated data. **All Other Data:** • 1960-1966—Bureau of Mines, *Natural Gas Production and Consumption.* • 1967-1990—EIA, *Natural Gas Annual 1990, Volume 2* (December 1991), Tables 5 and 6. • 1991—EIA, *Natural Gas Monthly,* March 1992, Table 1, and Gulf Publishing Company, *World Oil,* February 1992.

Figure 78. Natural Gas Delivered for the Account of Others, 1986-1990



NA=Not available.
Source: Table 78.

Table 78. Natural Gas Delivered for the Account of Others, 1986-1990

Year	Commercial Customers			Industrial Customers			Electric Utilities [1]		
	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	Delivered for the Account of Others	Total Deliveries	Account of Others Share of Total [1]
	(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	414	2,680	15	4,483	6,970	64	1,395	2,787	51

[1] 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.

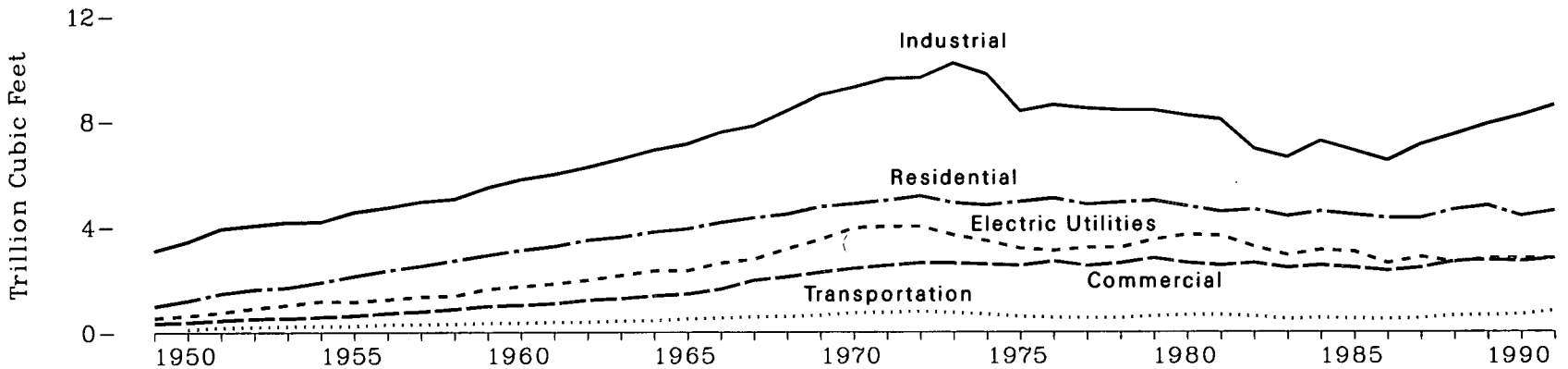
NA = Not available.

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 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.

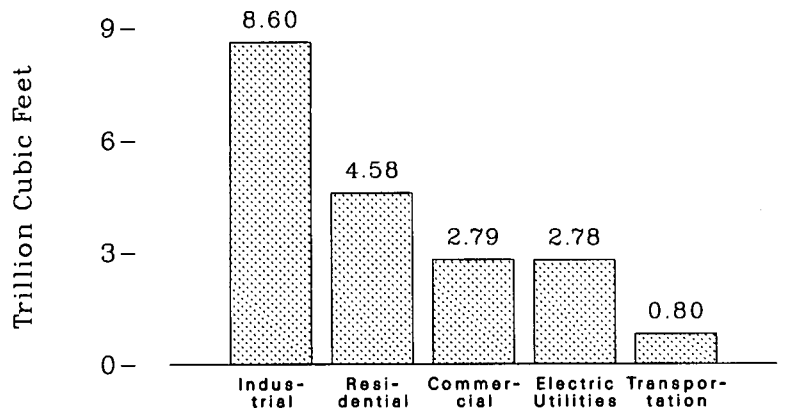
Sources: **Electric Utilities Total Deliveries:** EIA, Form EIA-759, "Monthly Power Plant Report." **All Other Data:** EIA, *Natural Gas Annual 1990, Volume 1* (December 1991), Tables 17-20.

Figure 79. Natural Gas Consumption by Sector

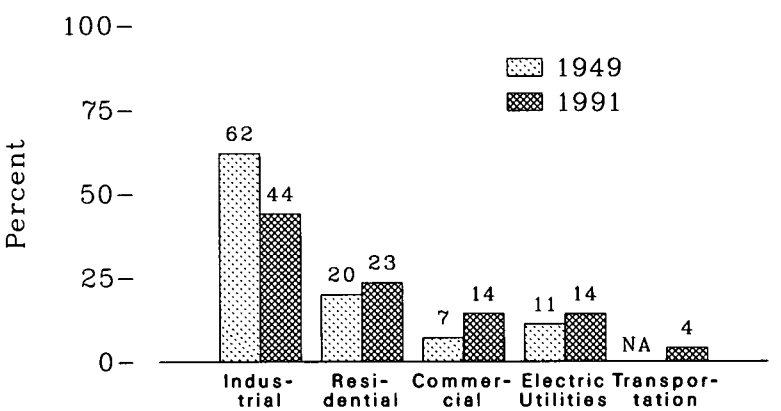
By Sector, 1949-1991



By Sector, 1991



Shares by Sector, 1949 and 1991



NA=Not available.
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 79.

Table 79. Natural Gas Consumption by Sector, 1949-1991

(Trillion Cubic Feet)

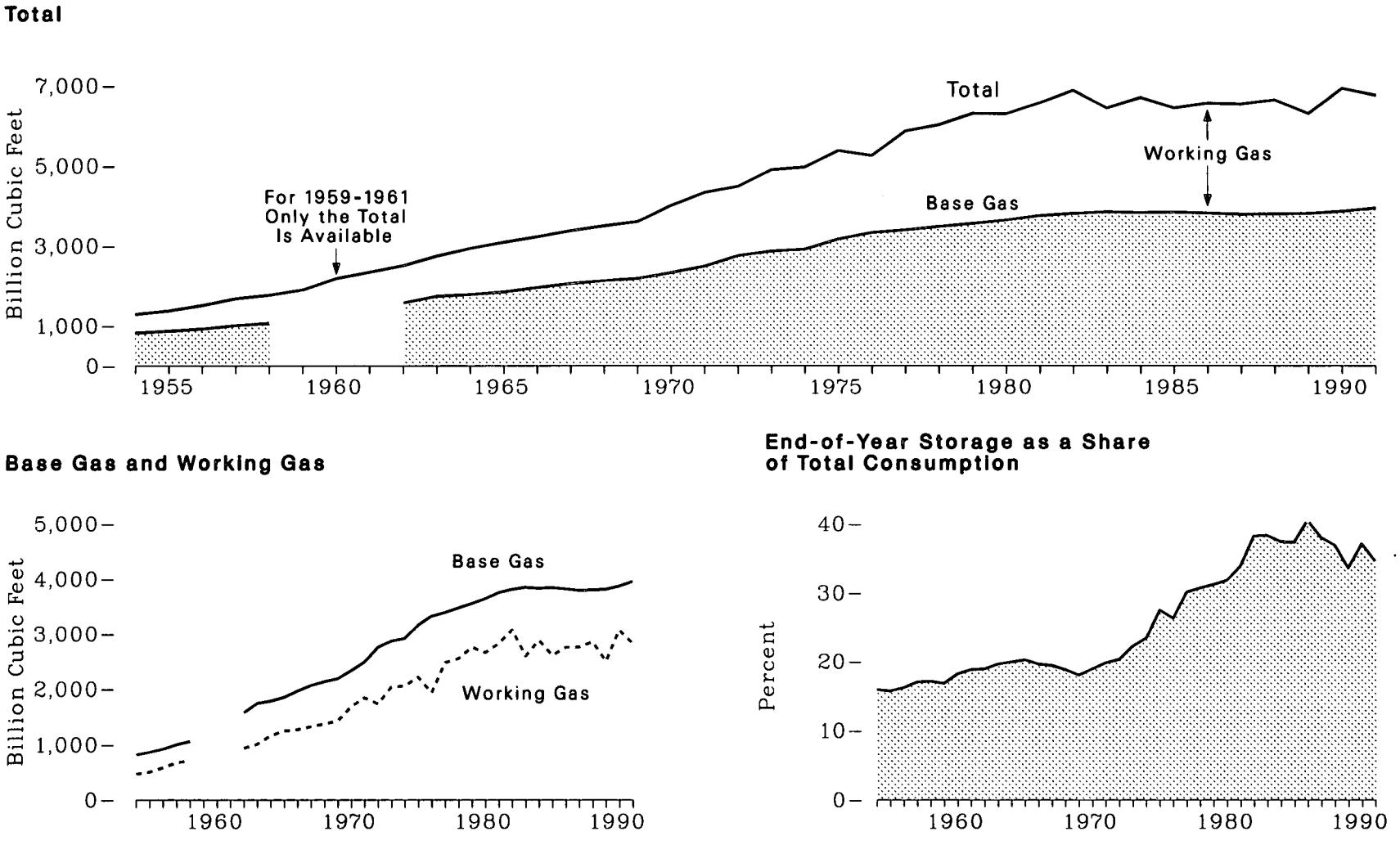
Year	Residential	Commercial [1]	Industrial			Transportation [2]	Electric Utilities	Total
			Lease and Plant Fuel	Other	Total Industrial			
1949	0.99	0.35	0.84	2.25	3.08	NA	0.55	4.97
1950	1.20	0.39	0.93	2.50	3.43	0.13	0.63	5.77
1951	1.47	0.46	1.15	2.77	3.91	0.19	0.76	6.81
1952	1.62	0.52	1.16	2.87	4.04	0.21	0.91	7.29
1953	1.69	0.53	1.13	3.03	4.16	0.23	1.03	7.64
1954	1.89	0.58	1.10	3.07	4.17	0.23	1.17	8.05
1955	2.12	0.63	1.13	3.41	4.54	0.25	1.15	8.69
1956	2.33	0.72	1.00	3.71	4.71	0.30	1.24	9.29
1957	2.50	0.78	1.05	3.89	4.93	0.30	1.34	9.85
1958	2.71	0.87	1.15	3.89	5.03	0.31	1.37	10.30
1959	2.91	0.98	1.24	4.22	5.46	0.35	1.63	11.32
1960	3.10	1.02	1.24	4.53	5.77	0.35	1.72	11.97
1961	3.25	1.08	1.29	4.67	5.96	0.38	1.83	12.49
1962	3.48	1.21	1.37	4.86	6.23	0.38	1.97	13.27
1963	3.59	1.27	1.41	5.13	6.55	0.42	2.14	13.97
1964	3.79	1.37	1.37	5.52	6.89	0.44	2.32	14.81
1965	3.90	1.44	1.16	5.96	7.11	0.50	2.32	15.28
1966	4.14	1.62	1.03	6.51	7.55	0.54	2.61	16.45
1967	4.31	1.96	1.14	6.65	7.79	0.58	2.75	17.39
1968	4.45	2.08	1.24	7.13	8.37	0.59	3.15	18.63
1969	4.73	2.25	1.35	7.61	8.96	0.63	3.49	20.06
1970	4.84	2.40	1.40	7.85	9.25	0.72	3.93	21.14
1971	4.97	2.51	1.41	8.18	9.59	0.74	3.98	21.79
1972	5.13	2.61	1.46	8.17	9.62	0.77	3.98	22.10
1973	4.88	2.60	1.50	8.69	10.18	0.73	3.66	22.05
1974	4.79	2.56	1.48	8.29	9.77	0.67	3.44	21.22
1975	4.92	2.51	1.40	6.97	8.36	0.58	3.16	19.54
1976	5.05	2.67	1.63	6.96	8.60	0.55	3.08	19.95
1977	4.82	2.50	1.66	6.82	8.47	0.53	3.19	19.52
1978	4.90	2.60	1.65	6.76	8.40	0.53	3.19	19.63
1979	4.97	2.79	1.50	6.90	8.40	0.60	3.49	20.24
1980	4.75	2.61	1.03	7.17	8.20	0.63	3.68	19.88
1981	4.55	2.52	0.93	7.13	8.06	0.64	3.64	19.40
1982	4.63	2.61	1.11	5.83	6.94	0.60	3.23	18.00
1983	4.38	2.43	0.98	5.64	6.62	0.49	2.91	16.83
1984	4.56	2.52	1.08	6.15	7.23	0.53	3.11	17.95
1985	4.43	2.43	0.97	5.90	6.87	0.50	3.04	17.28
1986	4.31	2.32	0.92	5.58	6.50	0.49	2.60	16.22
1987	4.31	2.43	1.15	5.95	7.10	0.52	2.84	17.21
1988	4.63	2.67	1.10	6.38	7.48	0.61	2.64	18.03
1989	4.78	2.72	1.07	6.82	7.89	0.63	2.79	18.80
1990	4.39	2.68	1.24	6.97	8.21	0.66	2.79	18.72
1991[3]	4.58	2.79	1.25	7.36	8.60	0.80	2.78	19.55

[1] Includes deliveries to municipalities and public authorities for institutional heating and other purposes. From 1990 forward, volumes include natural gas delivered for use as vehicle fuel.
[2] Pipeline fuel.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
NA = Not available.

Notes: • For the definition of natural gas consumption, see Appendix E, Note 11. • 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 is 14.65 p.s.i.a. at 60 °F. • Sum of components may not equal total due to independent rounding.

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." **All Other Data:** • 1949-1989—EIA, *Natural Gas Annual 1990, Volume 1* (December 1991), Table 97. • 1990 and 1991—EIA, *Natural Gas Monthly,* March 1992, Table 3.

Figure 80. Natural Gas in Underground Storage, End of Year 1954–1991



Note: Because vertical scales differ, graphs should not be compared.
Source: Tables 79 and 80.

Table 80. Natural Gas in Underground Storage, End of Year 1954-1991

(Billion Cubic Feet)

Year	Base Gas [1]	Working Gas	Total [1]
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	3,070	6,939
1991	3,952	2,817	6,769

[1] Includes native gas.

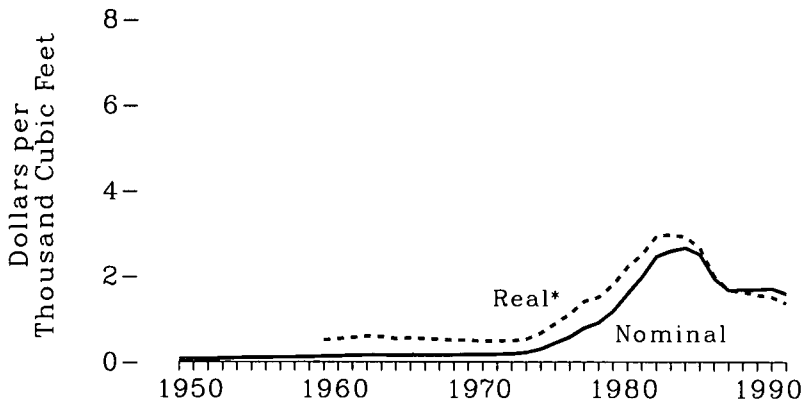
NA = Not available.

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 is 14.65 p.s.i.a. at 60 °F. • Sum of components may not equal total due to independent rounding.

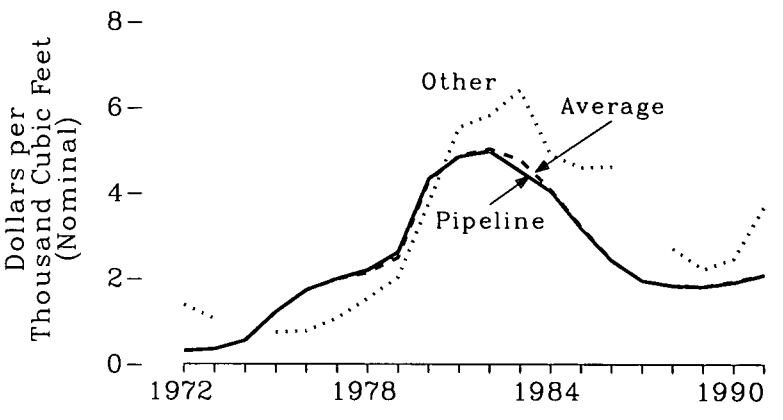
Sources: • 1954-1974—American Gas Association, *Gas Facts.* • 1975 and 1976—Federal Energy Administration, Form FEA-G318-M-O, and Federal Power Commission, Form FPC-8, "Underground Gas Storage Report." • 1977 and 1978—Energy Information Administration (EIA), and Federal Energy Administration, Form FEA-G318-M-O, and Federal Power Commission, Form FPC-8, "Underground Gas Storage Report." • 1979-1984—EIA, Form EIA-191 and Federal Energy Regulatory Commission, Form FERC-8, "Underground Gas Storage Report." •1985 forward—EIA, *Natural Gas Monthly,* March 1992, Table 17.

Figure 81. Natural Gas Wellhead and Import Prices

Wellhead, 1949-1991

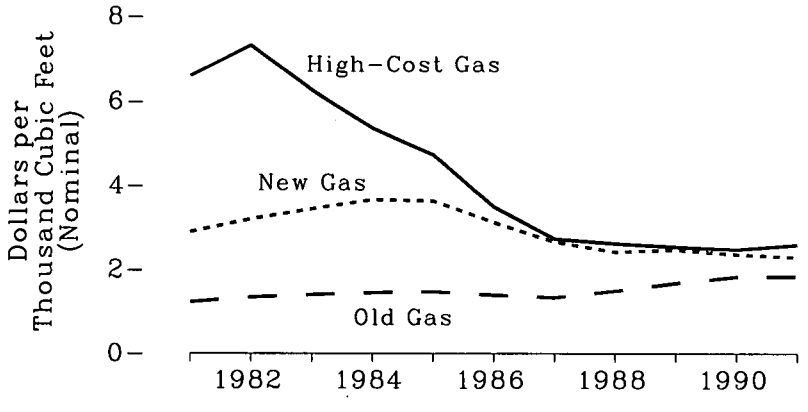


Imports, 1972-1991

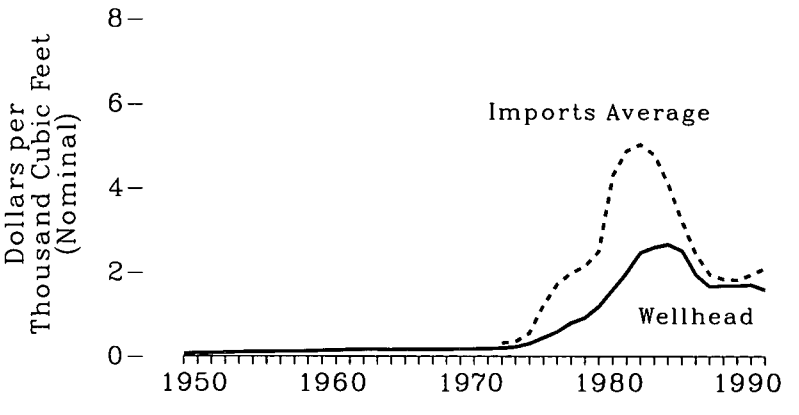


In 1974 and 1987 all imports were by pipeline.

Purchases by NGPA Categories, 1981-1991



Domestic and Imported Average Prices, 1949-1991



*In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.
Source: Table 81.

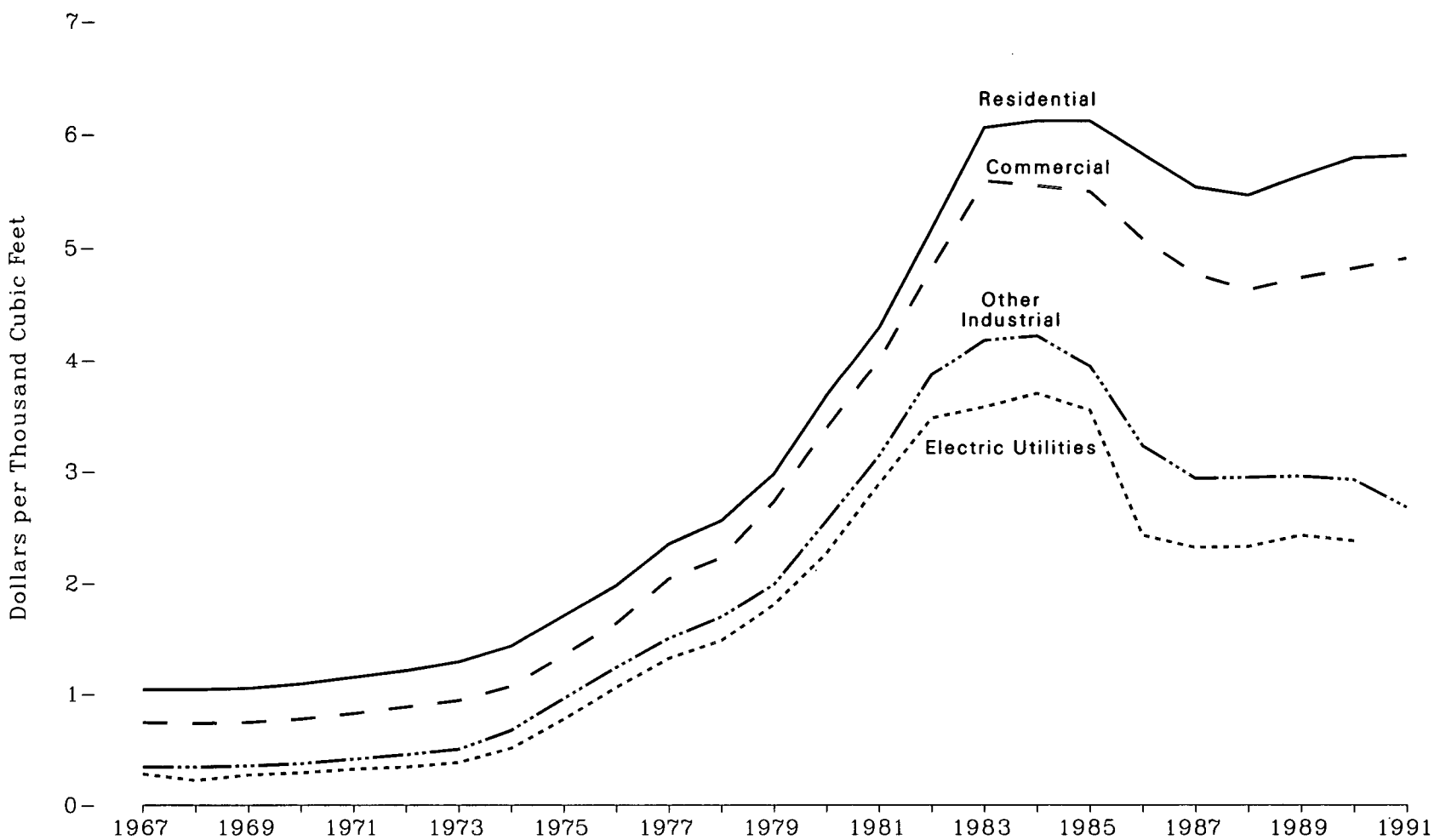
Table 81. Natural Gas Wellhead and Import Prices, 1949-1991

(Dollars per Thousand Cubic Feet)

Year	Wellhead [2]		Purchases by NGPA Categories [1]			Imports		
			Old Gas	New Gas	High-Cost Gas	Pipeline	Other [3]	Average
	Nominal	Real [4]	Nominal	Nominal	Nominal	Nominal	Nominal	Nominal
1949	0.06	NA	—	—	—	NA	NA	NA
1950	0.07	NA	—	—	—	NA	NA	NA
1951	0.07	NA	—	—	—	NA	NA	NA
1952	0.08	NA	—	—	—	NA	NA	NA
1953	0.09	NA	—	—	—	NA	NA	NA
1954	0.10	NA	—	—	—	NA	NA	NA
1955	0.10	NA	—	—	—	NA	NA	NA
1956	0.11	NA	—	—	—	NA	NA	NA
1957	0.11	NA	—	—	—	NA	NA	NA
1958	0.12	NA	—	—	—	NA	NA	NA
1959	0.13	0.51	—	—	—	NA	NA	NA
1960	0.14	0.54	—	—	—	NA	NA	NA
1961	0.15	0.57	—	—	—	NA	NA	NA
1962	0.16	0.60	—	—	—	NA	NA	NA
1963	0.16	0.59	—	—	—	NA	NA	NA
1964	0.15	0.54	—	—	—	NA	NA	NA
1965	0.16	0.56	—	—	—	NA	NA	NA
1966	0.16	0.54	—	—	—	NA	NA	NA
1967	0.16	0.53	—	—	—	NA	NA	NA
1968	0.16	0.50	—	—	—	NA	NA	NA
1969	0.17	0.51	—	—	—	NA	NA	NA
1970	0.17	0.48	—	—	—	NA	NA	NA
1971	0.18	0.49	—	—	—	NA	NA	NA
1972	0.19	0.49	—	—	—	0.31	1.38	0.31
1973	0.22	0.53	—	—	—	0.35	1.05	0.35
1974	0.30	0.67	—	—	—	0.55	[5]	0.55
1975	0.44	0.89	—	—	—	1.21	0.74	1.21
1976	0.58	1.11	—	—	—	1.73	0.77	1.72
1977	0.79	1.41	—	—	—	1.99	1.07	1.98
1978	0.91	1.51	—	—	—	2.19	1.53	2.13
1979	1.18	1.80	—	—	—	2.61	2.03	2.49
1980	1.59	2.22	—	—	—	4.33	3.77	4.28
1981	1.98	2.51	1.22	2.89	6.58	4.85	5.54	4.88
1982	2.46	2.94	1.34	3.19	7.31	4.98	5.82	5.03
1983	2.59	2.97	1.40	3.43	6.25	4.51	6.41	4.78
1984	2.66	2.92	1.45	3.65	5.35	4.04	4.90	4.08
1985	2.51	2.66	1.47	3.62	4.71	3.17	4.60	3.21
1986	1.94	2.00	1.39	3.11	3.48	2.42	4.62	2.43
1987	1.67	1.67	1.33	2.65	2.72	1.95	[5]	1.95
1988	1.69	1.63	1.49	2.41	2.61	1.83	2.71	1.84
1989	1.69	1.56	1.68	2.46	2.53	1.81	2.22	1.82
1990	1.71	1.51	1.83	2.35	2.47	1.91	2.47	1.94
1991[6]	1.59	1.36	1.84	2.28	2.58	2.08	3.71	2.09

[1] Projected natural gas wellhead purchase prices by major interstate pipeline companies by National Gas Policy Act of 1978 categories (see Appendix E, Note 12). [2] See Glossary for definition of Natural Gas Wellhead Price. [3] Primarily liquefied natural gas from Algeria. [4] In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C. [5] Not applicable. All imports were by pipeline. [6] Previous-year data have been revised. Current-year data are estimated and will be revised in future publications. — = Not applicable. NA = Not available. Sources: **Wellhead:** • 1949-1990—Energy Information Administration (EIA), *Natural Gas Annual 1990, Volume 2* (December 1991), Table 1. • 1991—EIA, *Natural Gas Monthly* (March 1992), Table 4. **Purchases by NGPA Categories:** • 1981-1984—EIA, *Natural Gas Monthly*, November 1987 (January 1988), Table 5. • 1985-1991—EIA, *Natural Gas Monthly*, March 1992, Table 5. **Imports:** • 1972 and 1973—Federal Power Commission, *Pipeline Imports and Exports of Natural Gas - Imports and Exports of LNG.* • 1974-1976—Federal Power Commission, *United States Imports and Exports of Natural Gas*, annual. • 1977-1990—EIA, *Natural Gas Monthly*, August 1991 (September 1991). • 1991—EIA estimates.

Figure 82. Natural Gas Prices by Sector, 1967-1991



Source: Table 82.

Table 82. Natural Gas Prices by Sector, 1967-1991

(Dollars per Thousand Cubic Feet)

Year	Residential	Commercial [1]	Industrial			Transportation [2]	Electric Utilities
			Lease and Plant Fuel	Other Industrial	Total Industrial		
1967	1.04	0.74	0.15	0.34	0.31	0.20	0.28
1968	1.04	0.73	0.16	0.34	0.31	0.20	0.22
1969	1.05	0.74	0.18	0.35	0.32	0.21	0.27
1970	1.09	0.77	0.18	0.37	0.34	0.21	0.29
1971	1.15	0.82	0.19	0.41	0.38	0.22	0.32
1972	1.21	0.88	0.20	0.45	0.41	0.23	0.34
1973	1.29	0.94	0.21	0.50	0.46	0.25	0.38
1974	1.43	1.07	0.51	0.67	0.65	0.30	0.51
1975	1.71	1.35	0.47	0.96	0.88	0.40	0.77
1976	1.98	1.64	0.57	1.24	1.11	0.51	1.06
1977	2.35	2.04	0.71	1.50	1.34	0.77	1.32
1978	2.56	2.23	0.79	1.70	1.52	0.90	1.48
1979	2.98	2.73	1.06	1.99	1.82	1.32	1.81
1980	3.68	3.39	1.43	2.56	2.42	1.85	2.27
1981	4.29	4.00	1.93	3.14	3.00	2.39	2.89
1982	5.17	4.82	2.23	3.87	3.61	2.97	3.48
1983	6.06	5.59	2.54	4.18	3.94	3.15	3.58
1984	6.12	5.55	2.71	4.22	3.99	3.04	3.70
1985	6.12	5.50	2.37	3.95	3.73	2.92	3.55
1986	5.83	5.08	2.02	3.23	3.06	2.52	2.43
1987	5.54	4.77	NA	2.94	NA	2.17	2.32
1988	5.47	4.63	NA	2.95	NA	2.10	2.33
1989	5.64	4.74	NA	2.96	NA	2.01	2.43
1990	5.80	4.82	NA	2.93	NA	1.95	2.38
1991[3]	5.82	4.91	NA	2.68	NA	NA	NA

[1] Includes deliveries to municipalities and public authorities for institutional heating and other purposes.
[2] Pipeline fuel.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
NA = Not available.
Notes: • Dry natural gas including supplemental gaseous fuels. • 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 Appendix E, Note 11.
Sources: **Total Industrial:** Energy Information Administration (EIA) calculations, weighed by volume. **All Other Data, 1967-1990:** EIA, *Natural Gas Annual 1990, Volume 2* (December 1991), Table 4. **All Other Data, 1991:** EIA, *Natural Gas Monthly*, March 1992, Table 4.

7. Coal

Changing Patterns of Coal Production

In 1991, production of all types of coal totaled 994 million short tons, down from the 1990 record level of over 1 billion short tons (84).[1] The record level of production in 1990 was due to several factors, including increased demand at electric utilities seeking to build up coal stocks and increased consumption and exports. In 1991, in contrast, consumption of coal declined and stocks remained relatively unchanged. Of all coal production, bituminous and subbituminous coal accounted for by far the largest share (91 percent). Lignite and anthracite accounted for the remainder of coal produced. Despite its superior burning qualities, anthracite, mined in northeastern Pennsylvania, accounts for a diminishing share of total coal production. In 1949, anthracite accounted for 9 percent of the total; by 1991, its share had shrunk to less than one-half of 1 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 (84). That year, production of western coal was 27 million short tons, 5 percent of the total. By 1991, western production had increased by almost 15 times, to 404 million short tons (41 percent of the total). The growth in western coal was due in part to environmental concerns that led to increased demand for low-sulfur coal, which is concentrated in the West. In addition, surface mining, with its higher average productivity, is much more prevalent in the West.

Domestic Markets: Changes in Coal End Use

Electric utilities are the dominant consumers of coal (85). Their consumption grew from 84 million short tons, a 17-percent share, in 1949, to 772 million short tons, an 87-percent share, in 1991. In contrast, consumption by all other economic sectors in 1991 was lower than it had 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 1991, their consumption totaled 6 million short tons, less than 1 percent of U.S. 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 and 1989, growth in manufacturing activity was accompanied by a modest increase in industrial consumption, which rose to 118 million short tons in those 2 years. Thereafter, the economic recession restrained industrial demand for coal, and industrial consumption had declined to 110 million short tons by 1991.

Coal Mining Productivity

The average productivity of all types of mines in the United States increased each year after 1949, reaching 2.4 short tons per miner hour in 1969 (88). Productivity during the 1970's and early 1980's was lower, primarily due 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, led to increases in average productivity during the 1980's and 1990. In 1990, average productivity in all mines (excluding anthracite) reached an all-time high of 3.9 short tons per miner hour. That year, productivity of underground mines (excluding anthracite) was 2.5 short tons per miner hour and productivity of surface mines (excluding anthracite) was 6.1 short tons per miner hour.

[1]Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications.

Foreign Markets

Since World War II, coal has been the United States' major energy export (6). Throughout most of the 1960's and 1970's, U.S. exports of coal increased, peaking at 113 million short tons in 1981 (86). 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. In 1991, coal exports totaled 109 million short tons.

Japan, Italy, and Canada remained the three largest markets for U.S. coal. Together they accounted for almost 35 million short tons, 32 percent of total coal exports in 1991. However, Canada's 1991 purchases were down markedly from the 1990 level, and Japan's and Italy's purchases were down as well. In contrast, U.S. exports to France rose 38 percent to 9.5 million short tons.

Prices

In 1991, the average real price[2] of bituminous coal and lignite at the minemouth fell to $18.59 per short ton, down for the thirteenth year in a row (90). The 1991 price was well below the peak price of $39.09 per short ton recorded in 1975. Although the average real price of anthracite rose (for the first time in 9 years) to $35.25 per short ton, its 1991 price was also well below the 1975 peak of $65.57 per short ton.

[2]Real prices are expressed in 1987 dollars.

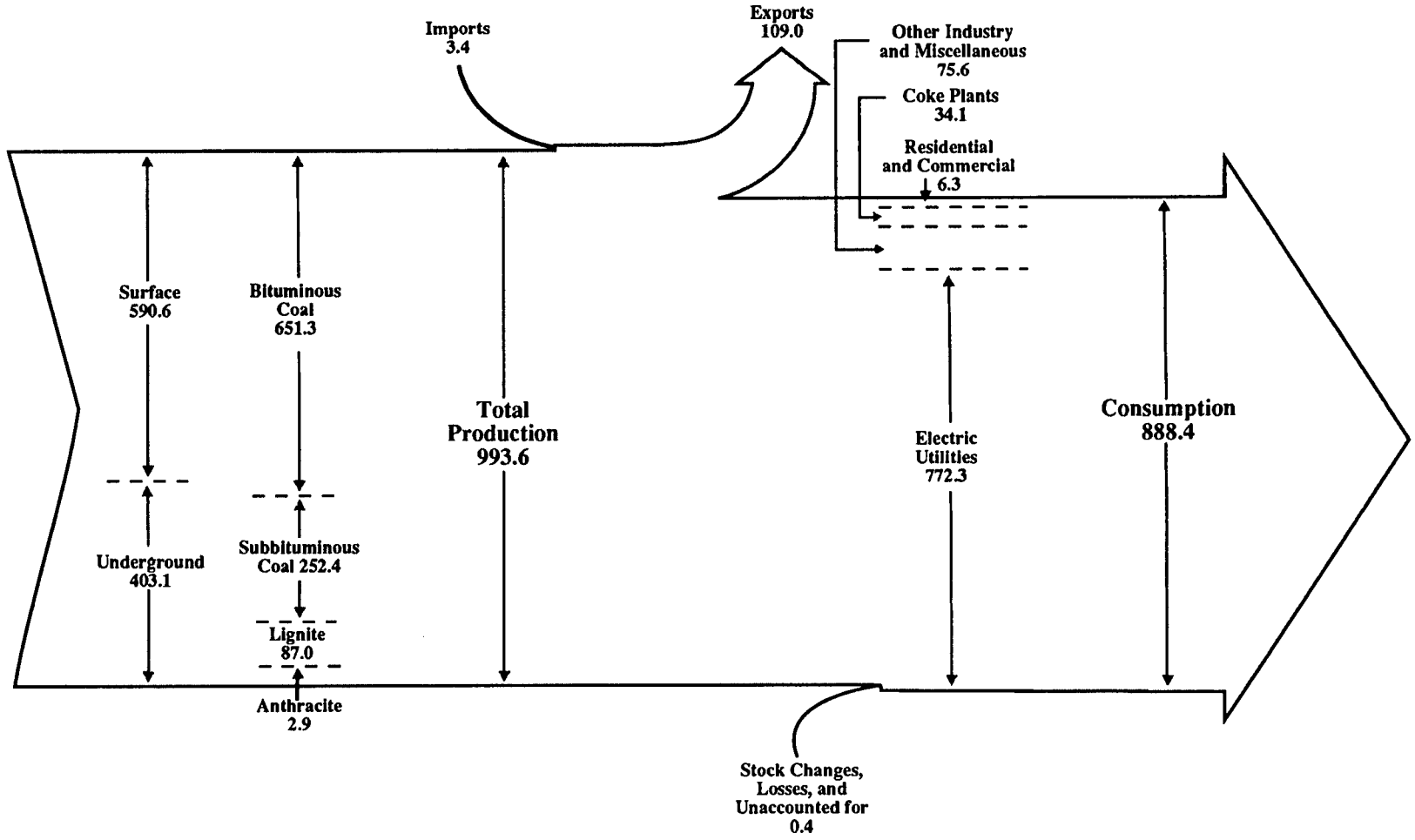
From 1961 on, electric utilities were the primary consumers of coal. Throughout the 1960's, the average real price of coal delivered to electric utilities declined. However, when prices of other fossil fuels rose rapidly after 1973, coal prices also increased, from $21.82 per short ton in 1973 to $34.43 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 $41.66 per short ton in 1982, and then declined each year through 1991, by which time the price had fallen to $25.71 per short ton.

Stocks

Although there is little seasonal variation in demand, production of coal can vary considerably due to factors such as coal miners' strikes and bad weather. To compensate for possible supply interruptions, coal producers and distributors, as well as major consumers such as electric utilities and coke plants, generally maintain large stockpiles. For example, in 1980 coal stocks were built up to a year-end total of 228 million short tons (87) and then drawn down to augment supplies during the 1981 miners' strike. Despite stockpiling during the second half of 1981, after the strike had ended, year-end stocks totaled 209 million short tons, 19 million short tons below the level at the end of 1980.

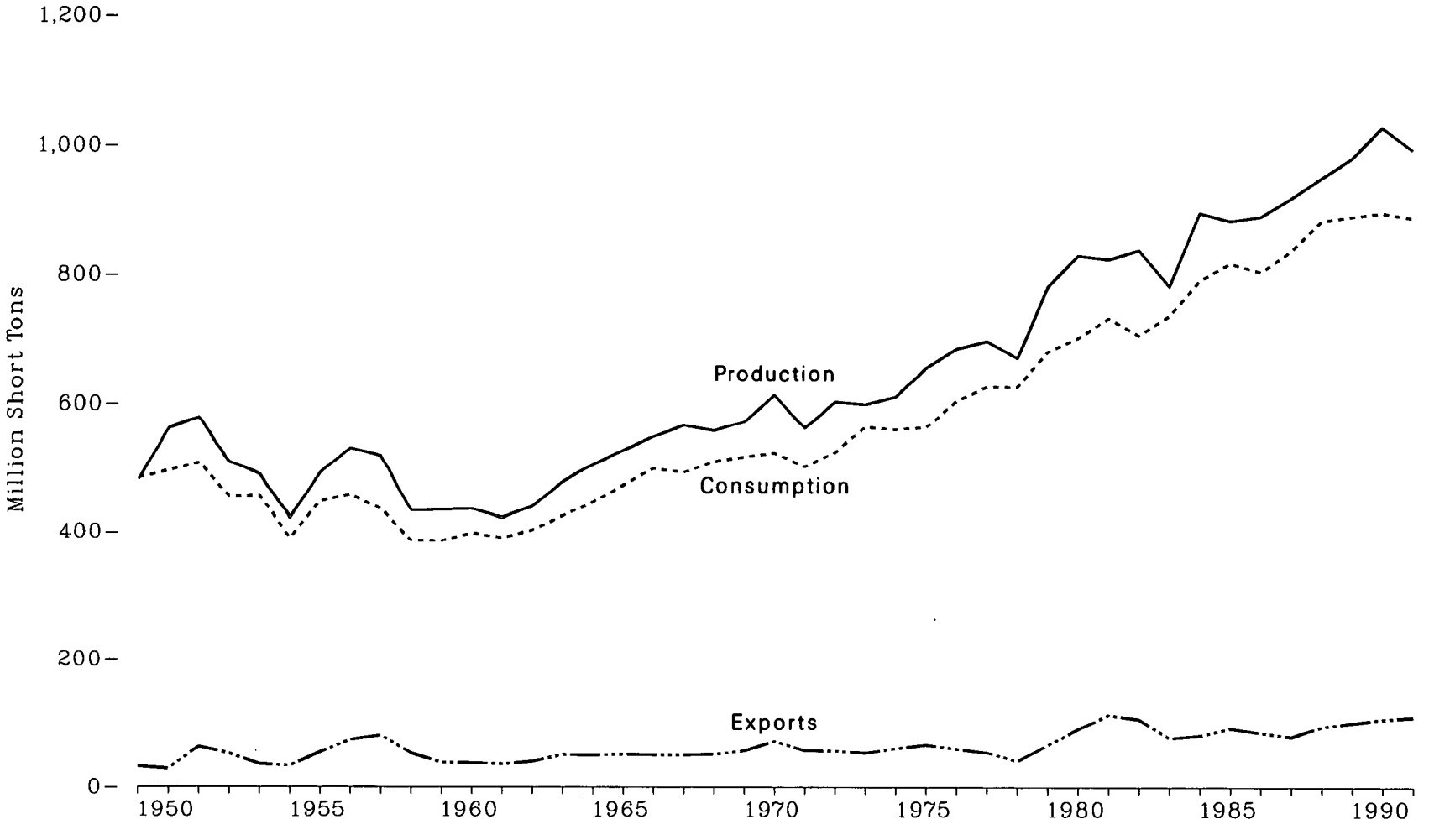
Similarly, wildcat strikes in 1989 resulted in year-end stocks of 175 million short tons, the lowest level since 1978. In 1990, a major stock build-up by electric utilities brought year-end stocks to 202 million short tons. In 1991, year-end coal stocks rose slightly, to 205 million short tons. Electric utilities held over three-fourths of the coal, and coal producers and distributors held most of the remainder. Stocks at coke plants and other industrial sites were relatively small.

Diagram 4. Coal Flow, 1991
(Million Short Tons)



Notes: • Data are preliminary. • Sum of components may not equal total due to independent rounding.
Sources: Tables 83, 84, and 85.

Figure 83. Coal Overview, 1949-1991



Source: Table 83.

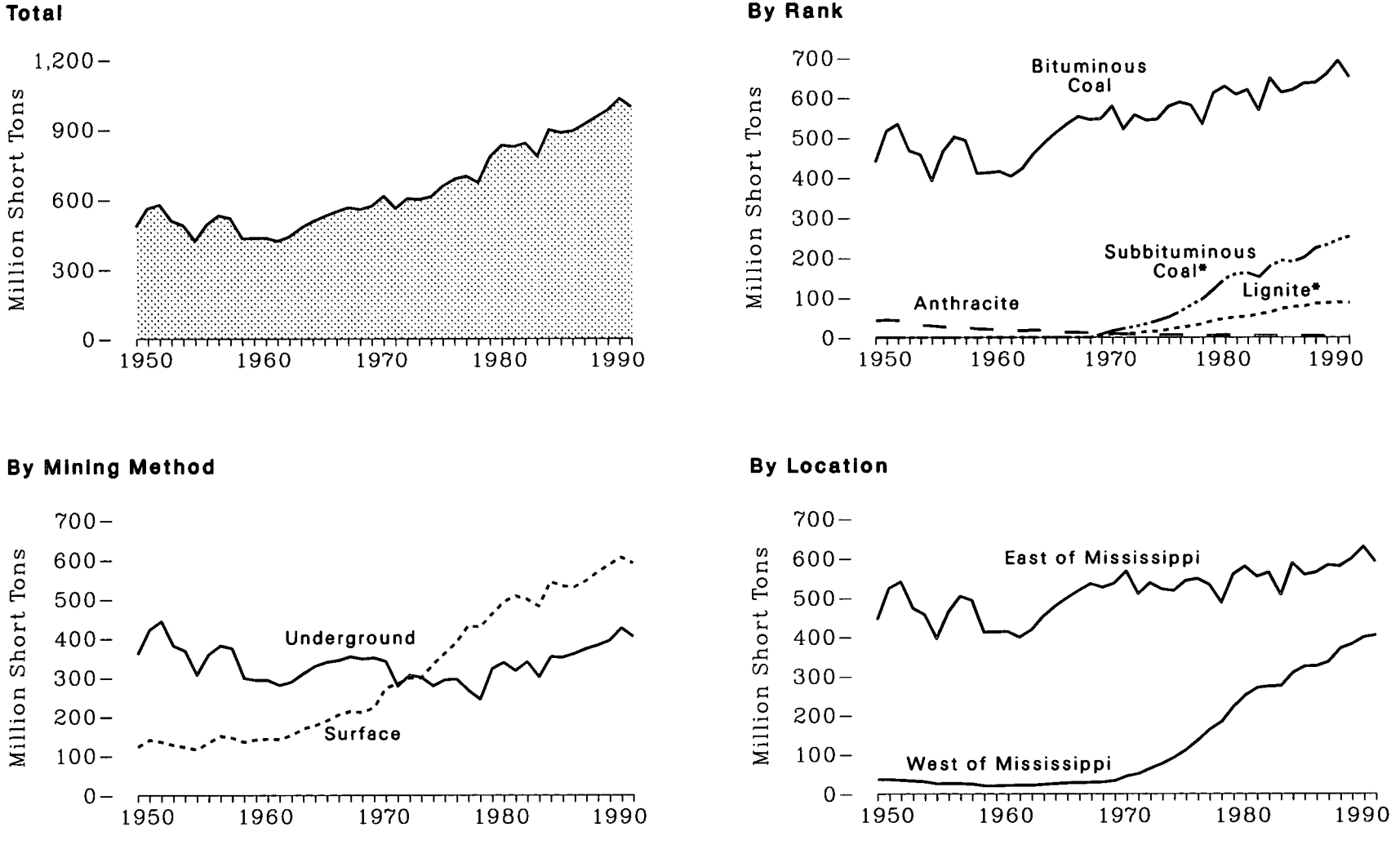
Table 83. Coal Overview, 1949-1991

(Million Short Tons)

Year	Production	Imports	Exports	Stock Changes, Losses, and Unaccounted for [1]	Consumption
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	[2]	71.7	-17.7	523.2
1971	560.9	0.1	57.3	-2.2	501.6
1972	602.5	[2]	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	20.4	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	-2.7	804.3
1987	918.8	1.7	79.6	-4.0	836.9
1988	950.3	2.1	95.0	26.3	883.7
1989	980.7	2.9	100.8	7.8	890.6
1990	1,029.1	2.7	105.8	-29.5	896.4
1991	[3] 993.6	3.4	109.0	[3] 0.4	[3] 888.4

[1] Includes changes in stocks at electric utilities, coke plants, other industries, retail dealers, and producers/distributors and the balancing item of losses and unaccounted for.
[2] Less than 0.05 million short tons.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Note: Sum of components may not equal total 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 forward—EIA, *Weekly Coal Production*.

Figure 84. Coal Production, 1949-1991



*Included with bituminous coal prior to 1969.
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 84.

Table 84. Coal Production, 1949-1991

(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	[1]	[1]	42.7	358.9	121.7	36.4	444.2	480.6
1950	516.3	[1]	[1]	44.1	421.0	139.4	36.0	524.4	560.4
1951	533.7	[1]	[1]	42.7	442.2	134.2	34.6	541.7	576.3
1952	466.8	[1]	[1]	40.6	381.2	126.3	32.7	474.8	507.4
1953	457.3	[1]	[1]	30.9	367.4	120.8	30.6	457.7	488.2
1954	391.7	[1]	[1]	29.1	306.0	114.8	25.4	395.4	420.8
1955	464.6	[1]	[1]	26.2	358.0	132.9	26.6	464.2	490.8
1956	500.9	[1]	[1]	28.9	380.8	148.9	25.8	504.0	529.8
1957	492.7	[1]	[1]	25.3	373.6	144.5	24.7	493.4	518.0
1958	410.4	[1]	[1]	21.2	297.6	134.0	20.3	411.3	431.6
1959	412.0	[1]	[1]	20.6	292.8	139.8	20.3	412.4	432.7
1960	415.5	[1]	[1]	18.8	292.6	141.7	21.3	413.0	434.3
1961	403.0	[1]	[1]	17.4	279.6	140.9	21.8	398.6	420.4
1962	422.1	[1]	[1]	16.9	287.9	151.1	21.4	417.6	439.0
1963	458.9	[1]	[1]	18.3	309.0	168.2	23.7	453.5	477.2
1964	487.0	[1]	[1]	17.2	327.7	176.5	25.7	478.5	504.2
1965	512.1	[1]	[1]	14.9	338.0	189.0	27.4	499.5	527.0
1966	533.9	[1]	[1]	12.9	342.6	204.2	28.0	518.8	546.8
1967	552.6	[1]	[1]	12.3	352.4	212.5	28.9	536.0	564.9
1968	545.2	[1]	[1]	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[2]	651.3	252.4	87.0	2.9	403.1	590.6	403.9	589.7	993.6

[1] Included in bituminous coal.

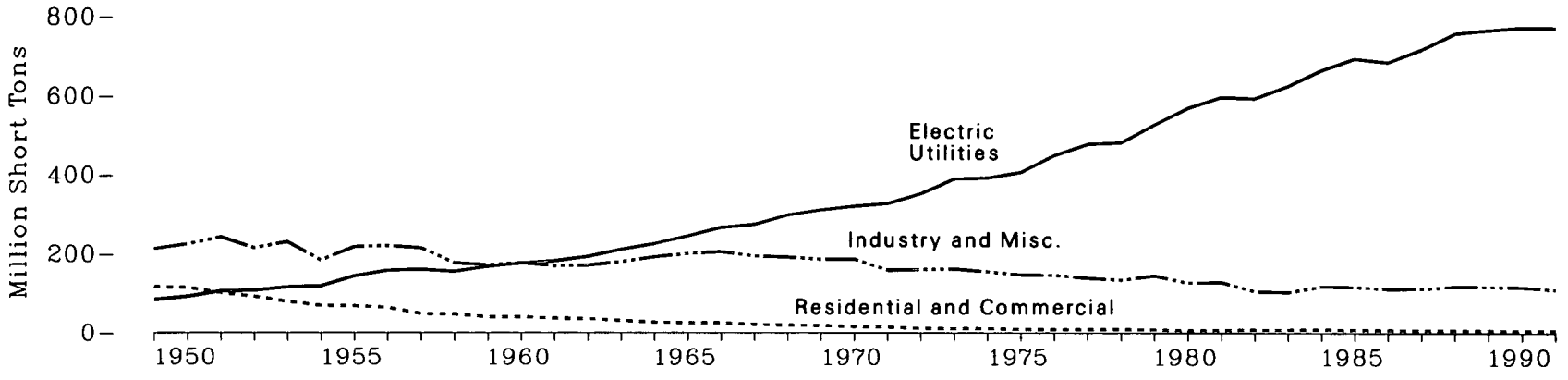
[2] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Note: Sum of components may not equal total due to independent rounding.

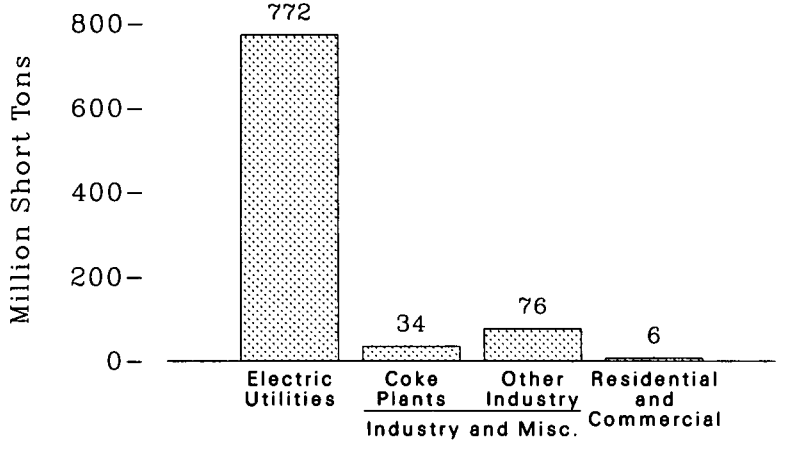
Sources: • 1949-1975—Bureau of Mines, *Minerals Yearbook*, "Coal-Bituminous and Lignite" and "Coal-Pennsylvania Anthracite" chapters. • 1976—Energy Information Administration (EIA), Energy Data Report, *Coal-Bituminous and Lignite in 1976* and *Coal-Pennsylvania Anthracite 1976*. • 1977 and 1978—EIA, 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 forward—EIA, *Weekly Coal Production* and *Coal Production* (annual), except for 1990 data by rank and mining method, which are EIA estimates.

Figure 85. Coal Consumption by Sector

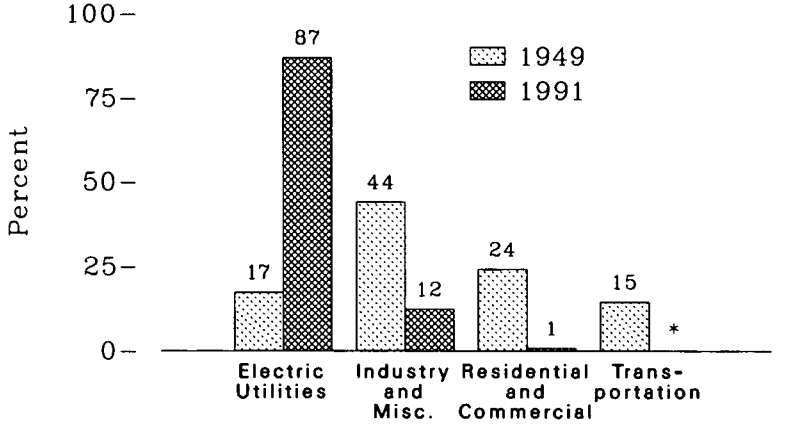
By Sector, 1949-1991



By Sector, 1991



Shares by Sector, 1949 and 1991



*Small amounts of coal for transportation use are included in Industry and Miscellaneous.
Source: Table 85.

Table 85. Coal Consumption by Sector, 1949-1991

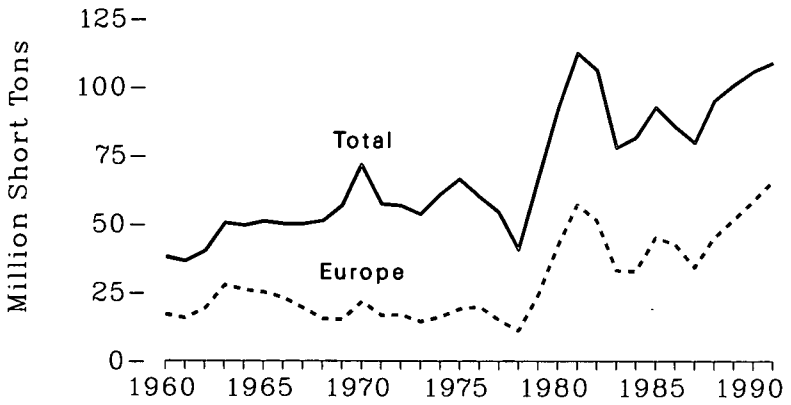
(Million Short Tons)

Year	Residential and Commercial	Industry and Miscellaneous			Transportation	Electric Utilities	Total
		Coke Plants	Other Industry and Miscellaneous	Total			
1949	116.5	91.4	121.2	212.6	70.2	84.0	483.2
1950	114.6	104.0	120.6	224.6	63.0	91.9	494.1
1951	101.5	113.7	128.7	242.4	56.2	105.8	505.9
1952	92.3	97.8	117.1	214.9	39.8	107.1	454.1
1953	79.2	113.1	117.0	230.1	29.6	115.9	454.8
1954	69.1	85.6	98.2	183.9	18.6	118.4	389.9
1955	68.4	107.7	110.1	217.8	17.0	143.8	447.0
1956	64.2	106.3	114.3	220.6	13.8	158.3	456.9
1957	49.0	108.4	106.5	214.9	9.8	160.8	434.5
1958	47.9	76.8	100.5	177.4	4.7	155.7	385.7
1959	40.8	79.6	92.7	172.3	3.6	168.4	385.1
1960	40.9	81.4	96.0	177.4	3.0	176.7	398.1
1961	37.3	74.2	95.9	170.1	0.8	182.2	390.4
1962	36.5	74.7	97.1	171.7	0.7	193.3	402.3
1963	31.5	78.1	101.9	180.0	0.7	211.3	423.5
1964	27.2	89.2	103.1	192.4	0.7	225.4	445.7
1965	25.7	95.3	105.6	200.8	0.7	244.8	472.0
1966	25.6	96.4	108.7	205.1	0.6	266.5	497.7
1967	22.1	92.8	101.8	194.6	0.5	274.2	491.4
1968	20.0	91.3	100.4	191.6	0.4	297.8	509.8
1969	18.9	93.4	93.1	186.6	0.3	310.6	516.4
1970	16.1	96.5	90.2	186.6	0.3	320.2	523.2
1971	15.2	83.2	75.6	158.9	0.2	327.3	501.6
1972	11.7	87.7	72.9	160.6	0.2	351.8	524.3
1973	11.1	94.1	68.0	162.1	0.1	389.2	562.6
1974	11.4	90.2	64.9	155.1	0.1	391.8	558.4
1975	9.4	83.6	63.6	147.2	(1)	406.0	562.6
1976	8.9	84.7	61.8	146.5	(1)	448.4	603.8
1977	9.0	77.7	61.5	139.2	(1)	477.1	625.3
1978	9.5	71.4	63.1	134.5	(2)	481.2	625.2
1979	8.4	77.4	67.7	145.1	(2)	527.1	680.5
1980	6.5	66.7	60.3	127.0	(2)	569.3	702.7
1981	7.4	61.0	67.4	128.4	(2)	596.8	732.6
1982	8.2	40.9	64.1	105.0	(2)	593.7	706.9
1983	8.4	37.0	66.0	103.0	(2)	625.2	736.7
1984	9.1	44.0	73.7	117.8	(2)	664.4	791.3
1985	7.8	41.1	75.4	116.4	(2)	693.8	818.0
1986	7.7	36.0	75.6	111.6	(2)	685.1	804.3
1987	6.9	37.0	75.2	112.1	(2)	717.9	836.9
1988	7.1	41.9	76.3	118.2	(2)	758.4	883.7
1989	6.2	41.4	76.1	117.5	(2)	766.9	890.6
1990	6.7	39.8	76.3	116.2	(2)	773.5	896.4
1991[3]	6.3	34.1	75.6	109.8	(2)	772.3	888.4

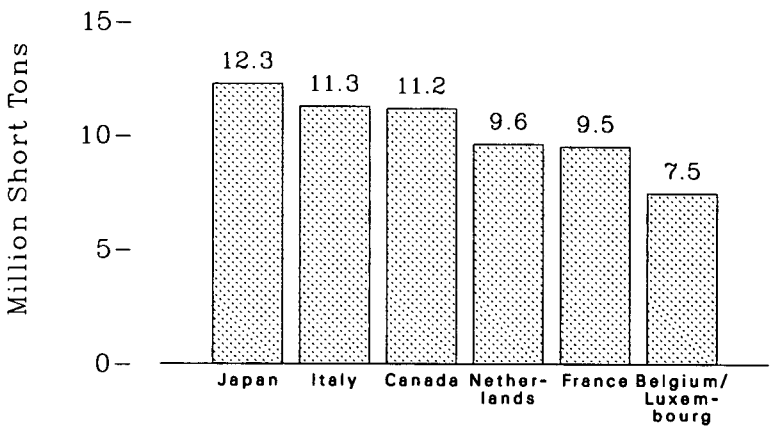
[1] Less than 0.05 million short tons.
[2] After 1977 small amounts of coal consumed by Transportation Sector are included in the Other Industry and Miscellaneous category.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Notes: • See Appendix E, Note 13. • Sum of components may not equal total 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*. • 1979-1980—EIA, Energy Data Report, *Weekly Coal Report*. • 1981—EIA, *Weekly Coal Production*. • 1982 forward—EIA, *Quarterly Coal Report*.

Figure 86. Coal Exports by Country of Destination

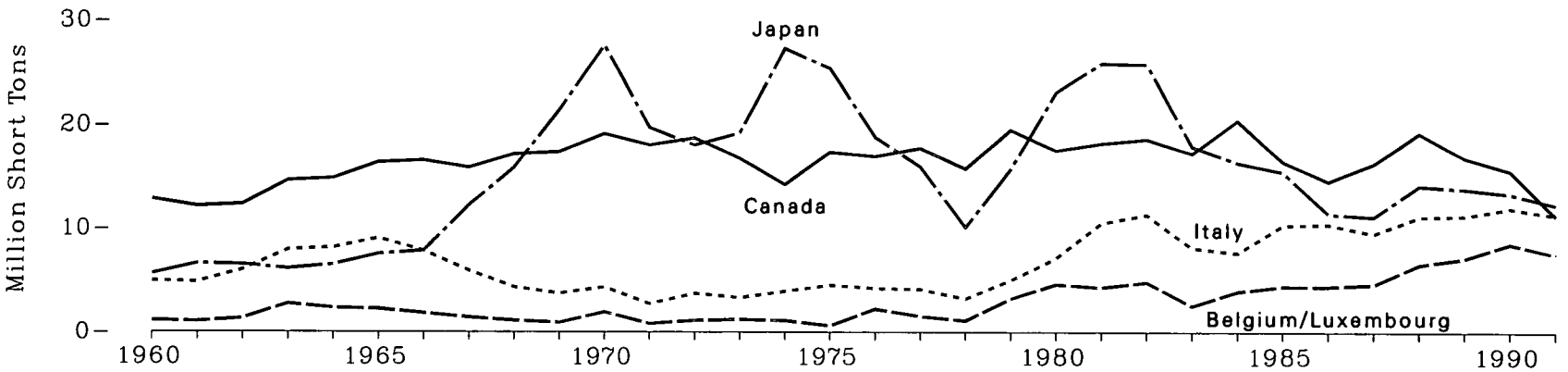
Total and Europe, 1960-1991



By Selected Country, 1991



By Selected Country, 1960-1991



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 86.

Table 86. Coal Exports by Country of Destination, 1960-1991

(Million Short Tons)

Year	Canada	Brazil	Europe												
			Belgium/ Luxem-bourg	Denmark	France	Germany [1]	Italy	Nether-lands	Spain	United Kingdom	Other	Total	Japan	Other	Total
1960	12.8	1.1	1.1	0.1	0.8	4.6	4.9	2.8	0.3	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	2.0	15.7	6.6	1.0	36.4
1962	12.3	1.3	1.3	(2)	0.9	5.1	6.0	3.3	0.8	(2)	1.8	19.1	6.5	1.0	40.2
1963	14.6	1.2	2.7	(2)	2.7	5.6	7.9	5.0	1.5	(2)	2.4	27.7	6.1	0.9	50.4
1964	14.8	1.1	2.3	(2)	2.2	5.2	8.1	4.2	1.4	(2)	2.6	26.0	6.5	1.1	49.5
1965	16.3	1.2	2.2	(2)	2.1	4.7	9.0	3.4	1.4	(2)	2.3	25.1	7.5	0.9	51.0
1966	16.5	1.7	1.8	(2)	1.6	4.9	7.8	3.2	1.2	(2)	2.5	23.1	7.8	1.0	50.1
1967	15.8	1.7	1.4	0	2.1	4.7	5.9	2.2	1.0	0	2.1	19.4	12.2	1.0	50.1
1968	17.1	1.8	1.1	0	1.5	3.8	4.3	1.5	1.5	0	1.9	15.5	15.8	0.9	51.2
1969	17.3	1.8	0.9	0	2.3	3.5	3.7	1.6	1.8	(2)	1.3	15.2	21.4	1.2	56.9
1970	19.1	2.0	1.9	0	3.6	5.0	4.3	2.1	3.2	(2)	1.8	21.8	27.6	1.2	71.7
1971	18.0	1.9	0.8	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	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	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	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	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	(2)	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	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

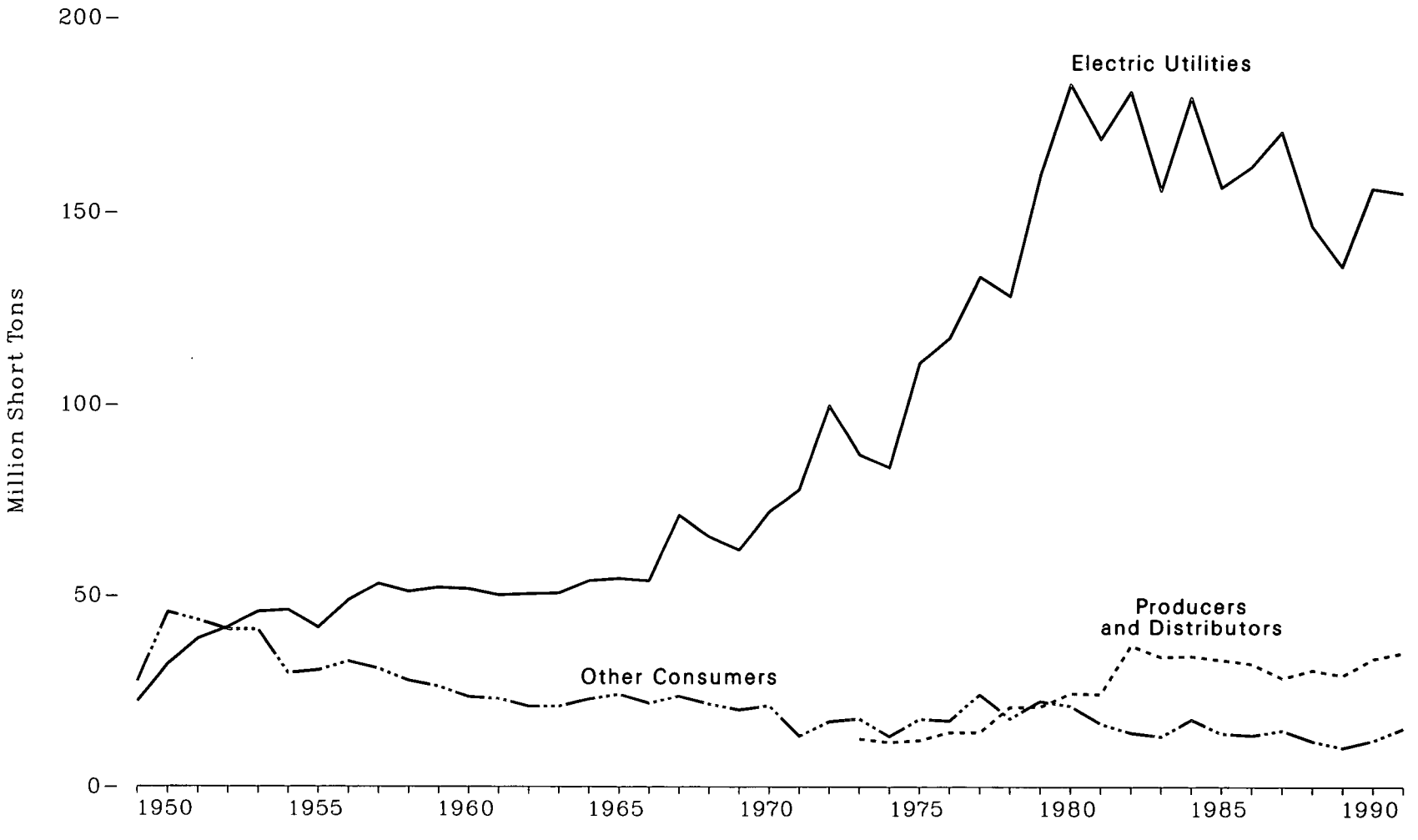
[1] Through 1990, the data for Germany are for the former West Germany only. Beginning with 1991, the data for Germany are for the unified Germany, i.e., the former East Germany and West Germany.

[2] Less than 50,000 tons.

Note: Sum of components may not equal total due to independent rounding.

Source: U.S. Department of Commerce, Bureau of the Census, *U.S. Exports by Schedule B Commodities*, EM 522.

Figure 87. Coal Stocks, End of Year 1949-1991



Source: Table 87.

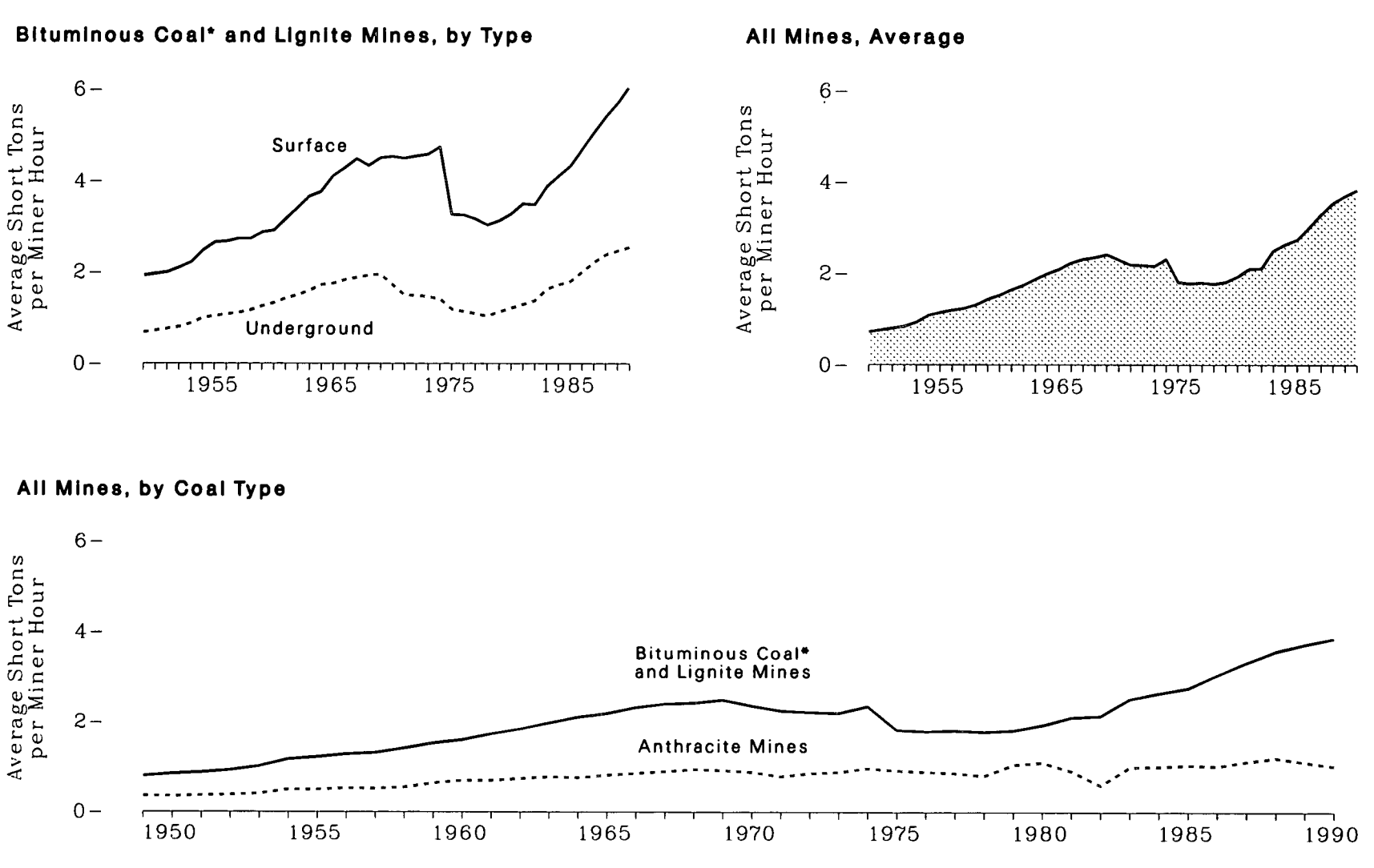
Table 87. Coal Stocks, End of Year 1949-1991

(Million Short Tons)

Year	Consumer					Producers and Distributors	Total
	Residential [1] and Commercial	Coke Plants	Other Industry [2]	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	24.2	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[3]	NA	3.4	8.8	158.0	170.2	35.0	205.2

[1] Stocks at retail dealers, excluding anthracite.
[2] Includes transportation sector.
[3] Previous-year data have been revised. Current-year data are estimated and will be revised in future publications.
NA = Not available.
Note: Sum of components may not equal total 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 forward—EIA, *Quarterly Coal Report*.

Figure 88. Coal Mining Productivity, 1949-1990



*Includes subbituminous coal.
Source: Table 88.

Table 88. Coal Mining Productivity, 1949-1990

(Short Tons per Miner Hour [1])

Year	Bituminous Coal [2] 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

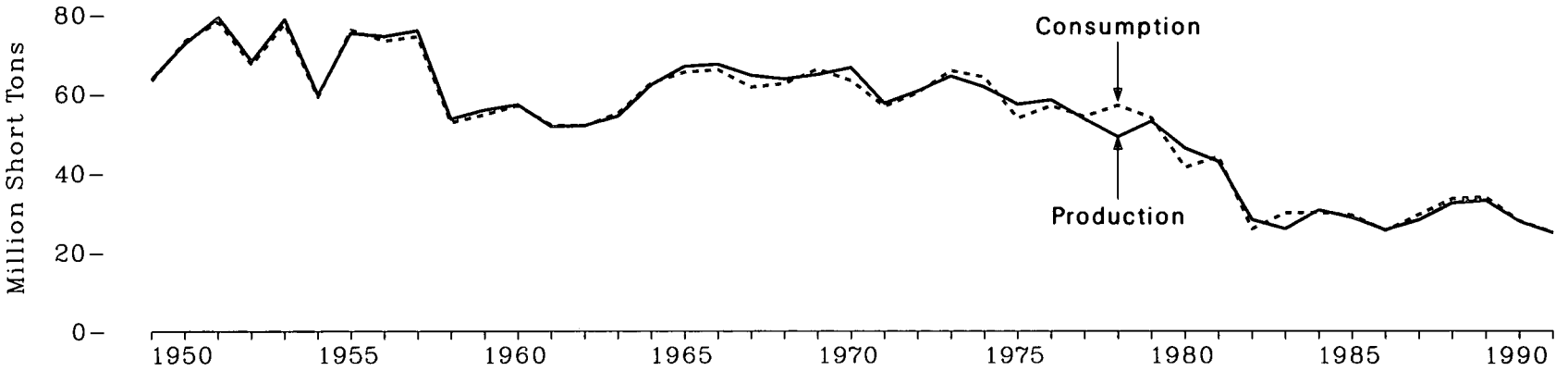
[1] Data for bituminous coal and lignite mines 1949-1973 and anthracite mines 1949-1978 were originally reported in short tons per miner-day. The data were converted to short-tons per miner hour by assuming an eight-hour day. All remaining data were calculated by dividing total production by total labor hours worked by all mine employees except office workers.

[2] Includes subbituminous coal.

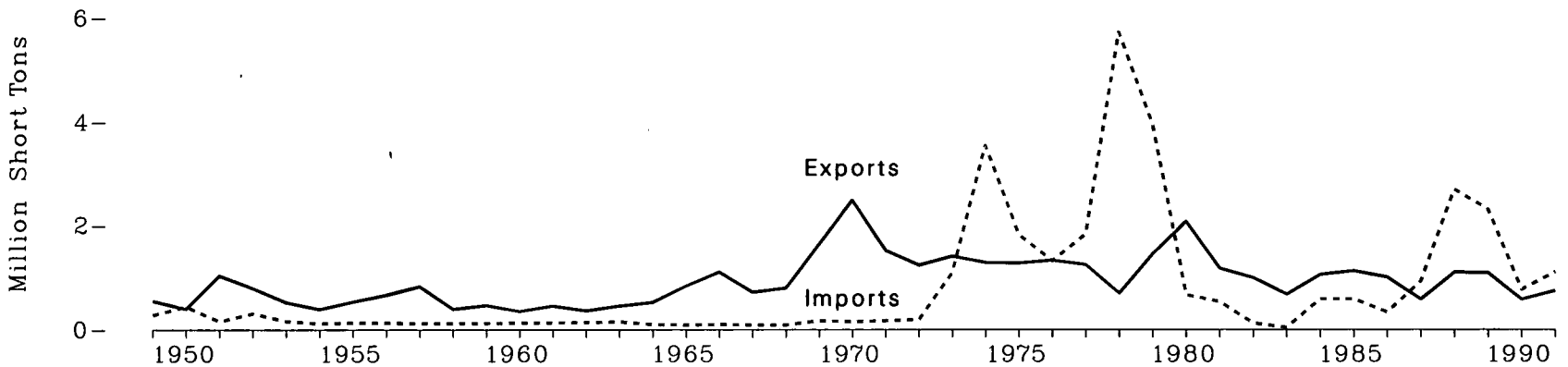
Sources: • 1949-1975—Bureau of Mines, *Minerals Yearbook*, "Coal-Bituminous and Lignite" and "Coal-Pennsylvania Anthracite" chapters. • 1976—Energy Information Administration (EIA), Energy Data Report, *Coal-Bituminous and Lignite in 1976* and *Coal-Pennsylvania Anthracite 1976*. • 1977 and 1978—EIA, 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 forward—EIA, *Coal Production* (annual).

Figure 89. Coke Overview, 1949-1991

Production and Consumption



Imports and Exports



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 89.

Table 89. Coke Overview, 1949-1991

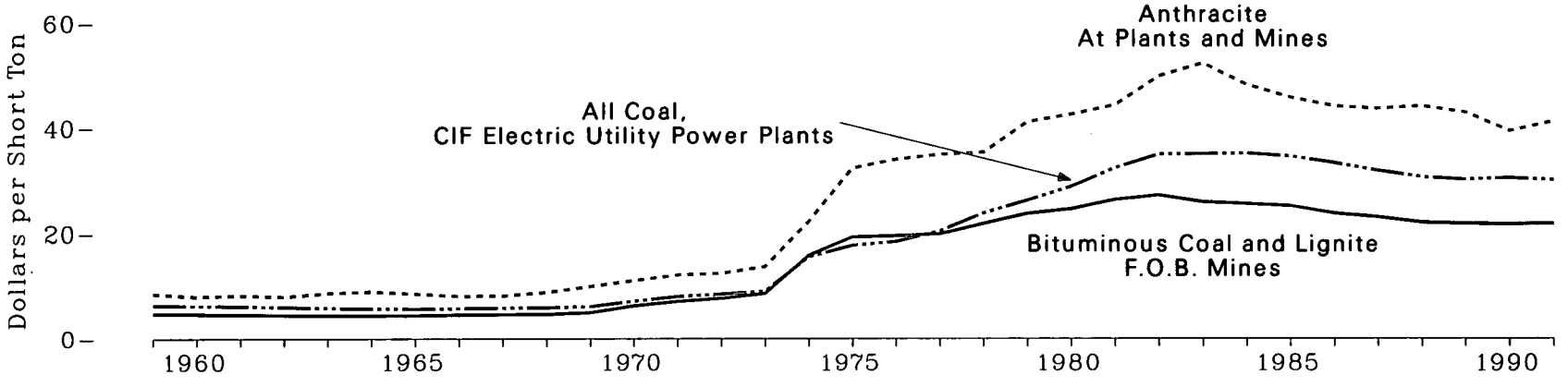
(Million Short Tons)

Year	Production	Imports	Exports	Stock Change [1]	Apparent Consumption
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	1.76	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	30.56	0.58	1.05	- 0.20	29.90
1985	28.65	0.58	1.12	1.16	29.27
1986	25.54	0.33	1.00	0.49	25.35
1987	28.04	0.92	0.57	1.00	29.39
1988	32.40	2.69	1.09	- 0.52	33.48
1989	33.02	2.31	1.09	- 0.34	33.90
1990	27.62	0.77	0.57	(2)	27.81
1991	[3] 24.80	1.10	0.74	[3] 0.19	[3] 24.97

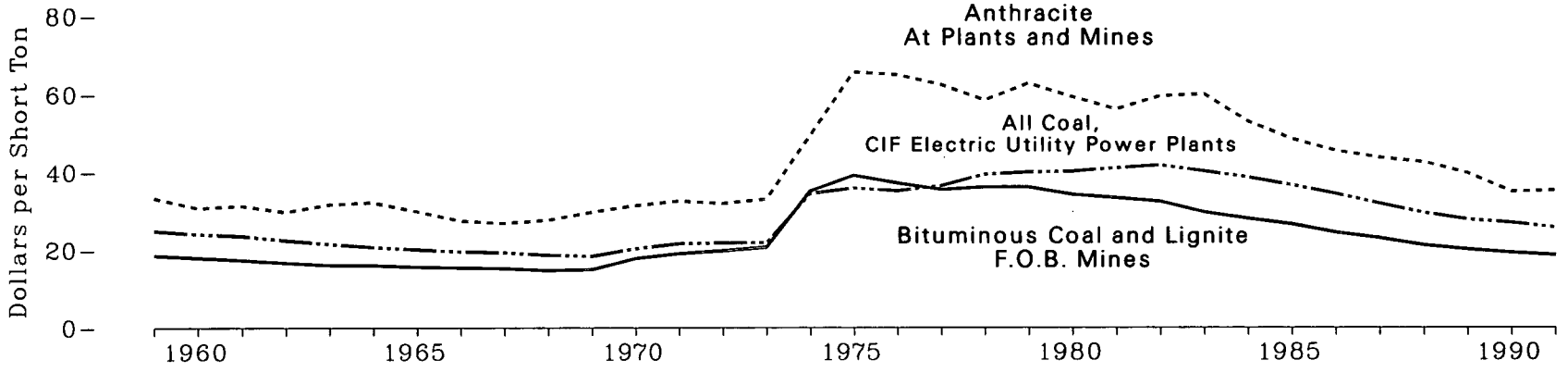
[1] Negative numbers denote a net addition to stocks or a reduction in supply. Positive numbers denote a net withdrawal from stocks or an addition to supply.
[2] Less than 0.05 percent.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Note: Sum of components may not equal total 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 forward—EIA, *Quarterly Coal Report*, except for 1991 production and apparent consumption, which are EIA estimates.

Figure 90. Coal Prices, 1959-1991

Nominal



Real*



*In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.
Note: Bituminous coal includes subbituminous coal.
Source: Table 90.

Table 90. Coal Prices, 1949-1991

(Dollars per Short Ton)

Year	Bituminous Coal [1] and Lignite		Anthracite		All Coal	
	F.O.B. [2] Mines		At Plants and Mines [3]		CIF [4] Electric Utility Power Plants	
	Nominal	Real [5]	Nominal	Real [5]	Nominal	Real [5]
1949	4.88	NA	8.90	NA	NA	NA
1950	4.84	NA	9.34	NA	NA	NA
1951	4.92	NA	9.94	NA	NA	NA
1952	4.90	NA	9.58	NA	6.61	NA
1953	4.92	NA	9.87	NA	6.61	NA
1954	4.52	NA	8.76	NA	6.31	NA
1955	4.50	NA	8.00	NA	6.07	NA
1956	4.82	NA	8.33	NA	6.32	NA
1957	5.08	NA	9.11	NA	6.64	NA
1958	4.86	NA	9.14	NA	6.58	NA
1959	4.77	18.63	8.55	33.40	6.37	24.88
1960	4.69	18.04	8.01	30.81	6.26	24.08
1961	4.58	17.41	8.26	31.41	6.20	23.57
1962	4.48	16.72	7.99	29.81	6.02	22.46
1963	4.39	16.14	8.64	31.76	5.86	21.54
1964	4.45	16.06	8.93	32.24	5.74	20.72
1965	4.44	15.63	8.51	29.96	5.71	20.11
1966	4.54	15.44	8.08	27.48	5.76	19.59
1967	4.62	15.25	8.15	26.90	5.85	19.31
1968	4.67	14.73	8.78	27.70	5.93	18.71
1969	4.99	14.98	9.91	29.76	6.13	18.41
1970	6.26	17.83	11.03	31.42	7.13	20.31
1971	7.07	19.06	12.08	32.56	8.00	21.56
1972	7.66	19.74	12.40	31.96	8.44	21.75
1973	8.53	20.65	13.65	33.05	9.01	21.82
1974	15.75	35.08	22.19	49.42	15.46	34.43
1975	19.23	39.09	32.26	65.57	17.63	35.83
1976	19.43	37.15	33.92	64.86	18.38	35.14
1977	19.82	35.46	34.86	62.36	20.37	36.44
1978	21.78	36.12	35.25	58.46	23.75	39.39
1979	23.65	36.11	41.06	62.69	26.15	39.92
1980	24.52	34.20	42.51	59.29	28.76	40.11
1981	26.29	33.32	44.28	56.12	32.32	40.96
1982	27.14	32.39	49.85	59.49	34.91	41.66
1983	25.85	29.64	52.29	59.97	34.99	40.13
1984	25.51	28.03	48.22	52.99	35.12	38.59
1985	25.10	26.59	45.80	48.52	34.53	36.58
1986	23.70	24.46	44.12	45.53	33.30	34.37
1987	23.00	23.00	43.65	43.65	31.83	31.83
1988	22.00	21.17	44.16	42.50	30.64	29.49
1989	21.76	20.07	42.93	39.60	30.15	27.81
1990	21.71	19.23	39.40	34.90	30.45	26.97
1991[6]	21.75	18.59	41.24	35.25	30.08	25.71

[1] Includes subbituminous coal. [2] Free on board (see Glossary). [3] For 1949-1978 prices are F.O.B. preparation plants. For 1979 forward prices are F.O.B. mines. [4] Cost, Insurance, and Freight (see Glossary). [5] In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C. [6] Previous-year data have been revised. Current-year data are estimated and will be revised in future publications. 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.* • 1979-1990—EIA, *Coal Production*, annual. • 1991—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—EIA, *Coal Production-1980.* • 1981-1990—EIA, *Coal Production*, annual. • 1991—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."

8. Electricity

Net Summer Capability at Electric Utilities

Net summer capability, a common measure of generating capacity, 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. Although data on net summer capability have been collected only since 1985, the Energy Information Administration has estimated values for prior years (97).[1] Estimates and collected data indicate that net summer capability during the 1949-to-1991 period increased at an average annual rate of 5.9 percent.

Conventional steam plants, fueled by fossil fuels, wood, and waste, were responsible for most of the growth. In 1991, they accounted for close to two-thirds of total net summer capability. Nuclear-powered plants accounted for 14 percent and hydroelectric facilities accounted for 13 percent of the total in 1991. Internal combustion and gas turbine plants, as well as plants powered by emerging sources of energy such as geothermal, accounted for the remainder.

Electric Utility Net Generation

Net generation of electricity by electric utilities in 1991 reached 2.8 trillion kilowatthours, up 0.5 percent from the 1990 level (92). Coal continued to fuel most of the generation and accounted for 1.5 trillion kilowatthours. Natural gas accounted for 264 billion kilowatthours. Despite lower petroleum prices, petroleum-fired generation in 1991 fell 5 percent from the 1990 level to 111 billion kilowatthours. Nuclear-based generation surpassed its previous-year level for the eleventh consecutive year, reaching an all-time high in 1991 of 613 billion kilowatthours. Hydroelectric generation totaled 275 billion kilowatthours, down 2 percent from generation in 1990. Geothermal and other alternative energy sources accounted for 10 billion kilowatthours.

[1]Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications.

Fossil-fueled steam generators, consistently the major source of electricity, provided 67 percent of net generation in 1991 (93). Nuclear, hydroelectric, geothermal, and other generators powered by renewables supplied 32 percent. Internal combustion and gas turbine generators, usually reserved for meeting peak demand, supplied 1 percent of net generation.

Fossil Fuel Consumption

During the 1949-to-1991 period, consumption of coal at electric utilities grew at a faster rate than did consumption of natural gas and petroleum (95). On a Btu basis, coal accounted for 67 percent of total fossil fuel consumption in 1949 and 80 percent of the total in 1991. Electric utility consumption of both petroleum and natural gas increased during most of the 1949-to-1991 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 the consumption of petroleum and natural gas at electric utilities in 1986 through 1988 were particularly illustrative of the utilities' fuel-switching capabilities and their use of them to respond to fluctuations in fuel prices. In 1986, when petroleum prices fell dramatically, petroleum

Nonutility Power Producers

Nonutility power producers own electric generating capacity but, unlike electric utilities, they lack a designated service area. Cogenerators, small power producers, and independent power producers all are classified as nonutility power producers. In 1990, nonutility power producers' gross generation totaled 215 billion kilowatthours, up 15 percent from the 1989 level (103). Close to half of that total was sold to electric utilities. Whereas electric utilities rely heavily on coal as an energy input, 46 percent of the nonutilities' gross generation came from natural gas and 37 percent came from renewable energy sources.

consumption at electric utilities rose 0.36 quadrillion Btu, while natural gas consumption fell 0.47 quadrillion Btu. When petroleum prices recovered somewhat in 1987, electric utilities scaled back consumption of petroleum by 0.19 quadrillion Btu while increasing natural gas consumption by 0.25 quadrillion Btu. In response to the 1988 decline in petroleum prices, electric utilities increased petroleum consumption by 0.30 quadrillion Btu and consumed 0.23 quadrillion Btu less of natural gas.

In 1991, coal accounted for 16 quadrillion Btu of electric utility consumption of fossil fuels. By comparison, natural gas accounted for 3 quadrillion Btu and petroleum accounted for 1 quadrillion Btu.

Emissions and Environmental Equipment at Electric Utilities

In general, changes in electric utility consumption of fossil fuels are accompanied by concomitant changes in the emission of the products of fossil fuel combustion. From 1985 to 1989, consumption of fossil fuels to generate electricity increased 9 percent (95). Emissions of carbon dioxide from fossil-fueled steam-electric generating units rose 12 percent to 2 billion short tons, nitrogen oxide emissions rose 9 percent to 7 million short tons, and sulfur dioxide emissions rose 4 percent to 17 million short tons (100). In 1990, however, a 1.0-percent decline in consumption was accompanied by declines in carbon dioxide, nitrogen oxide, and sulfur dioxide emissions.

Most emissions, particularly sulfur dioxide, were attributable to coal combustion. Coal accounted for 80 percent of fossil fuels consumed at electric utilities in 1990 (95), but 96 percent of sulfur dioxide emissions (100). However, sulfur dioxide emissions from coal combustion can be controlled through the use of coal with a lower sulfur content and through the use of scrubbers (flue gas desulfurization units). From 1985 through 1990, the amount of coal-fired capacity equipped with scrubbers increased 14 percent to 70 million kilowatts (101). Coal is also the principal source of ash, which can be prevented from reaching the atmosphere by the use of particulate collectors. Almost all coal-fired capacity (314 million kilowatts) was equipped with particulate collectors in 1990.

Only about one-third of the heat generated by fossil-fueled steam-electric generating units is used to produce electricity. The remaining heat generally is dissipated in cooling water, but in areas where that is not workable (either because of a lack of cooling water or adverse effects on plant and marine life), cooling towers can be installed. Over the 1985-to-1990 period, the amount of fossil-fueled capacity equipped with cooling towers rose 9 percent to 176 million kilowatts.

Sales of Electricity to Consumers

During the 1949-to-1991 period, electricity sales increased at an average annual rate of 5.8 percent (96). Annual sales declined only twice, during the economic recessions of 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. During the latter part of the 43-year period, growth in electricity sales slowed. From 1980 through 1991, sales increased at an average annual rate of 2.5 percent.

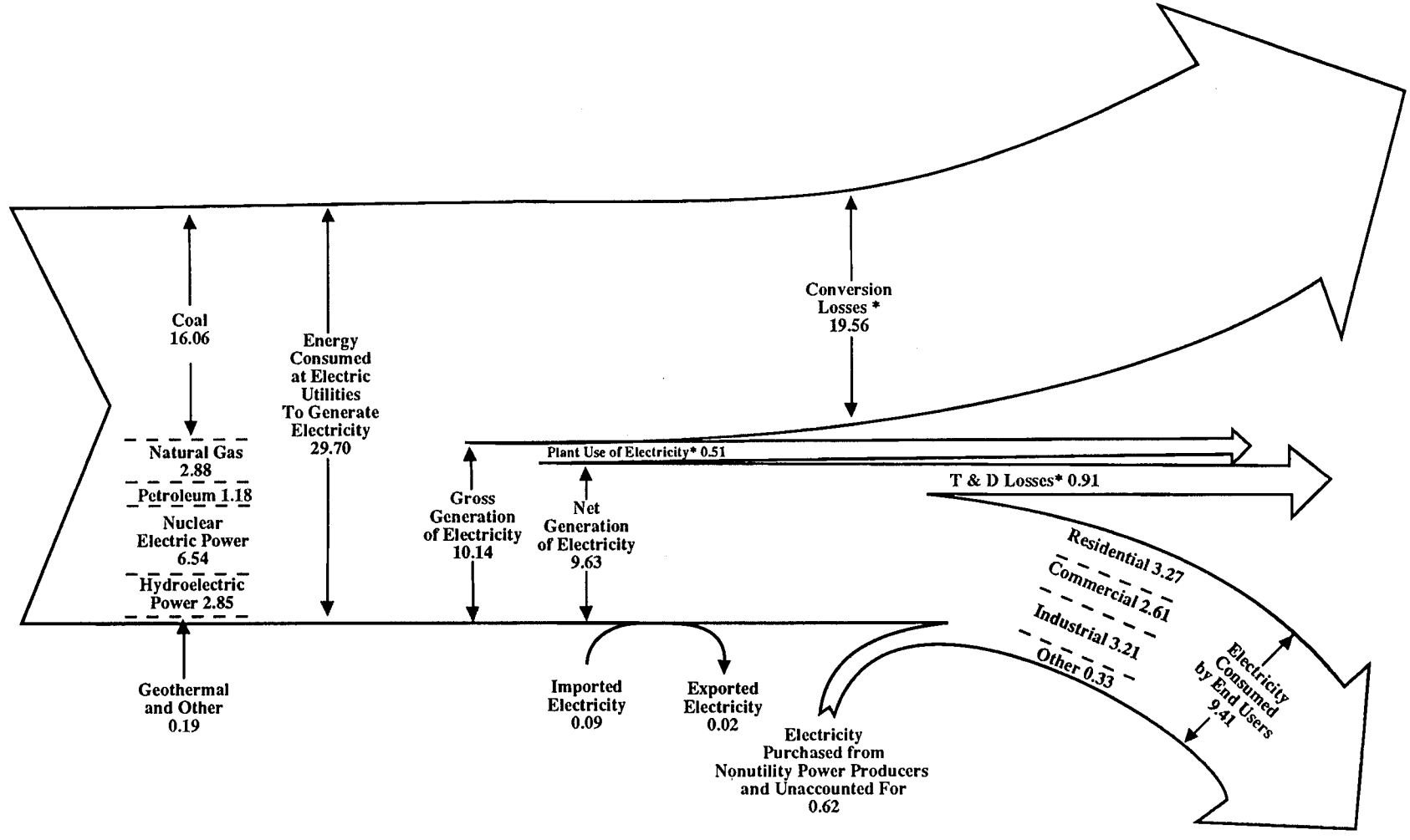
From 1949 through 1990, sales of electricity to the industrial sector exceeded sales to other sectors, but in 1991, sales to the residential sector accounted for the largest share of the 2.8-trillion-kilowatthour total of electricity sales. An unusually warm summer boosted demand for electricity, and sales to the residential sector rose 3.6 percent to 957 billion kilowatthours. Sales to the commercial sector rose 1.9 percent to 765 billion kilowatthours. In contrast, the economic recession led to a 0.5-percent decline in sales to the industrial sector (941 billion kilowatthours).

Retail Prices of Electricity

The weighted average real price[2] of electricity to all sectors in 1991 was 5.8 cents per kilowatthour, 16 percent below the price in 1960 (102). However, the apparent stability in electricity prices masked fluctuations that occurred throughout the period and variations in prices paid by consumers in different end-use sectors. And, although prices of the other major energy sources increased significantly during the 1960-1991 period, 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 6.9 cents per kilowatthour in 1991, unchanged from the price in 1990. The commercial sector experienced a decrease, in real terms, of 2 percent, as the price declined to 6.4 cents per kilowatthour in 1991. Meanwhile, industrial customers continued to pay prices favorable compared with prices in other sectors. In 1991, the real price of electricity sold to industrial users was 4.2 cents per kilowatthour, unchanged from the price in 1990.

[2]Real prices are expressed in 1987 dollars.

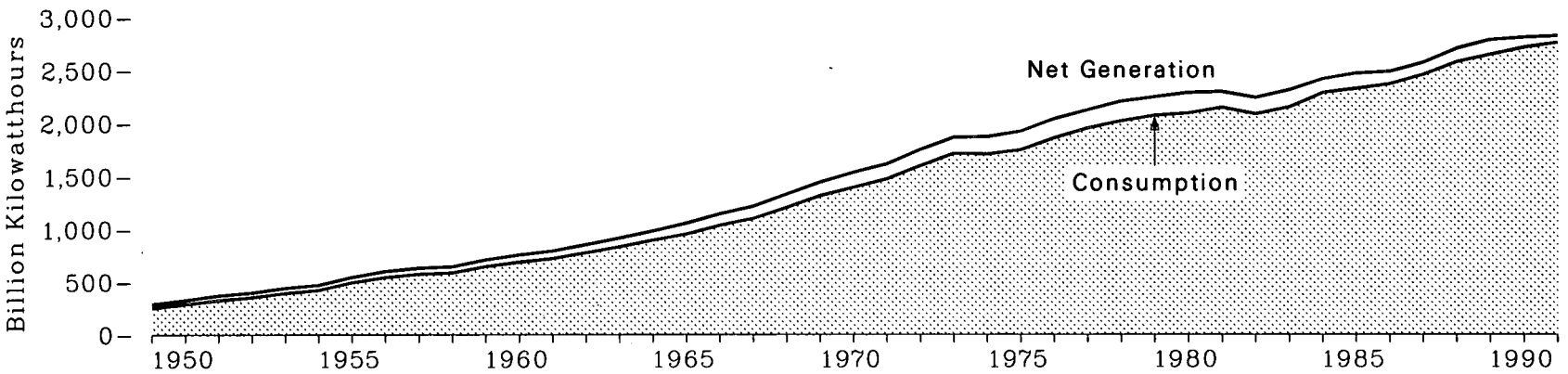
Diagram 5. Electricity Flow, 1991
(Quadrillion Btu)



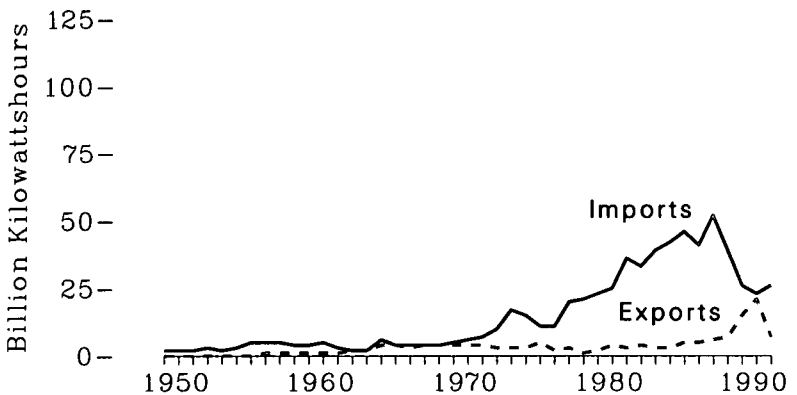
*Plant use of electricity is approximately 5 percent of gross generation, and transmission and distribution (T&D) losses are approximately 9 percent of gross generation.
Notes: • Data are preliminary. • Sum of components may not equal totals due to independent rounding.
Sources: Tables 91, 92, 95, 96, 114, and A7.

Figure 91. Electric Utility Industry Overview

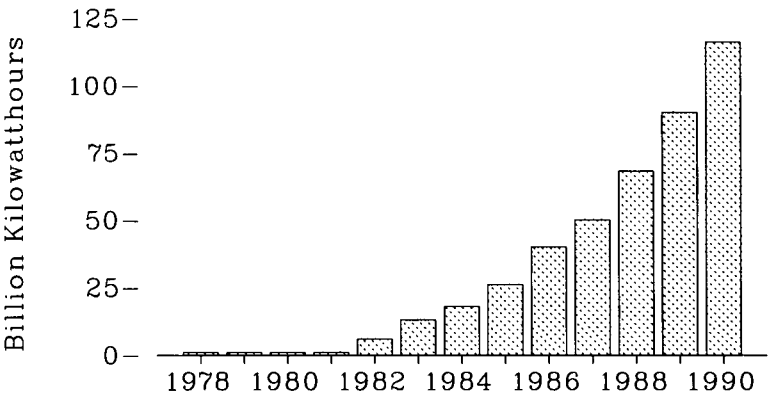
Net Generation and Consumption of Electricity, 1949-1991



Electricity Trade, 1949-1991



Electricity Purchased from Nonutility Power Producers, 1978-1990



Notes: • The difference between net generation and consumption is imports and purchases from nonutility power producers minus exports, losses, and unaccounted for. • Because vertical scales differ, graphs should not be compared.

Source: Table 91.

Table 91. Electric Utility Industry Overview, 1949-1991

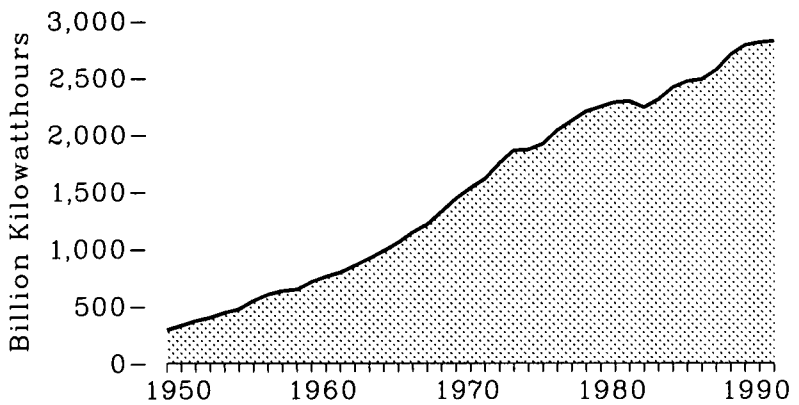
(Billion Kilowatthours)

Year	Net Generation [1]	Purchases from Nonutility Power Producers [2]	Imports [3]	Exports [3]	Losses and Unaccounted For [4]	Consumption
1949	291	NA	2	(5)	38	255
1950	329	NA	2	(5)	39	291
1951	371	NA	2	(5)	43	330
1952	399	NA	3	(5)	45	356
1953	443	NA	2	(5)	48	396
1954	472	NA	3	(5)	50	424
1955	547	NA	5	(5)	54	497
1956	601	NA	5	1	59	546
1957	632	NA	5	1	59	576
1958	645	NA	4	1	61	588
1959	710	NA	4	1	67	647
1960	756	NA	5	1	72	688
1961	794	NA	3	1	74	722
1962	855	NA	2	2	77	778
1963	917	NA	2	2	84	833
1964	984	NA	6	4	90	896
1965	1,055	NA	4	4	101	954
1966	1,144	NA	4	3	110	1,035
1967	1,214	NA	4	4	115	1,099
1968	1,329	NA	4	4	126	1,203
1969	1,442	NA	5	4	129	1,314
1970	1,532	NA	6	4	142	1,392
1971	1,613	NA	7	4	147	1,470
1972	1,750	NA	10	3	162	1,595
1973	1,861	NA	17	3	162	1,713
1974	1,867	NA	15	3	174	1,706
1975	1,918	NA	11	5	177	1,747
1976	2,038	NA	11	2	191	1,855
1977	2,124	NA	20	3	193	1,948
1978	2,206	1	21	1	209	2,018
1979	2,247	1	23	2	198	2,071
1980	2,286	1	25	4	214	2,094
1981	2,295	1	36	3	182	2,147
1982	2,241	6	33	4	190	2,086
1983	2,310	13	39	3	207	2,151
1984[6]	2,416	18	42	3	188	2,286
1985[6]	2,470	26	46	5	212	2,324
1986[6]	2,487	40	41	5	194	2,369
1987[6]	2,572	50	52	6	211	2,457
1988	2,704	68	39	7	226	2,578
1989	2,784	90	26	15	238	2,647
1990	2,808	116	23	21	214	2,713
1991[7]	2,822	NA	26	7	NA	2,759

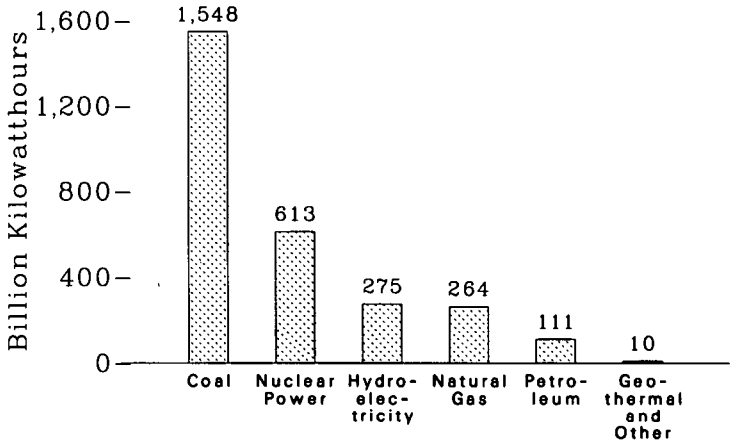
[1] See Appendix E, Note 1. [2] See Glossary. [3] Electricity transmitted across U.S. borders with Canada and Mexico. [4] Balancing item, mainly transmission and distribution losses. [5] Less than 0.5 billion kilowatthours. [6] Consumption data are revised using the Form EIA-861, "Annual Electric Utility 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. Purchases from nonutilities data are also revised for 1986-1988 using the Form EIA-861 and differ from the Form FERC-1, "Annual Report of Major Electric Utilities, Licensees and Others," data published in previous issues. Data on losses are modified due to revisions in data for consumption and purchases from nonutilities. [7] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications. NA = Not available. Notes: • See Appendix E, Note 14. • Sum of components may not equal total due to independent rounding. Sources: **Net Generation:** See Table 92. **Purchases from Nonutility Power Producers:** • 1978-1985—Federal Energy Regulatory Commission, Form FERC-1, "Annual Report of Major Electric Utilities, Licensees and Others." • 1986 forward—Energy Information Administration, Form EIA-861, "Annual Electric Utility Report." **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 and 1990—Fossil Energy, Form FE-781R, "Annual Report of International Electrical Export/Import Data." • 1991—EIA estimates based on preliminary data from the National Energy Board of Canada and Department of Energy, Fossil Energy. **Consumption:** See Table 96.

Figure 92. Electric Utility Net Generation of Electricity by Energy Source

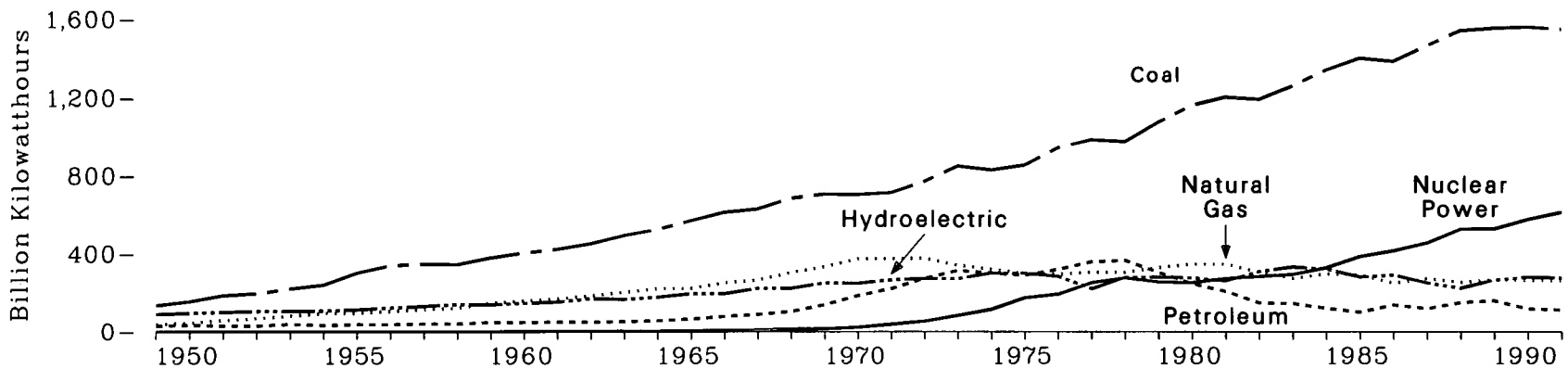
Total, 1949-1991



By Major Energy Source, 1991



By Major Energy Source, 1949-1991



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 92.

Table 92. Electric Utility Net Generation of Electricity by Energy Source, 1949-1991

(Billion Kilowatthours)

Year	Coal	Natural Gas	Petroleum [1]	Nuclear Power	Hydroelectric Power	Geothermal and Other [2]	Total
1949	135	37	29	0	90	[3]	291
1950	155	45	34	0	96	[3]	329
1951	185	57	29	0	100	[3]	371
1952	195	68	30	0	105	[3]	399
1953	219	80	38	0	105	[3]	443
1954	239	94	32	0	107	[3]	472
1955	301	95	37	0	113	[3]	547
1956	339	104	36	0	122	[3]	601
1957	346	114	40	[3]	130	[3]	632
1958	344	120	40	[3]	140	[3]	645
1959	378	147	47	[3]	138	[3]	710
1960	403	158	48	1	146	[3]	756
1961	422	169	49	2	152	[3]	794
1962	450	184	49	2	169	[3]	855
1963	494	202	52	3	166	[3]	917
1964	526	220	57	3	177	[3]	984
1965	571	222	65	4	194	[3]	1,055
1966	613	251	79	6	195	1	1,144
1967	630	265	89	8	222	1	1,214
1968	685	304	104	13	222	1	1,329
1969	706	333	138	14	250	1	1,442
1970	704	373	184	22	248	1	1,532
1971	713	374	220	38	266	1	1,613
1972	771	376	274	54	273	2	1,750
1973	848	341	314	83	272	2	1,861
1974	828	320	301	114	301	3	1,867
1975	853	300	289	173	300	3	1,918
1976	944	295	320	191	284	4	2,038
1977	985	306	358	251	220	4	2,124
1978	976	305	365	276	280	3	2,206
1979	1,075	329	304	255	280	4	2,247
1980	1,162	346	246	251	276	6	2,286
1981	1,203	346	206	273	261	6	2,295
1982	1,192	305	147	283	309	5	2,241
1983	1,259	274	144	294	332	6	2,310
1984	1,342	297	120	328	321	9	2,416
1985	1,402	292	100	384	281	11	2,470
1986	1,386	249	137	414	291	12	2,487
1987	1,464	273	118	455	250	12	2,572
1988	1,541	253	149	527	223	12	2,704
1989	1,554	267	158	529	265	11	2,784
1990	1,560	264	117	577	280	11	2,808
1991[4]	1,548	264	111	613	275	10	2,822

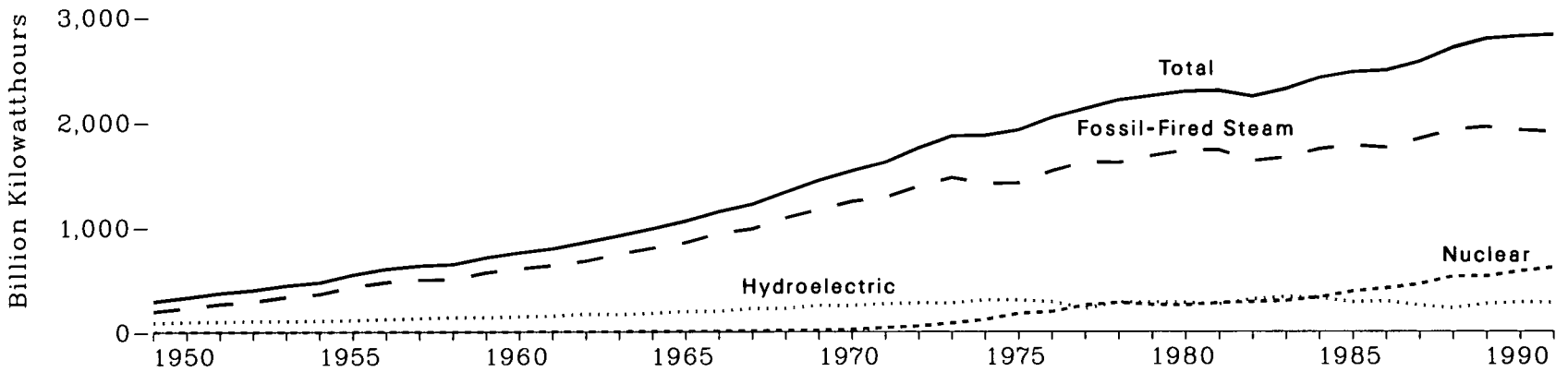
[1] Distillate fuel oil, residual fuel oil (including crude oil burned as fuel), jet fuel, and petroleum coke.
[2] Other is wood, waste, wind, photovoltaic, and solar thermal energy used to generate electricity for distribution.
[3] Less than 0.5 billion kilowatthours.
[4] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Notes: • See Appendix E, Notes 1 and 14. • Sum of components may not equal total due to independent rounding.

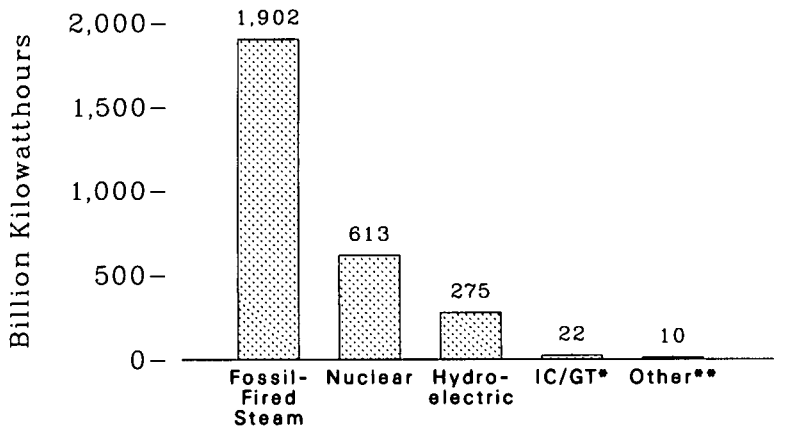
Sources: • 1949-September 1977—Federal Power Commission, Form FPC-4, "Monthly Power Plant Report." • October 1977-1981—Federal Energy Regulatory Commission, Form FPC-4, "Monthly Power Plant Report." • 1982 forward—Energy Information Administration, Form EIA-759, "Monthly Power Plant Report."

Figure 93. Electric Utility Net Generation of Electricity by Prime Mover

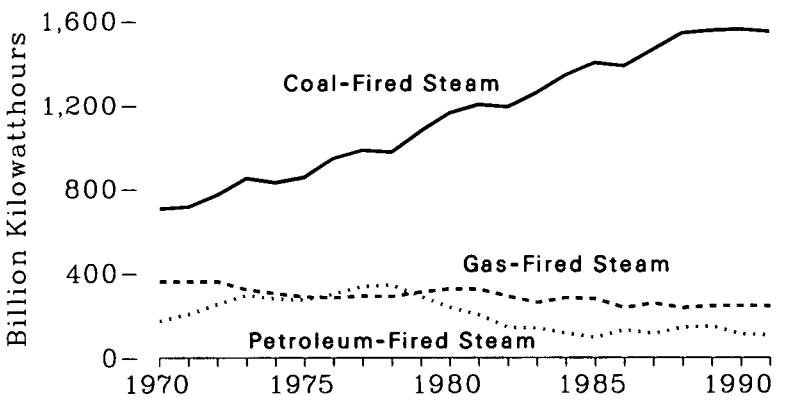
Total, 1949-1991



Total by Prime Mover, 1991



Fossil-Fired Steam by Fuel, 1970-1991



*IC/GT is internal combustion units and petroleum and gas combustion turbine units. **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 93.

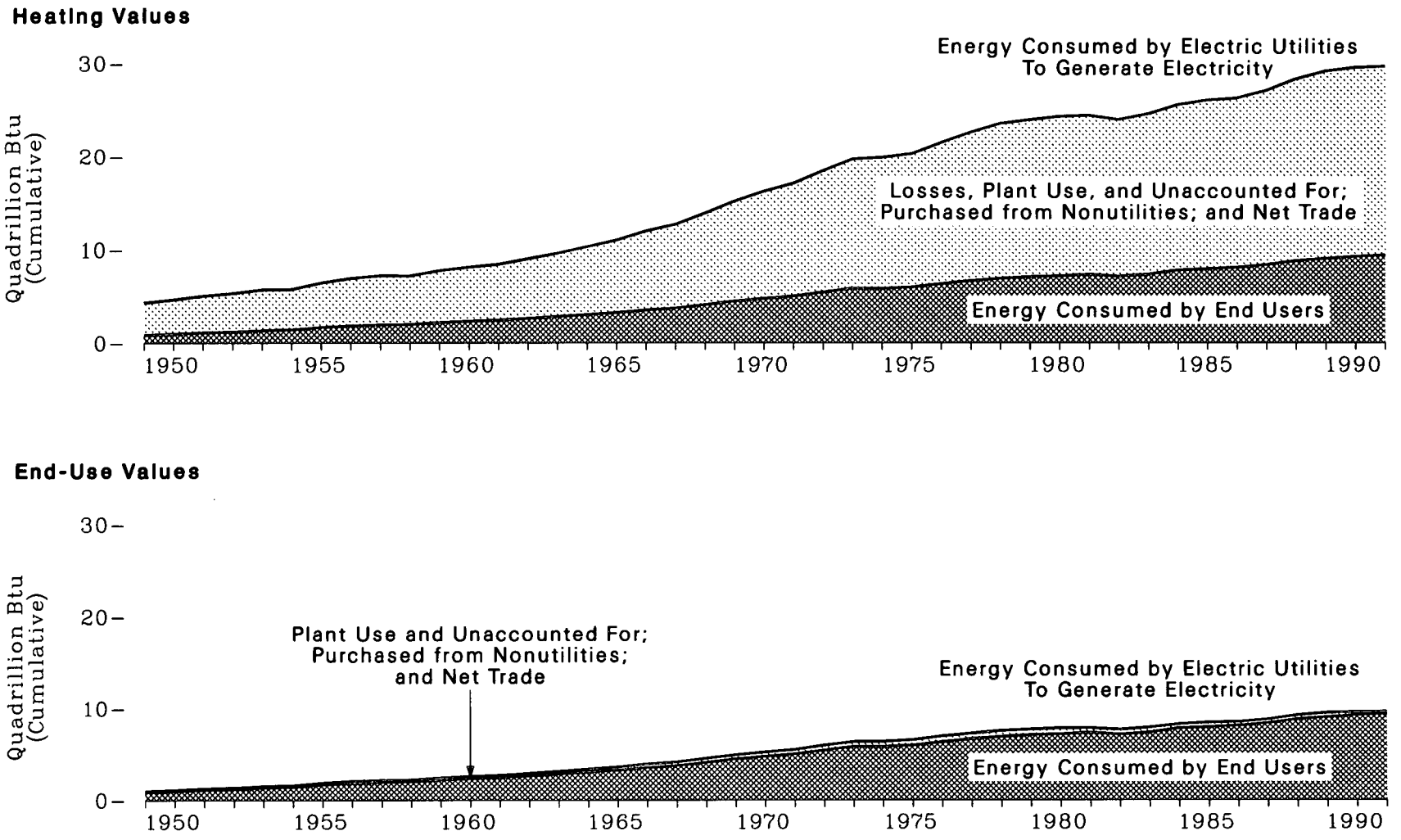
Table 93. Electric Utility Net Generation of Electricity by Prime Mover, 1949-1991

(Billion Kilowatthours)

Year	Fossil-Fired Steam				Internal Combustion and Gas Turbine	Nuclear	Hydroelectric	Other [1]	Total
	Coal-Fired	Petroleum-Fired	Gas-Fired	Total					
1949	135	NA	NA	197	3	0	90	[2]	291
1950	155	NA	NA	229	4	0	96	[2]	329
1951	185	NA	NA	267	4	0	100	[2]	371
1952	195	NA	NA	290	4	0	105	[2]	399
1953	219	NA	NA	333	4	0	105	[2]	443
1954	239	NA	NA	361	4	0	107	[2]	472
1955	301	NA	NA	430	4	0	113	[2]	547
1956	339	NA	NA	474	4	0	122	[2]	601
1957	346	NA	NA	497	4	[2]	130	[2]	632
1958	344	NA	NA	500	4	[2]	140	[2]	645
1959	378	NA	NA	567	4	[2]	138	[2]	710
1960	403	NA	NA	603	4	1	146	[2]	756
1961	422	NA	NA	634	5	2	152	[2]	794
1962	450	NA	NA	677	5	2	169	[2]	855
1963	494	NA	NA	742	5	3	166	[2]	917
1964	526	NA	NA	798	6	3	177	[2]	984
1965	571	NA	NA	851	6	4	194	[2]	1,055
1966	613	NA	NA	938	5	6	195	1	1,144
1967	630	NA	NA	980	5	8	222	1	1,214
1968	685	NA	NA	1,084	9	13	222	1	1,329
1969	706	NA	NA	1,163	14	14	250	1	1,442
1970	704	174	361	1,240	22	22	248	1	1,532
1971	713	206	360	1,279	28	38	266	1	1,613
1972	771	253	361	1,385	36	54	273	2	1,750
1973	848	296	323	1,467	36	83	272	2	1,861
1974	828	279	304	1,411	38	114	301	3	1,867
1975	853	273	288	1,414	28	173	300	3	1,918
1976	944	302	284	1,530	29	191	284	4	2,038
1977	985	338	292	1,615	34	251	220	4	2,124
1978	976	345	290	1,610	36	276	280	3	2,206
1979	1,075	290	311	1,676	32	255	280	4	2,247
1980	1,162	238	326	1,726	28	251	276	6	2,286
1981	1,203	202	325	1,730	25	273	261	6	2,295
1982	1,192	144	291	1,628	16	283	309	5	2,241
1983	1,259	141	261	1,661	17	294	332	6	2,310
1984	1,342	117	284	1,742	17	328	321	9	2,416
1985	1,402	97	279	1,778	16	384	281	11	2,470
1986	1,386	133	236	1,756	15	414	291	12	2,487
1987	1,464	115	258	1,837	18	455	250	12	2,572
1988	1,541	144	236	1,921	22	527	223	12	2,704
1989	1,554	151	245	1,950	29	529	265	11	2,784
1990	1,560	113	246	1,919	22	577	280	11	2,808
1991[3]	1,548	108	245	1,902	22	613	275	10	2,822

[1] Other is geothermal, wood, waste, wind, photovoltaic, and solar thermal energy used to generate electricity for distribution. [2] Less than 0.5 billion kilowatthours. [3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications. NA = Not available. Notes: • See Appendix E, Notes 1 and 14. • Sum of components may not equal total 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 94. Heating and End-Use Values of Electrical Energy, 1949-1991



Source: Table 94.

Table 94. Heating and End-Use Values of Electrical Energy, 1949-1991

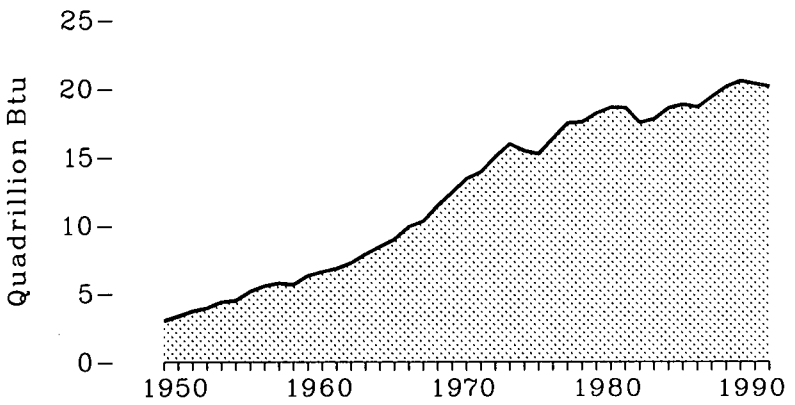
(Quadrillion Btu)

Year	Energy Consumed by Electric Utilities to Generate Electricity										Electricity Purchased from Nonutilities and Net Trade [1]		Energy Losses, Plant Use, and Unaccounted For [2]		Electricity Consumed by End Users
	Heating Value of Energy Sources					End-Use Value of Electrical Output									
	Fossil Fuels	Nuclear Power [3]	Hydroelectric Power [4]	Other [5]	Total	Fossil Fuels [6]	Nuclear Power [6]	Hydroelectric Power [6]	Other [6]	Total	Heating Value [4]	End-Use Value [6]	Heating Value	End-Use Value	
1949	2.98	0	1.35	0.01	4.33	0.69	0	0.31	(7)	0.99	0.02	0.01	3.49	0.13	0.87
1950	3.32	0	1.35	0.01	4.67	0.79	0	0.33	(7)	1.12	0.03	0.01	3.70	0.13	0.99
1951	3.70	0	1.36	0.01	5.06	0.92	0	0.34	(7)	1.26	0.03	0.01	3.97	0.15	1.13
1952	3.92	0	1.40	0.01	5.33	1.00	0	0.36	(7)	1.36	0.03	0.01	4.15	0.15	1.22
1953	4.36	0	1.36	0.01	5.72	1.15	0	0.36	(7)	1.51	0.03	0.01	4.40	0.17	1.35
1954	4.46	0	1.30	(7)	5.77	1.24	0	0.37	(7)	1.61	0.03	0.01	4.35	0.17	1.45
1955	5.12	0	1.32	(7)	6.45	1.48	0	0.39	(7)	1.87	0.05	0.01	4.80	0.19	1.69
1956	5.53	0	1.40	(7)	6.93	1.63	0	0.42	(7)	2.05	0.05	0.02	5.11	0.20	1.86
1957	5.74	(7)	1.48	(7)	7.22	1.71	(7)	0.44	(7)	2.15	0.04	0.01	5.29	0.20	1.96
1958	5.63	(7)	1.55	(7)	7.19	1.72	(7)	0.48	(7)	2.20	0.04	0.01	5.22	0.21	2.01
1959	6.27	(7)	1.51	(7)	7.78	1.95	(7)	0.47	(7)	2.42	0.04	0.01	5.61	0.23	2.21
1960	6.57	0.01	1.57	(7)	8.14	2.08	(7)	0.50	(7)	2.58	0.05	0.02	5.84	0.25	2.35
1961	6.80	0.02	1.62	(7)	8.44	2.18	0.01	0.52	(7)	2.71	0.02	0.01	6.01	0.25	2.46
1962	7.22	0.03	1.78	(7)	9.03	2.33	0.01	0.58	(7)	2.92	0.01	(7)	6.38	0.26	2.65
1963	7.85	0.04	1.74	0.01	9.63	2.55	0.01	0.57	(7)	3.13	(7)	(7)	6.79	0.29	2.84
1964	8.41	0.04	1.85	0.01	10.31	2.74	0.01	0.60	(7)	3.36	0.02	0.01	7.27	0.31	3.06
1965	8.94	0.04	2.03	0.01	11.01	2.93	0.01	0.66	(7)	3.60	(7)	(7)	7.76	0.35	3.25
1966	9.88	0.06	2.03	0.01	11.98	3.22	0.02	0.66	(7)	3.90	0.01	(7)	8.46	0.38	3.53
1967	10.29	0.09	2.31	0.01	12.70	3.36	0.03	0.76	(7)	4.14	(7)	(7)	8.95	0.39	3.75
1968	11.42	0.14	2.31	0.01	13.89	3.73	0.04	0.76	(7)	4.54	0.01	(7)	9.79	0.43	4.10
1969	12.39	0.15	2.61	0.02	15.17	4.02	0.05	0.85	(7)	4.92	0.01	(7)	10.70	0.44	4.48
1970	13.40	0.24	2.60	0.02	16.25	4.30	0.07	0.85	(7)	5.23	0.02	0.01	11.52	0.48	4.75
1971	13.89	0.41	2.79	0.02	17.11	4.46	0.13	0.91	(7)	5.50	0.04	0.01	12.13	0.50	5.01
1972	14.99	0.58	2.83	0.03	18.44	4.85	0.18	0.93	0.01	5.97	0.08	0.03	13.08	0.55	5.44
1973	15.92	0.91	2.83	0.05	19.70	5.13	0.28	0.93	0.01	6.35	0.15	0.05	14.01	0.55	5.84
1974	15.42	1.27	3.14	0.06	19.89	4.95	0.39	1.03	0.01	6.37	0.13	0.04	14.20	0.59	5.82
1975	15.19	1.90	3.12	0.07	20.29	4.92	0.59	1.02	0.01	6.54	0.06	0.02	14.39	0.60	5.96
1976	16.35	2.11	2.94	0.08	21.48	5.32	0.65	0.97	0.01	6.95	0.09	0.03	15.24	0.65	6.33
1977	17.45	2.70	2.30	0.08	22.53	5.63	0.86	0.75	0.01	7.25	0.18	0.06	16.07	0.66	6.65
1978	17.52	3.02	2.91	0.07	23.52	5.62	0.94	0.96	0.01	7.53	0.21	0.07	16.85	0.71	6.89
1979	18.16	2.78	2.90	0.09	23.92	5.83	0.87	0.95	0.01	7.67	0.22	0.07	17.07	0.67	7.07
1980	18.57	2.74	2.87	0.11	24.29	5.98	0.86	0.94	0.02	7.80	0.22	0.07	17.37	0.73	7.15
1981	18.55	3.01	2.72	0.13	24.41	5.99	0.93	0.89	0.02	7.83	0.36	0.12	17.44	0.62	7.33
1982	17.49	3.13	3.23	0.11	23.96	5.61	0.96	1.06	0.02	7.65	0.37	0.12	17.21	0.65	7.12
1983	17.75	3.20	3.49	0.13	24.58	5.73	1.00	1.13	0.02	7.88	0.50	0.16	17.75	0.71	7.34
1984	18.53	3.55	3.32	0.17	25.57	6.00	1.12	1.10	0.03	8.24	0.60	0.20	18.36	0.64	7.80
1985	18.79	4.15	2.91	0.21	26.06	6.12	1.31	0.96	0.04	8.43	0.69	0.23	18.82	0.72	7.93
1986	18.59	4.47	2.98	0.23	26.27	6.04	1.41	0.99	0.04	8.49	0.78	0.26	18.97	0.66	8.08
1987	19.37	4.91	2.56	0.24	27.08	6.33	1.55	0.85	0.04	8.78	0.99	0.33	19.68	0.72	8.38
1988	20.12	5.66	2.28	0.23	28.30	6.63	1.80	0.76	0.04	9.23	1.02	0.34	20.53	0.77	8.80
1989	20.54	5.68	2.74	0.22	29.18	6.75	1.81	0.90	0.04	9.50	1.04	0.34	21.19	0.81	9.03
1990	20.32	6.16	2.89	0.20	29.58	6.62	1.97	0.96	0.04	9.58	1.22	0.40	21.54	0.73	9.26
1991[8]	20.12	6.54	2.85	0.19	29.70	6.56	2.09	0.94	0.03	9.63	0.20	0.07	20.49	0.28	9.41

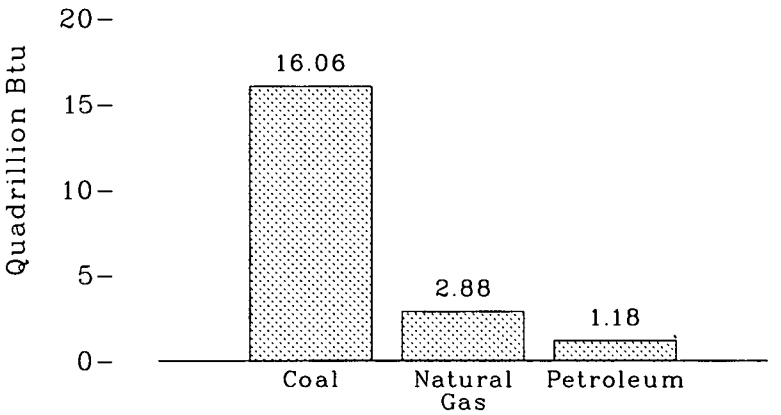
[1] Electricity purchased from nonutility sources, including cogenators, small power producers, and other nonutility power producing establishments plus U.S. imported electricity minus U.S. exported electricity. [2] For heating value, conversion, transmission, and distribution losses, plant use, and unaccounted for. For end-use value, plant use and unaccounted for. Calculated as total plus purchased from nonutilities and net trade minus electricity consumed by end users. [3] Heat released in reactors by fissioning uranium. [4] The equivalent of fossil fuel energy required to generate the electricity distributed using the average fossil fuel steam-electric plant thermal efficiency. [5] For geothermal plants, the heat content of the steam consumed; for all other plants, the fossil fuel equivalent using the U.S. average heat rate for fossil fuel steam-electric plants. [6] The equivalent amount of heat that could be produced by the electricity distributed using the conversion factor 3,412 Btu per kilowatthour. [7] Less than 0.005 quadrillion Btu. [8] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications. Sources: Tables 91, 92, 95, and 114 and conversion factors in Appendix A.

Figure 95. Electric Utility Consumption of Fossil Fuels To Generate Electricity

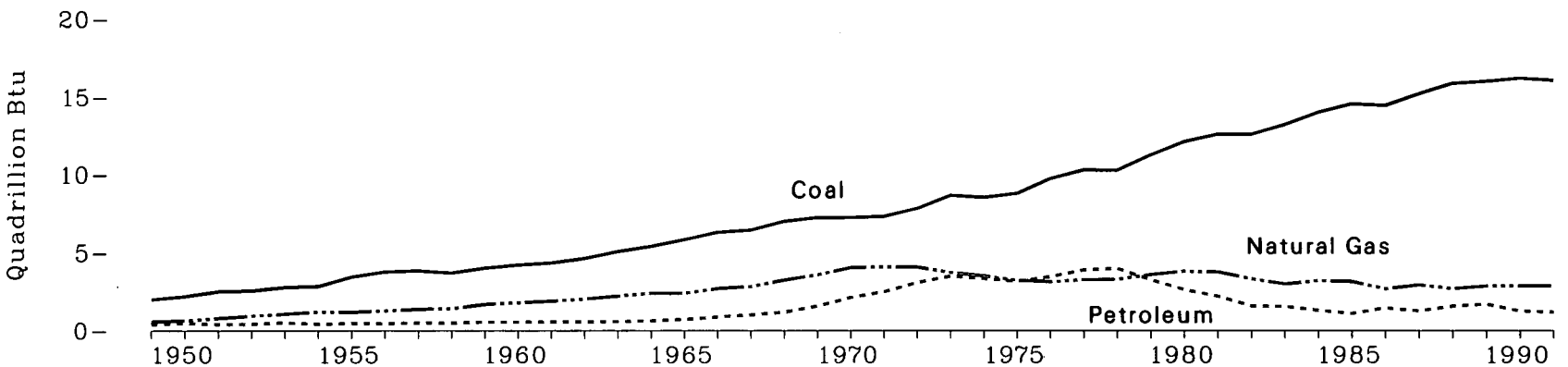
Total, 1949-1991



By Energy Source, 1991



By Energy Source, 1949-1991



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 95.

Table 95. Electric Utility Consumption of Fossil Fuels To Generate Electricity, 1949-1991

Year	Coal		Natural Gas		Petroleum [1]		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[2]	772.3	16.06	2,781.4	2.88	188.5	1.18	20.12

[1] These data are 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, which is reported in short tons, and has been converted to barrels at a rate of 5 barrels per short ton.

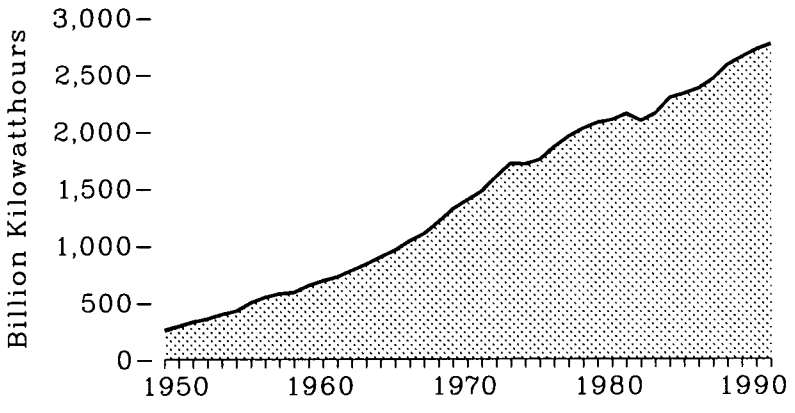
[2] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Notes: • See Appendix E, Note 14. • Sum of components may not equal total due to independent rounding.

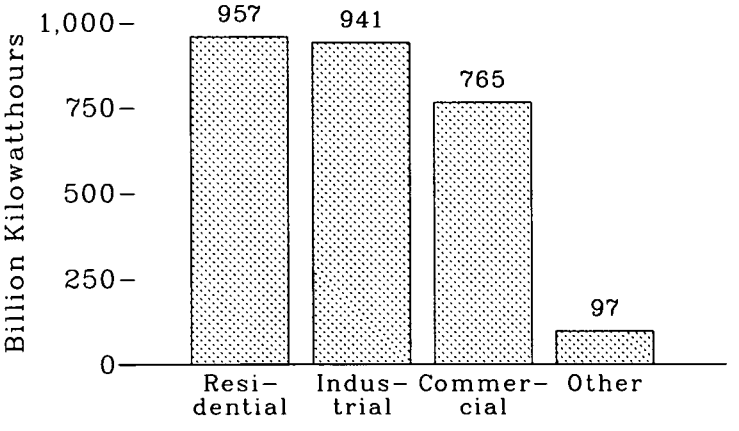
Sources: • 1949-September 1977—Federal Power Commission, Form FPC-4, "Monthly Power Plant Report." • October 1977-1981—Federal Energy Regulatory Commission, Form FPC-4, "Monthly Power Plant Report." • 1982 forward—Energy Information Administration, Form EIA-759, "Monthly Power Plant Report."

Figure 96. Electricity Sales by End-Use Sector

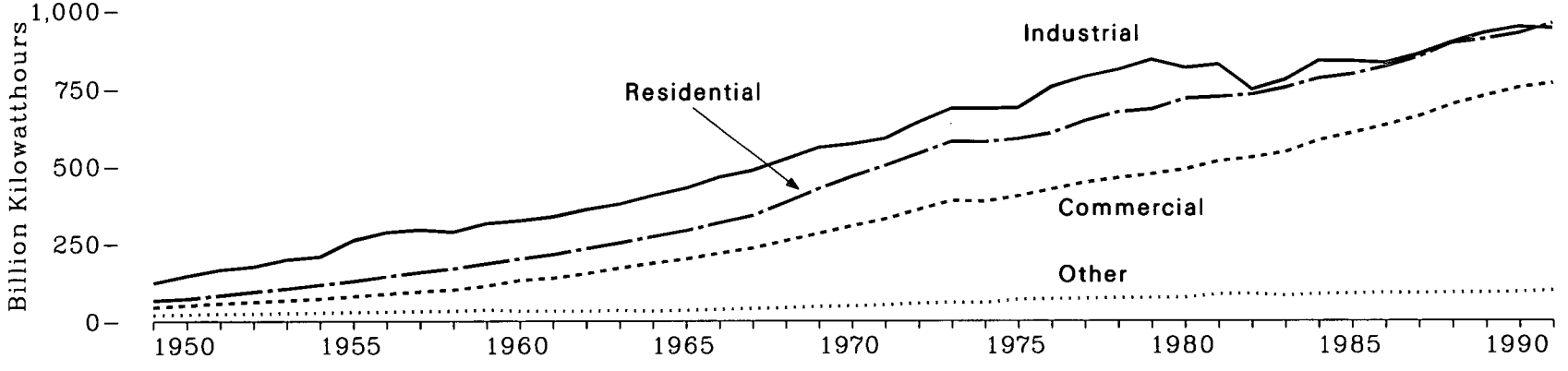
Total, 1949-1991



By End-Use Sector, 1991



By End-Use Sector, 1949-1991



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 96.

Table 96. Electricity Sales by End-Use Sector, 1949-1991

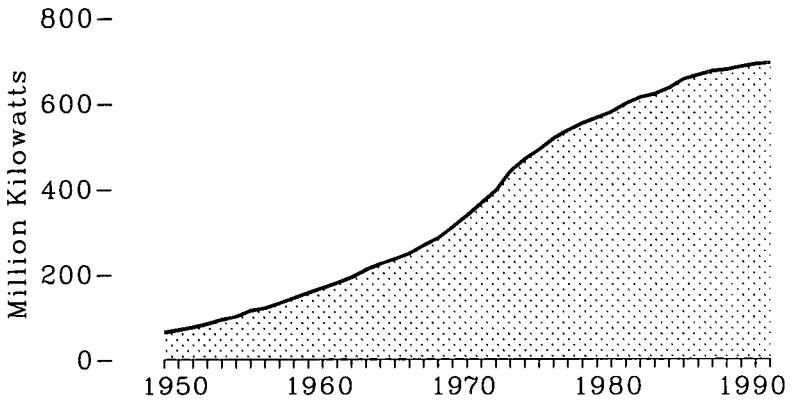
(Billion Kilowatthours)

Year	Residential	Commercial	Industrial	Other [1]	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[2]	780	583	838	85	2,286
1985[2]	794	606	837	87	2,324
1986[2]	819	631	831	89	2,369
1987[2]	850	660	858	88	2,457
1988[2]	893	699	896	90	2,578
1989	906	726	926	90	2,647
1990	924	751	946	92	2,713
1991[3]	957	765	941	97	2,759

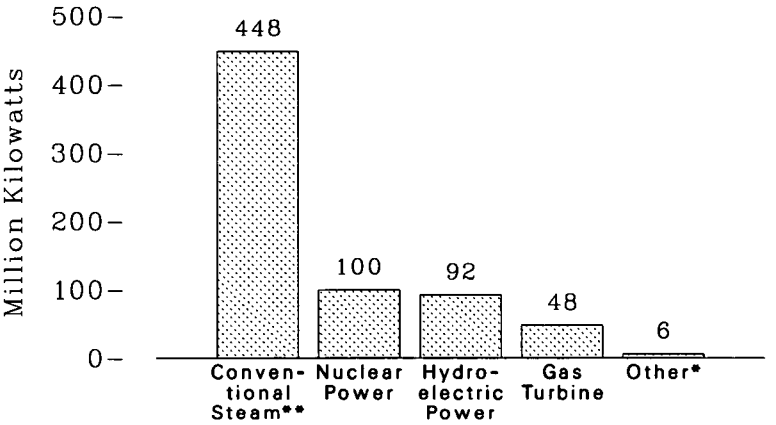
[1] Other is public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales. [2] These data are revised using the Form EIA-861, "Annual Electric Utility Report," and differ from the Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions," data published in previous issues of this publication. [3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications. Notes: • See Appendix E, Notes 14 and 16. • Sum of components may not equal total 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, Form FPC-5, "Monthly Statement of Electric Operating Revenue and Income." • March 1980-1982—Federal Energy Regulatory Commission, Form FPC-5, "Electric Utility Company Monthly Statement." • 1983—Energy Information Administration (EIA), Form EIA-826, "Electric Utility Company Monthly Statement." • 1984-1990—EIA, Form EIA-861, "Annual Electric Utility Report." • 1991—EIA, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions."

Figure 97. Electric Utility Net Summer Capability, End of Year

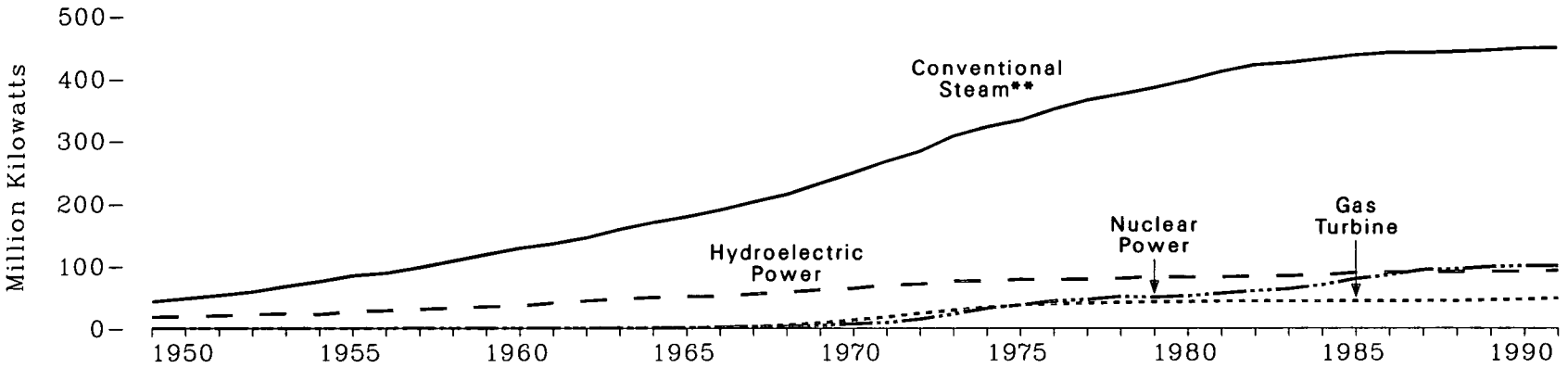
Total, 1949-1991



By Prime Mover, 1991



By Prime Mover, 1949-1991



*Other is internal combustion, geothermal, wind, photovoltaic, and solar thermal energy.
**Includes fossil steam, wood, and waste.
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 97.

Table 97. Electric Utility Net Summer Capability, End of Year 1949-1991

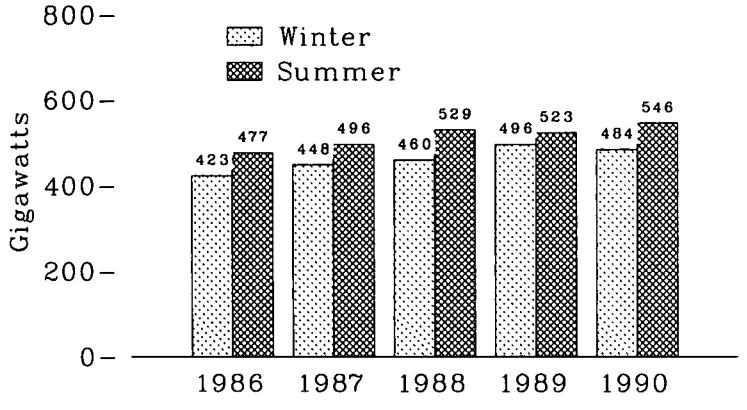
(Million Kilowatts)

Year	Conventional Steam [1]	Internal Combustion	Gas Turbine	Nuclear Power	Hydroelectric Power	Geothermal and Other [2]	Total
1949	43.2	1.7	0	0	18.5	([3])	63.4
1950	48.2	1.8	0	0	19.2	([3])	69.2
1951	53.1	1.9	0	0	20.5	([3])	75.5
1952	58.8	2.0	0	0	22.4	([3])	83.2
1953	67.5	2.1	0	0	23.8	([3])	93.3
1954	75.4	2.2	0	0	22.5	([3])	100.0
1955	84.6	2.3	0	0	27.4	([3])	114.2
1956	88.8	2.4	0	0	28.5	([3])	119.7
1957	97.9	2.3	0	0.1	30.7	([3])	131.1
1958	108.2	2.4	0	0.1	32.5	([3])	143.3
1959	118.5	2.5	0	0.1	34.8	([3])	155.9
1960	128.3	2.6	0	0.4	35.8	([3])	167.1
1961	135.1	2.8	0	0.4	40.7	([3])	179.0
1962	144.6	2.8	0	0.7	44.0	([3])	192.1
1963	158.4	3.0	0.5	0.8	47.0	([3])	209.7
1964	169.6	3.1	0.8	0.8	49.4	([3])	223.7
1965	178.7	3.2	1.1	0.8	51.0	([3])	234.8
1966	189.6	3.3	1.6	1.7	51.2	([3])	247.5
1967	202.5	3.6	2.8	2.7	55.0	0.1	266.7
1968	214.3	3.8	5.3	2.7	57.9	0.1	284.0
1969	231.4	4.0	8.4	4.4	61.6	0.1	309.8
1970	248.0	4.1	13.3	7.0	63.8	0.1	336.4
1971	266.0	4.2	17.9	9.0	69.1	0.2	366.4
1972	282.3	4.5	23.9	14.5	70.5	0.3	396.0
1973	307.9	4.7	28.8	22.7	75.4	0.4	439.8
1974	322.4	4.7	33.7	31.9	75.5	0.4	468.5
1975	333.3	4.8	37.1	37.3	78.4	0.5	491.3
1976	350.9	5.0	39.1	43.8	78.0	0.5	517.2
1977	365.3	5.0	40.3	46.3	78.6	0.5	535.9
1978	374.5	5.2	41.2	50.8	79.9	0.5	552.1
1979	384.6	5.2	42.5	49.7	82.9	0.7	565.5
1980	396.6	5.2	42.5	51.8	81.7	0.9	578.6
1981	410.7	5.3	43.2	56.0	82.4	0.9	598.3
1982	421.4	4.8	43.5	60.0	83.0	1.1	613.7
1983	424.9	4.7	43.3	63.0	83.9	1.2	621.1
1984	430.8	4.5	43.5	69.7	85.3	1.3	635.1
1985	436.8	4.7	43.9	79.4	88.9	1.6	655.2
1986	440.6	4.6	43.4	85.2	89.3	1.6	664.8
1987	440.3	4.8	44.2	93.6	89.7	1.5	674.1
1988	442.4	4.7	43.9	94.7	90.3	1.7	677.7
1989	444.4	4.6	45.4	98.2	90.5	1.6	684.6
1990	447.5	4.6	46.3	99.6	90.9	1.6	690.5
1991[4]	448.1	4.5	47.9	99.6	92.2	1.6	693.9

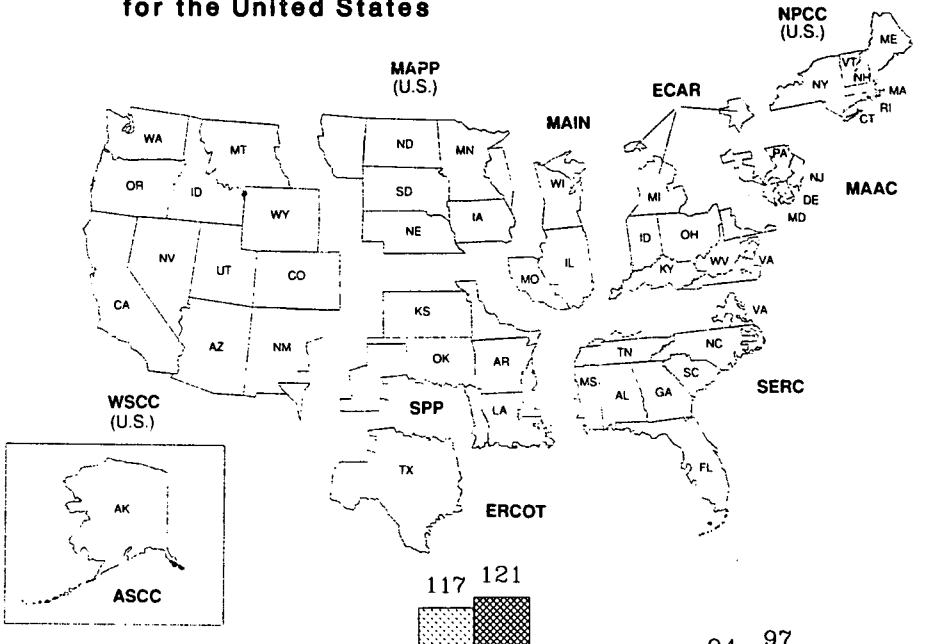
[1] Includes fossil steam, wood, and waste.
[2] Other is wind, photovoltaic, and solar thermal energy.
[3] Less than 0.05 million kilowatts.
[4] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Notes: • See Glossary and Appendix E, Notes 14 and 17. • Sum of components may not equal total due to independent rounding.
Sources: • 1949-1984—Energy Information Administration (EIA) estimates. • 1985 forward—EIA, Form EIA-860, "Annual Electric Generator Report."

Figure 98. Electric Utility Noncoincidental Peak Load

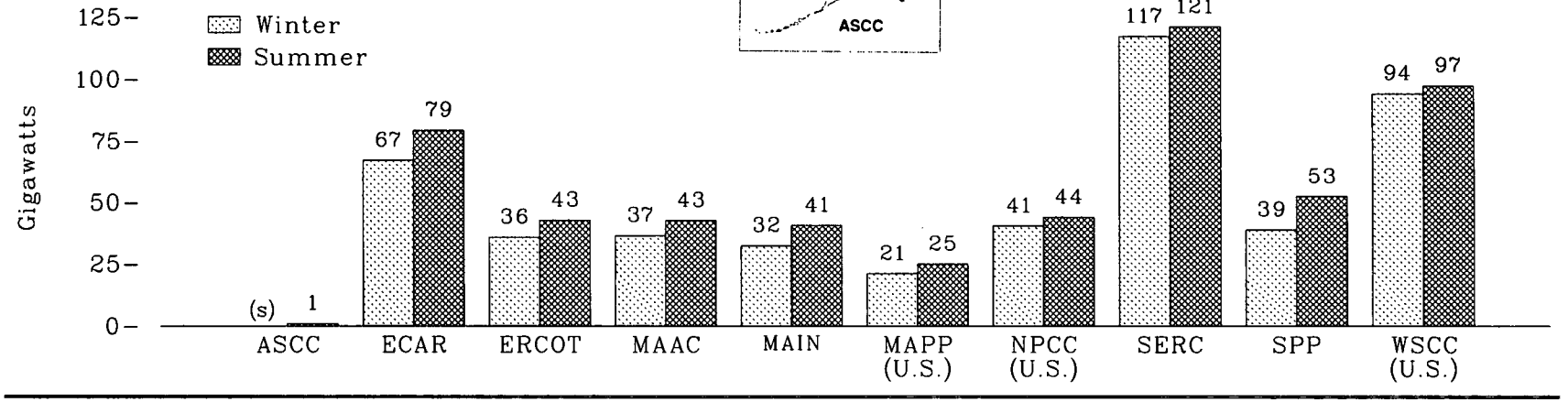
In the Contiguous United States, 1986-1990



North American Electric Reliability Council Map for the United States



By NERC Regions, 1990



(s)=Less than 500 megawatts.

Notes: • Noncoincidental peak load is the sum of two or more peak loads on individual systems that do not occur ar 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 98.

Table 98. Electric Utility Noncoincidental Peak Load by Region, 1986-1990
(Megawatts)

Year	North American Electric Reliability Council Regions [1]									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	NA
1987	72,561	39,339	40,526	37,446	23,162	42,651	109,798	47,723	82,967	496,173	NA
1988	79,149	40,843	43,110	41,139	24,899	45,245	115,168	49,356	90,551	529,460	NA
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
	Winter										
1986	64,561	28,730	32,807	28,036	18,850	37,976	101,849	33,877	76,171	422,857	NA
1987	68,118	31,399	35,775	30,606	19,335	41,902	105,476	34,472	81,182	448,265	NA
1988	67,771	34,621	36,363	30,631	20,162	42,951	108,649	35,649	82,937	459,734	NA
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

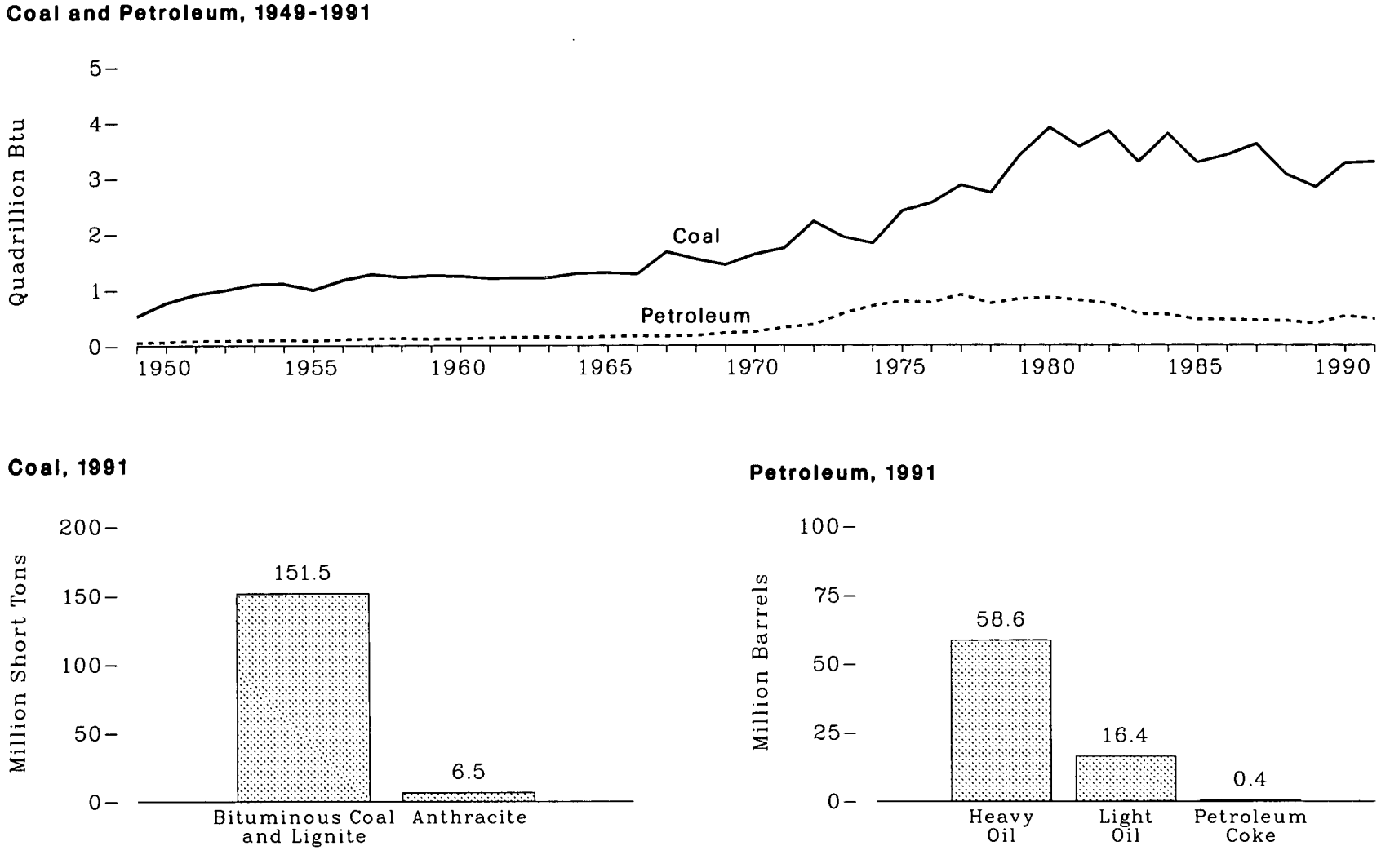
[1] See Glossary for information on the North American Electric Reliability Council (NERC). This table includes the U.S. portion of NERC only and does not cover Hawaii. See Figure 98 for an illustration of NERC regions.

NA = Not available.

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.

Source: Energy Information Administration, *Electric Power Annual 1990* (January 1992), Table 53.

Figure 99. Electric Utility Stocks of Coal and Petroleum, End of Year



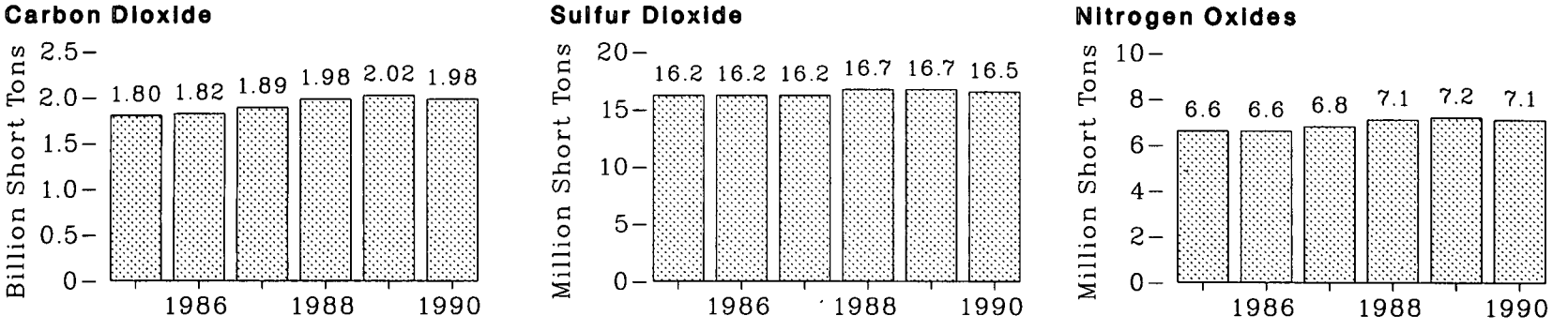
Source: Table 99.

Table 99. Electric Utility Stocks of Coal and Petroleum, End of Year 1949-1991

Year	Coal				Petroleum					
	Anthracite [1]	Bituminous Coal [2] and Lignite	Total		Heavy Oil [3]	Light Oil [4]	Total Liquids	Petroleum Coke [5]	Total	
	(million short tons)		(million short tons)	(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]	6.5	151.5	158.0	3,287	58.6	16.4	75.0	0.4	75.4	471

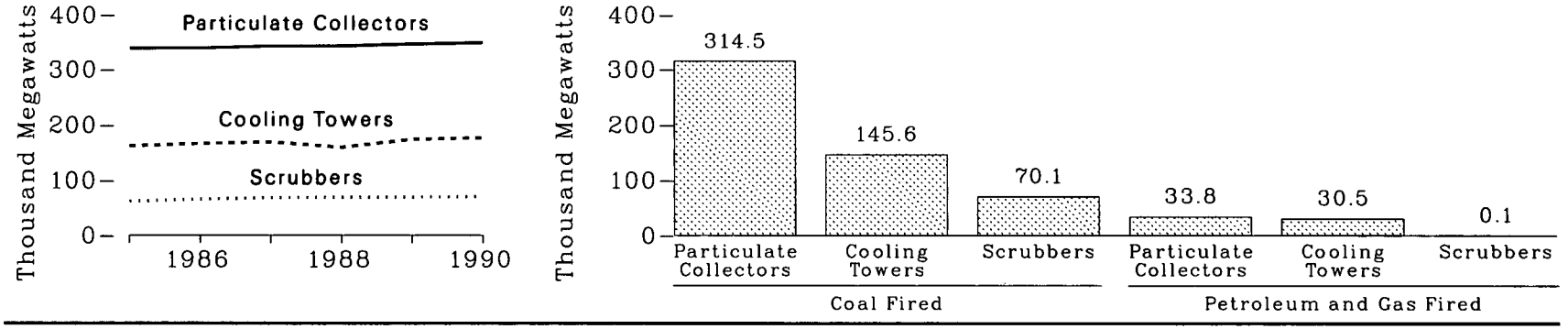
[1] Includes anthracite silt stored off-site. [2] Includes subbituminous coal. [3] Includes Grade Nos. 4, 5, and 6, and residual fuel oils. [4] Includes Grade No. 2 heating oil, kerosene, and jet fuel. [5] Petroleum coke, which is reported in short tons, has been converted to barrels at a rate of 5 barrels per short ton. [6] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications. NA = Not available. Notes: • See Appendix E, Note 14. • Sum of components may not equal total 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 100. Emissions from Fossil-Fueled Steam-Electric Generating Units, 1985-1990



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 100.

Figure 101. Installed Nameplate Capacity of Fossil-Fueled Steam-Electric Generators for Plants With Environmental Equipment



Source: Table 101.

Table 100. Emissions from Fossil-Fueled Steam-Electric Generating Units, 1985-1990

(Thousand Short Tons)

Year	Coal Fired			Petroleum Fired			Gas Fired			Total [1]		
	Carbon Dioxide	Sulfur Dioxide	Nitrogen Oxides	Carbon Dioxide	Sulfur Dioxide	Nitrogen Oxides	Carbon Dioxide	Sulfur Dioxide	Nitrogen Oxides	Carbon Dioxide	Sulfur Dioxide	Nitrogen Oxides
1985	1,527,345	15,569	5,786	95,109	599	188	174,420	0	644	1,803,823	16,172	6,621
1986	1,528,137	15,376	5,753	129,781	815	261	150,841	0	552	1,815,833	16,212	6,572
1987	1,602,982	15,528	5,963	110,451	655	224	165,200	0	610	1,890,223	16,215	6,804
1988	1,685,036	15,929	6,245	134,088	738	286	149,443	0	554	1,982,390	16,707	7,097
1989	1,697,838	15,912	6,300	141,567	780	301	158,005	0	579	2,016,377	16,747	7,194
1990	1,702,244	15,858	6,285	108,053	640	226	156,967	0	560	1,979,408	16,549	7,087

[1] In addition to coal, petroleum, and gas, also includes light oil, methane, coal/oil mixture, propane gas, blast furnace gas, wood, and refuse.

Notes: • Historical data are revised to include emissions from other fuels (see footnote 1) and to reflect the reevaluation and resubmission of data by repondents due to The Clean Air Act Amendments of 1990. • All data are preliminary and may be revised in future publications. • Sum of components may not equal total due to independent rounding.

Source: Energy Information Administration, Form EIA-767, "Steam-Electric Plant Operation and Design Report."

Table 101. Installed Nameplate Capacity of Fossil-Fueled Steam-Electric Generators for Plants With Environmental Equipment, 1985-1990

(Megawatts)

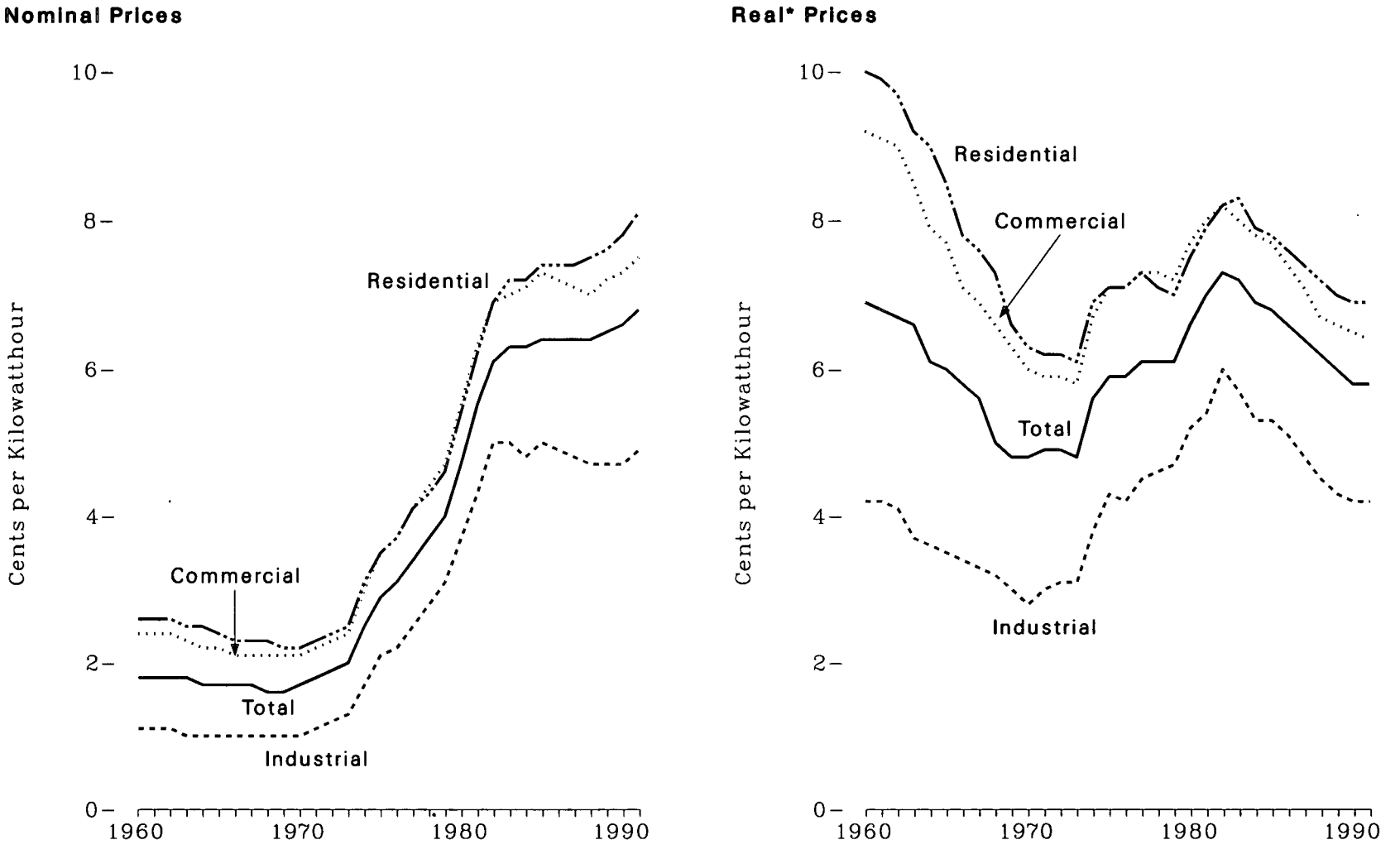
Year	Coal Fired				Petroleum and Gas Fired				Total			
	Particulate Collectors	Cooling Towers	Scrubbers	Total [1]	Particulate Collectors	Cooling Towers	Scrubbers	Total [1]	Particulate Collectors	Cooling Towers	Scrubbers	Total [1]
1985	303,252	131,094	61,544	304,826	34,806	30,699	65	62,945	338,058	161,793	61,609	367,770
1986	304,752	135,474	65,451	306,327	33,559	30,400	65	61,399	338,311	165,874	65,516	367,726
1987	308,690	139,015	68,109	310,324	32,956	29,703	65	60,039	341,646	168,718	68,174	370,363
1988	308,811	132,618	68,903	310,446	33,178	26,377	65	57,174	341,989	158,995	68,968	367,620
1989	312,236	143,497	69,098	313,871	33,422	29,683	65	60,389	345,658	173,180	69,163	374,260
1990	314,491	145,556	70,089	316,126	33,837	30,452	65	61,062	348,328	176,008	70,154	377,188

[1] 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 and to reflect the reevaluation and resubmission of data by respondents due to The Clean Air Act Amendments of 1990. • All data are preliminary and may be revised in future publications. • Coverage is plants with fossil-fueled steam-electric capacity of 100 megawatts or greater.

Source: Energy Information Administration (EIA), Form EIA-767, "Steam-Electric Plant Operation and Design Report."

Figure 102. Retail Prices of Electricity Sold by Electric Utilities, 1960-1991



*In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.
Source: Table 102.

Table 102. Retail Prices of Electricity Sold by Electric Utilities, 1960-1991

(Cents per Kilowatthour)

Year	Residential		Commercial		Industrial		Other [1]		Total	
	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]
1960	2.6	10.0	2.4	9.2	1.1	4.2	1.9	7.3	1.8	6.9
1961	2.6	9.9	2.4	9.1	1.1	4.2	1.8	6.8	1.8	6.8
1962	2.6	9.7	2.4	9.0	1.1	4.1	1.9	7.1	1.8	6.7
1963	2.5	9.2	2.3	8.5	1.0	3.7	1.8	6.6	1.8	6.6
1964	2.5	9.0	2.2	7.9	1.0	3.6	1.8	6.5	1.7	6.1
1965	2.4	8.5	2.2	7.7	1.0	3.5	1.8	6.3	1.7	6.0
1966	2.3	7.8	2.1	7.1	1.0	3.4	1.8	6.1	1.7	5.8
1967	2.3	7.6	2.1	6.9	1.0	3.3	1.8	5.9	1.7	5.6
1968	2.3	7.3	2.1	6.6	1.0	3.2	1.8	5.7	1.6	5.0
1969	2.2	6.6	2.1	6.3	1.0	3.0	1.7	5.1	1.6	4.8
1970	2.2	6.3	2.1	6.0	1.0	2.8	1.8	5.1	1.7	4.8
1971	2.3	6.2	2.2	5.9	1.1	3.0	1.9	5.1	1.8	4.9
1972	2.4	6.2	2.3	5.9	1.2	3.1	2.0	5.2	1.9	4.9
1973	2.5	6.1	2.4	5.8	1.3	3.1	2.1	5.1	2.0	4.8
1974	3.1	6.9	3.0	6.7	1.7	3.8	2.8	6.2	2.5	5.6
1975	3.5	7.1	3.5	7.1	2.1	4.3	3.1	6.3	2.9	5.9
1976	3.7	7.1	3.7	7.1	2.2	4.2	3.3	6.3	3.1	5.9
1977	4.1	7.3	4.1	7.3	2.5	4.5	3.5	6.3	3.4	6.1
1978	4.3	7.1	4.4	7.3	2.8	4.6	3.6	6.0	3.7	6.1
1979	4.6	7.0	4.7	7.2	3.1	4.7	4.0	6.1	4.0	6.1
1980	5.4	7.5	5.5	7.7	3.7	5.2	4.8	6.7	4.7	6.6
1981	6.2	7.9	6.3	8.0	4.3	5.4	5.3	6.7	5.5	7.0
1982	6.9	8.2	6.9	8.2	5.0	6.0	5.9	7.0	6.1	7.3
1983	7.2	8.3	7.0	8.0	5.0	5.7	6.4	7.3	6.3	7.2
1984[3]	7.2	7.9	7.1	7.8	4.8	5.3	5.9	6.5	6.3	6.9
1985[3]	7.4	7.8	7.3	7.7	5.0	5.3	6.1	6.5	6.4	6.8
1986[3]	7.4	7.6	7.2	7.4	4.9	5.1	6.1	6.3	6.4	6.6
1987[3]	7.4	7.4	7.1	7.1	4.8	4.8	6.2	6.2	6.4	6.4
1988	7.5	7.2	7.0	6.7	4.7	4.5	6.2	6.0	6.4	6.2
1989	7.6	7.0	7.2	6.6	4.7	4.3	6.2	5.7	6.5	6.0
1990	7.8	6.9	7.3	6.5	4.7	4.2	6.4	5.7	6.6	5.8
1991[4]	8.1	6.9	7.5	6.4	4.9	4.2	6.4	5.5	6.8	5.8

[1] Other is public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

[2] In 1987 dollars, calculated using implicit GDP price deflators. See Appendix C.

[3] These data are revised using the 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.

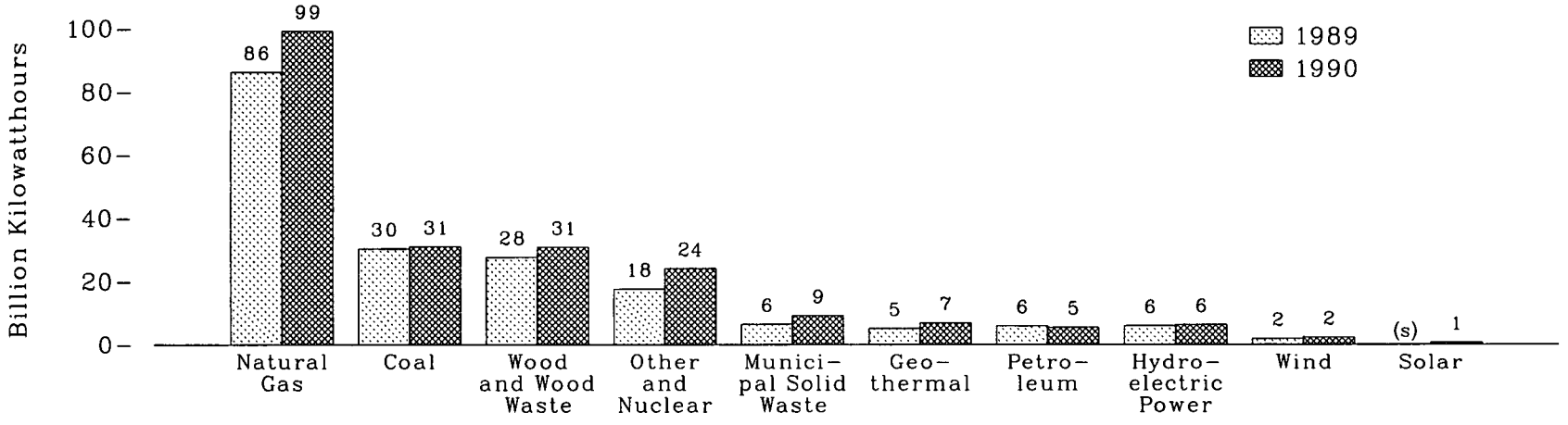
[4] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Note: Data 1979 and earlier are for Classes A and B privately owned electric utilities only. Data 1980 forward are for selected Class A utilities whose electric operating revenues were $100 million or more during the previous year.

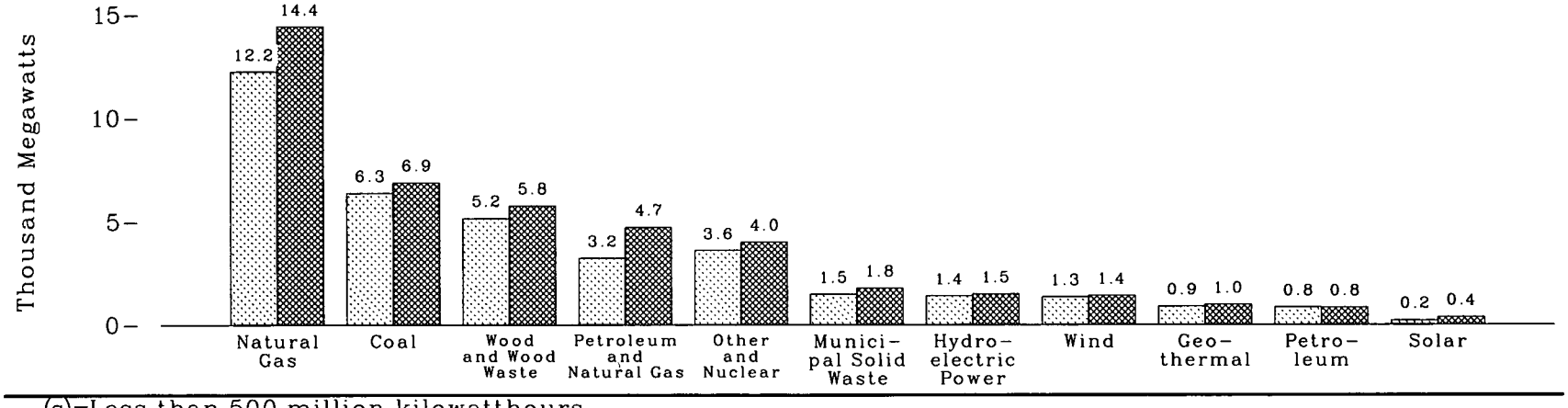
Sources: • 1960 through September 1977—Federal Power Commission, Form FPC-5, "Monthly Statement of Electric Operating Revenues and Income." • October 1977 through February 1980—Federal Energy Regulatory Commission, Form FPC-5, "Monthly Statement of Electric Operating Revenues and Income." • March 1980 through 1982—Federal Energy Regulatory Commission, Form FERC-5, "Electric Utility Company Monthly Statement." • 1983—Energy Information Administration (EIA), Form EIA-826, "Electric Utility Company Monthly Statement." • 1984-1990—EIA, Form EIA-861, "Annual Electric Utility Report." • 1991—EIA, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions."

Figure 103. Nonutility Power Overview, 1989 and 1990

Gross Generation



Installed Nameplate Capacity



(s)=Less than 500 million kilowatthours.

Notes: • Data cover facilities with installed nameplate capacity of 5 megawatts or more. • Wood includes wood wastes. Waste is municipal solid waste, other waste, and sludge. • Other is waste gases, waste heat, agricultural waste, railroad ties, rubber, sulfur, and hydrogen.

Source: Table 103.

Table 103. Nonutility Power Overview, 1989 and 1990

Item	1989	1990	Percent Change
Supply and Disposition (million kilowatthours)			
Gross Generation	187,079	215,196	15
Receipts	59,776	61,487	3
Sales to Electric Utilities	81,229	104,786	29
Facility Use	165,626	171,897	4
Gross Generation (million kilowatthours)	**187,079**	**215,196**	**15**
Coal	30,270	30,870	2
Natural Gas	86,172	99,093	15
Petroleum	5,897	5,441	-8
Hydroelectric Power	5,922	6,235	5
Geothermal	5,046	6,872	36
Wood and Wood Waste	27,543	30,689	11
Municipal Solid Waste [1]	6,394	9,129	43
Solar	489	663	36
Wind	1,833	2,251	23
Nuclear	49	116	137
Other [2]	17,465	23,838	37
Installed Nameplate Capacity (megawatts)	**36,639**	**42,546**	**16**
Coal	6,346	6,851	8
Natural Gas	12,232	14,412	18
Petroleum	829	823	-1
Petroleum and Natural Gas (dual fired)	3,223	4,733	47
Hydroelectric Power	1,382	1,476	7
Geothermal	877	961	10
Wood and Wood Waste	5,151	5,751	12
Municipal Solid Waste [1]	1,466	1,765	20
Solar	200	360	80
Wind	1,337	1,403	5
Nuclear	19	19	0
Other [2]	3,577	3,993	12

[1] Also includes other waste and sludge.
[2] Includes over 50 percent waste gases, approximately 25 percent waste heat, and less than 25 percent agricultural waste, railroad ties, rubber, sulfur, and hydrogen.
Notes: • Data cover facilities with installed nameplate capacity of 5 megawatts or more. • Sum of components may not equal total due to independent rounding.
Source: Energy Information Administration, Form EIA-867, "Annual Nonutility Power Producer Report."

9. Nuclear Energy

Status of Nuclear Generating Units

At the end of 1991, there were 111 operable nuclear generating units in the United States, the same number as in 1990 (104).[1] Most of the units were located in the eastern half of the country. In addition, 8 units had received construction permits. No units had construction permits pending and there were no units on order.

Although the number of operable units reached an all-time high in 1990 and 1991, the total of 119 units in all stages of planning, construction, and operation was well below the total of 226 in 1974.[2] After 1974, many planned units were canceled; after 1977, no orders for new units were announced.

Several factors contributed to the decline in the number of planned nuclear units. Growth in electricity demand was slower than expected. Longer leadtimes for licensing and construction coupled with higher financing expenses increased the cost of nuclear power plants, and rising interest rates and an uncertain economic environment diminished electric utilities' willingness to commission new plants.

Contributions to Electricity Net Generation

Nuclear power's contribution to electricity net generation in the United States increased almost every year from the late 1950's through 1991 (105). In 1991, 613 billion kilowatthours (22 percent of all U.S. net generation) came from nuclear power. Net summer capability, a measure of the steady hourly output that generating equipment is expected to supply to the system, also increased almost every year, reaching 100 million kilowatts in 1990 and 1991.

[1]Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications.

[2]Energy Information Administration, *Monthly Energy Review* March 1992, DOE/EIA-0035(92/03) (Washington, DC, March 1992), Table 8.2.

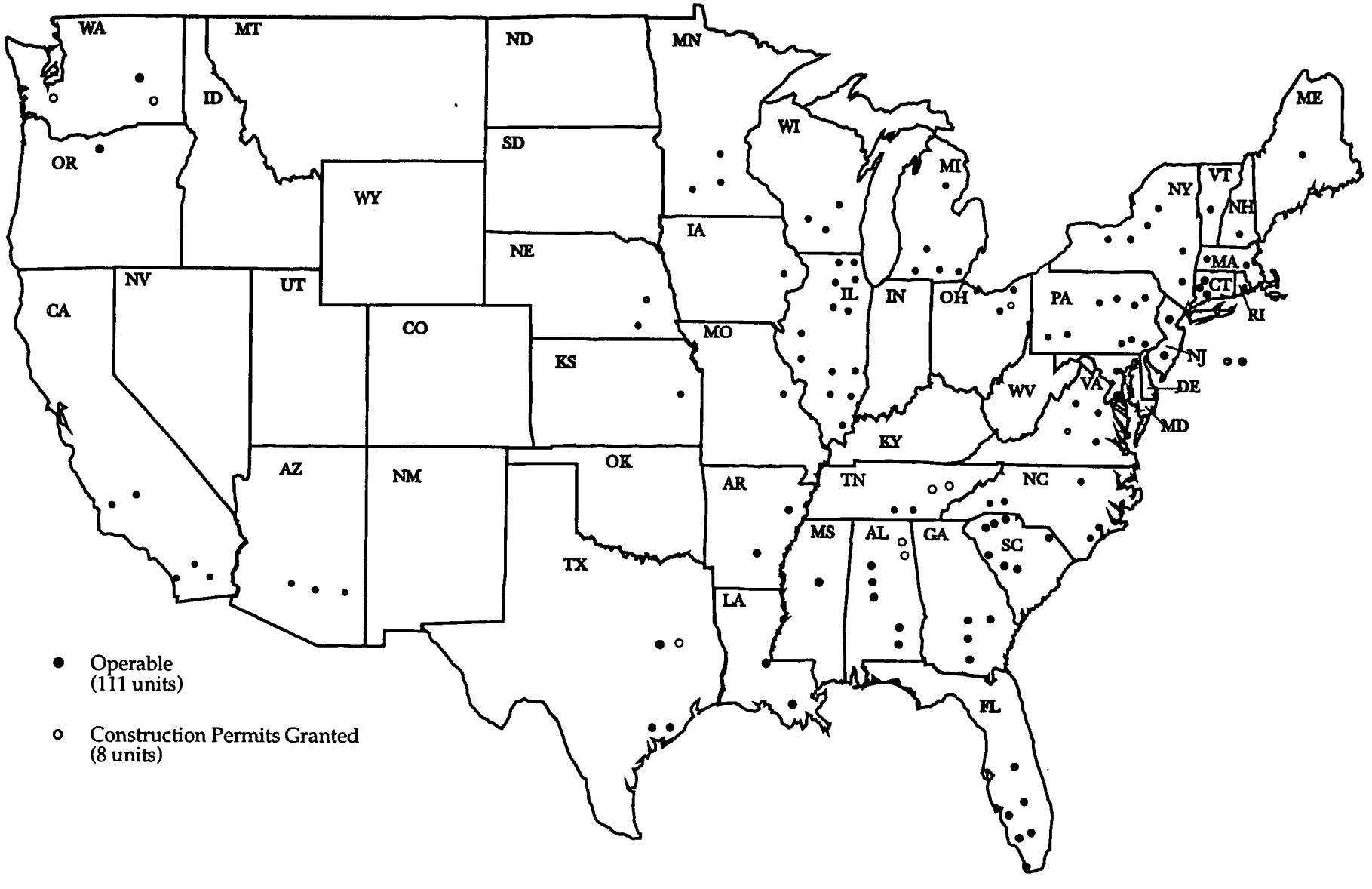
The Uranium Industry

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 (106). 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 27 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 buildups of inventories at electric utilities and foreign competition, caused the second major decline in production, which fell to 11 million pounds in 1985. In 1991, production fell to 8 million pounds.

Historically, domestic producers have faced competition from low-cost uranium imports. From 1949 through 1960, net imports actually exceeded domestic production (106). 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 1968 through 1974. With the gradual removal of the AEC restrictions during the 1977-to-1983 period, foreign uranium deliveries to the United States increased. In 1991, net imports of U_3O_8 totaled an estimated 12 million pounds.

Figure 104. Nuclear Generating Units, December 31, 1991



Note: Due to space limitations, symbols do not represent actual locations.
Source: Table 104.

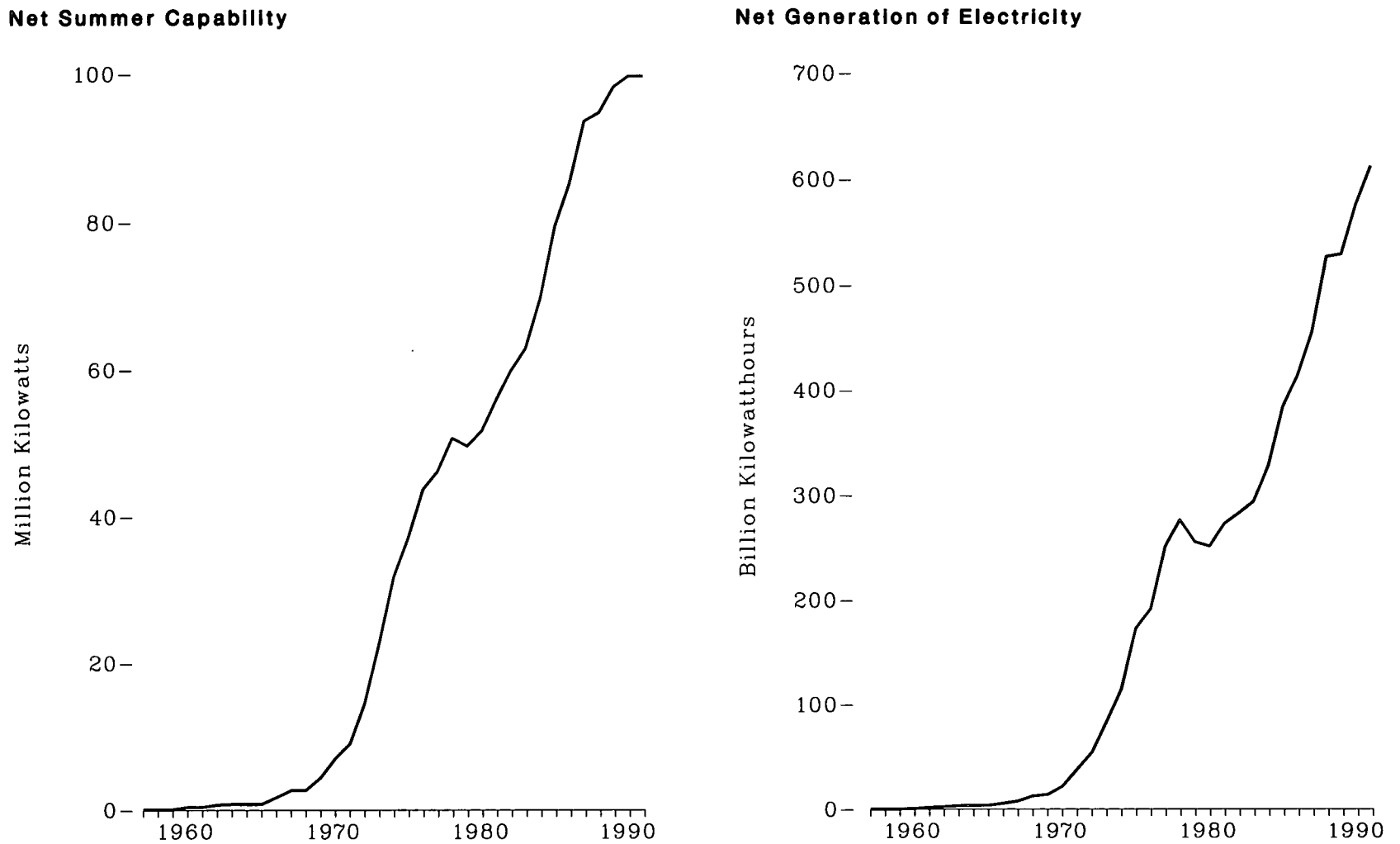
Table 104. Nuclear Generating Units, End of Year 1989-1991

(Number of Reactors)

Status	1989				1990				1991			
	Boiling Water Reactors	Pressurized Water Reactors	Other [1]	Total	Boiling Water Reactors	Pressurized Water Reactors	Other [2]	Total	Boiling Water Reactors	Pressurized Water Reactors	Other	Total
Operable [3]	38	72	0	110	38	73	0	111	38	73	0	111
In Startup [4]	0	1	0	1	0	0	0	0	0	0	0	0
Construction Permits Granted	2	8	0	10	1	7	0	8	1	7	0	8
Construction Permits Pending	0	0	0	0	0	0	0	0	0	0	0	0
On Order	0	0	0	0	0	0	0	0	0	0	0	0
Total	40	81	0	121	39	80	0	119	39	80	0	119

[1] Includes one gas-cooled reactor.
[2] High-temperature gas-cooled reactor.
[3] Units that have received a full-power license from the Nuclear Regulatory Commission.
[4] Units that have received a low-power license from the Nuclear Regulatory Commission authorizing fuel loading and low-power testing.
Sources: Compiled by the Energy Information Administration from Nuclear Regulatory Commission sources.

Figure 105. Nuclear Generating Units Net Summer Capability and Net Generation of Electricity, 1957-1991



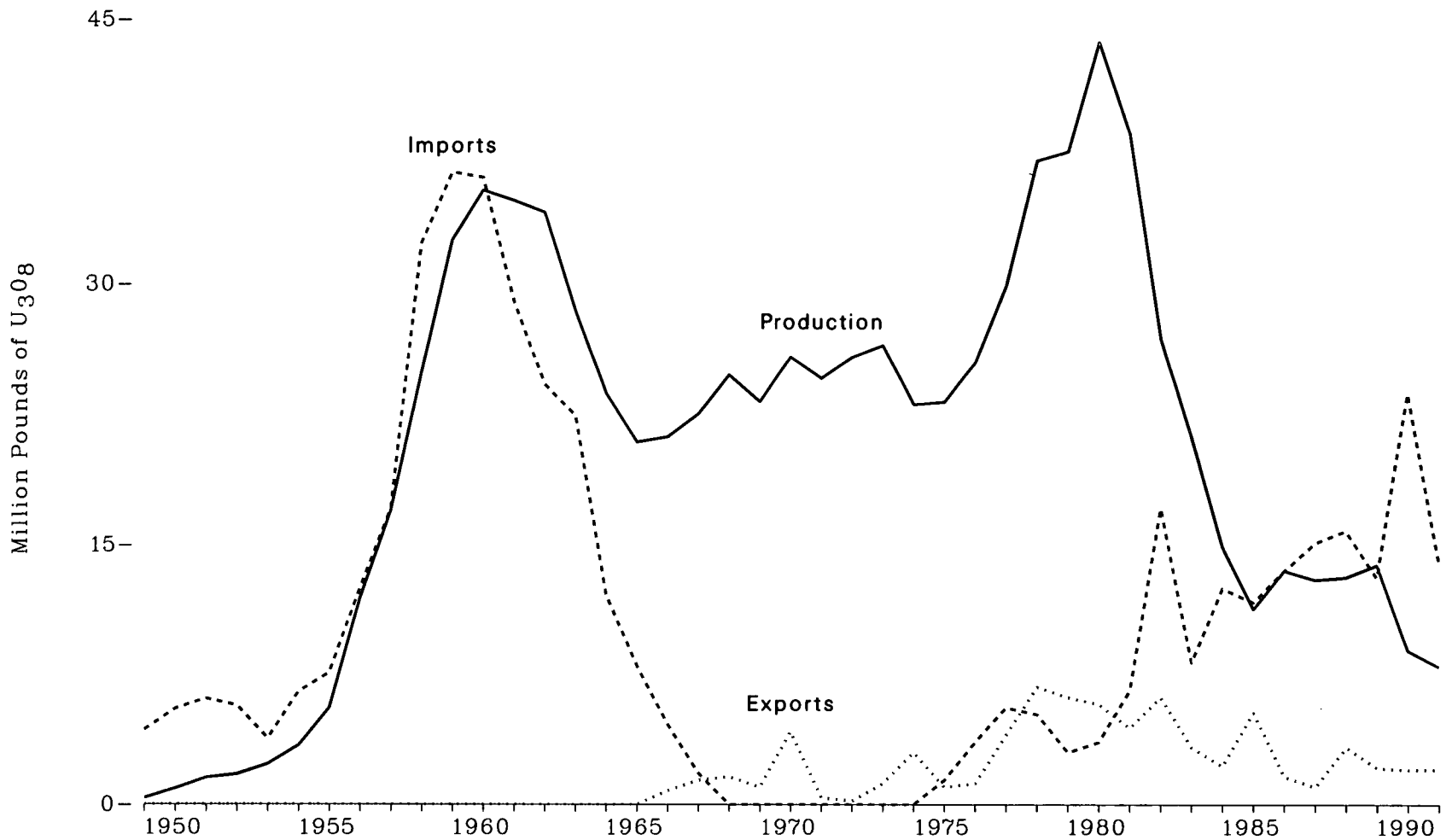
Source: Table 105.

Table 105. Nuclear Generating Units Net Summer Capability and Net Generation of Electricity, 1957-1991

Year	Operable Units [1,2]	Nuclear Electricity Net Generation	Nuclear Portion of Domestic Electricity Net Generation	Net Summer Capability of Operable Units [1,3]	Capacity Factor [3]
	Number	Billion Kilowatthours	Percent	Million Kilowatts	Percent
1957	1	[4]	[5]	0.1	NA
1958	1	0.2	[5]	0.1	NA
1959	1	0.2	[5]	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	[2] 29	54.1	3.1	[2] 14.5	NA
1973	[2] 39	83.5	4.5	[2] 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[6]	111	612.6	21.7	99.6	70.2

[1] At end of Year.
[2] See Appendix E, Note 18.
[3] See Glossary.
[4] Less than 0.05 billion kilowatthours.
[5] Less than 0.05 percent.
[6] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
NA = Not available.
Sources: **Operable Units:** • 1957-1972—Federal Power Commission, Form FPC-4, "Monthly Power Plant Report." • 1973 forward—Nuclear Regulatory Commission, *Licensed Operating Reactors*, (NUREG-0020), monthly. **Electricity Generation:** • 1957-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." **Net Summer Capability of Operable Units:** • 1957- 1983—See Appendix E, Note 17. • 1984 forward—EIA, Form EIA-860, "Annual Electric Generator Report."

Figure 106. Uranium Concentrate Production, Exports, and Imports, 1949-1991



Source: Table 106.

Table 106. Uranium Concentrate Production, Exports, and Imports, 1949-1991

(Million Pounds of U_3O_8)

Year	Domestic Production	Exports	Imports [1]
1949	0.36	0	4.3
1950	0.92	0	5.5
1951	1.54	0	6.1
1952	1.74	0	5.7
1953	2.32	0	3.8
1954	3.40	0	6.5
1955	5.56	0	7.6
1956	11.92	0	12.5
1957	16.96	0	17.1
1958	24.88	0	32.3
1959	32.48	0	36.3
1960	35.28	0	36.0
1961	34.70	0	29.0
1962	34.02	0	24.2
1963	28.44	0	22.4
1964	23.70	0	12.1
1965	20.88	0	8.0
1966	21.18	0.8	4.6
1967	22.51	1.4	1.8
1968	24.74	1.6	0
1969	23.22	1.0	0
1970	25.81	4.2	0
1971	24.55	0.4	0
1972	25.80	0.2	0
1973	26.47	1.2	0
1974	23.06	3.0	0
1975	23.20	1.0	1.4
1976	25.49	1.2	3.6
1977	29.88	4.0	5.6
1978	36.97	6.8	5.2
1979	37.47	6.2	3.0
1980	43.70	5.8	3.6
1981	38.47	4.4	6.6
1982	26.87	6.2	17.1
1983	21.16	3.3	8.2
1984	14.88	2.2	12.5
1985	11.31	5.3	11.7
1986	13.51	1.6	13.5
1987	12.99	1.0	15.1
1988	13.13	3.3	15.8
1989	13.84	2.1	13.1
1990	8.89	2.0	23.7
1991[2]	7.95	2.0	14.0

[1] Import quantities through 1970 are reported for fiscal years. Prior to 1968 the Atomic Energy Commission was the sole purchaser of all imported U_3O_8.
[2] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
NA = Not available.
Note: Import and export data prior to 1982 are for transactions conducted by uranium suppliers only. For 1982 forward, transactions by uranium buyers (consumers) are included. In 1983, buyer imports totalled 3,800 million pounds of U_3O_8 and buyer exports totalled 1,000 million pounds of U_3O_8. Buyer imports and exports prior to 1982 are believed to be small.
Sources: • 1949-1967—U.S. Department of Energy, Grand Junction Office, *Statistical Data of the Uranium Industry*, Report No. GJO-100, annual. • 1968-1990—Energy Information Administration (EIA), *Uranium Industry Annual 1990*. • 1991—EIA, Form EIA-858, "Uranium Industry Annual Survey."

10. Renewable Energy

Emerging Sources of Renewable Energy

After World War II, the United States relied on petroleum, natural gas, and coal, which, in addition to having high Btu contents, were inexpensive, readily accessible, and easy to transport. During the early 1970's, however, increases in the prices of petroleum and natural gas, concerns about the stability of supply, and environmental factors stimulated interest in alternative sources of energy. Sources such as the burning of wood for heat and the use of flat-plate solar thermal collectors for domestic hot water lend themselves to on-site applications, while sources such as photovoltaics can be used to generate electricity for transmission to distant markets. Although some sources with the potential for centralized applications, such as windmills, heliostats, and ocean thermal energy conversion, are not yet widely used, they may eventually contribute significantly to the domestic energy supply.

Renewable Energy Consumption

In 1990, electric utilities reported 3.1 quadrillion Btu of renewable energy consumption, most of which was hydroelectric power (107).[1] (That consumption is included in the Energy Information Administration's total energy consumption.) In addition, nonutility power producers reported 0.6 quadrillion Btu of renewable energy consumption, most of which was biofuels. Consumption of biofuels by other consumers for purposes other than electricity generation totaled 2.5 quadrillion Btu. When U.S. total energy consumption is adjusted by the addition of those data, total renewable energy consumption accounted for a 7-percent share of energy consumed.

[1]Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications.

Wood and Other Biofuels

Energy derived from wood totaled 2.3 quadrillion Btu in 1990 (108). Almost 1.7 quadrillion Btu of wood was consumed by the industrial sector. Industries with ready access to wood and wood byproducts, such as the paper and lumber industries, relied heavily on wood as an energy source. Energy derived from other biofuels, such as agricultural and solid wastes and alcohol fuels, totaled 0.5 quadrillion Btu in 1990.

Solar Energy

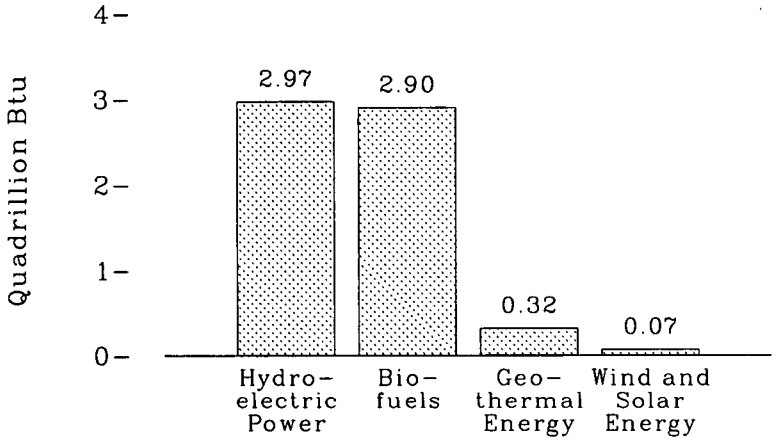
Because it is difficult to measure solar energy consumption directly, producer shipments of equipment are used as an indication of solar energy consumption. Shipments of low-temperature collectors, used primarily for heating swimming pools, peaked at 12 million square feet in 1980 but totaled only 3.6 million square feet in 1990 (110). Shipments of medium-temperature collectors, used for pool heating and 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, fell to 0.7 million square feet in 1988. In 1990, 2.5 million square feet were shipped. Shipments of high-temperature collectors, used for electricity generation, reached 5.2 million square feet in 1990. Shipments of photovoltaic cells and modules, which have a wide variety of applications, totaled 14 thousand peak kilowatts in 1990 (113).

Geothermal Energy

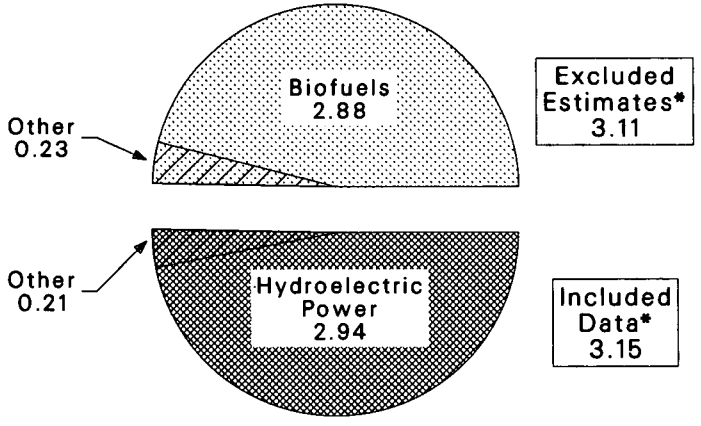
Most geothermal energy is trapped below the Earth's crust in layers of molten rock, but where the crust is thinner, geothermal energy can be harnessed. Geothermal energy may be used directly, for purposes such as space heating, or converted to electricity. In 1960, The Geysers in California became the first U.S. utility to generate electricity from geothermal steam. Subsequently, electricity generation from geothermal sources trended upward and peaked at 10.8 billion kilowatthours of electricity in 1987 (114). From 1988 to 1991, however, electricity generation from geothermal sources declined, falling to 8.1 billion kilowatthours in 1991.

Figure 107. Renewable Energy Consumption Estimates

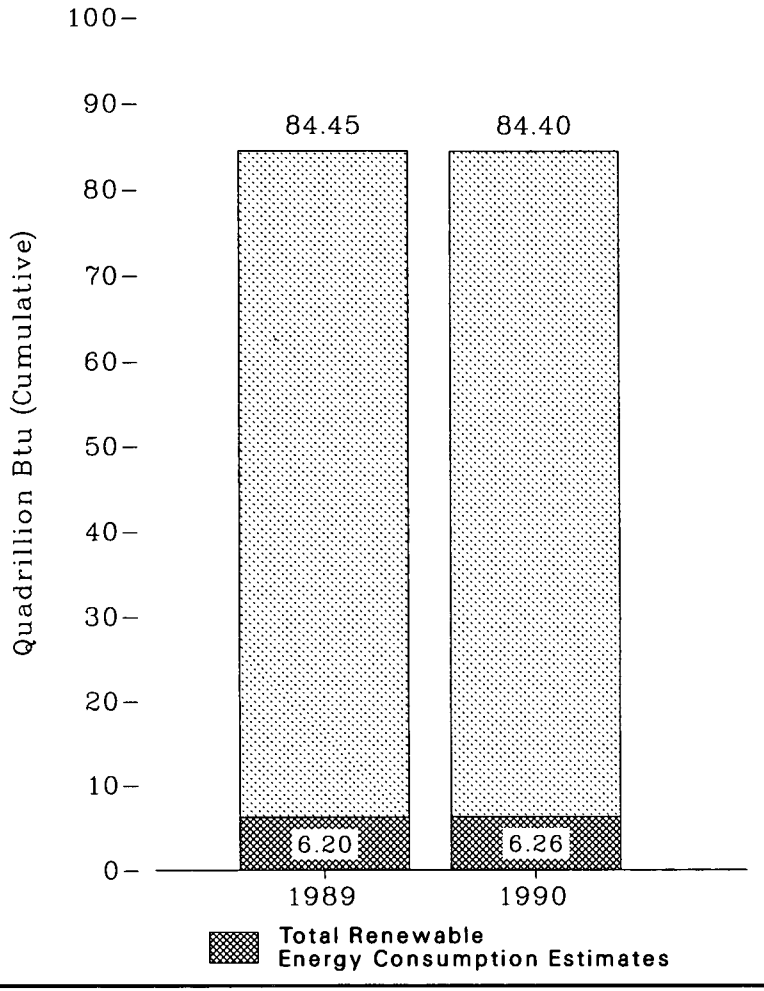
Renewable Energy Consumption Estimates by Source, 1990



Renewable Energy Consumption Estimates, 1990
(Quadrillion Btu)



Adjusted Total Energy Consumption Estimates, 1989 and 1990



*Excluded estimates are those excluded from EIA's total energy consumption data. Included data are those included in EIA's total energy consumption data.

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

Source: Table 107.

Table 107. Renewable Energy Consumption Estimates, 1989 and 1990

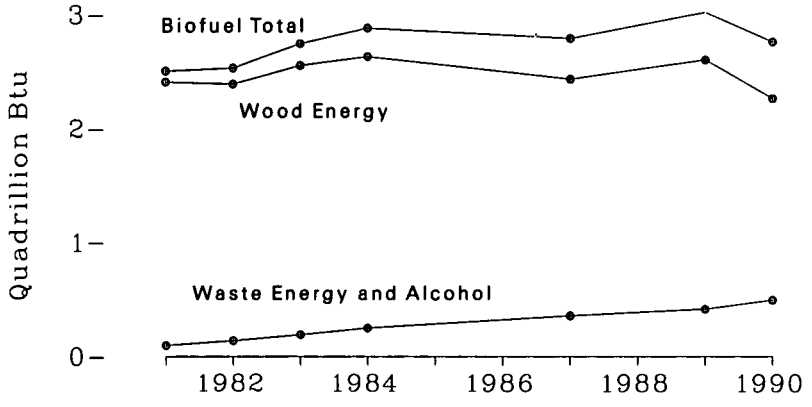
(Quadrillion Btu, Except as Noted)

Activity, Consuming Sector, and Energy Source	1989	1990
Data Included in EIA's [1] Total Energy Consumption	**3.10**	**3.15**
Consumption To Generate Electricity		
Electric Utilities		
Hydroelectric Power	2.74	2.89
Geothermal Energy	0.20	0.18
Biofuels	0.02	0.02
Wind Energy [2]	[3]	[3]
Industrial		
Hydroelectric Power	0.03	0.03
Other Electricity Generated from Renewable Energy		
Imported Electricity [4]	0.27	0.23
Exported Electricity [4]	0.16	0.21
Estimates Excluded from EIA's Total Energy Consumption	**3.10**	**3.11**
Consumption by Nonutility Power Producers To Generate Electricity		
Hydroelectric Power (Additional Industrial Use)	0.03	0.03
Geothermal Energy	0.11	0.14
Biofuels	0.35	0.40
Solar Energy	0.01	0.01
Wind Energy	0.02	0.02
Consumption by End Users		
Biofuels		
Industrial	1.81	1.80
Residential	0.67	0.58
Transportation	0.07	0.10
Solar Energy	0.03	0.03
Photovoltaic Energy	[3]	[3]
Total Renewable Energy Consumption Estimates	**6.20**	**6.26**
Adjusted Total Energy Consumption Estimates [5]	**84.45**	**84.40**
Total Renewable Energy Consumption Estimates Share of Adjusted Total Energy Consumption Estimates (Percent)	**7.3**	**7.4**

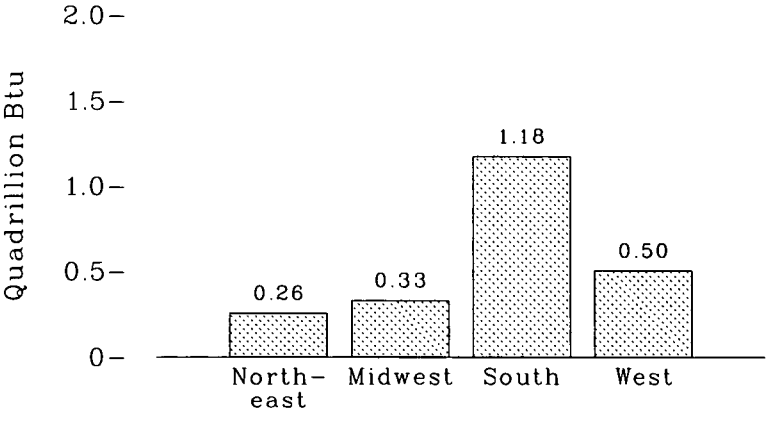
[1] Energy Information Administration.
[2] Includes photovoltaic and solar thermal energy.
[3] Less than 0.005 quadrillion Btu.
[4] Kilowatthours of imported and exported electricity, which are assumed to be generated by hydroelectric power, are converted to Btu using the heat rate factor for fossil fuel steam-electric power plants given in Table A7 of this report.
[5] Adjusted Total Energy Consumption Estimates is EIA's Total Energy Consumption from Table 3 of this report plus Estimates Excluded from EIA's Total Energy Consumption from this table.
Note: Sum of components may not equal total due to independent rounding.
Sources: **Data Included in EIA's Total Energy Consumption:** Tables 91, 92, 114, and A7. **Estimates Excluded from EIA's Total Energy Consumption:** EIA, Office of Coal, Nuclear, Electric and Alternate Fuels.

Figure 108. Wood and Waste Energy and Alcohol Fuels Consumption

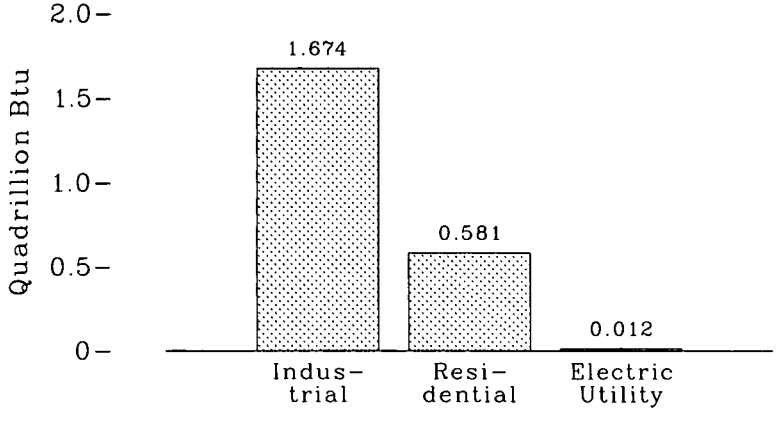
Biofuel Total, 1981-1984, 1987, 1989, and 1990



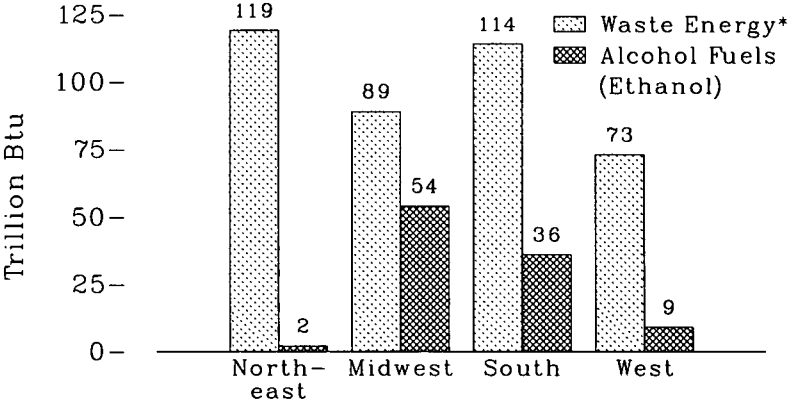
Wood Energy by Census Region, 1990



Wood Energy by Sector, 1990



Waste Energy and Alcohol Fuels by Census Region, 1990



*Mass burning, manufacturing waste, refuse-derived fuel, and methane recovered from landfills.

Notes: • No data are available for 1985, 1986, and 1988. • See Appendix D for Census regions. • Because vertical scales differ, graphs should not be compared.

Source: Table 108.

Table 108. Wood and Waste Energy and Alcohol Fuels Consumption by Sector and Census Region, Selected Years, 1981-1990

(Trillion Btu)

Energy Source	1981	1982	1983	1984	1987	1989	1990
Wood Energy	**2,495**	**2,478**	**2,640**	**2,633**	**2,437**	**2,604**	**2,267**
Sector							
Industrial	1,602	1,516	1,690	1,679	1,576	1,673	1,674
Residential	869	937	925	923	852	918	581
Commercial	21	22	22	22	[1]	[1]	[1]
Electric Utility	3	2	3	9	9	13	12
Census Region							
Northeast	395	358	380	349	350	432	256
Midwest	335	343	323	341	474	552	330
South	1,349	1,392	1,526	1,482	1,147	1,161	1,176
West	416	385	411	461	467	459	505
Waste Energy [2]	**88**	**120**	**157**	**208**	**289**	**344**	**394**
Census Region							
Northeast	16	20	36	39	60	84	119
Midwest	5	13	17	21	47	64	89
South	37	50	56	57	108	145	114
West	30	36	48	91	74	51	73
Alcohol Fuels (Ethanol)	**7**	**19**	**35**	**43**	**69**	**71**	**101**
Census Region							
Northeast	[3]	[3]	[3]	[3]	[3]	[3]	2
Midwest	4	11	22	25	38	38	54
South	1	4	8	13	26	26	36
West	2	4	5	5	4	7	9
Biofuel Total	**2,507**	**2,534**	**2,748**	**2,884**	**2,794**	**3,019**	**2,762**

[1] Commercial wood energy use is not included because there are no accurate data sources to provide reliable estimates. However, from the "1986 Nonresidential Buildings Energy Consumption Survey" conducted by the Energy Information Administration (EIA), it is estimated that commercial sector use is about 20 trillion Btu to 40 trillion Btu.

[2] Mass burning, manufacturing waste, refuse-derived fuel, and methane recovered from landfills.

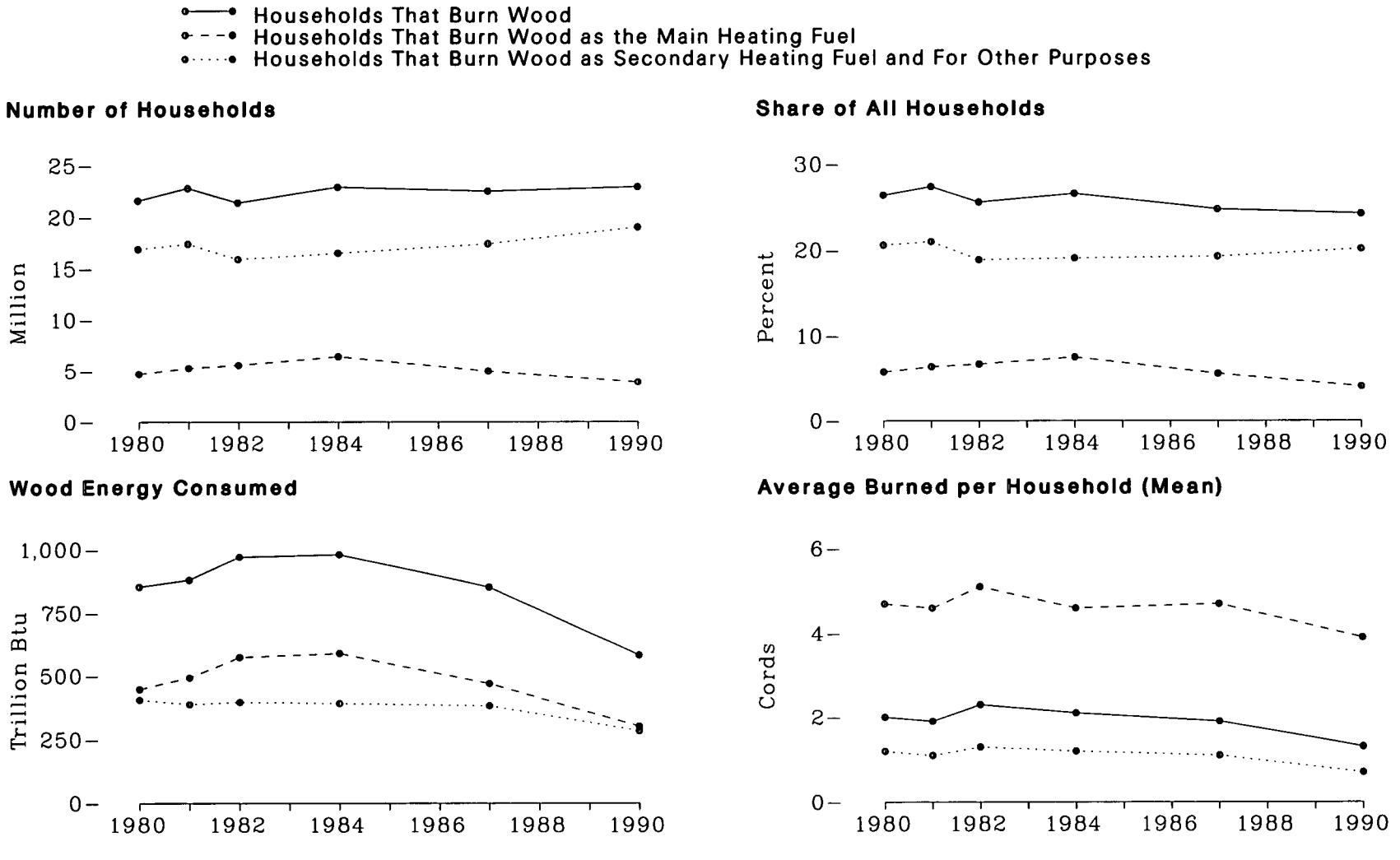
[3] Less than 0.5 trillion Btu.

Notes: • No data are available for years not shown. • See Appendix D for Census regions. • Sum of components may not equal total 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**—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, Preliminary. **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).

≠ Sum of the parts
Wood data were adjusted ↑ in this AER.
Expect that totals should have ↑, too.
Ask CNEAF to resolve in AER '92.

Figure 109. Households That Burn Wood, Selected Years, 1980-1990



Note: No data are available for 1983, 1985, 1988, and 1989.
Source: Table 109.

Table 109. Households That Burn Wood, Selected Years, 1980-1990

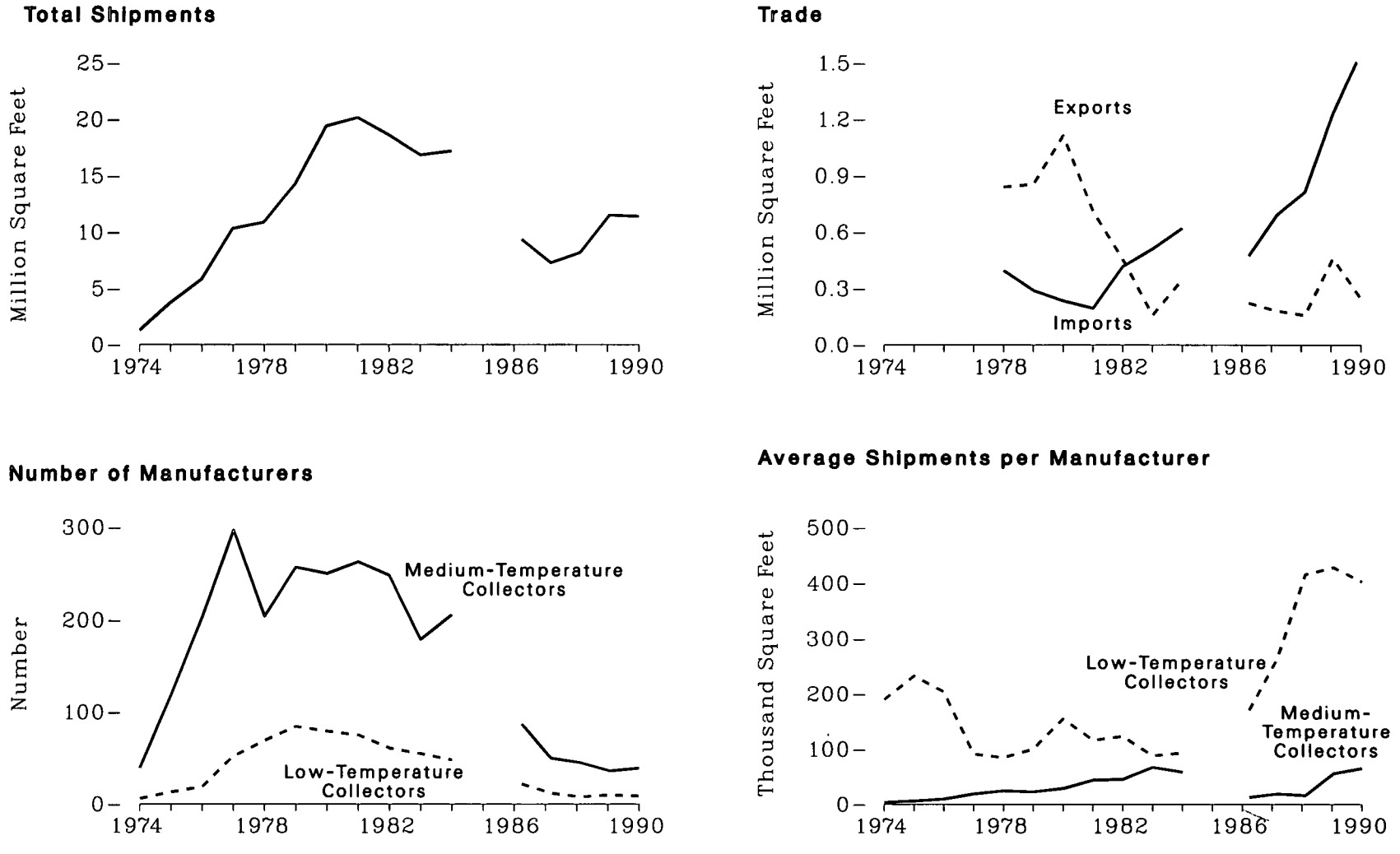
Household Characteristic	1980	1981	1982	1984	1987	1990 [1]
Households That Burn Wood						
Number of Households (millions)	21.6	22.8	21.4	22.9	22.5	22.9
Share of All U.S. Households (percent)	26.4	27.4	25.6	26.6	24.8	24.3
Number of Cords Burned (millions)	42.7	44.0	48.6	49.0	42.6	29.1
Average Number of Cords Burned per Household						
Mean	2.0	1.9	2.3	2.1	1.9	1.3
Median	0.7	1.0	1.0	1.0	0.7	0.5
Wood Energy Consumed (trillion Btu)	854	881	971	981	853	582
Households That Burn Wood as Main Heating Fuel						
Number of Households (millions)	4.7	5.3	5.6	6.4	5.0	3.9
Share of All U.S. Households (percent)	5.8	6.4	6.7	7.5	5.6	4.1
Number of Cords Burned (millions)	22.4	24.7	28.7	29.4	23.5	15.0
Average Number of Cords Burned per Household						
Mean	4.7	4.6	5.1	4.6	4.7	3.9
Median	3.3	3.0	4.0	4.0	4.0	3.3
Wood Energy Consumed (trillion Btu)	448	493	574	589	470	300
Households That Burn Wood as Secondary Heating Fuel and for Other Purposes						
Number of Households (millions)	16.9	17.4	15.9	16.5	17.4	19.0
Share of All U.S. Households (percent)	20.6	21.0	18.9	19.1	19.3	20.2
Number of Cords Burned (millions)	20.3	19.4	19.9	19.6	19.2	14.1
Average Number of Cords Burned per Household						
Mean	1.2	1.1	1.3	1.2	1.1	0.7
Median	0.3	0.5	0.5	0.5	0.5	0.3
Wood Energy Consumed (trillion Btu)	406	388	397	392	383	282

[1] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

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 110. Solar Thermal Collector Shipments and Trade, 1974-1984 and 1986-1990



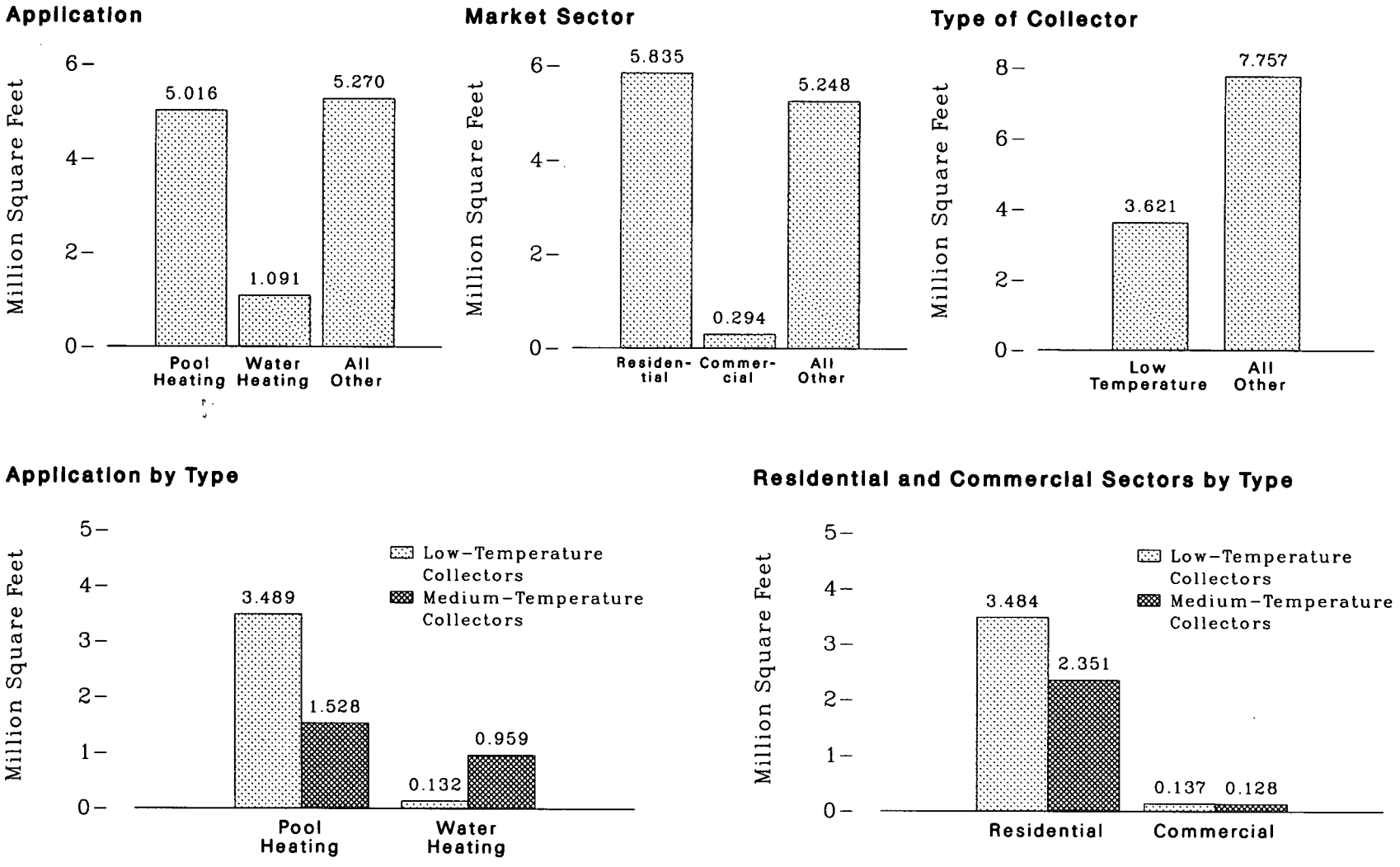
Notes: • Data were not collected for 1985. • Medium-temperature collectors include special collectors. • Because vertical scales differ, graphs should not be compared.
Source: Table 110.

Table 110. Solar Thermal Collector Shipments by Type and Trade, 1974-1984 and 1986-1990

Year	Low-Temperature Collectors			Medium-Temperature Collectors [1]			High-Temperature Collector Shipments (million square feet)	Total Shipments [2]	Imports	Exports
	Number of Manufacturers	Quantity Shipped (million square feet)	Average Shipments per Manufacturer (thousand square feet)	Number of Manufacturers	Quantity Shipped (million square feet)	Average 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	20,133	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
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	9	3.62	402.4	39	2.52	64.6	5.24	11,378	1,562	245

[1] Medium-temperature collector shipments include special collectors.
[2] Total shipments include all types of solar thermal collectors (low-temperature, medium-temperature, high-temperature, and other) and internationally traded collectors.
NA = Not available.
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 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 forward—EIA, *Solar Collector Manufacturing Activity 1990* (February 1992), Table 2. **Total Shipments, Imports, and Exports:** EIA, *Solar Collector Manufacturing Activity 1990* (February 1992), Table 1.

Figure 111. Solar Thermal Collector Shipments by Type and End Use, 1990



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 111.

Table 111. Solar Thermal Collector Shipments by Type and End Use, 1990

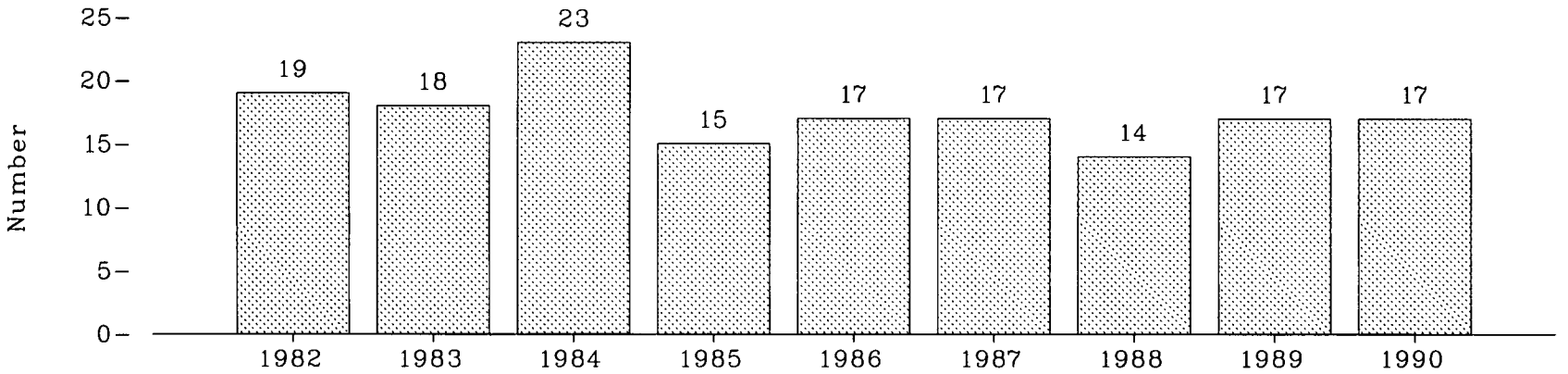
(Thousand Square Feet)

End Use	Low-Temperature Collectors	Medium-Temperature Collectors [1]	High-Temperature Collectors [2]	Total
Application Total	**3,621**	**2,519**	**5,237**	**11,378**
Pool Heating	3,489	1,528	0	5,016
Water Heating	132	959	[3]	1,091
Electricity Generation	0	1	5,207	5,209
Other [4]	[3]	32	29	61
Market Sector Total	**3,621**	**2,519**	**5,237**	**11,378**
Residential	3,484	2,351	[3]	5,835
Commercial	137	128	29	294
Electric Utility	0	15	5,207	5,222
Other [5]	0	25	1	26

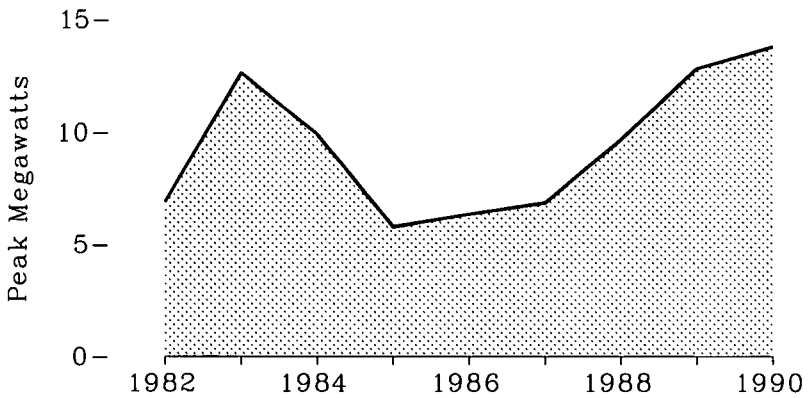
[1] Includes special collectors.
[2] Parabolic dish/trough collectors used primarily by independent power producers to generate electricity for the electric grid.
[3] Less than 500 square feet.
[4] Collectors for combined space and water heating, process heating, space cooling, and space heating.
[5] Collector shipments to industrial and government sectors.
Note: Sum of components may not equal total due to independent rounding.
Source: Energy Information Administration, *Solar Collector Manufacturing Activity 1990* (February 1992), Tables 6 and 7.

Figure 112. Photovoltaic Cell and Module Shipments and Trade

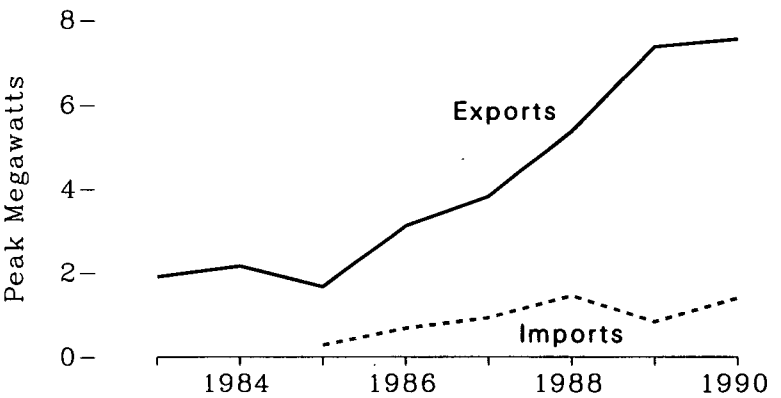
Number of Companies Reporting Shipments, 1982-1990



Shipments, 1982-1990



Trade, 1983-1990



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 112.

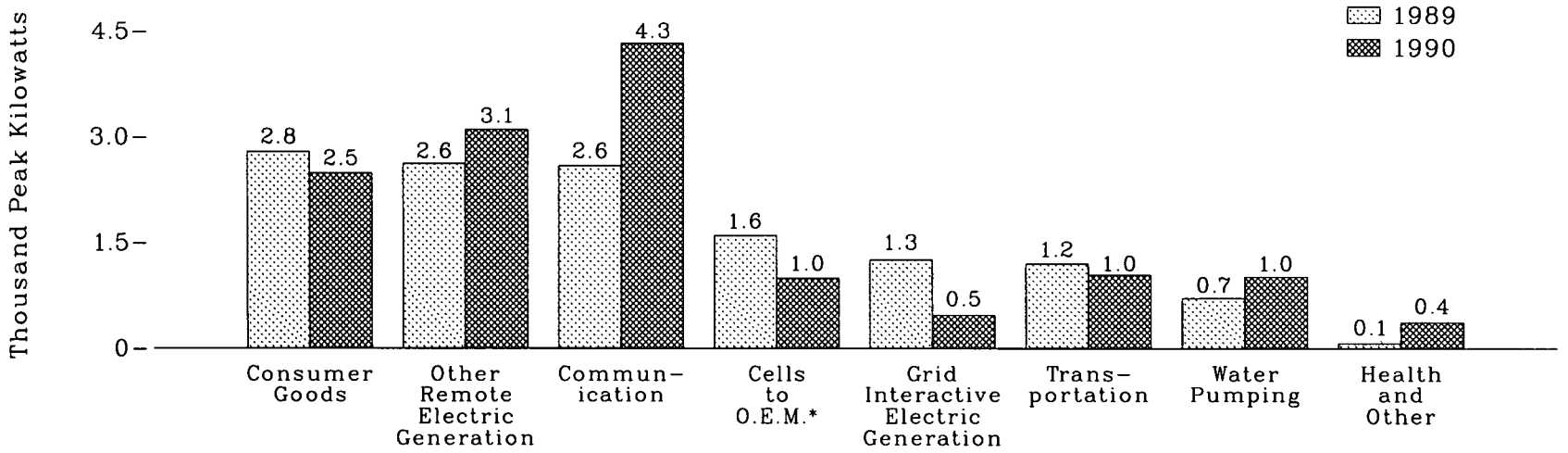
Table 112. Photovoltaic Cell and Module Shipments and Trade, 1982-1990

Year	Number of Companies Reporting Shipments	Total Shipments [1]	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[2]	15	5,769	285	1,670
1986[2]	17	6,333	678	3,109
1987[2]	17	6,850	921	3,821
1988[2]	14	9,676	1,453	5,358
1989[2]	17	12,825	826	7,363
1990[2]	[3] 17	[3] 13,787	1,398	7,543

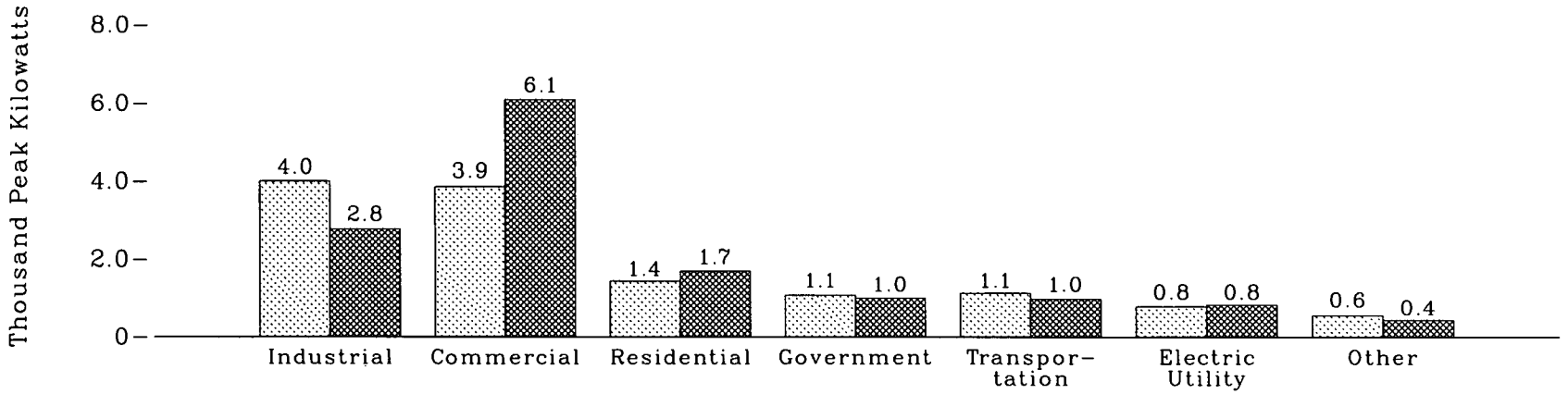
[1] Total shipments include all types of photovoltaic cells and modules (single-crystal silicon, cast silicon, ribbon silicon, thin-film silicon, concentrator silicon, and others) and internationally traded cells and modules.
[2] Shipments of modules for space satellite applications are not included.
[3] Data were imputed for one nonrespondent who exited the industry during the year.
NA = Not available.
Source: Energy Information Administration, *Solar Collector Manufacturing Activity 1990* (February 1992), Table 15.

Figure 113. Photovoltaic Cell and Module Shipments by End Use, 1989 and 1990

By Application



By Market Sector



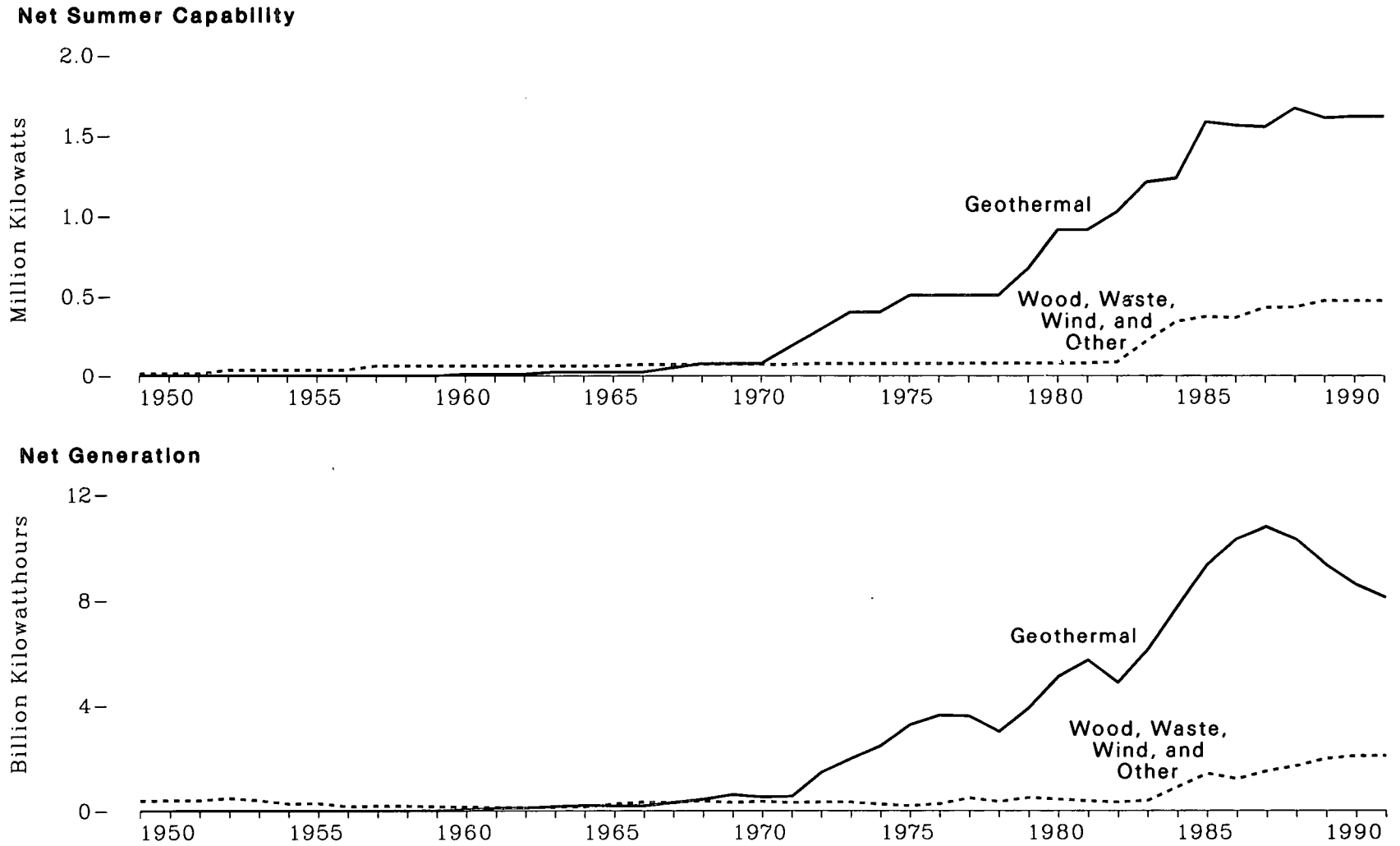
*Original Equipment Manufacturers.
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 113.

Table 113. Photovoltaic Cell and Module Shipments by End Use, 1989 and 1990

End Use	Amount Shipped (peak kilowatts)		Percent of Total	
	1989	1990	1989	1990
Application Total	**12,825**	**13,787**	**100.0**	**100.0**
Health	5	5	[1]	[1]
Water Pumping	711	1,014	5.5	7.4
Transportation	1,196	1,039	9.3	7.5
Communication	2,590	4,320	20.2	31.3
Consumer Goods	2,788	2,484	21.7	18.0
Electric Generation				
Grid Interactive	1,251	469	9.8	3.4
Other Remote	2,620	3,097	20.4	22.5
Cells to Original Equipment Manufacturers	1,595	993	12.4	7.2
Other [2]	69	366	0.5	2.7
Market Sector Total	**12,825**	**13,787**	**100.0**	**100.0**
Residential	1,439	1,700	11.2	12.3
Commercial	3,850	6,086	30.0	44.1
Government	1,077	1,002	8.4	7.3
Industrial	3,993	2,767	31.1	20.1
Electric Utility	785	826	6.1	6.0
Transportation	1,130	974	8.8	7.1
Other [3]	551	432	4.3	3.1

[1] Less than 0.05 percent.
[2] Represents applications such as "marine".
[3] Represents markets such as the "educational sector".
Note: Sum of components may not equal total 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 1990* (February 1992), Tables 18 and 19.

Figure 114. Electric Utility Net Summer Capability and Net Generation of Electricity by Renewable Energy Resource, 1949–1991



Source: Table 114.

Table 114. Electric Utility Net Summer Capability and Net Generation of Electricity by Renewable Energy Resource, 1949-1991

Year	Geothermal		Wood and Waste		Wind and Other [1]	
	Net Summer Capability [2] (thousand kilowatts)	Net Generation (million kilowatthours)	Net Summer Capability [2] (thousand kilowatts)	Net Generation (million kilowatthours)	Net Summer Capability [2] (thousand kilowatts)	Net Generation (million kilowatthours)
1949	[3]	[3]	13	386	0	0
1950	[3]	[3]	13	390	0	0
1951	[3]	[3]	13	391	0	0
1952	[3]	[3]	37	482	0	0
1953	[3]	[3]	37	389	0	0
1954	[3]	[3]	37	263	0	0
1955	[3]	[3]	37	276	0	0
1956	[3]	[3]	37	152	0	0
1957	[3]	[3]	64	177	0	0
1958	[3]	[3]	64	175	0	0
1959	[3]	[3]	64	153	0	0
1960	11	33	64	140	NA	NA
1961	11	94	64	126	NA	NA
1962	11	100	64	128	NA	NA
1963	24	168	64	128	NA	NA
1964	24	204	64	148	NA	NA
1965	24	189	64	269	NA	NA
1966	24	188	72	334	NA	NA
1967	51	316	72	316	NA	NA
1968	78	436	72	375	NA	NA
1969	78	615	72	320	NA	NA
1970	78	525	72	356	NA	NA
1971	184	548	72	311	NA	NA
1972	290	1,453	77	331	NA	NA
1973	396	1,966	77	328	NA	NA
1974	396	2,453	77	251	NA	NA
1975	502	3,246	77	191	NA	NA
1976	502	3,616	77	266	NA	NA
1977	502	3,582	77	481	NA	NA
1978	502	2,978	77	338	NA	NA
1979	667	3,889	78	498	NA	NA
1980	909	5,073	78	433	NA	NA
1981	909	5,686	78	368	[4]	NA
1982	1,022	4,843	79	321	6	NA
1983	1,207	6,075	212	379	6	3
1984	1,231	7,741	321	886	17	12
1985	1,580	9,325	350	1,383	18	16
1986	1,558	10,308	343	1,177	19	18
1987	1,549	10,775	401	1,477	25	14
1988	1,667	10,300	421	1,674	7	10
1989	1,606	9,342	465	1,965	4	3
1990	1,614	8,581	464	2,067	4	3
1991[5]	1,614	8,087	464	2,072	4	4

[1] Includes photovoltaic and solar thermal energy.
[2] At end of year.
[3] No geothermal capability prior to 1960.
[4] Less than 500 kilowatts.
[5] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
NA = Not available.
Note: For the definition of net summer capability, see Glossary.
Sources: **Net Summer Capability at End of Year:** • 1960-1984—Energy Information Administration (EIA) estimates. • 1985 forward—EIA, Form EIA-860, "Annual Electric Generator Report." **Net Generation:** • 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—EIA, Form EIA-759, "Monthly Power Plant Report."

11. International Energy

World Leaders in Energy Production

Worldwide energy production of 345 quadrillion Btu in 1990 was 60 quadrillion Btu greater than in 1980 (115).[1] The relative contributions of the four leading energy producers changed markedly over the 11-year period.

In 1980, the United States was the leading producer of energy and U.S. production of 65 quadrillion Btu accounted for 23 percent of the world total. The U.S.S.R., the second leading producer, accounted for 55 quadrillion Btu, a 19-percent share. In 1986, the U.S.S.R.'s production surpassed U.S. production for the first time; U.S.S.R. production remained higher than U.S. production through 1990. That year, U.S.S.R. production of 67.6 quadrillion Btu was slightly above U.S. production of 67.5 quadrillion Btu. Together, they accounted for 39 percent of the world total.

At 22 quadrillion Btu, Saudi Arabia was the third largest producer of energy in 1980. During the 1980-to-1990 period, Saudi Arabian production levels varied widely. The low point came in 1985, when Saudi Arabia cut back production of energy (primarily petroleum) to 8.6 quadrillion Btu in an effort to regain control of world oil markets. In 1990, Saudi Arabian production rose to 16 quadrillion Btu. That year, Saudi Arabia was the fourth largest producer in the world.

Energy production in China exhibited the greatest growth over the 11-year period. In 1980, China produced 18 quadrillion Btu of energy, much of which was coal. By 1990, Chinese production had reached 30 quadrillion Btu and China had displaced Saudi Arabia as the world's third largest producer.

Crude Oil Production in 1991

World production of crude oil totaled 60 million barrels per day in 1991, down 0.9 percent from the 1990 level (118). The most noticeable production declines occurred in Iraq, where a United Nations embargo on exports was in effect, and in Kuwait,[2] where production facilities were severely damaged by Iraq during its February retreat. In contrast, Saudi Arabia, the major supplier of replacement oil to world markets in 1991, increased production by 1.7 million barrels per day to 8.2 million barrels per day and accounted for 14 percent of the world total in 1991. Iran and Venezuela registered smaller gains. Crude oil production by all members of the Organization of Petroleum Exporting Countries (OPEC) combined accounted for 40 percent of the world total in 1991.

Among non-OPEC producers, the U.S.S.R., suffering the dissolution of its union, posted an 11-percent decline in crude oil production in 1991. However, the U.S.S.R. remained the world's largest crude oil producer, and its production of 9.6 million barrels per day accounted for 16 percent of the world total. U.S. crude oil production of 7.4 million barrels per day accounted for 12 percent of the world total. Due to higher production in the early part of 1991 in support of the Persian Gulf war, U.S. production for the year was up slightly (0.1 percent) for the first time since 1985. Among other non-OPEC countries, China, Mexico, the United Kingdom, and Canada were the primary producers of crude oil in 1991.

Natural Gas Production in 1990

World production of dry natural gas totaled 74 trillion cubic feet (125) and, on a Btu basis, equaled 21 percent of world energy production in 1990 (116). Natural gas production in 1990 was 3 percent above the 1989 level (125). The U.S.S.R. was the major producer and accounted for 29 trillion cubic feet, a 39-percent share of the world total. The United States was the second largest producer and accounted for 18 trillion cubic feet, a 24-percent share.

Coal Production in 1990

World production of coal totaled 5.2 billion short tons (130) and, on a Btu basis, equaled 27 percent of world energy production in 1990 (116). That level of coal production was 0.8 percent below the 1989 level (130).

[1]Numbers in parentheses indicate related tables. Annual data are the most recent available; they frequently are preliminary and may be revised in future publications.

[2]Energy Information Administration, *Monthly Energy Review* March 1992, DOE/EIA-0035(92/03) (Washington, DC, March 1992), Table 3.3a.

China, the leading producer, accounted for 1.2 billion short tons in 1990. Coal production in the United States, the second leading producer, surpassed 1 billion short tons for the first time. The U.S.S.R., the world's third largest producer of coal in 1990, accounted for 0.7 billion short tons.

Installed Capacity and Electricity Generation

As of January 1, 1990, world electricity installed capacity at all sites (including non-electric utilities) totaled 2.6 billion kilowatts (133). Most of the capacity (63 percent) was fossil fuel-fired. Hydroelectric generating capacity accounted for 24 percent and nuclear electric generating capacity accounted for 12 percent. Renewable sources such as biofuels and geothermal, solar, and wind energy accounted for a small but growing share of the world total.

World hydroelectric power net generation in 1990 totaled 2.1 trillion kilowatthours, the highest level since at least 1980 (134). Canada, the United States, Brazil, and the U.S.S.R. were the world leaders in hydroelectric power net generation and together accounted for close to half of the world total.

In 1991, nuclear-based electricity gross generation by reporting countries totaled 1.8 trillion kilowatthours (135). The U.S. share of the world total remained at 35 percent. France accounted for 18 percent, Japan for 11 percent, and Germany for 8 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 (123). 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 1979-1980 combined with the longer-term effects of conservation, 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. In 1986, the price of crude oil plunged 46 percent to $14.55 per barrel (71). 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 (71), and year-to-year growth in world petroleum consumption of only 0.3 percent was the lowest in 5 years (123).

Throughout the 1949-1990 period, the United States consumed more petroleum by far than any other country (123). In 1990, U.S. consumption accounted for 45 percent of the 38 million barrels per day consumed by the Organization for Economic Cooperation and Development (OECD) countries. Japan consumed 5 million barrels per day. Of the non-OECD countries, the U.S.S.R. was the biggest consumer, accounting for 8 million barrels per day.

Dry Natural Gas Consumption in 1990

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 three top producers of dry natural gas in 1990 were also the three top consumers (125 and 128).

Petroleum Stocks in OECD Countries

Following the oil supply disruptions in the mid-1970's, petroleum stocks held by members of the Organization for Economic Cooperation and Development (OECD) trended upward (124). In 1973, OECD petroleum stocks totaled 2.6 billion barrels. As of October 31, 1991 (the most recent month for which data are available), stocks were 3.6 billion barrels. Throughout the 19-year period, the United States held the largest share of total OECD stocks. U.S. petroleum stocks in 1973 totaled 1 billion barrels, a 39-percent share. In 1991, U.S. petroleum stocks of 1.6 billion barrels equaled a 45-percent share. Japan more than doubled its petroleum stocks over the same period, from 303 million barrels in 1973 to 619 million barrels in 1991.

The U.S.S.R. consumed 26 trillion cubic feet, an amount equal to 88 percent of its production of dry natural gas (128). U.S. consumption of dry natural gas totaled 19 trillion cubic feet, equal to 106 percent of production, and Canadian consumption totaled 2.5 trillion cubic feet, equal to 65 percent of production.

Coal Consumption in 1990

World coal consumption in 1990 totaled 5.2 billion short tons, down 2 percent from the level of consumption in 1989 (132). China, the United States, and the U.S.S.R., the world's leading producers of coal, were also the leading consumers. China consumed 1.2 billion short tons, the United States consumed 896 million short tons, and the U.S.S.R. consumed 661 million short tons of coal in 1990.

Energy Reserves

As of January 1, 1991, world crude oil reserves were estimated to equal about 999 billion barrels (117).[3] Two-thirds of the reserves were located in the Middle East, especially in Saudi Arabia, where about 39 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 any region in the world other than the Middle East.

Outside of the Middle East, three countries were estimated to have very large reserves: Venezuela, 59 billion barrels; the U.S.S.R., 57 billion barrels; and Mexico, 52 billion barrels. The United States, at 26 billion barrels, had the ninth largest amount of crude oil reserves in the world.

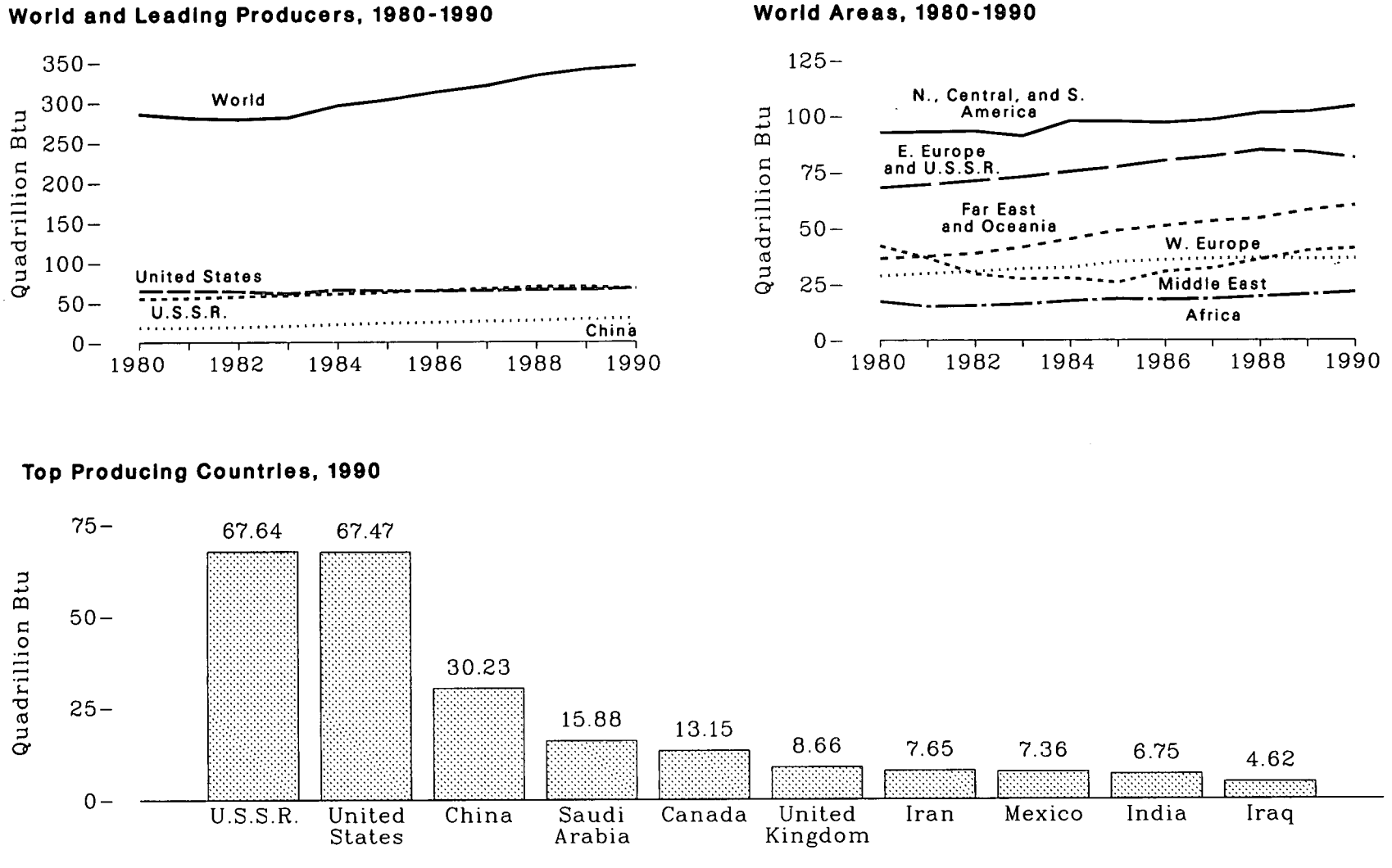
The distribution of the world's 4.2 quadrillion cubic feet of natural gas reserves was different from the distribution of crude oil reserves (117).[3] U.S.S.R. reserves of 1.6 quadrillion cubic feet made the Eastern Europe and U.S.S.R. region first in the world in amount of natural gas reserves. The Middle East was estimated to have reserves of 1.3 quadrillion cubic feet, primarily in Iran, as well as in the United Arab Emirates, Saudi Arabia, and Qatar. The United States, at 169 trillion cubic feet, had the fifth largest amount of natural gas reserves in the world.

As of the end of 1990, recoverable reserves of coal were estimated to be 1.2 trillion short tons (129).[4] The three countries with the most plentiful coal reserves were estimated to be the United States, with 265 billion short tons; the U.S.S.R., with 263 billion short tons; and China, with 183 billion short tons.

[3]*Oil and Gas Journal* data. The Energy Information Administration does not certify international reserves data. For more information, see notes and sources to Table 117 in this report.

[4]British Petroleum data. The Energy Information Administration does not certify international reserves data. For more information, see notes and sources to Table 129 in this report.

Figure 115. World Primary Energy Production by Area and Country



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 115.

Table 115. World Primary Energy Production by Area and Country, 1980-1990

(Quadrillion Btu)

Area and Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990 [1]
North, Central, and South America	**92.65**	**92.94**	**93.27**	**91.12**	**97.70**	**97.54**	**96.96**	**98.25**	**101.32**	**101.90**	**104.44**
Canada	10.06	9.77	9.66	10.14	11.01	11.80	11.71	12.32	13.17	13.10	13.15
Mexico	5.80	6.78	7.82	7.70	7.88	7.74	7.07	7.20	7.31	7.33	7.36
United States	64.65	64.30	63.79	61.08	65.67	64.55	63.99	64.58	65.77	65.85	67.47
Venezuela	5.71	5.58	5.22	5.00	5.02	4.78	5.18	5.14	5.56	5.72	6.29
Other	6.43	6.51	6.78	7.20	8.12	8.67	9.01	9.01	9.51	9.90	10.17
Western Europe	**28.68**	**29.75**	**30.70**	**31.91**	**32.41**	**35.01**	**35.84**	**36.52**	**36.84**	**36.35**	**36.54**
France	2.32	2.65	2.61	2.96	3.37	3.54	3.81	3.97	4.09	4.09	4.20
Netherlands	3.32	3.10	2.67	2.62	2.71	2.82	2.71	2.78	2.55	2.63	2.72
Norway	3.03	3.07	3.12	3.42	3.66	3.83	3.98	4.48	4.74	5.77	6.13
United Kingdom	8.35	8.64	9.43	9.85	8.78	10.10	10.54	10.22	9.95	8.90	8.66
West Germany	5.43	5.61	5.76	5.58	5.78	6.10	5.85	5.80	5.99	5.83	5.77
Other	6.23	6.68	7.11	7.48	8.11	8.62	8.95	9.27	9.52	9.13	9.06
Eastern Europe and U.S.S.R.	**68.09**	**69.45**	**71.15**	**72.84**	**75.21**	**77.28**	**80.06**	**81.98**	**84.85**	**84.09**	**81.43**
East Germany	2.44	2.53	2.57	2.66	2.82	2.97	2.92	2.79	3.20	2.82	2.32
Poland	5.28	4.54	5.16	5.25	5.37	5.54	5.72	5.79	5.87	5.49	5.76
Romania	2.47	2.54	2.65	2.67	2.72	2.64	2.72	2.65	2.46	2.59	2.28
U.S.S.R.	54.55	55.47	57.23	58.65	60.67	62.44	64.95	66.95	69.48	69.48	67.64
Other	3.35	4.37	3.54	3.61	3.63	3.69	3.75	3.80	3.84	3.71	3.43
Middle East	**42.16**	**36.73**	**29.54**	**27.29**	**27.65**	**25.66**	**30.62**	**32.09**	**36.04**	**39.83**	**41.04**
Iran	3.93	3.28	5.12	5.67	5.29	5.57	5.06	5.66	5.70	7.12	7.65
Iraq	5.45	2.16	2.19	2.17	2.61	3.09	3.66	4.58	5.97	6.31	4.62
Kuwait	3.88	2.70	1.98	2.51	2.76	2.44	3.36	3.77	3.64	4.36	2.94
Saudi Arabia	22.48	22.57	14.86	11.69	11.29	8.55	11.91	10.73	12.73	12.68	15.88
United Arab Emirates	3.89	3.45	3.00	2.91	3.00	3.29	3.68	4.21	4.25	5.20	5.62
Other	2.53	2.57	2.39	2.34	2.70	2.72	2.95	3.14	3.75	4.16	4.33
Africa	**17.34**	**15.10**	**15.42**	**16.12**	**17.51**	**18.42**	**18.13**	**18.50**	**19.43**	**20.37**	**21.45**
Algeria	2.75	2.95	3.11	3.46	3.71	3.77	3.55	4.01	4.02	4.29	4.56
Libya	4.03	2.57	2.61	2.52	2.53	2.46	2.43	2.29	2.73	2.68	3.18
Nigeria	4.50	3.18	2.86	2.77	3.12	3.35	3.30	3.04	3.29	3.83	4.14
South Africa	2.73	3.09	3.24	3.45	3.87	4.17	4.26	4.23	4.30	4.28	4.07
Other	3.33	3.31	3.60	3.92	4.28	4.67	4.59	4.93	5.09	5.29	5.50
Far East and Oceania	**36.51**	**37.50**	**38.79**	**41.51**	**45.08**	**48.96**	**51.08**	**53.18**	**54.42**	**57.93**	**60.17**
Australia	3.50	3.88	4.04	4.24	4.41	5.33	5.49	6.02	5.81	6.13	6.62
China	18.33	18.11	19.14	20.47	22.40	24.15	24.85	26.19	27.07	29.07	30.23
India	3.36	4.10	4.43	4.88	5.22	5.53	5.97	5.71	5.97	6.50	6.75
Indonesia	4.17	4.29	3.68	3.84	4.27	4.24	4.33	4.36	4.44	4.73	4.92
Japan	2.30	2.21	2.31	2.48	2.55	2.91	3.07	3.24	3.10	3.13	3.23
Other	4.85	4.91	5.19	5.60	6.23	6.80	7.37	7.66	8.03	8.37	8.42
World	**285.43**	**280.47**	**278.87**	**280.80**	**295.57**	**302.86**	**312.69**	**320.52**	**332.91**	**340.47**	**345.06**

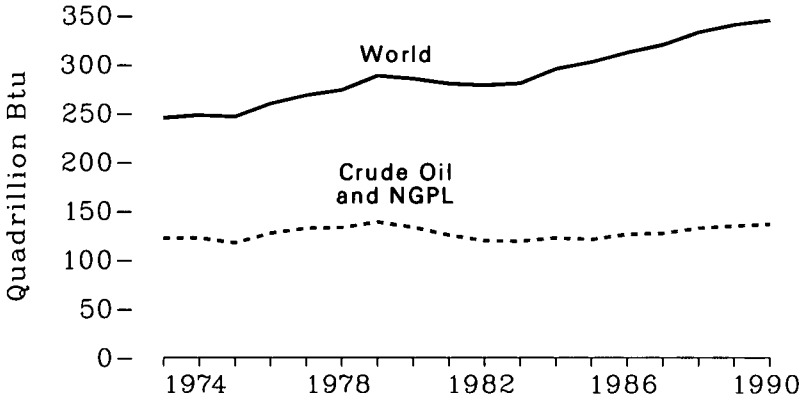
[1] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Notes: • See Appendix E, Note 19. • Primary energy includes crude oil, lease condensate, natural gas plant liquids, dry natural gas, coal, net hydroelectric power, and net nuclear power. It excludes wood, waste, geothermal, wind, photovoltaic, and solar thermal energy. • Sum of components may not equal total due to independent rounding.

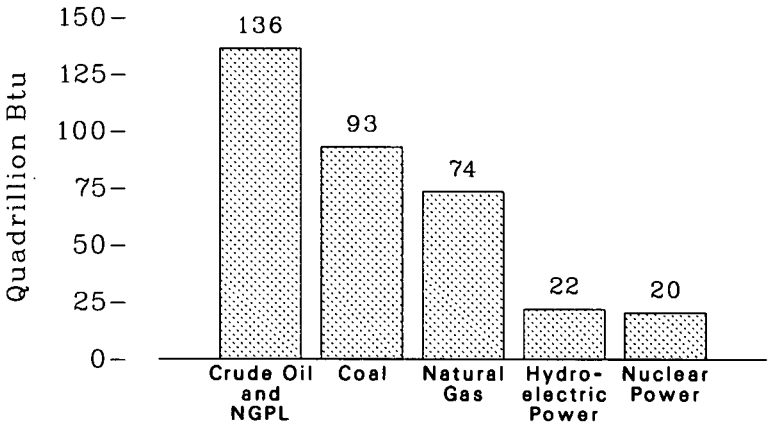
Sources: • 1980—Energy Information Administration (EIA), *International Energy Annual 1989* (February 1991), Table A1. • 1981 forward—EIA, *International Energy Annual 1990* (January 1992), Table A1.

Figure 116. World Primary Energy Production by Source

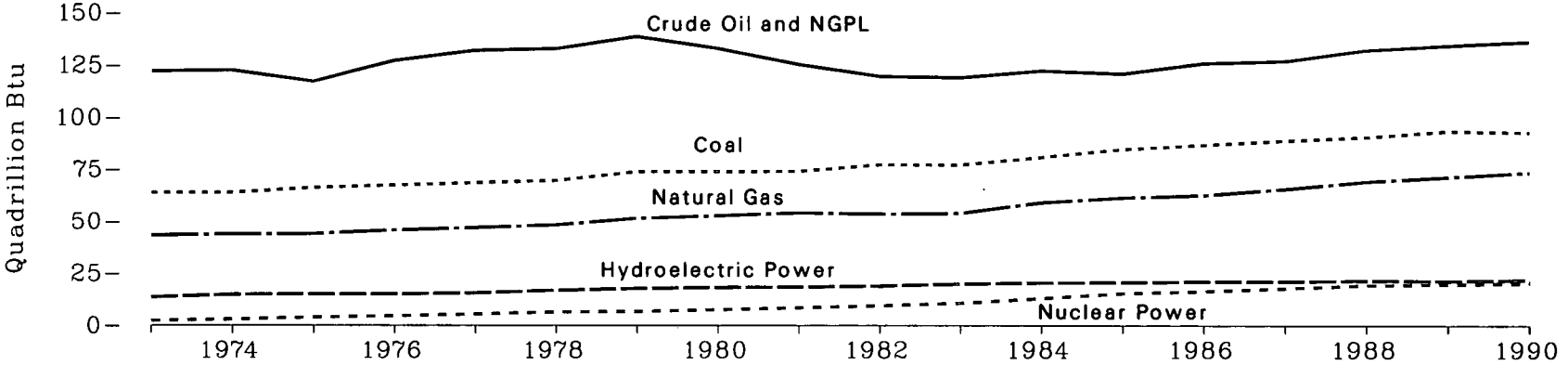
World and Crude Oil and NGPL, 1973-1990



By Source, 1990



By Source, 1973-1990



Notes: • Crude oil includes lease condensate. • NGPL is natural gas plant liquids. • Because vertical scales differ, graphs should not be compared.
Source: Table 116.

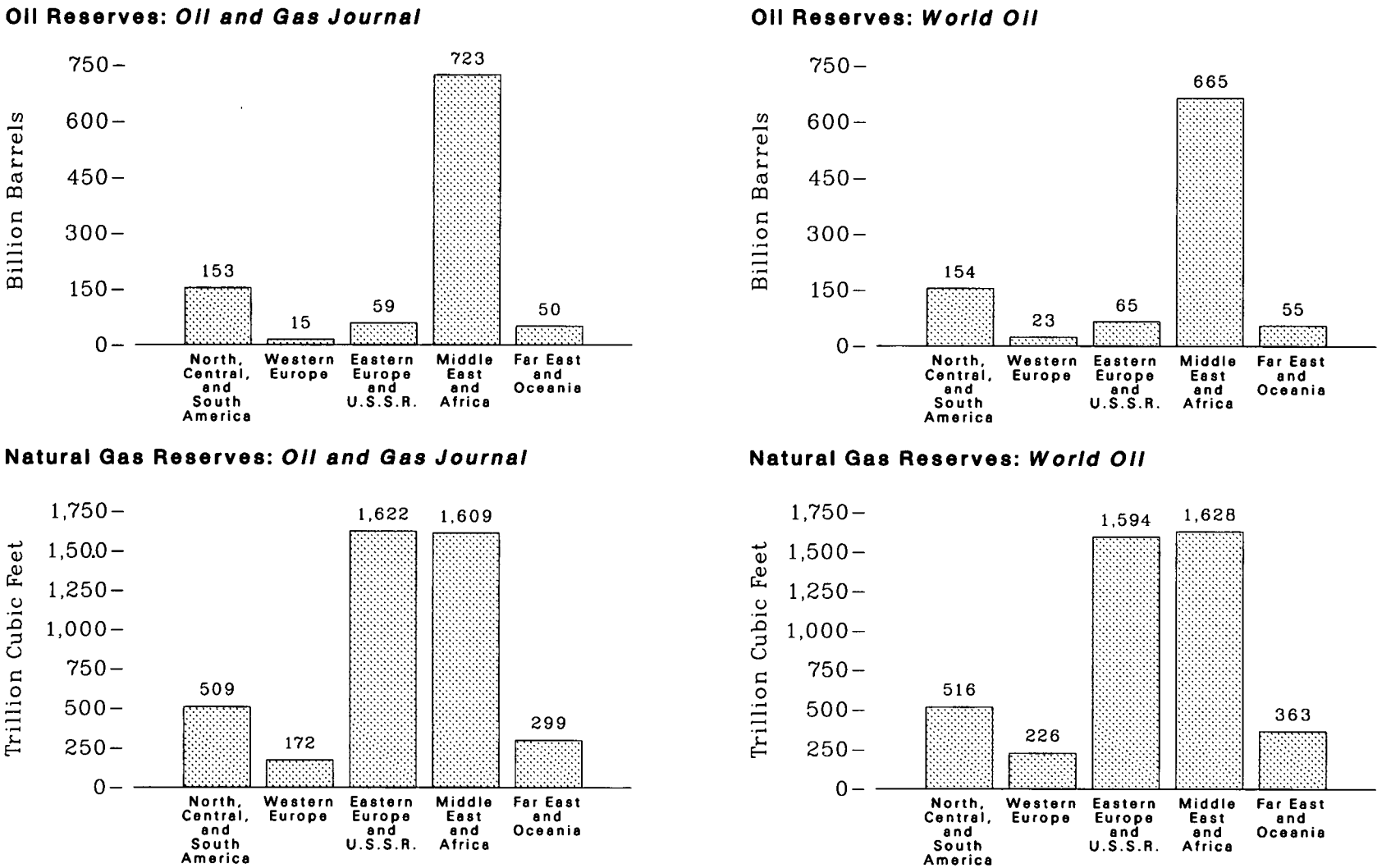
Table 116. World Primary Energy Production by Source, 1973-1990

(Quadrillion Btu)

Year	Coal	Natural Gas [1]	Crude Oil [2]	Natural Gas Plant Liquids	Nuclear Power [3]	Hydroelectric Power [3]	World [4]
1973	63.82	43.18	117.84	4.24	2.19	13.52	244.78
1974	63.82	43.76	118.10	4.36	2.87	14.83	247.74
1975	66.17	43.90	112.87	4.35	3.85	15.03	246.18
1976	67.32	45.68	122.56	4.52	4.52	15.08	259.67
1977	68.46	46.88	127.38	4.70	5.40	15.56	268.37
1978	69.53	48.24	128.05	4.84	6.41	16.80	273.87
1979	73.81	51.57	133.37	5.20	6.67	17.69	288.31
1980	73.84	52.79	127.59	5.47	7.56	18.18	285.43
1981	73.99	54.25	119.52	5.81	8.51	18.38	280.47
1982	77.11	53.74	113.87	5.79	9.50	18.86	278.87
1983	77.07	54.06	113.35	5.78	10.71	19.84	280.80
1984	80.73	59.12	116.23	6.14	12.98	20.36	295.57
1985	84.68	61.37	114.67	6.23	15.35	20.56	302.86
1986	86.86	62.56	119.47	6.54	16.31	20.96	312.69
1987	89.00	65.58	120.37	6.75	17.76	21.06	320.52
1988	90.66	69.13	125.42	6.85	19.28	21.56	332.91
1989	93.62	71.26	127.42	7.01	19.79	21.37	340.47
1990	93.00	73.50	129.06	7.19	20.35	21.95	345.06

[1] Dry production.
[2] Includes lease condensate.
[3] Net generation, i.e., gross generation less plant use.
[4] Total excludes wood, waste, geothermal, wind, photovoltaic, and solar thermal energy.
Notes: • See Appendix E, Note 19. • Sum of components may not equal total due to independent rounding.
Sources: • 1973—Energy Information Administration (EIA), *International Energy Annual 1983* (October 1984), Tables 1-7. • 1974—EIA, *International Energy Annual 1984* (October 1985), Tables 1-7. • 1975—EIA, *International Energy Annual 1985* (October 1986), Tables 26-31. • 1976—EIA, *International Energy Annual 1986* (October 1987), Tables 26-31. • 1977-1979—EIA, *International Energy Annual 1987* (October 1988), Tables 26-31. • 1980—EIA, *International Energy Annual 1989* (February 1991), Tables A1-A7. • 1981 forward—EIA, *International Energy Annual 1990* (January 1992), Tables A1-A7.

Figure 117. World Crude Oil and Natural Gas Reserves, January 1, 1991



Source: Table 117.

Table 117. World Crude Oil and Natural Gas Reserves, January 1, 1991

Region and Country	Crude Oil (billion barrels)		Natural Gas (trillion cubic feet)	
	Oil and Gas Journal	*World Oil*	*Oil and Gas Journal*	*World Oil*
North America	**84.0**	**84.0**	**339.7**	**337.6**
Canada	5.8	6.4	97.6	96.7
Mexico	52.0	51.3	72.7	71.5
United States	26.3	26.3	169.3	169.3
Central and South America	**69.1**	**69.9**	**169.5**	**178.6**
Argentina	2.3	1.6	27.0	20.5
Bolivia	0.1	0.2	4.1	4.6
Brazil	2.8	2.8	4.0	4.1
Colombia	2.0	1.8	4.5	4.2
Ecuador	1.4	1.4	3.9	4.0
Trinidad and Tobago	0.5	0.6	8.9	9.2
Venezuela	59.0	60.1	105.7	121.1
Other	1.0	1.4	11.4	10.9
Western Europe	**14.7**	**23.4**	**172.4**	**225.8**
Denmark	0.8	0.8	4.5	4.1
Italy	0.7	0.7	11.6	11.4
Netherlands	0.2	0.1	60.9	69.5
Norway	7.6	16.6	60.7	108.7
United Kingdom	3.8	4.0	19.8	19.2
West Germany	0.4	0.3	6.6	6.7
Other	1.2	0.9	8.3	6.2
Eastern Europe and U.S.S.R.	**58.6**	**64.8**	**1,621.9**	**1,593.9**
U.S.S.R.	57.0	63.2	1,600.0	1,575.9
Other [2]	1.6	1.6	21.9	18.0
Middle East	**662.6**	**602.5**	**1,324.3**	**1,337.7**
Bahrain	0.1	0.1	6.3	6.1
Iran	92.8	63.0	600.3	600.5
Iraq	100.0	100.0	95.0	109.7
Kuwait [1]	97.0	98.0	53.6	52.9
Oman	4.3	4.4	7.2	10.0
Qatar	4.5	3.7	163.2	162.0
Saudi Arabia [1]	260.0	260.3	185.4	184.2
United Arab Emirates	98.1	66.5	200.4	190.7
Other	5.8	6.5	12.9	21.6
Africa	**59.9**	**62.1**	**285.1**	**289.8**
Algeria	9.2	9.5	114.7	116.5
Cameroon	0.4	0.4	3.9	3.8
Egypt	4.5	6.2	12.4	10.9
Libya	22.8	22.9	43.0	43.0
Nigeria	17.1	17.4	87.4	93.3
Tunisia	1.7	1.7	3.0	3.0
Other	4.2	4.0	20.7	19.3
Far East and Oceania	**50.2**	**54.7**	**298.6**	**363.2**
Australia	1.6	2.8	15.4	73.4
Brunei	1.3	1.1	11.2	11.9
China	24.0	30.8	35.3	33.2
India	8.0	4.2	25.0	21.1
Indonesia	11.0	10.7	91.4	101.8
Malaysia	2.9	3.6	56.9	53.6
New Zealand	0.2	0.2	4.1	3.9
Pakistan	0.2	0.3	19.4	22.7
Thailand	0.1	0.3	5.8	14.5
Other	0.9	0.7	34.1	27.1
World	**999.2**	**961.4**	**4,211.5**	**4,326.5**

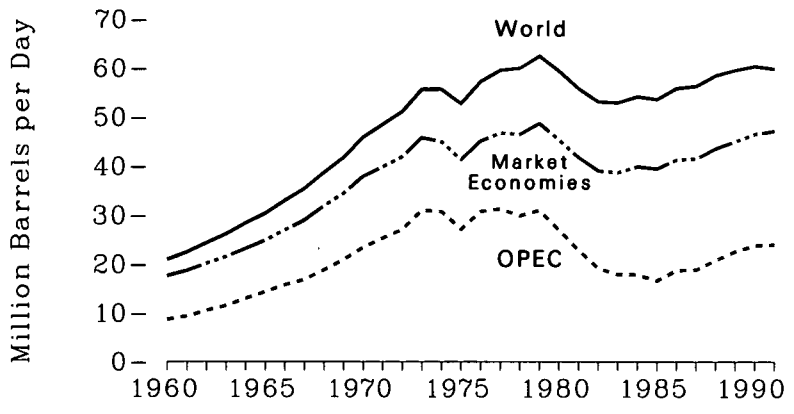
[1] Includes one-half of the reserves in the Neutral Zone between Kuwait and Saudi Arabia.
[2] Albania, Bulgaria, Cuba, Czechoslovakia, East Germany, Hungary, Mongolia, North Korea, Poland, Romania, Yugoslavia, and Vietnam.

Notes: • All reserve figures except those for the U.S.S.R. and natural gas reserves in Canada are proved reserves recoverable with present technology and prices. U.S.S.R. figures are "explored reserves," which include proved, probable, and some 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, 1990. See Table 48. • Sum of components may not equal total due to independent rounding.

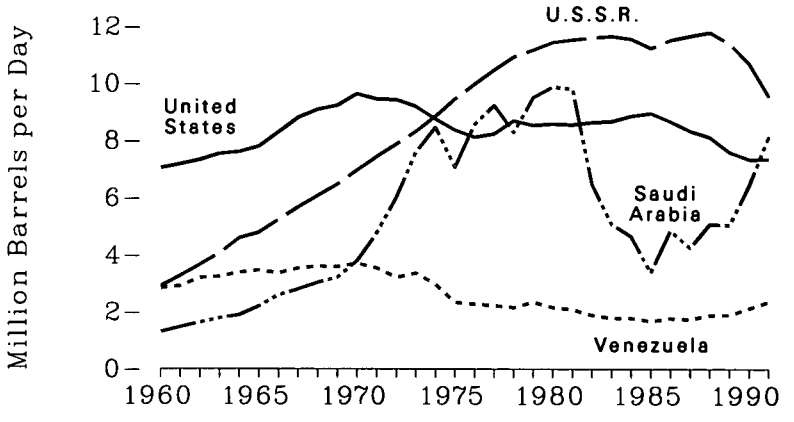
Sources: **United States:** Energy Information Administration (EIA), *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1990 Annual Report* (October 1991). **All Other Data:** PennWell Publishing Company, *Oil and Gas Journal*, December 31, 1990. Gulf Publishing Company, *World Oil*, August 1991. The EIA does not certify the international reserves data; they are published here for the convenience of the reader.

Figure 118. World Crude Oil Production

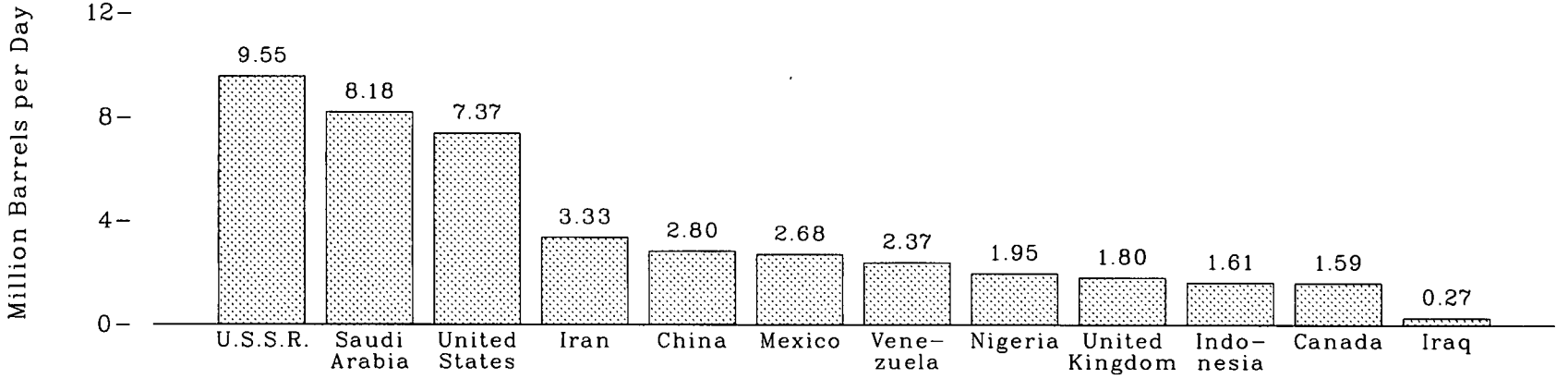
World, Market Economies, and OPEC, 1960-1991



Leading Producers, 1960-1991



Top Producing Countries, 1991



Notes: • "Market Economies" is the world excluding Albania, Bulgaria, Cambodia, China, Cuba, Czechoslovakia, East Germany, Hungary, Laos, Mongolia, North Korea, Poland, Romania, U.S.S.R., Vietnam, and Yugoslavia.
• Because vertical scales differ, graphs should not be compared.
Source: Table 118.

Table 118. World Crude Oil Production, 1960-1991

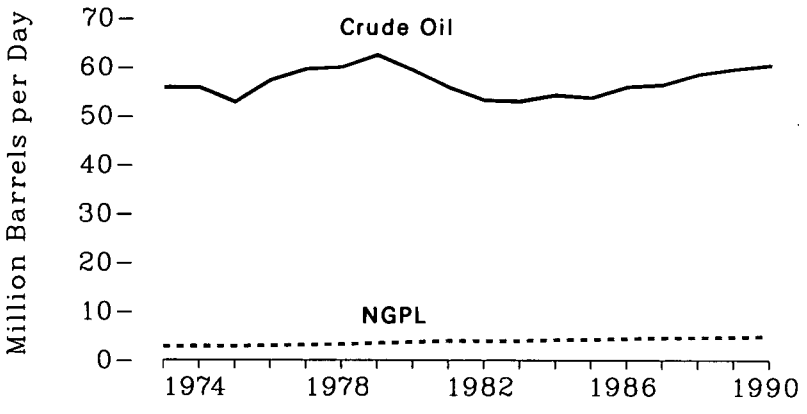
(Million Barrels per Day)

Year	OPEC[1]								Non-OPEC								
	Indonesia	Iran	Iraq	Nigeria	Saudi Arabia[2]	Venezuela	Other	Total	Canada	China	Mexico	United Kingdom	United States	U.S.S.R.	Other	Market Economies[3]	World
1960	0.41	1.07	0.97	0.02	1.31	2.85	2.07	8.70	0.52	0.10	0.27	(4)	7.04	2.91	1.42	17.65	20.96
1961	0.42	1.20	1.01	0.05	1.48	2.92	2.28	9.36	0.61	0.11	0.29	(4)	7.18	3.28	1.60	18.66	22.43
1962	0.45	1.34	1.01	0.07	1.64	3.20	2.80	10.51	0.67	0.12	0.31	(4)	7.33	3.67	1.71	20.14	24.32
1963	0.44	1.49	1.16	0.08	1.79	3.25	3.30	11.51	0.71	0.13	0.32	(4)	7.54	4.07	1.85	21.52	26.13
1964	0.46	1.71	1.26	0.12	1.90	3.39	4.14	12.98	0.75	0.18	0.32	(4)	7.61	4.60	1.92	23.15	28.36
1965	0.48	1.91	1.31	0.27	2.21	3.47	4.69	14.34	0.81	0.23	0.32	(4)	7.80	4.79	2.01	24.85	30.30
1966	0.47	2.13	1.39	0.42	2.60	3.37	5.39	15.77	0.88	0.29	0.33	(4)	8.30	5.23	2.13	26.96	32.93
1967	0.51	2.60	1.23	0.32	2.81	3.54	5.84	16.85	0.96	0.28	0.37	(4)	8.81	5.68	2.42	28.95	35.37
1968	0.60	2.84	1.50	0.14	3.04	3.61	7.06	18.79	1.19	0.30	0.39	(4)	9.10	6.08	2.79	31.85	38.64
1969	0.75	3.38	1.52	0.54	3.22	3.59	7.91	20.91	1.13	0.48	0.46	(4)	9.24	6.48	2.99	34.42	41.69
1970	0.85	3.83	1.55	1.08	3.80	3.71	8.59	23.41	1.26	0.60	0.49	(4)	9.64	6.97	3.50	37.87	45.87
1971	0.89	4.54	1.69	1.53	4.77	3.55	8.36	25.33	1.35	0.78	0.49	(4)	9.46	7.44	3.64	39.83	48.48
1972	1.08	5.02	1.47	1.82	6.02	3.22	8.46	27.09	1.53	0.90	0.51	(4)	9.44	7.88	3.77	41.91	51.13
1973	1.34	5.86	2.02	2.05	7.60	3.37	8.75	30.99	1.80	1.09	0.47	(4)	9.21	8.33	3.80	45.81	55.68
1974	1.38	6.02	1.97	2.26	8.48	2.98	7.64	30.73	1.55	1.32	0.57	(4)	8.77	8.86	3.86	45.02	55.66
1975	1.31	5.35	2.26	1.78	7.08	2.35	7.03	27.15	1.43	1.49	0.71	0.01	8.38	9.47	4.14	41.34	52.78
1976	1.50	5.88	2.42	2.07	8.58	2.29	8.00	30.74	1.31	1.67	0.83	0.25	8.13	9.99	4.36	45.13	57.27
1977	1.69	5.66	2.35	2.09	9.25	2.24	8.02	31.30	1.32	1.87	0.98	0.77	8.25	10.49	4.62	46.75	59.59
1978	1.64	5.24	2.56	1.90	8.30	2.17	8.07	29.88	1.32	2.08	1.21	1.08	8.71	10.95	4.78	46.50	60.00
1979	1.59	3.17	3.48	2.30	9.53	2.36	8.57	31.00	1.50	2.12	1.46	1.57	8.55	11.19	5.09	48.72	62.48
1980	1.58	1.66	2.51	2.06	9.90	2.17	7.11	26.99	1.44	2.11	1.94	1.62	8.60	11.46	5.20	45.36	59.35
1981	1.61	1.38	1.00	1.43	9.82	2.10	5.51	22.84	1.29	2.01	2.31	1.81	8.57	11.55	5.39	41.78	55.78
1982	1.34	2.21	1.01	1.30	6.48	1.90	4.91	19.15	1.27	2.05	2.75	2.07	8.65	11.62	5.65	39.07	53.18
1983	1.34	2.44	1.01	1.24	5.09	1.80	4.98	17.89	1.36	2.12	2.69	2.29	8.69	11.68	6.25	38.70	52.97
1984	1.41	2.17	1.21	1.39	4.66	1.80	5.21	17.86	1.44	2.30	2.78	2.48	8.88	11.58	6.90	39.89	54.20
1985	1.33	2.25	1.43	1.50	3.39	1.68	5.07	16.63	1.47	2.51	2.75	2.53	8.97	11.25	7.54	39.46	53.65
1986	1.39	2.04	1.69	1.47	4.87	1.79	5.50	18.73	1.47	2.62	2.44	2.54	8.68	11.54	7.85	41.28	55.87
1987	1.34	2.30	2.08	1.34	4.27	1.75	5.77	18.85	1.54	2.69	2.55	2.41	8.35	11.69	8.24	41.51	56.31
1988	1.34	2.24	2.69	1.45	5.09	1.90	6.08	20.79	1.62	2.73	2.51	2.23	8.14	11.82	8.67	43.56	58.51
1989	1.41	2.81	2.90	1.72	5.06	1.91	6.75	22.56	1.56	2.76	2.52	1.80	7.61	11.42	9.34	45.00	59.57
1990	1.46	3.09	2.04	1.83	6.45	2.14	6.82	23.83	1.55	2.77	2.55	1.81	7.36	10.72	9.79	46.51	60.36
1991[5]	1.61	3.33	0.27	1.95	8.18	2.37	6.27	23.98	1.59	2.80	2.68	1.80	7.37	9.55	10.08	47.13	59.84

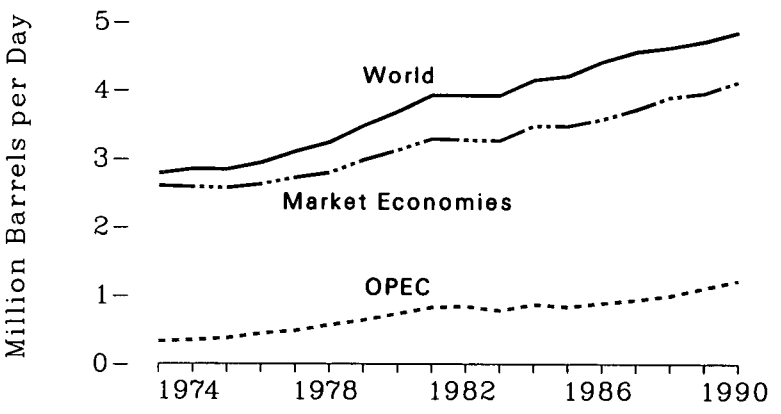
[1] Organization of Petroleum Exporting Countries. See Glossary for membership.
[2] Includes about one-half of the production in the Neutral Zone between Kuwait and Saudi Arabia.
[3] World excluding Albania, Bulgaria, Cambodia, China, Cuba, Czechoslovakia, Hungary, Laos, Mongolia, North Korea, Poland, Romania, U.S.S.R., Viet Nam, Yugoslavia, and, through 1990, East Germany. For 1991, Market Economies includes unified Germany.
[4] Less than 5,000 barrels per day.
[5] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Notes: • Includes lease condensate, excludes natural gas plant liquids. • Sum of components may not equal total 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—EIA, *International Energy Annual 1989*, Table 1. • 1981-1990—EIA, *International Energy Annual 1990*, Table 1. • 1991—EIA, *Monthly Energy Review*, March 1992, 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*. • 1981-1990—EIA, *Petroleum Supply Annual*. • 1991—EIA, *Monthly Energy Review*, March 1992, Table 10.1. **U.S.S.R.:** • 1960-1972—U.S.S.R. Central Statistical Office, *Narodnoye Khozyaystvo SSSR* (National Economy USSR). • 1973 and 1974—EIA, *Monthly Energy Review*, March 1992, Table 10.1. • 1975-1979—EIA, *International Energy Annual 1985*, Table 1. • 1980—EIA, *International Energy Annual 1989*, Table 1. • 1981-1990—EIA, *International Energy Annual 1990*, Table 1. • 1991—EIA, *Monthly Energy Review*, March 1992, Table 10.1. **OPEC Nations:** • 1960-1972—Organization of Petroleum Exporting Countries, *Annual Statistical Bulletin 1979*. • 1973-1979—EIA, *International Energy Annual 1983*, Table 8. • 1980—EIA, *International Energy Annual 1989*, Table 1. • 1981-1990—EIA, *International Energy Annual 1990*, Table 1. • 1991—EIA, *Monthly Energy Review*, March 1992, 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—EIA, *International Energy Annual 1989*, Table 1. • 1981-1990—EIA, *International Energy Annual 1990*, Table 1. • 1991—EIA, *Monthly Energy Review*, March 1992, Table 10.1.

Figure 119. World Natural Gas Plant Liquids Production

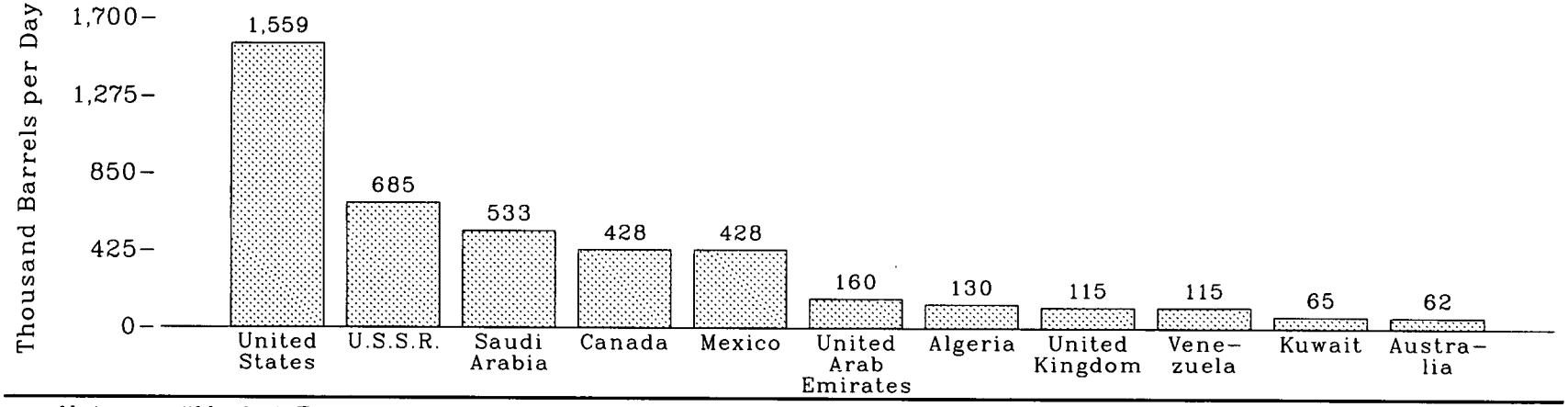
Crude Oil and NGPL Production, 1973-1990



World, Market Economies, and OPEC NGPL Production, 1973-1990



Top NGPL Producing Countries, 1990



Notes: • "Market Economies" is the world excluding Albania, Bulgaria, Cambodia, China, Cuba, Czechoslovakia, East Germany, Hungary, Laos, Mongolia, North Korea, Poland, Romania, U.S.S.R., Vietnam, and Yugoslavia.
• Because vertical scales differ, graphs should not be compared.
Source: Tables 118 and 119.

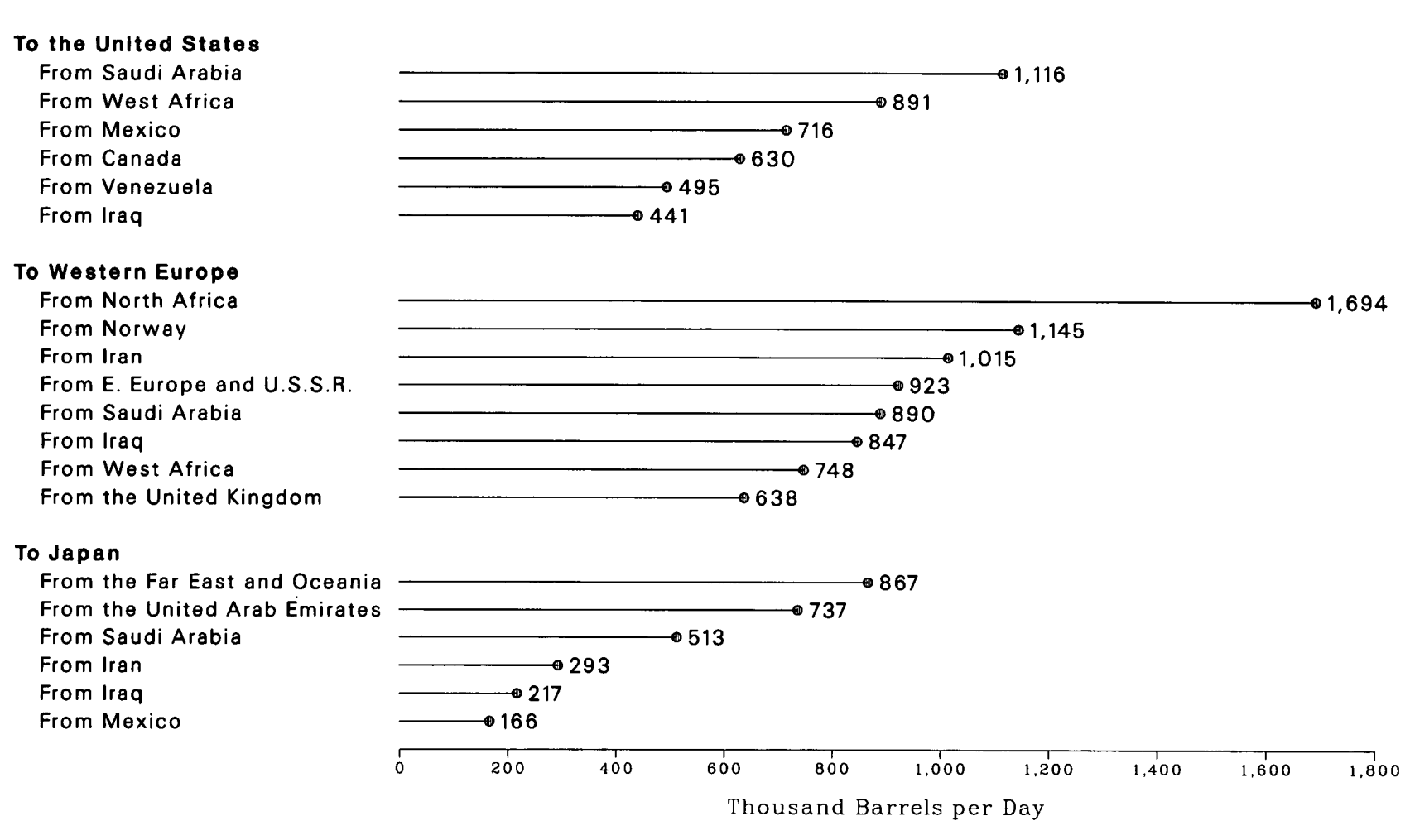
Table 119. World Natural Gas Plant Liquids Production, 1973-1990

(Thousand Barrels per Day)

Year	OPEC[1]							Non-OPEC								
	Algeria	Kuwait[2]	Saudi Arabia[2]	United Arab Emirates	Venezuela	Other	Total	Australia	Canada	Mexico	United Kingdom	United States	U.S.S.R.	Other	Market Economies	World
1973	9	60	90	[3]	89	76	325	50	314	75	5	1,738	165	108	2,598	2,780
1974	12	50	130	[3]	84	71	347	50	314	80	5	1,688	246	114	2,581	2,845
1975	20	50	140	[3]	76	86	373	50	309	80	15	1,633	256	126	2,566	2,841
1976	24	50	185	[3]	77	106	442	50	289	95	15	1,603	295	151	2,623	2,940
1977	19	55	215	15	78	100	482	55	290	105	30	1,618	353	166	2,723	3,100
1978	25	75	250	30	61	127	568	60	281	115	40	1,567	410	192	2,794	3,233
1979	30	95	303	30	69	112	639	60	331	150	45	1,584	467	206	2,983	3,482
1980	36	95	369	35	60	139	734	60	331	193	45	1,573	531	223	3,121	3,690
1981	49	60	433	60	55	170	827	60	330	241	50	1,609	598	208	3,287	3,923
1982	58	40	430	90	60	166	844	52	318	255	78	1,550	612	214	3,272	3,922
1983	56	55	330	120	57	164	782	52	309	265	111	1,559	618	227	3,263	3,923
1984	105	67	355	130	57	157	871	54	336	257	136	1,630	625	245	3,486	4,154
1985	120	54	316	160	63	122	835	65	337	271	145	1,609	685	267	3,482	4,214
1986	120	75	304	185	97	109	890	60	328	352	152	1,551	795	296	3,582	4,424
1987	140	95	345	145	94	116	935	65	367	338	162	1,595	790	314	3,725	4,566
1988	120	100	416	130	98	132	996	67	381	370	159	1,625	680	349	3,897	4,627
1989	130	105	421	130	108	214	1,108	65	410	384	140	1,546	720	343	3,957	4,716
1990[4]	130	65	533	160	115	214	1,217	62	428	428	115	1,559	685	359	4,129	4,853

[1] Organization of Petroleum Exporting Countries. See Glossary for membership.
[2] Includes about one-half of the production in the Neutral Zone between Kuwait and Saudi Arabia.
[3] Less than 500 barrels per day.
[4] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Note: Sum of components may not equal total due to independent rounding.
Sources: • **1973-1979, Algeria, Canada, U.S.S.R., and Total World**—Energy Information Administration (EIA), *International Petroleum Statistics Report*, February 1990, Table 4.2. • **1973-1979, All Other Data**—EIA, *International Energy Annual 1983* (November 1984), Table 9. • **1980**—EIA, *International Energy Annual 1989* (February 1991), Table 2. • **1981 forward**—EIA, *International Energy Annual 1990* (January 1992), Table 2.

Figure 120. International Crude Oil Flow, 1989



Source: Table 120.

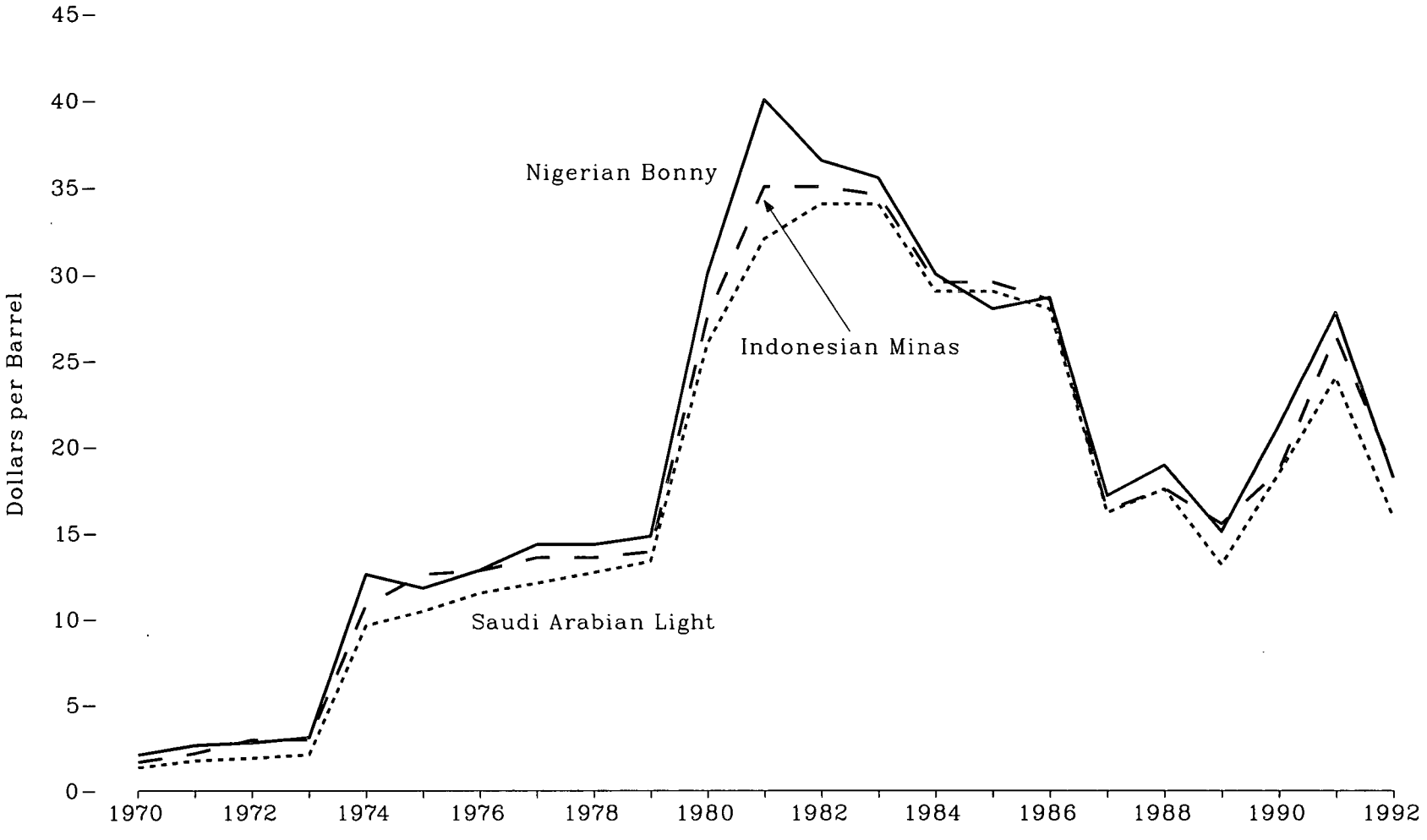
Table 120. International Crude Oil Flow, 1989

(Thousand Barrels per Day)

Exporters	Importers										
	North America		Central and South America						Far East and Oceania		
	United States	Canada	Caribbean Islands	Other	Western Europe	Eastern Europe and U.S.S.R.	Middle East	Africa	Japan	Other	Total [1]
North America											
Canada	630	—	[2]	—	[2]	—	—	—	5	6	642
Mexico	716	9	24	30	299	—	34	—	166	—	1,278
United States	—	8	[3] 132	—	—	—	—	—	—	2	142
Central and South America											
Ecuador	80	1	19	54	—	—	—	—	—	21	175
Peru	1	—	—	—	—	—	—	—	—	—	1
Trinidad and Tobago	73	—	—	—	—	—	—	—	—	—	73
Venezuela	495	44	248	45	141	—	—	5	8	—	986
Other	146	2	35	18	23	—	—	—	—	—	224
Western Europe											
Norway	127	77	1	—	1,145	2	11	—	—	—	1,363
United Kingdom	160	199	8	—	638	—	—	—	—	—	1,005
Other	3	—	—	—	77	9	—	13	—	—	102
Eastern Europe and U.S.S.R.	—	—	69	12	923	1,402	16	36	[2]	96	2,554
Middle East											
Iran	—	20	32	63	1,015	200	25	35	293	437	2,120
Iraq	441	12	—	252	847	339	102	70	217	190	2,470
Saudi Arabia	1,116	35	8	90	890	—	203	15	513	520	3,390
United Arab Emirates	21	—	52	35	169	—	—	177	737	459	1,650
Other	213	—	47	93	455	18	19	117	723	778	2,462
Africa											
North [4]	80	2	—	28	1,694	145	102	55	—	47	2,153
West [5]	891	67	36	30	748	—	—	74	2	14	1,862
Other	316	14	132	43	76	—	8	26	10	5	630
Far East and Oceania [6]	334	—	3	17	10	8	—	15	867	754	2,008
World	5,843	490	846	810	9,150	2,123	520	638	3,541	3,329	27,290

[1] The data in this column are total exports plus adjustments; they do not equal total reported exports because of changes in stocks at sea, exchanges, transshipments, and other statistical discrepancies.
[2] Less than 500 barrels per day.
[3] Includes shipments to Puerto Rico and the Virgin Islands.
[4] Algeria, Egypt, Libya, Morocco, and Tunisia.
[5] Benin, Cameroon, Equatorial Guinea, Gabon, Ghana, Ivory Coast, Nigeria, and Togo.
[6] Primarily Indonesia, China, Malaysia, and Brunei.
— = Not applicable.
Notes: • Transshipments are assigned to the country of original lading, if known. • Sum of components may not equal total due to independent rounding.
Source: Energy Information Administration, *International Energy Annual 1990* (January 1992), Table 20.

Figure 121. Official Prices of Selected Foreign Crude Oils, 1970–1992



Note: Prices are as of January 1, except 1987, which is February 1.
Source: Table 121.

Table 121. Official Prices of Selected Foreign Crude Oils, 1970-1992

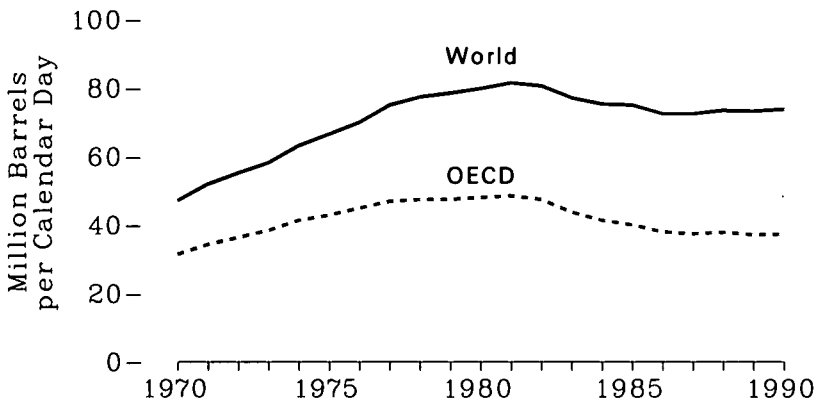
(Dollars per Barrel)

Year	Saudi Arabian Light-34° API	Iranian Light-34° API	Libyan [1] Es Sider-37° API	Nigerian [2] Bonny-37° API	Indonesian Minas-34° API	Venezuelan Tia Juana [3]	Mexico [4] Maya-22° API	United Kingdom [5] 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	[6] 30.00	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	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

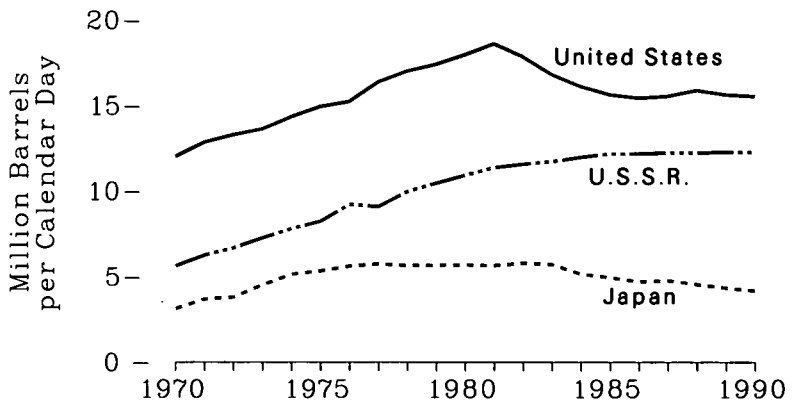
[1] Prices for 1974 and 1975 are for 40 degrees API gravity. Prices for 1980 include $4.72 in retroactive charges and market premiums.
[2] Prices from 1977 forward include 2 cents per barrel harbor dues.
[3] 1970-1985—26° API; 1986 forward—31° API.
[4] Mexico does not post official crude oil prices. Prices are formula-determined for each contract. For example, the prices given here are for f.o.b. deliveries to Houston, Texas. They are based on a variety of U.S. domestic crude oil postings and on quotations for fuel oil imports into U.S. Gulf of Mexico ports.
[5] The United Kingdom does not post official crude oil prices. Prices for 1979-1984 are estimated long-term contract prices; prices for 1985 forward are contractural arrangements based on spot market quotations.
[6] Price for 1980 includes $1.87 market premiums and credit charges.
NA = Not available.
Notes: • The Organization of Petroleum Exporting Countries (OPEC) adopted major changes in their crude oil pricing system at the beginning of 1986. The primary result of these changes was a switch from official prices to netback arrangements and spot crude oil sales for the January 1986 through January 1987 time period. On February 1, 1987, official contract prices were again being used by OPEC as their primary pricing mechanism. However, subsequently in 1987 all OPEC producers moved to spot crude oil sales as a basis for their crude oil pricing systems. Spot market related pricing continued through 1990 and into 1992. • Prices are usually free on board (f.o.b.) at the foreign port of lading. Prices for the period mid-1974 forward are official selling prices. • As of January 1, except in 1987, when prices are as of February 1.
Sources: • 1970-1978—Petroleum and Energy Intelligence Weekly, Inc., *Petroleum Intelligence Weekly.* • 1979 forward—Energy Information Administration, *Weekly Petroleum Status Report.*

Figure 122. World Petroleum Refinery Capacity by Country

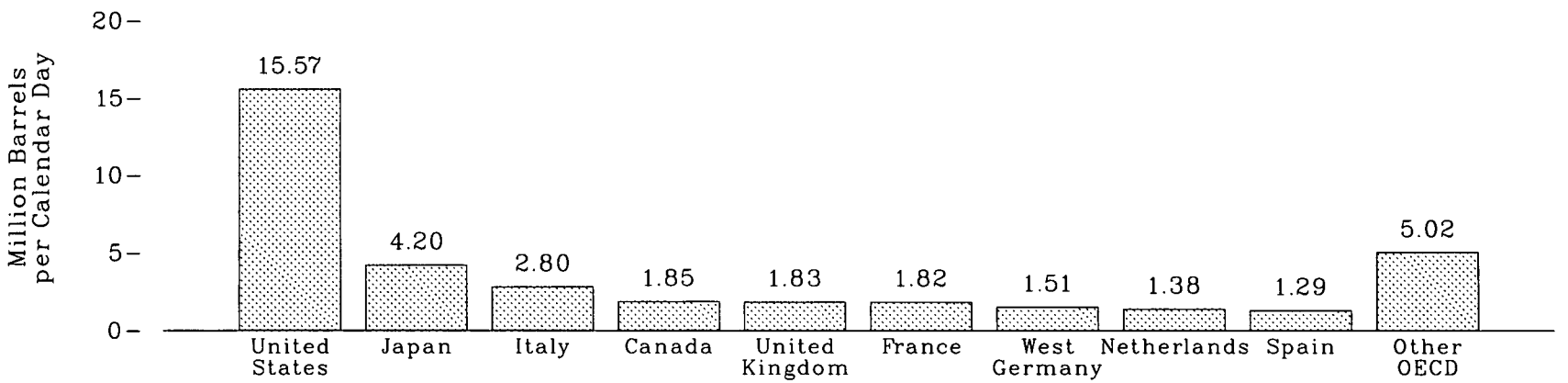
World and OECD, 1970-1990



Capacity in Leading Countries, 1970-1990



OECD Refinery Capacity by Country, 1990



Notes: • Capacity is as of January 1. • Because vertical scales differ, graphs should not be compared.
Source: Table 122.

Table 122. World Petroleum Refinery Capacity by Country, 1970-1990

(Million Barrels per Calendar Day)

Year	OECD [1]											Non-OECD					World
	Canada	France	Italy	Japan	Nether-lands	Spain	United Kingdom	United States	West Germany	Other	Total	Brazil	China	Mexico	U.S.S.R.	Other	
1970	1.40	2.32	2.96	3.14	1.36	0.69	2.30	12.02	2.36	2.96	31.51	0.50	0.30	0.50	5.64	8.65	47.10
1971	1.45	2.53	3.24	3.70	1.39	0.85	2.39	12.86	2.54	3.40	34.35	0.51	0.42	0.57	6.27	9.79	51.91
1972	1.45	2.69	3.68	3.82	1.64	0.87	2.59	13.29	2.56	3.82	36.41	0.56	0.48	0.59	6.68	10.41	55.13
1973	1.73	2.95	3.59	4.53	1.83	1.03	2.47	13.64	2.70	3.97	38.42	0.72	0.50	0.63	7.26	10.67	58.20
1974	1.79	3.14	3.88	5.15	1.83	1.16	2.76	14.36	2.83	4.47	41.37	0.79	0.60	0.63	7.81	11.96	63.15
1975	1.88	3.34	3.95	5.35	1.84	1.17	2.78	14.96	2.99	4.63	42.89	0.96	0.85	0.76	8.24	12.83	66.52
1976	2.02	3.31	4.08	5.63	1.99	1.32	2.89	15.24	3.10	5.38	44.97	0.99	1.01	0.76	9.23	12.97	69.93
1977	2.10	3.52	4.26	5.76	2.03	1.28	3.01	16.40	3.08	5.55	46.98	1.12	1.40	0.94	9.10	15.58	75.12
1978	2.17	3.46	4.23	5.67	1.87	1.27	2.91	17.05	3.08	5.81	47.51	1.16	1.46	1.38	9.98	15.97	77.46
1979	2.23	3.47	4.20	5.68	1.86	1.43	2.53	17.44	3.10	5.61	47.52	1.21	1.58	1.24	10.48	16.55	78.58
1980	2.22	3.40	4.13	5.71	1.83	1.46	2.53	17.99	2.99	5.83	48.08	1.21	1.60	1.39	10.95	16.62	79.85
1981	2.17	3.34	4.09	5.66	1.83	1.46	2.63	18.62	3.02	5.75	48.57	1.40	1.81	1.39	11.40	16.99	81.56
1982	2.20	3.29	4.00	5.81	1.71	1.52	2.48	17.89	2.94	5.64	47.48	1.41	1.81	1.47	11.60	16.87	80.63
1983	2.02	2.87	3.28	5.73	1.55	1.52	2.26	16.86	2.47	5.18	43.75	1.22	2.00	1.29	11.75	17.21	77.21
1984	1.81	2.67	3.05	5.17	1.55	1.49	2.09	16.14	2.39	5.01	41.37	1.30	2.05	1.27	12.00	17.43	75.42
1985	1.87	2.39	3.10	4.97	1.50	1.49	2.01	15.66	2.17	4.91	40.05	1.31	2.15	1.27	12.20	18.14	75.12
1986	1.86	1.95	2.74	4.72	1.47	1.37	1.79	15.46	1.93	4.67	37.95	1.31	2.15	1.27	12.20	17.68	72.56
1987	1.76	1.83	2.68	4.79	1.40	1.31	1.78	15.57	1.72	4.60	37.43	1.32	2.20	1.35	12.26	18.01	72.57
1988	1.87	1.94	2.56	4.57	1.38	1.31	1.80	15.92	1.65	4.86	37.85	1.41	2.20	1.35	12.26	18.50	73.57
1989	1.86	1.88	2.45	4.36	1.38	1.29	1.80	15.65	1.52	4.93	37.12	1.41	2.20	1.35	12.30	18.96	73.34
1990	1.85	1.82	2.80	4.20	1.38	1.29	1.83	15.57	1.51	5.02	37.28	1.40	2.20	1.51	12.30	19.18	73.86

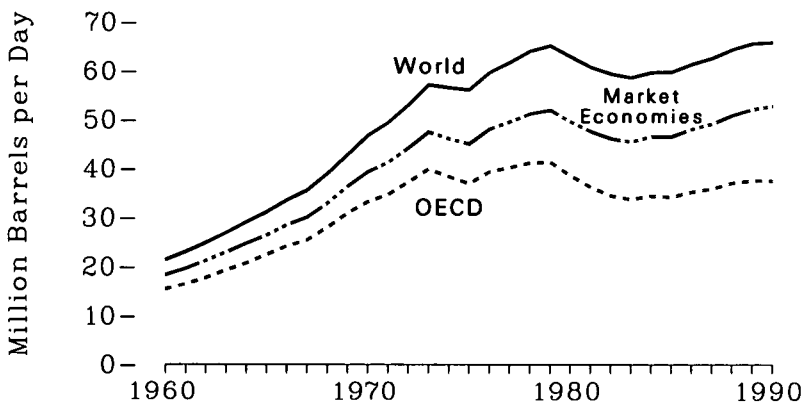
[1] Organization for Economic Cooperation and Development. See Glossary for membership. Other OECD includes the United States territories of Puerto Rico, Virgin Islands, Guam, and Hawaiian Trade Zone. As of January 1, 1987, Hawaiian Trade Zone data are included in U.S. 50 States data.

Notes: • Capacity is as of January 1. • Sum of components may not equal total due to independent rounding.

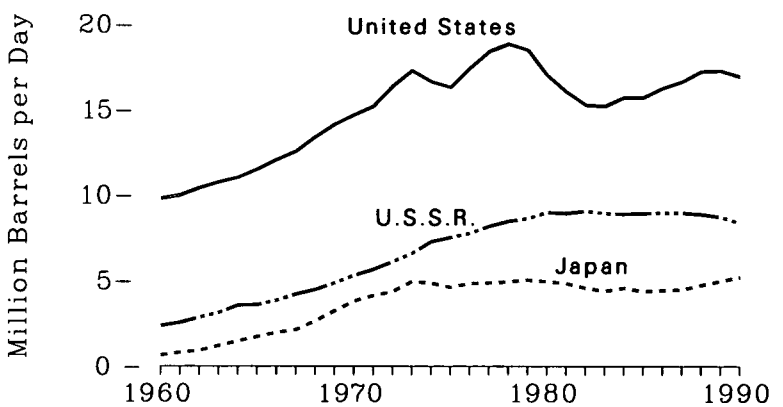
Sources: **United States:** • 1970-1977—Bureau of Mines, Mineral Industry Surveys, *Petroleum Refineries, Annual.* • 1978-1981—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Refineries in the United States and U.S. Territories.* • 1982 forward—EIA, *Petroleum Supply Annual.* **China and U.S.S.R.:** • 1970-1976—Ballinger Publishing Company, *The Energy Decade, 1970-1980, A Statistical and Graphic Chronicle.* • 1977-1990—PennWell Publishing Company, *Oil and Gas Journal.* **All Other Countries:** PennWell Publishing Company, *Oil and Gas Journal.*

Figure 123. World Petroleum Consumption

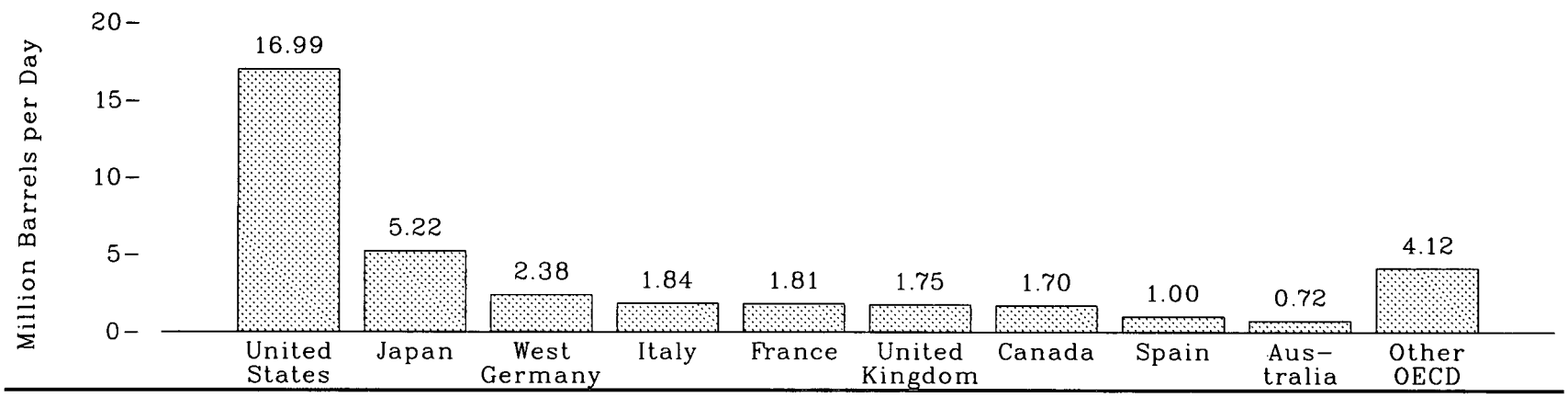
World, Market Economies, and OECD, 1960-1990



Leading Consumers, 1960-1990



OECD Consumers, 1990



Notes: • "Market Economies" is the world excluding Albania, Bulgaria, Cambodia, China, Cuba, Czechoslovakia, East Germany, Hungary, Laos, Mongolia, North Korea, Poland, Romania, U.S.S.R., Vietnam, and Yugoslavia. • OECD=Organization of Economic Cooperation and Development. See Glossary for membership. • Because vertical scales differ, graphs should not be compared.

Source: Table 123.

Table 123. World Petroleum Consumption, 1960-1990

(Million Barrels per Day)

	OECD[1]											Non-OECD					
Year	Australia	Canada	France	Italy	Japan	Spain	United Kingdom	United States	West Germany	Other	Total	Brazil	China	Mexico	U.S.S.R.	Market Economies	World
1960	0.22	0.84	0.56	0.44	0.66	0.10	0.94	9.80	0.63	1.28	15.47	0.27	0.17	0.30	2.38	18.32	21.34
1961	0.23	0.87	0.63	0.54	0.82	0.12	1.04	9.98	0.79	1.45	16.46	0.28	0.17	0.29	2.57	19.57	23.00
1962	0.25	0.92	0.73	0.67	0.93	0.12	1.12	10.40	1.00	1.62	17.74	0.31	0.14	0.30	2.87	21.20	24.89
1963	0.29	0.99	0.86	0.77	1.21	0.12	1.27	10.74	1.17	1.85	19.26	0.34	0.17	0.31	3.15	22.90	26.92
1964	0.32	1.05	0.98	0.90	1.48	0.20	1.36	11.02	1.36	2.03	20.70	0.35	0.20	0.33	3.58	24.76	29.08
1965	0.35	1.14	1.09	0.98	1.74	0.23	1.49	11.51	1.61	2.30	22.44	0.33	0.23	0.34	3.61	26.45	31.14
1966	0.37	1.21	1.19	1.08	1.98	0.31	1.58	12.08	1.80	2.61	24.20	0.38	0.30	0.36	3.87	28.53	33.56
1967	0.41	1.25	1.34	1.19	2.14	0.36	1.64	12.56	1.86	2.72	25.48	0.38	0.28	0.39	4.22	30.08	35.59
1968	0.45	1.34	1.46	1.40	2.66	0.46	1.82	13.39	1.99	3.08	28.05	0.46	0.31	0.41	4.48	32.96	38.96
1969	0.49	1.42	1.66	1.69	3.25	0.49	1.98	14.14	2.33	3.49	30.94	0.48	0.44	0.45	4.87	36.37	42.89
1970	0.52	1.52	1.94	1.71	3.82	0.58	2.10	14.70	2.61	3.79	33.27	0.53	0.62	0.50	5.31	39.32	46.81
1971	0.48	1.56	2.12	1.84	4.14	0.64	2.14	15.21	2.70	3.92	34.76	0.58	0.79	0.52	5.66	41.27	49.42
1972	0.50	1.66	2.32	1.95	4.36	0.68	2.28	16.37	2.86	4.29	37.28	0.66	0.91	0.59	6.12	44.27	53.09
1973	0.57	1.73	2.60	2.07	4.95	0.78	2.34	17.31	3.06	4.50	39.90	0.78	1.12	0.67	6.60	47.53	57.24
1974	0.66	1.78	2.45	2.00	4.86	0.86	2.21	16.65	2.75	4.16	38.38	0.86	1.19	0.71	7.28	46.22	56.68
1975	0.64	1.78	2.25	1.86	4.62	0.87	1.91	16.32	2.65	4.08	36.98	0.92	1.36	0.75	7.52	45.14	56.20
1976	0.67	1.82	2.42	1.97	4.84	0.97	1.89	17.46	2.88	4.44	39.36	1.00	1.53	0.83	7.78	48.11	59.67
1977	0.68	1.85	2.29	1.90	4.88	0.94	1.91	18.43	2.87	4.49	40.24	1.02	1.64	0.88	8.18	49.60	61.83
1978	0.70	1.90	2.41	1.95	4.95	0.98	1.94	18.85	2.93	4.59	41.19	1.11	1.79	0.99	8.48	51.28	64.16
1979	0.69	1.97	2.46	2.04	5.05	1.02	1.97	18.51	3.00	4.65	41.38	1.18	1.84	1.10	8.64	52.06	65.26
1980	0.59	1.87	2.26	1.93	4.96	0.99	1.73	17.06	2.71	4.50	38.60	1.15	1.77	1.27	9.00	49.63	63.07
1981	0.58	1.77	2.02	1.87	4.85	0.94	1.59	16.06	2.45	4.13	36.27	1.09	1.71	1.40	8.94	47.67	60.87
1982	0.62	1.58	1.88	1.78	4.58	1.00	1.59	15.30	2.37	3.82	34.52	1.06	1.66	1.48	9.08	46.21	59.47
1983	0.59	1.45	1.84	1.75	4.40	1.01	1.53	15.23	2.32	3.67	33.79	0.98	1.73	1.35	8.95	45.58	58.69
1984	0.61	1.47	1.75	1.65	4.58	0.91	1.85	15.73	2.32	3.63	34.50	1.03	1.74	1.45	8.91	46.64	59.78
1985	0.63	1.50	1.77	1.72	4.38	0.85	1.63	15.73	2.34	3.72	34.27	1.08	1.78	1.47	8.95	46.60	59.86
1986	0.63	1.51	1.77	1.74	4.44	0.88	1.65	16.28	2.50	3.90	35.28	1.24	1.92	1.49	8.98	48.12	61.51
1987	0.64	1.55	1.79	1.85	4.48	0.90	1.60	16.67	2.42	4.00	35.91	1.26	2.08	1.52	8.99	49.20	62.77
1988	0.65	1.69	1.80	1.84	4.75	0.98	1.70	17.28	2.42	3.98	37.09	1.30	2.15	1.55	8.89	50.99	64.50
1989	0.69	1.73	1.86	1.93	4.98	1.03	1.74	17.33	2.28	4.01	37.57	1.32	2.32	1.66	8.74	52.25	65.71
1990[2]	0.72	1.70	1.81	1.84	5.22	1.00	1.75	16.99	2.38	4.12	37.55	1.33	2.28	1.72	8.40	52.91	65.92

[1] Organization for Economic Cooperation and Development. See Glossary for membership. Other OECD includes the United States territories of Puerto Rico, Virgin Islands, Guam, and Hawaiian Trade Zone. As of January 1, 1987, Hawaiian Trade Zone data are included in U.S. 50 States data.

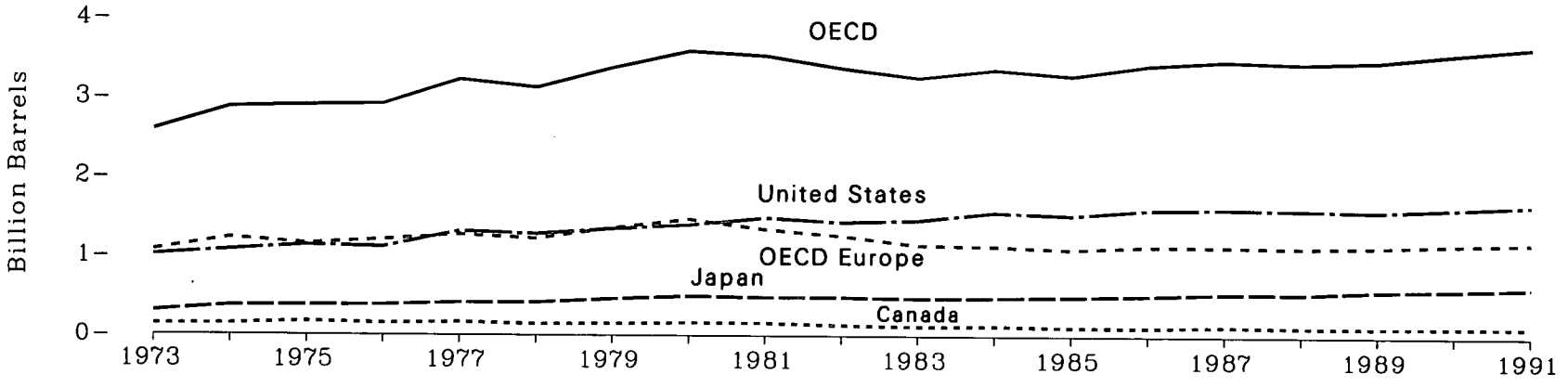
[2] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Note: Sum of components may not equal total due to independent rounding.

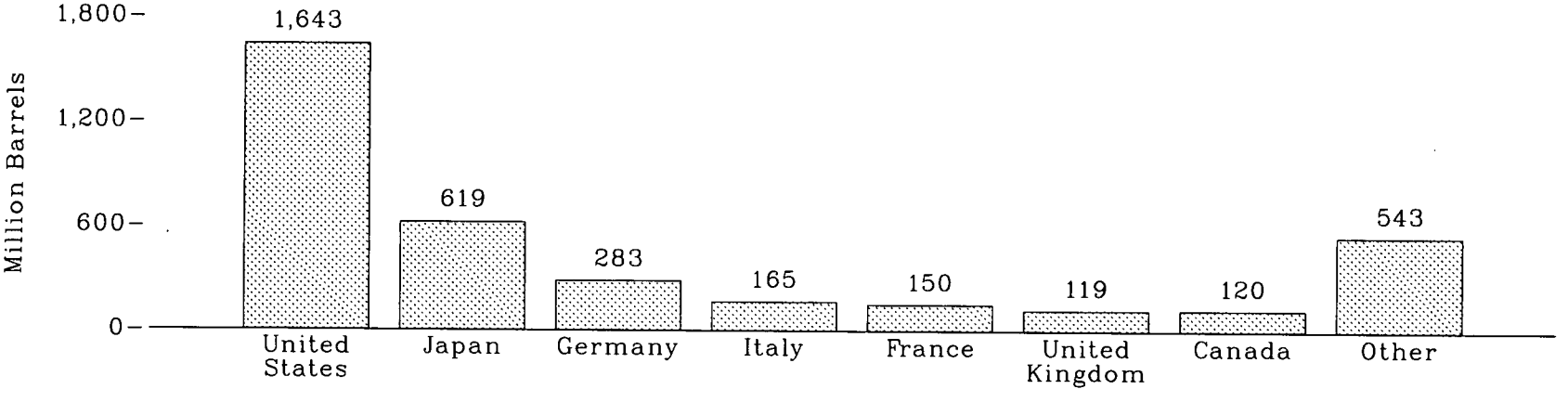
Sources: **United States:** • 1960-1976—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1977-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual.* • 1981 forward—EIA, *Petroleum Supply Annual.* **U.S.S.R.:** • 1960-1969—U.S.S.R. Central Statistical Office, *Narodnoye Khozyaystvo SSSR* (National Economy U.S.S.R.), and *Vneshnyaya Torgvliya SSSR* (Foreign Trade of the U.S.S.R.), annual issues. • 1970-1979—International Statistics Branch. • 1980—EIA, *International Energy Annual 1989* (February 1991), Table 8. • 1981 forward—EIA, *International Energy Annual 1990* (January 1992), Table 8. **China:** • 1960-1969—Central Intelligence Agency, unpublished data. • 1970-1979— International Statistics Branch. • 1980—EIA, *International Energy Annual 1989* (February 1991), Table 8. • 1981 forward—EIA, *International Energy Annual 1990* (January 1992), Table 8. **All Other Countries:** • 1960-1969—Bureau of Mines, *International Petroleum Annual, 1969.* • 1970-1979—EIA, International Statistics Branch. • 1980—EIA, *International Energy Annual 1989* (February 1991), Table 8. • 1981-1989—EIA, *International Energy Annual 1990* (January 1992), Table 8. • 1990—EIA, *Monthly Energy Review* (March 1992), Table 10.2.

Figure 124. Petroleum Stocks in OECD Countries, End of Year

Total, 1973-1991



By Country, 1991



Note: OECD=Organization for Economic Cooperation and Development. See Glossary for membership.
Source: Table 124.

Table 124. Petroleum Stocks in OECD Countries, End of Year 1973-1991

(Million Barrels)

Year	France	Germany [1]	Italy	United Kingdom	Other OECD Europe	OECD Europe	Canada	Japan	United States	Other OECD [2]	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	72	3,474
1988	140	266	155	112	444	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	475	1,163	121	590	1,621	73	3,569
1991 [3]	150	283	165	119	468	1,184	120	619	1,643	75	3,640

[1] 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.

[2] Australia, New Zealand, and U.S. Territories.

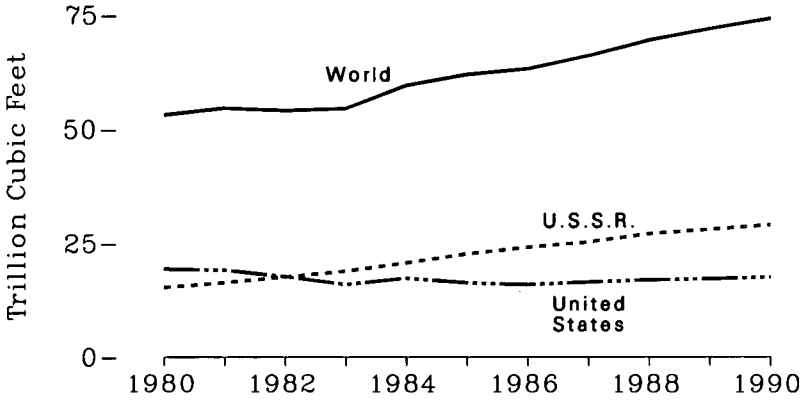
[3] Preliminary data as of October 31. Previous-year data may have been revised.

Notes: • Includes crude oil, lease condensate, natural gas plant liquids, unfinished oils, and finished petroleum products. See Appendix E, Note 20. • Organization for Economic Cooperation and Development. See Glossary for membership. • Sum of components may not equal total due to independent rounding.

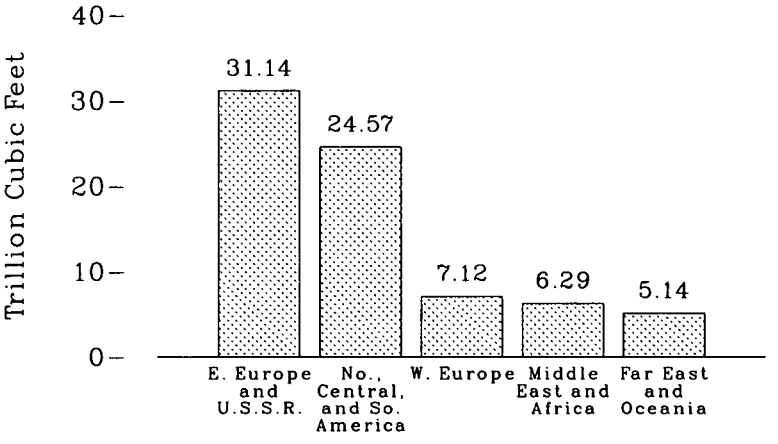
Sources: **United States:** Energy Information Administration, *Petroleum Supply Monthly*, March 1992. **All Other Data:** Organization for Economic Cooperation and Development, International Energy Agency, *Quarterly Oil and Gas Statistics*.

Figure 125. World Dry Natural Gas Production

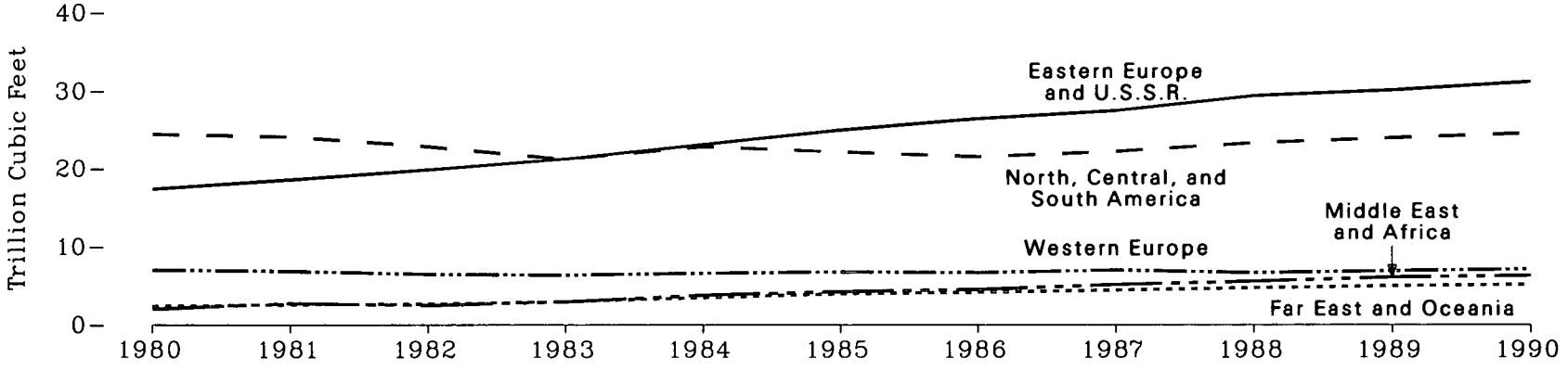
World and Leading Producers, 1980-1990



World Areas, 1990



World Areas, 1980-1990



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 125.

Table 125. World Dry Natural Gas Production, 1980-1990

(Trillion Cubic Feet)

Area and Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990 [1]
North, Central, and South America	**24.36**	**23.99**	**22.75**	**21.14**	**22.75**	**22.07**	**21.47**	**22.14**	**23.29**	**23.97**	**24.57**
Argentina	0.28	0.35	0.40	0.45	0.49	0.50	0.55	0.53	0.63	0.72	0.74
Canada	2.65	2.47	2.45	2.52	2.61	2.98	2.77	3.00	3.47	3.68	3.80
Mexico	1.01	1.03	1.11	1.10	1.04	0.95	0.92	0.86	0.92	0.93	0.96
United States	19.40	19.18	17.76	16.03	17.39	16.38	15.99	16.54	17.03	17.24	17.61
Venezuela	0.49	0.52	0.60	0.58	0.61	0.62	0.67	0.66	0.66	0.77	0.80
Other	0.53	0.44	0.44	0.47	0.60	0.64	0.57	0.55	0.58	0.64	0.66
Western Europe	**7.02**	**6.83**	**6.44**	**6.34**	**6.59**	**6.75**	**6.67**	**7.00**	**6.66**	**6.88**	**7.12**
Italy	0.42	0.49	0.51	0.46	0.49	0.50	0.56	0.57	0.59	0.60	0.62
Netherlands	3.38	3.15	2.67	2.58	2.65	2.73	2.57	2.66	2.35	2.54	2.63
Norway	0.89	0.89	0.90	0.86	0.93	0.94	0.96	1.07	1.05	1.08	1.12
United Kingdom	1.23	1.22	1.36	1.40	1.42	1.52	1.60	1.68	1.62	1.58	1.64
West Germany	0.67	0.68	0.59	0.61	0.66	0.61	0.55	0.56	0.59	0.58	0.60
Other	0.44	0.40	0.41	0.43	0.45	0.46	0.44	0.46	0.46	0.50	0.52
Eastern Europe and U.S.S.R.	**17.34**	**18.49**	**19.79**	**21.18**	**23.02**	**24.96**	**26.44**	**27.46**	**29.37**	**30.08**	**31.14**
Romania	1.20	1.24	1.35	1.40	1.34	1.27	1.34	1.32	1.28	1.13	1.17
U.S.S.R.	15.37	16.43	17.68	18.93	20.74	22.71	24.19	25.36	27.19	28.11	29.09
Other	0.77	0.82	0.76	0.85	0.93	0.99	0.90	0.79	0.90	0.84	0.87
Middle East and Africa	**2.02**	**2.73**	**2.47**	**2.95**	**3.81**	**4.24**	**4.51**	**5.13**	**5.55**	**6.08**	**6.29**
Algeria	0.41	0.77	0.94	1.31	1.36	1.36	1.33	1.52	1.63	1.71	1.77
Iran	0.25	0.21	0.25	0.31	0.48	0.60	0.54	0.57	0.71	0.78	0.81
Saudi Arabia	0.37	0.69	0.20	0.19	0.62	0.72	0.89	0.95	1.03	1.05	1.09
United Arab Emirates	0.20	0.23	0.20	0.27	0.34	0.48	0.54	0.68	0.66	0.81	0.84
Other	0.78	0.83	0.88	0.86	1.01	1.08	1.22	1.42	1.52	1.72	1.78
Far East and Oceania	**2.38**	**2.57**	**2.67**	**2.96**	**3.50**	**3.98**	**4.17**	**4.43**	**4.71**	**4.97**	**5.14**
Australia	0.32	0.38	0.38	0.39	0.40	0.45	0.48	0.49	0.50	0.57	0.59
Brunei	0.32	0.34	0.32	0.33	0.30	0.30	0.29	0.31	0.30	0.31	0.32
China	0.51	0.45	0.38	0.43	0.44	0.46	0.48	0.49	0.49	0.51	0.52
Indonesia	0.63	0.66	0.67	0.78	1.06	1.23	1.18	1.29	1.34	1.42	1.47
Malaysia	0.04	0.04	0.06	0.15	0.33	0.44	0.53	0.55	0.58	0.61	0.63
Pakistan	0.29	0.32	0.35	0.34	0.35	0.37	0.39	0.42	0.44	0.47	0.49
Other	0.29	0.39	0.50	0.55	0.62	0.75	0.81	0.88	1.05	1.09	1.12
World	**53.11**	**54.62**	**54.12**	**54.57**	**59.66**	**62.00**	**63.25**	**66.17**	**69.57**	**71.99**	**74.27**

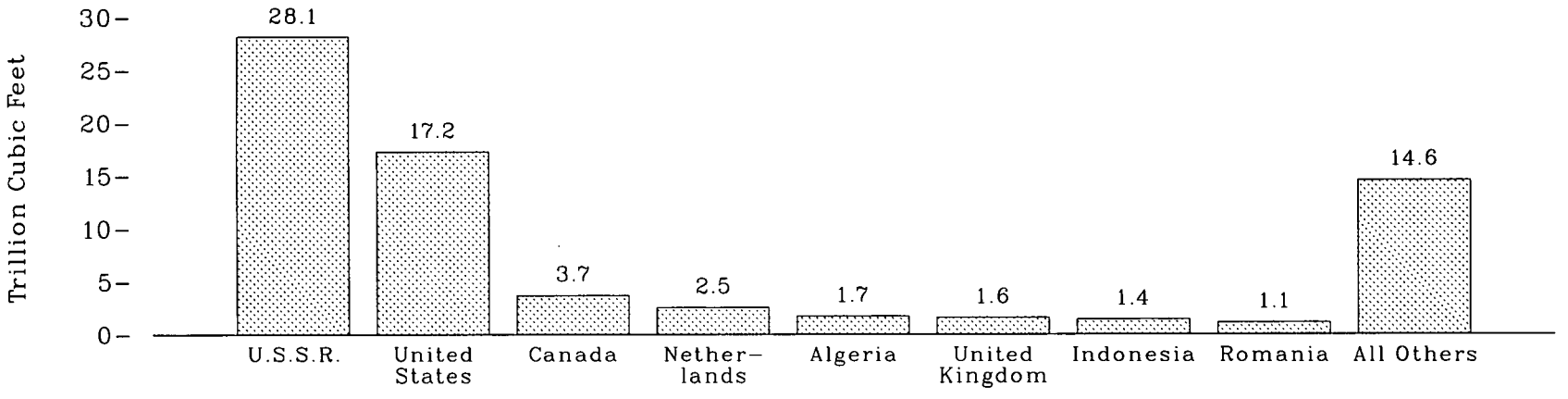
[1] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Note: Sum of components may not equal total due to independent rounding.

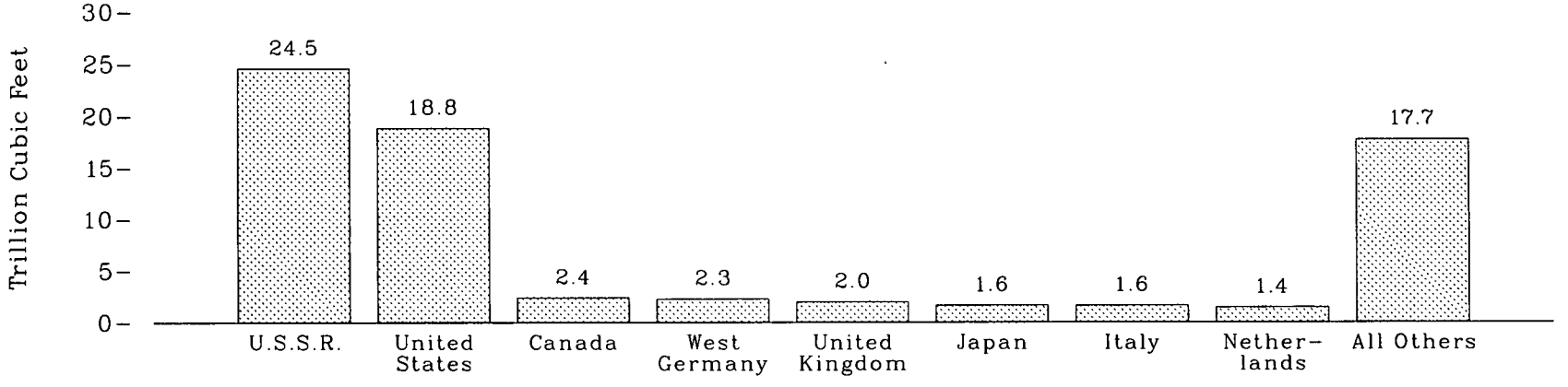
Sources: •1980—Energy Information Administration (EIA), *International Energy Annual 1989* (February 1991), Table 3. • 1981 forward—EIA, *International Energy Annual 1990* (January 1992), Table 3.

Figure 126. World Natural Gas Production and Consumption, 1989

Production by Selected Country



Consumption by Selected Country



Source: Table 126.

Table 126. World Natural Gas Supply and Disposition, 1989

(Billion Cubic Feet)

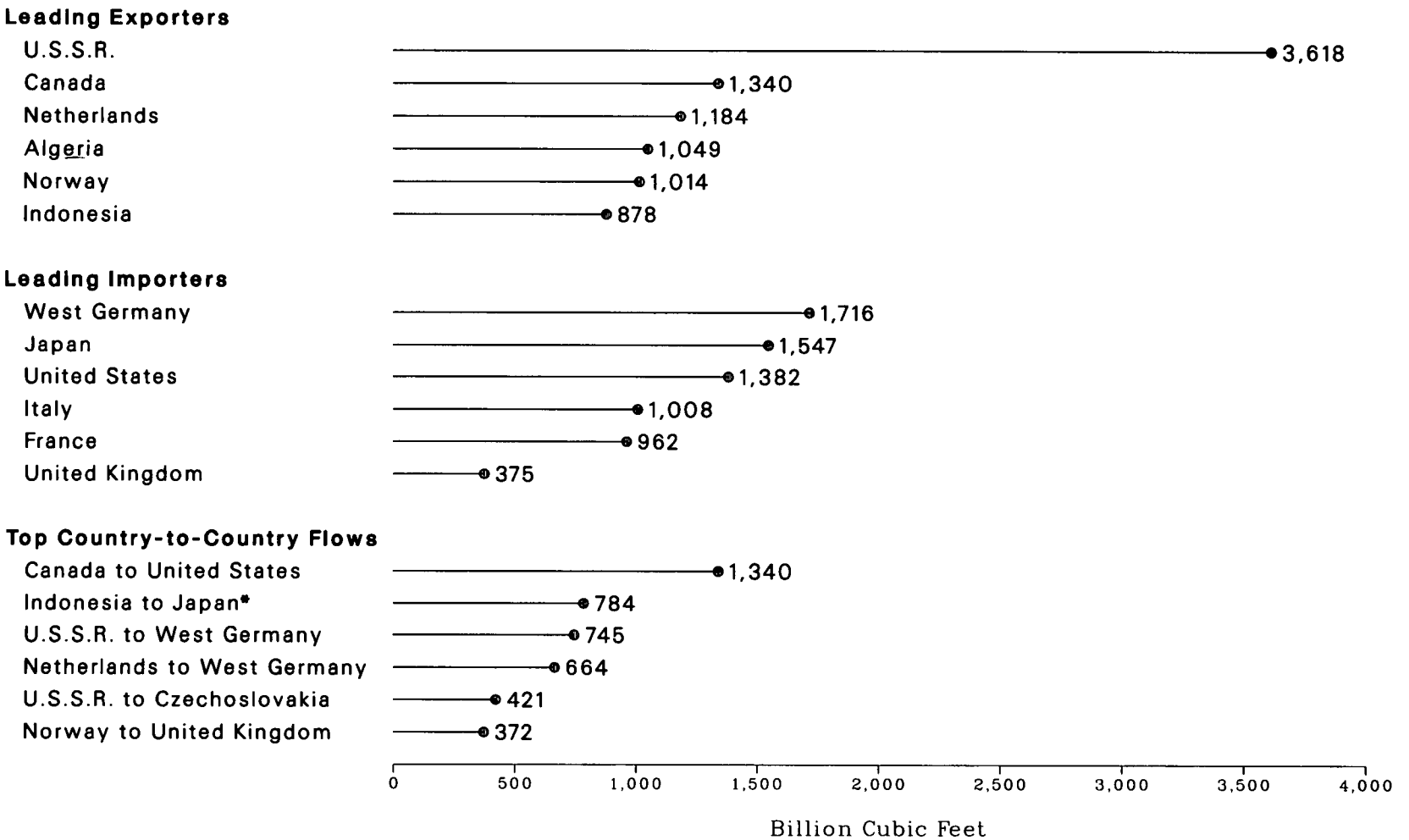
Area and Country	Supply		Disposition	
	Dry Natural Gas Production	Imports	Exports	Apparent Consumption
North, Central, and South America	**23,974**	**1,519**	**1,528**	**24,244**
Argentina	720	81	0	801
Canada	3,676	38	1,340	2,374
Mexico	925	17	0	943
United States	17,245	1,382	107	[1] 18,799
Venezuela	769	0	0	769
Other	639	0	81	558
Western Europe	**6,881**	**5,245**	**2,273**	**9,852**
France	107	962	0	1,069
Italy	600	1,008	0	1,608
Netherlands	2,538	82	1,184	1,436
Norway	1,080	0	1,014	66
United Kingdom	1,580	375	0	1,956
West Germany	578	1,716	41	2,253
Other	398	1,102	34	1,464
Eastern Europe and U.S.S.R.	**30,085**	**1,684**	**3,618**	**28,150**
Czechoslovakia	30	421	0	451
East Germany	381	265	0	646
Hungary	219	209	0	428
Poland	190	275	0	465
Romania	1,130	254	0	1,384
U.S.S.R.	28,111	36	3,618	24,529
Other	24	224	0	247
Middle East and Africa	**6,082**	**170**	**1,333**	**4,918**
Algeria	1,709	0	1,049	660
Iran	784	0	0	784
Kuwait	288	127	0	415
Saudi Arabia	1,052	0	0	1,052
Other	2,249	43	284	2,007
Far East and Oceania	**4,970**	**1,641**	**1,505**	**5,105**
Australia	566	0	32	534
China	505	0	0	505
Indonesia	1,425	0	878	546
Japan	71	1,547	0	1,618
Pakistan	475	0	0	475
Other	1,928	94	595	1,427
World	**71,991**	**10,258**	**10,258**	**72,270**

[1] Includes stock changes.

Note: Sum of components may not equal total due to independent rounding.

Source: Energy Information Administration, *International Energy Annual 1990* (January 1992), Table 23.

Figure 127. International Natural Gas Flow, 1989



*Liquefied natural gas.
Source: Table 127.

Table 127. International Natural Gas Flow, 1989

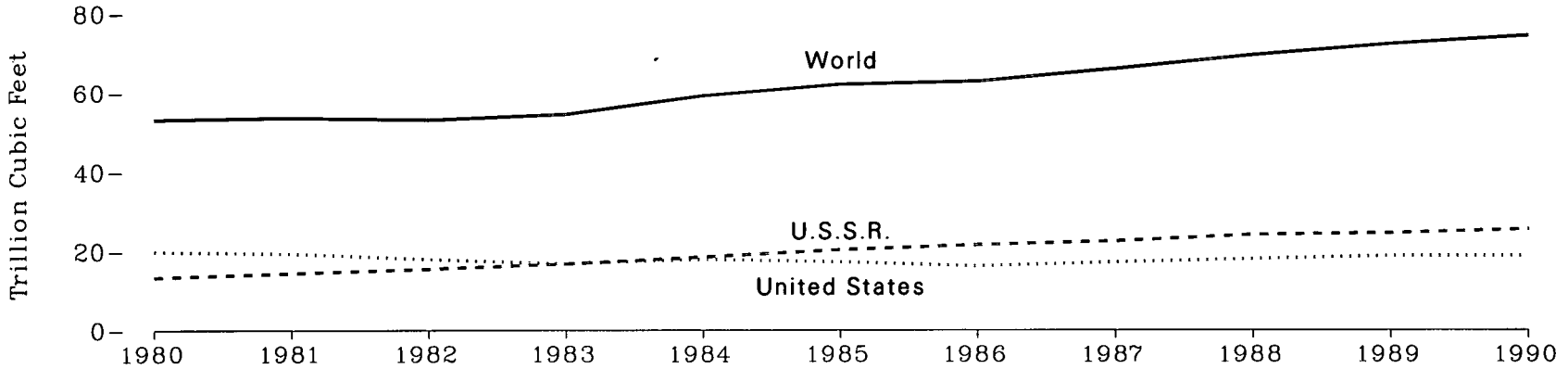
(Billion Cubic Feet)

Importers	Exporters												
	North and South America			Western Europe					Africa		Far East and Oceania		
	Canada	United States	Other	Nether-lands	Norway	Other	U.S.S.R.	Middle East[1]	Algeria	Libya	Indonesia	Other	Total
North America													
Canada	—	38	—	—	—	—	—	—	—	—	—	—	38
Mexico	—	17	—	—	—	—	—	—	—	—	—	—	17
United States	1,340	—	—	—	—	—	—	—	42	—	—	—	1,382
Central and South America													
Argentina	—	—	81	—	—	—	—	—	—	—	—	—	81
Western Europe													
Austria	—	—	—	—	—	5	145	—	—	—	—	—	150
Belgium and Luxembourg	—	—	—	153	74	—	—	—	[2] 140	—	—	—	[2] 388
France	—	—	—	153	196	—	296	—	[2] 316	—	—	—	[2] 962
Italy	—	—	—	200	—	—	404	—	394	11	—	—	1,008
Netherlands	—	—	—	—	82	—	—	—	—	—	—	—	82
Spain	—	—	—	—	—	—	—	—	[2] 100	[2] 37	—	—	[2] 136
United Kingdom	—	—	—	—	372	—	—	—	4	—	—	—	375
West Germany	—	—	—	664	290	16	745	—	—	—	—	—	1,716
Yugoslavia	—	—	—	—	—	—	186	—	—	—	—	—	186
Other	—	—	—	15	—	54	196	—	—	—	—	—	265
Eastern Europe and U.S.S.R.													
Bulgaria	—	—	—	—	—	—	222	—	—	—	—	—	222
Czechoslovakia	—	—	—	—	—	—	421	—	—	—	—	—	421
East Germany	—	—	—	—	—	—	265	—	—	—	—	—	265
Hungary	—	—	—	—	—	—	209	—	—	—	—	—	209
Poland	—	—	—	—	—	—	275	—	—	—	—	—	275
Romania	—	—	—	—	—	—	254	—	—	—	—	—	254
U.S.S.R.	—	—	—	—	—	—	—	—	—	—	—	36	36
Middle East													
Kuwait	—	—	—	—	—	—	—	127	—	—	—	—	127
United Arab Emirates	—	—	—	—	—	—	—	—	—	—	—	—	—
Africa													
Tunisia	—	—	—	—	—	—	—	—	43	—	—	—	43
Far East and Oceania													
Japan	—	[2] 51	—	—	—	—	—	[2] 110	11	—	[2] 784	[2] 591	[2] 1,547
South Korea	—	—	—	—	—	—	—	—	—	—	94	—	94
World	1,340	[2] 107	81	1,184	1,014	75	3,618	[2] 237	[2] 1,049	[2] 47	[2] 878	[2] 627	[2] 10,258

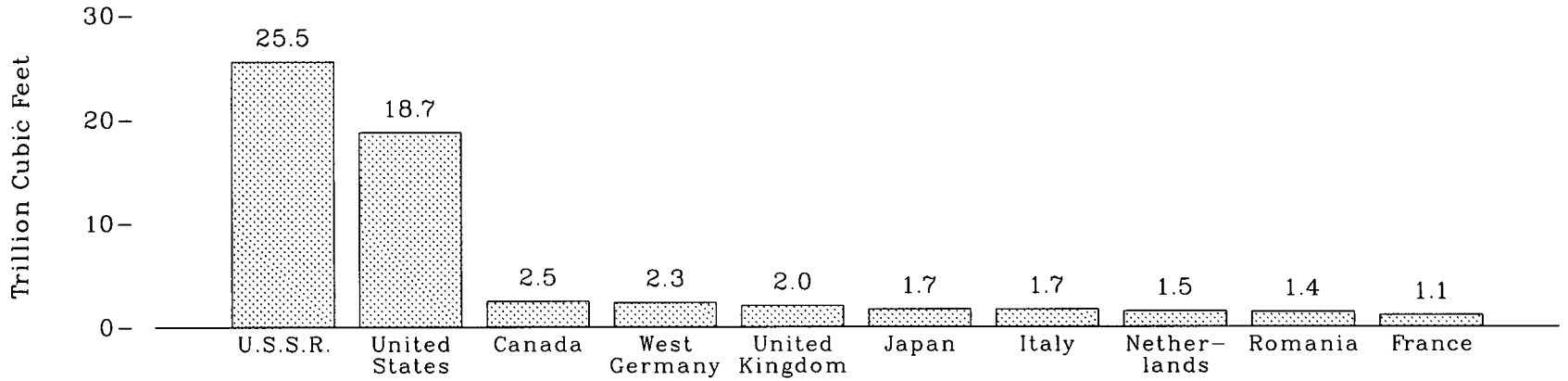
[1] United Arab Emirates and Iraq.
[2] Liquefied natural gas.
— = Not applicable.
Note: Sum of components may not equal total due to independent rounding.
Source: Energy Information Administration, *International Energy Annual 1990* (January 1992), Table 24.

Figure 128. World Dry Natural Gas Consumption

World and Leading Consumers, 1980-1990



Top Consuming Countries, 1990



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 128.

Table 128. World Dry Natural Gas Consumption, 1980-1990

(Billion Cubic Feet)

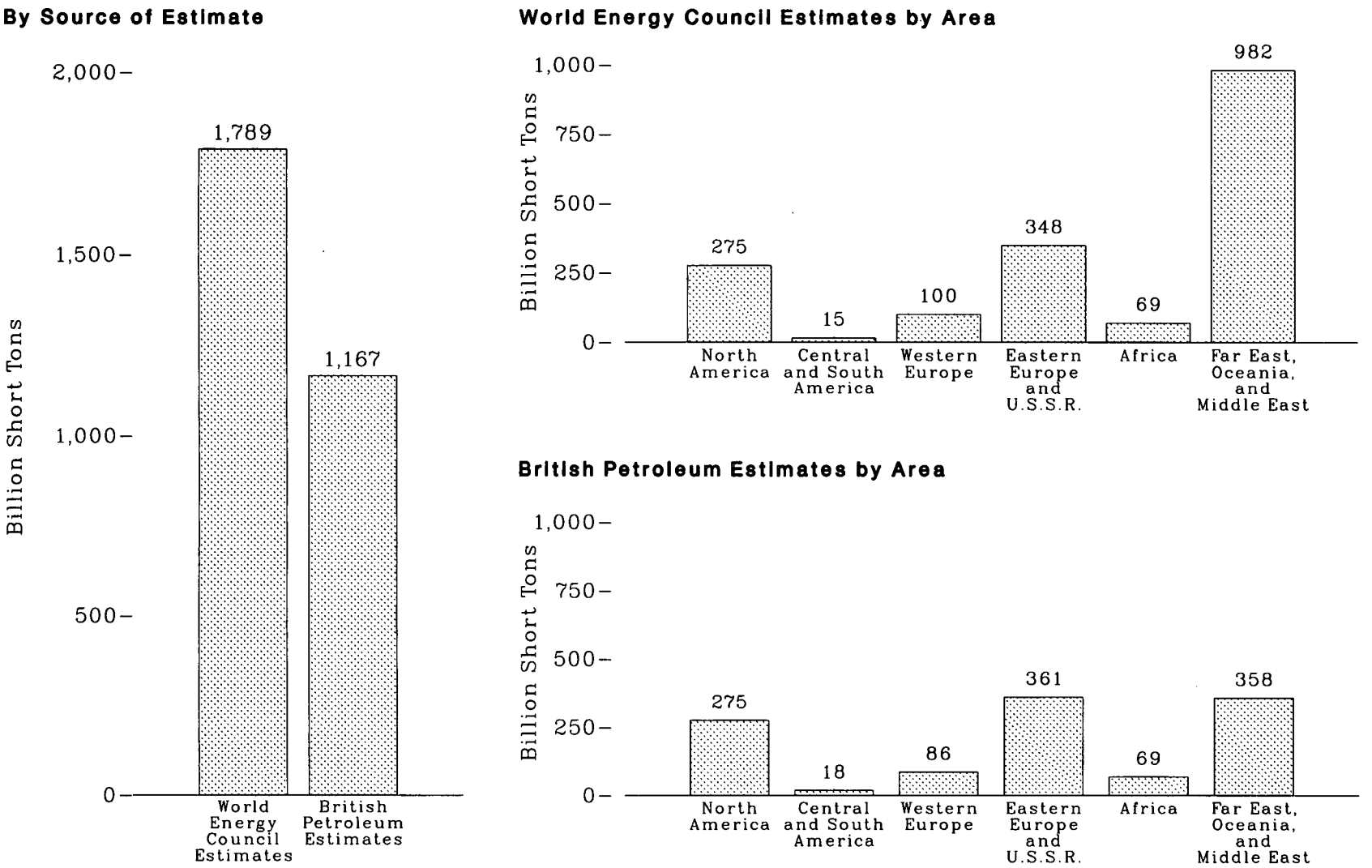
Year	Canada	France	Italy	Japan	Mexico	Nether-lands	Romania	Saudi Arabia	United Kingdom	United States	U.S.S.R.	West Germany	Other	World
1980	1,850	1,036	1,088	943	908	1,035	1,251	517	1,900	19,877	13,328	2,102	7,274	53,109
1981	1,708	996	983	886	930	1,421	1,267	460	1,671	19,404	14,440	2,133	7,311	53,610
1982	1,664	913	989	919	1,016	1,511	1,411	201	1,570	18,001	15,522	1,795	7,557	53,069
1983	1,807	1,049	1,009	1,008	1,078	1,371	1,446	200	1,774	16,835	16,822	1,818	8,203	54,420
1984	1,855	1,029	1,171	1,367	990	1,395	1,395	253	1,900	17,951	18,512	1,980	9,307	59,105
1985	2,054	1,093	1,222	1,419	955	1,267	1,336	716	1,995	17,281	20,302	2,104	10,255	61,999
1986	2,035	1,054	1,267	1,472	923	1,395	1,410	890	2,048	16,221	21,522	1,973	10,580	62,790
1987	2,013	1,095	1,395	1,496	865	1,514	1,405	946	2,117	17,211	22,462	2,140	11,252	65,910
1988	2,188	1,007	1,468	1,554	926	1,409	1,306	1,028	2,016	18,030	24,092	2,120	12,223	69,366
1989	2,374	1,069	1,608	1,618	943	1,436	1,384	1,052	1,956	18,801	24,529	2,253	13,250	72,270
1990[1]	2,469	1,111	1,672	1,683	980	1,493	1,440	1,094	2,034	18,724	25,510	2,343	13,778	74,423

[1] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Note: Sum of components may not equal total due to independent rounding.

Sources: **United States:** Table 74. **All Other Data:** • 1980—Energy Information Administration (EIA), *International Energy Annual 1989* (February 1991), Table 9. • 1981 forward—EIA, *International Energy Annual 1990* (January 1992), Table 9.

Figure 129. World Recoverable Reserves of Coal



Notes: • World Energy Council estimates are as of the end of 1988. British Petroleum estimates are as of the end of 1990. • Because vertical scales differ, graphs should not be compared.
Source: Table 129.

Table 129. World Recoverable Reserves of Coal

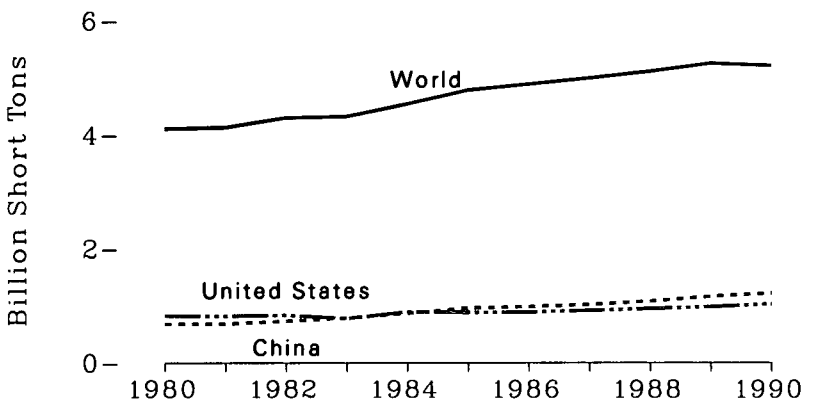
(Million Short Tons)

Area and Country	Anthracite and Bituminous Coal [1]		Lignite [1]		Total	
	World Energy Council [2]	British Petroleum [3]	World Energy Council [2]	British Petroleum [3]	World Energy Council [2]	British Petroleum [3]
North America	**237,490**	**129,639**	**37,437**	**145,031**	**274,927**	**274,671**
Canada	5,473	4,096	2,204	3,355	7,677	7,452
Mexico	2,078	1,347	—	699	2,078	2,046
United States [4]	229,939	124,196	35,233	140,977	265,173	265,173
Central and South America	**14,986**	**14,272**	**136**	**4,107**	**15,122**	**18,379**
Brazil	1,372	2,131	—	2,561	1,372	4,691
Chile	1,301	—	—	—	1,301	—
Colombia	10,652	10,595	—	—	10,652	10,595
Peru	1,058	—	110	—	1,168	—
Other	603	1,546	26	1,546	629	3,093
Western Europe	**33,851**	**37,323**	**66,037**	**49,047**	**99,889**	**86,370**
Greece	—	—	3,306	3,155	3,306	3,155
Spain	588	354	260	377	849	731
Turkey	193	174	6,534	6,369	6,727	6,543
United Kingdom	3,637	9,482	551	551	4,188	10,033
West Germany	26,359	26,123	38,735	38,388	65,094	64,510
Yugoslavia	1,730	—	16,530	—	18,260	—
Other	1,344	1,190	121	207	1,465	1,398
Eastern Europe and U.S.S.R.	**190,842**	**146,496**	**157,347**	**214,882**	**348,189**	**361,378**
Bulgaria	33	—	4,077	—	4,110	—
Czechoslovakia	2,061	—	3,857	—	5,918	—
Germany, East	—	—	23,142	22,199	23,142	22,199
Hungary	1,739	—	3,177	—	4,916	—
Poland	31,627	31,065	12,893	12,662	44,521	43,728
U.S.S.R.	155,382	112,982	110,200	150,487	265,582	263,470
Other	—	2,449	1	29,534	—	31,981
Africa	**69,310**	**68,438**	**—**	**308**	**69,310**	**68,746**
Botswana	3,857	—	—	—	3,857	—
South Africa	60,977	60,419	—	—	60,977	60,419
Swaziland	2,006	—	—	—	2,006	—
Zimbabwe	809	796	—	—	809	796
Other	1,661	7,223	—	308	1,661	7,531
Far East, Oceania, and Middle East	**798,206**	**287,063**	**183,301**	**70,740**	**981,508**	**357,803**
Australia	54,042	49,486	46,174	50,112	100,216	99,598
China	672,991	168,467	132,240	14,652	805,231	183,119
India	66,834	66,247	2,094	2,066	68,928	68,312
Indonesia	1,543	1,087	1,763	2,205	3,306	3,291
Japan	943	911	19	19	962	929
Other	1,853	865	1,011	1,686	2,865	2,554
World	**1,344,686**	**683,231**	**444,258**	**484,115**	**1,788,944**	**1,167,346**

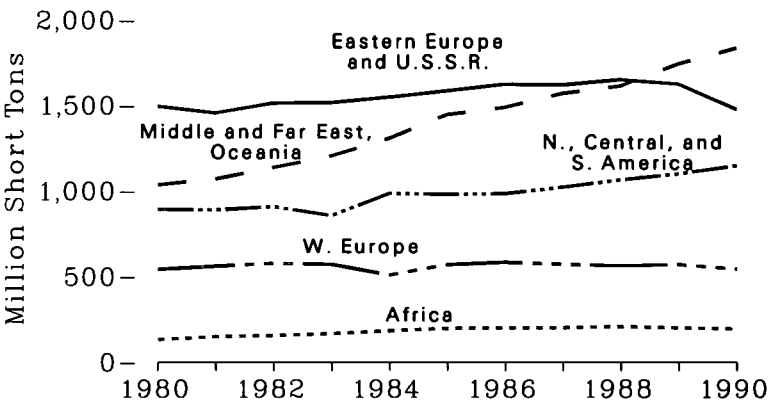
[1] In World Energy Council data, subbituminous coal is included in the anthracite and bituminous coal category; in the British Petroleum data, subbituminous coal is included in the lignite category. [2] World Energy Council definition of "Proved Recoverable Reserves": The tonnage of Proved Amount in Place that can be recovered (extracted from the earth in raw form) under present and expected local economic conditions with existing available technology. Data are from the *1989 Survey of Energy Resources* [3] British Petroleum definition of "Proved Reserves": Proved reserves of coal are generally taken to be those quantities which geological and engineering information indicate with reasonable certainty can be recovered in the future from known deposits under existing economic and operating conditions. Data are from the *BP Statistical Review of World Energy* (June 1991). [4] U.S. data are calculated from Energy Information Administration (EIA) file information. Excludes certain resource data currently under review. 7,315 million short tons of anthracite in 5 states; 1,407 short tons of subbituminous coal in Alaska, and a total of 164 million short tons of coal resources in non-coal-producing states. Data represent both measured and indicated tonnage, as of January 1, 1990. Those data have been combined prior to depletion adjustments and cannot be recaptured as "measured alone." — = Not applicable. Notes: • World Energy Council estimates are as of the end of 1987. British Petroleum estimates are as of the end of 1990. • Sum of components may not equal total due to independent rounding. The EIA does not certify the international reserves data but reproduces the information as a matter of convenience for the reader. Comparisons between sources for both the anthracite and bituminous coal category and the lignite category require careful interpretation because of the different definitional groupings for subbituminous coal. Source: EIA, *International Energy Annual 1990* (January 1992), Table 33.

Figure 130. World Coal Production

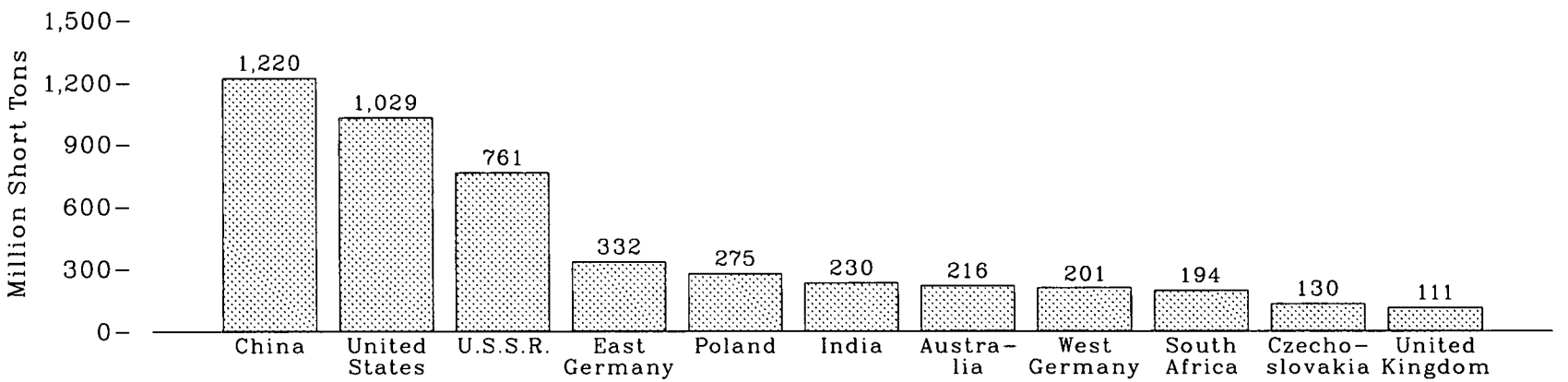
World and Leading Producers, 1980-1990



World Areas, 1980-1990



Top Producing Countries, 1990



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 130.

Table 130. World Coal Production, 1980-1990

(Million Short Tons)

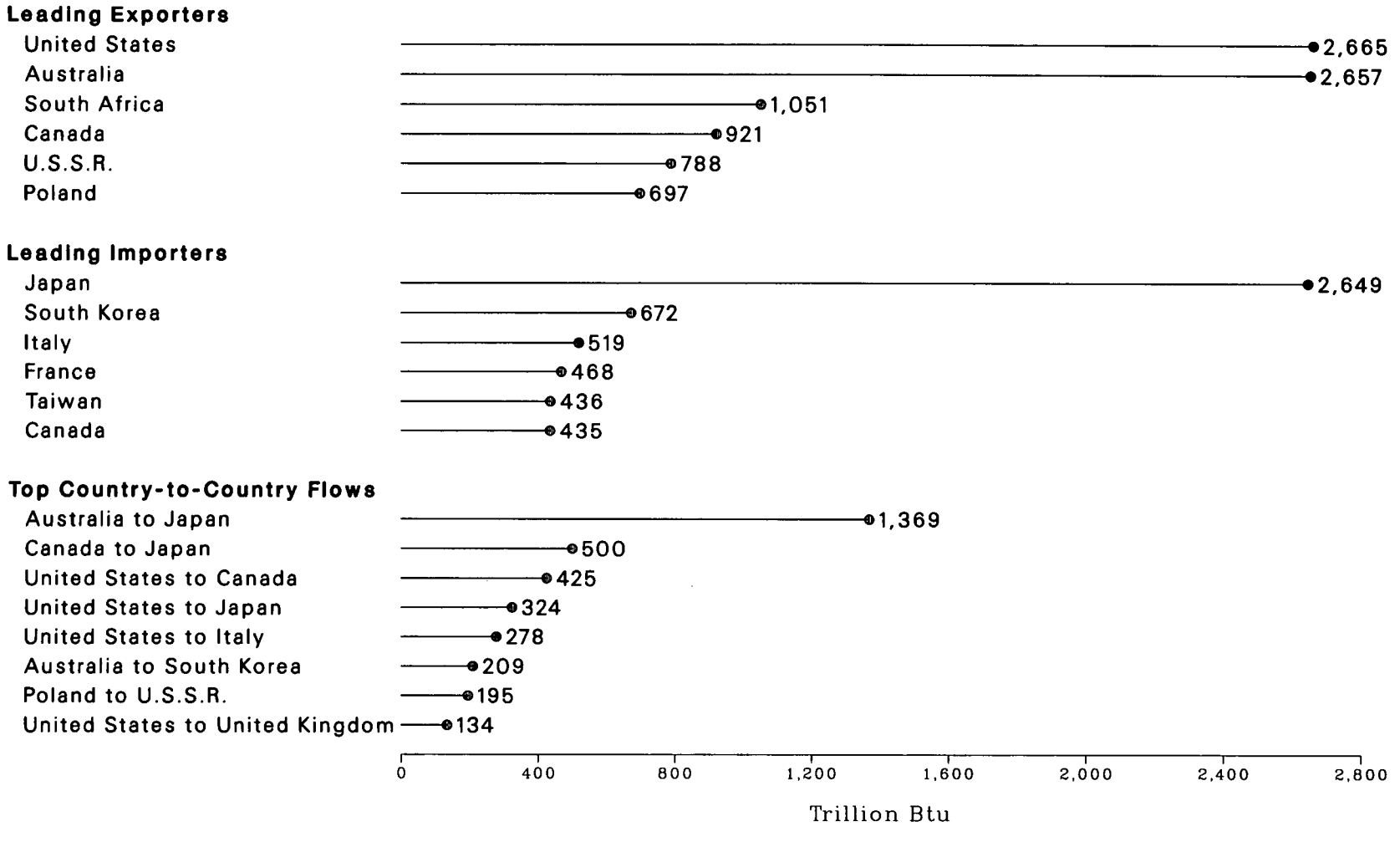
Area and Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990 [1]
North, Central, and South America	**894**	**890**	**909**	**857**	**987**	**981**	**986**	**1,024**	**1,067**	**1,103**	**1,151**
Canada	40	44	47	50	63	67	64	67	78	78	75
United States	830	824	838	782	896	884	890	919	950	981	1,029
Other	24	22	24	26	27	30	32	38	39	44	47
Western Europe	**543**	**561**	**577**	**571**	**510**	**570**	**584**	**573**	**564**	**571**	**545**
Greece	26	30	30	33	35	40	42	49	51	57	55
Spain	32	38	43	44	44	44	42	40	43	46	40
Turkey	18	19	24	32	38	43	51	52	43	44	43
United Kingdom	141	138	137	127	55	104	119	115	117	111	98
West Germany	239	241	247	236	233	231	222	211	207	206	203
Yugoslavia	52	58	60	65	72	75	77	78	78	82	84
Other	35	37	36	34	34	33	30	28	26	25	22
Eastern Europe and U.S.S.R.	**1,496**	**1,456**	**1,515**	**1,518**	**1,550**	**1,587**	**1,625**	**1,622**	**1,654**	**1,628**	**1,480**
Bulgaria	33	32	35	36	36	34	35	39	38	38	33
Czechoslovakia	136	137	139	140	143	140	139	137	137	130	118
East Germany	285	294	304	309	327	344	343	331	342	332	282
Poland	254	219	250	258	267	275	286	290	294	275	289
Romania	39	41	42	39	49	51	52	50	58	68	42
U.S.S.R.	719	703	713	707	700	714	741	750	761	761	694
Other	30	30	31	30	30	29	28	27	26	25	22
Africa	**133**	**150**	**157**	**167**	**184**	**198**	**201**	**202**	**208**	**202**	**195**
South Africa	127	144	151	161	179	192	195	195	200	194	186
Other	6	5	6	6	5	6	6	7	8	8	9
Middle East, Far East, and Oceania	**1,036**	**1,071**	**1,138**	**1,206**	**1,308**	**1,448**	**1,491**	**1,573**	**1,616**	**1,748**	**1,840**
Australia	116	130	140	146	153	186	187	209	198	216	231
China	683	685	734	787	870	961	985	1,023	1,080	1,162	1,220
India	125	142	148	158	168	173	188	207	208	230	241
North Korea	50	50	52	50	51	53	54	57	58	59	62
Other	62	64	63	64	67	74	77	76	72	82	86
World	**4,103**	**4,128**	**4,296**	**4,319**	**4,538**	**4,783**	**4,887**	**4,994**	**5,109**	**5,253**	**5,211**

[1] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Notes: • Coal includes anthracite, subanthracite, bituminous coal, subbituminous coal, lignite, and brown coal. • Sum of components may not equal total due to independent rounding.

Sources: **United States:** Table 83. **All Other Data:** • 1980—Energy Information Administration (EIA), *International Energy Annual 1989*, (February 1991), Table 4. • 1981 forward—EIA, *International Energy Annual 1990* (January 1992), Table 4.

Figure 131. International Coal Flow, 1989



Source: Table 131.

Table 131. International Coal Flow, 1989

(Trillion Btu)

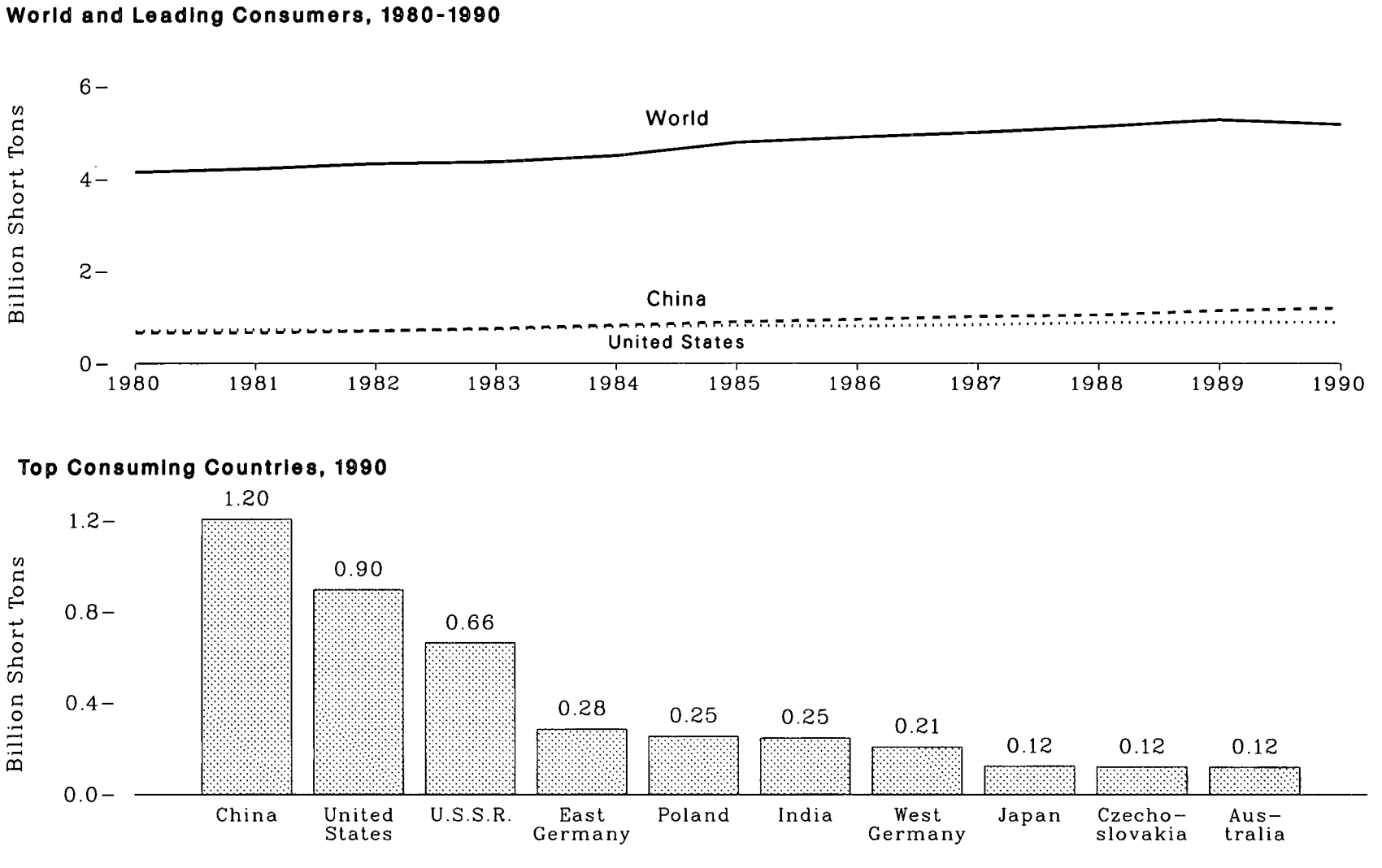
Importers	Exporters															
	North, Central, and South America			Western Europe				Eastern Europe			Africa	Far East				
	Canada	United States	Colombia	Belgium	West Germany	Netherlands	United Kingdom	Czechoslovakia	Poland	U.S.S.R.	South Africa	Australia	China	Japan	Other	Total
North America																
Canada	0	425	0	0	4	0	0	0	0	0	0	2	3	0	1	435
United States	35	0	27	2	12	1	1	0	3	0	0	23	3	23	0	130
Other	1	4	0	(1)	(1)	0	0	0	0	0	0	(1)	0	0	0	5
Central and South America																
Brazil	0	152	0	0	0	0	0	0	0	0	0	33	1	0	79	266
Other	0	33	4	0	18	0	(1)	31	0	5	0	15	2	0	12	120
Western Europe																
Belgium and Luxembourg	3	164	2	0	59	0	3	0	7	2	82	43	11	0	21	396
Denmark	15	72	58	0	(1)	0	11	(1)	20	18	0	70	4	0	0	268
Finland	0	23	4	0	(1)	0	5	0	54	61	0	0	1	0	0	148
France	18	155	36	8	42	0	8	0	0	42	17	75	29	0	38	468
Italy	1	278	15	0	31	0	0	0	20	14	124	28	8	0	0	519
Netherlands	14	132	40	5	19	0	0	0	20	4	29	78	8	0	(1)	348
Spain	0	85	12	1	9	0	3	0	0	7	124	25	1	0	0	266
United Kingdom	21	134	7	14	8	44	0	0	0	0	9	79	7	0	0	324
West Germany	(1)	52	8	2	0	(1)	2	5	42	21	76	9	4	0	0	221
Other	17	212	25	15	29	2	22	34	89	142	4	70	1	3	9	675
Eastern Europe and U.S.S.R.																
Bulgaria	0	2	0	0	0	0	0	0	0	132	0	0	0	0	0	134
East Germany	0	0	0	0	0	0	0	21	21	79	0	1	1	0	13	138
Romania	0	34	0	0	0	0	0	0	184	26	0	0	0	0	0	244
U.S.S.R.	0	0	0	0	0	0	0	0	195	0	0	55	(1)	0	(1)	251
Other	0	11	0	0	0	0	0	2	36	117	0	7	0	0	23	196
Middle East																
Israel	0	11	11	0	0	0	0	0	0	0	57	14	0	0	0	92
Other	2	5	0	0	0	0	3	0	0	0	0	0	0	0	3	13
Africa																
Algeria	0	26	0	0	0	0	0	0	0	0	0	0	0	0	3	29
Egypt	0	13	0	0	0	0	0	0	0	11	0	0	0	0	0	24
Other	0	19	0	0	0	0	(1)	0	0	0	0	32	0	0	4	55
Far East and Oceania																
Hong Kong	0	0	9	0	0	0	0	0	0	0	98	95	42	0	0	243
Japan	500	324	3	0	2	0	0	0	0	69	272	1,369	109	0	0	2,649
South Korea	250	133	0	0	0	0	0	0	0	38	0	209	40	0	4	672
Taiwan	25	124	0	0	0	0	0	0	0	0	130	150	5	1	0	436
Other	20	44	3	0	42	0	5	0	6	(1)	29	176	28	41	14	407
World	921	2,665	262	47	275	47	64	93	697	788	1,051	2,657	310	68	223	10,167

[1] Less than 500 million Btu.

Notes: • Includes coal coke. • Sum of components may not equal total due to statistical discrepancies, losses, unaccounted for coal and coal trade not in national accounts, such as the United States shipment of coal to United States Armed Forces in Europe.

Source: Energy Information Administration, *International Energy Annual 1990* (January 1992), Table 27.

Figure 132. World Coal Consumption



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 132.

Table 132. World Coal Consumption, 1980-1990

(Million Short Tons)

Year	Australia	China	Czechoslovakia	East Germany	India	Japan	Poland	South Africa	United Kingdom	United States	U.S.S.R.	West Germany	Yugoslavia	Other	World
1980	59	672	136	307	126	106	251	98	147	703	699	213	60	567	4,146
1981	61	667	136	312	145	117	230	110	131	733	688	223	68	599	4,219
1982	94	706	138	311	149	108	251	122	137	707	704	235	68	594	4,324
1983	86	757	142	312	159	107	210	129	124	737	703	232	75	586	4,358
1984	68	824	141	325	168	118	202	136	63	791	696	219	78	663	4,492
1985	71	897	139	350	201	128	218	140	113	818	701	230	81	696	4,783
1986	83	949	140	346	221	120	237	142	125	804	717	227	83	697	4,893
1987	94	1,011	137	331	211	127	256	147	120	837	721	213	84	707	4,995
1988	95	1,045	136	347	211	129	259	151	127	884	731	209	83	710	5,117
1989	105	1,147	130	338	234	121	241	145	127	891	729	210	87	768	5,272
1990[1]	118	1,205	119	284	246	122	253	137	112	896	661	207	88	725	5,171

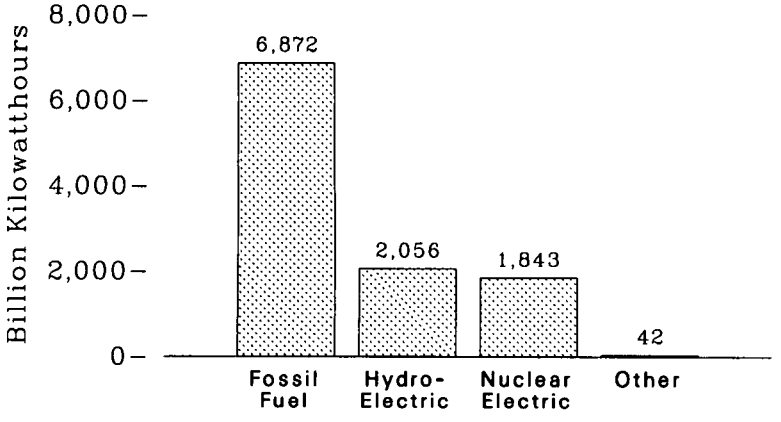
[1] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Note: Sum of components may not equal total due to independent rounding.

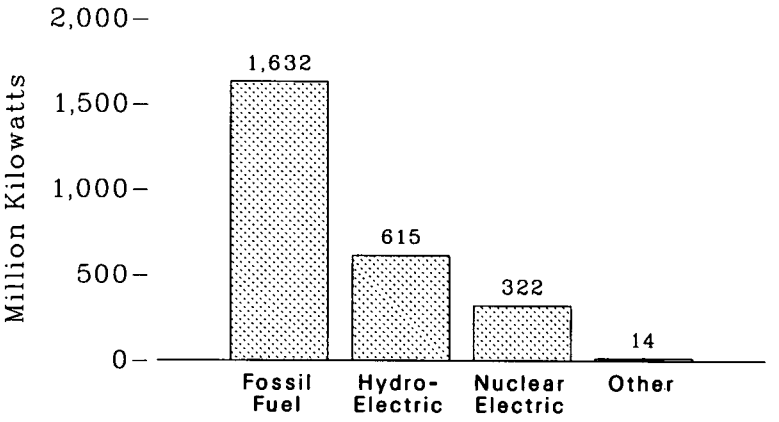
Sources: **United States:** Table 83. **All Other Data:** • 1980—Energy Information Administration (EIA), *International Energy Annual 1989* (February 1991), Table 10. • 1981 forward—EIA, *International Energy Annual 1990* (January 1992), Table 10.

Figure 133. World Net Generation of Electricity and Installed Capacity by Type

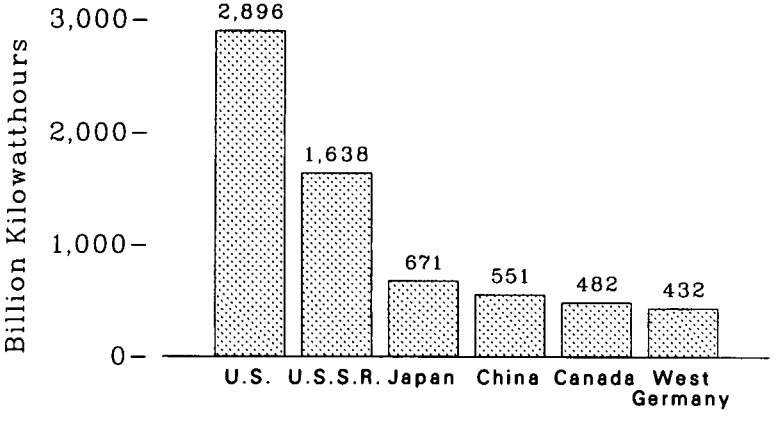
Net Generation by Type, 1989



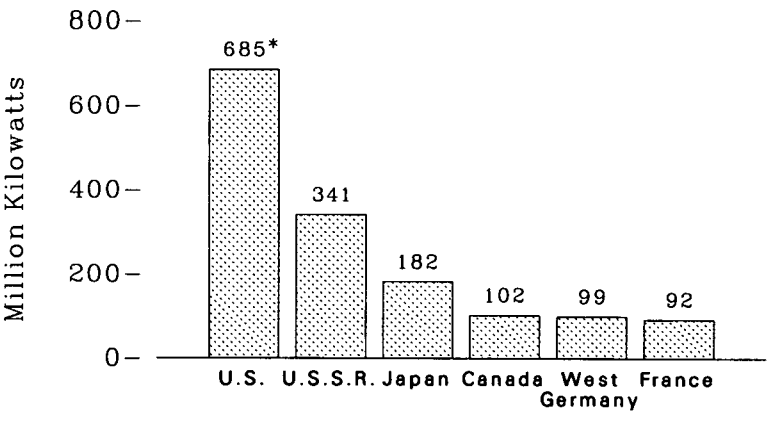
Installed Capacity by Type, January 1, 1990



Net Generation in Leading Countries, 1989



Installed Capacity in Leading Countries, January 1, 1990



*Net summer capability.

Notes: • Data include both electric utility and non-electric utility sources. • Other is geothermal, solar, biomass, wind, and other renewable energy sources. • Because vertical scales differ, graphs should not be compared.

Source: Table 133.

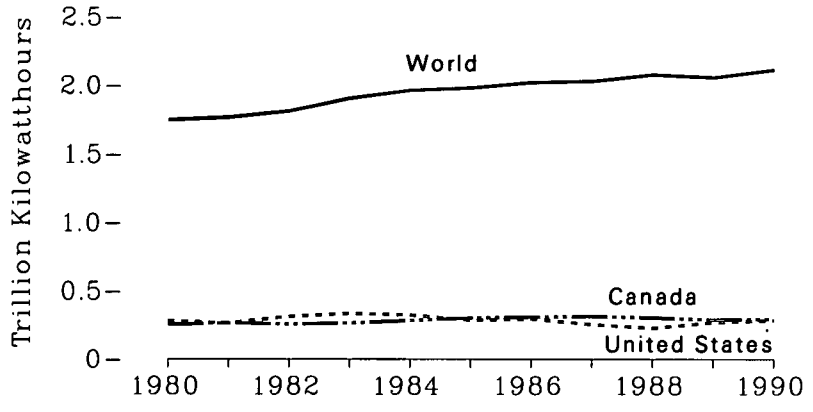
Table 133. World Net Generation of Electricity and Installed Capacity by Type

Region and Country	Net Generation, 1989					Installed Capacity, January 1, 1990				
	Fossil Fuel	Nuclear Electric	Hydro-electric	Other [1]	Total	Fossil Fuel	Nuclear Electric	Hydro-electric	Other [1]	Total
	(billion kilowatthours)					(million kilowatts)				
North America	**2,292.1**	**604.7**	**578.6**	**16.1**	**3,491.5**	**541.8**	**111.4**	**156.8**	**4.9**	**815.0**
Canada	119.2	75.4	287.6	0.0	482.2	31.1	12.6	58.5	0.0	102.2
Mexico	85.7	0.0	22.7	4.8	113.3	17.1	0.7	7.8	0.7	28.0
United States	2,086.6	529.4	268.2	11.3	2,895.5	[3] 491.7	[3] 98.2	[3] 90.5	[3] 4.2	[3] 684.6
Other	0.6	0.0	0.0	0.0	0.6	1.9	0.0	0.0	0.0	0.2
Central and South America	**127.0**	**6.3**	**335.9**	**7.0**	**476.2**	**43.7**	**1.7**	**80.3**	**4.8**	**130.5**
Argentina	28.3	4.8	15.0	0.0	48.1	9.0	1.0	6.6	0.0	16.6
Brazil	7.4	1.5	212.1	6.3	227.4	2.1	0.7	44.6	4.7	52.1
Colombia	8.4	0.0	29.6	0.0	38.0	2.2	0.0	6.7	0.0	8.9
Venezuela	24.2	0.0	33.8	0.0	58.0	10.7	0.0	7.0	0.0	17.7
Other	58.7	0.0	45.4	0.7	104.7	19.7	0.0	15.4	0.1	35.2
Western Europe	**1,018.0**	**696.2**	**442.3**	**9.7**	**2,166.3**	**272.5**	**116.3**	**155.0**	**2.5**	**546.4**
France	49.2	288.7	50.1	0.6	388.6	16.2	52.5	22.9	0.2	91.8
Italy	140.9	0.0	30.8	3.0	174.7	31.9	1.1	16.5	0.5	50.0
Norway	0.5	0.0	117.5	0.0	118.0	0.3	0.0	26.5	0.0	26.7
Spain	63.9	53.7	18.3	0.0	135.9	19.5	7.5	15.7	0.0	42.7
Sweden	5.8	62.8	71.1	[4]	139.7	6.6	9.8	15.1	[2]	31.5
United Kingdom	208.3	63.6	6.5	[4]	278.4	56.6	10.7	4.1	[2]	71.4
West Germany	270.2	140.4	19.1	2.2	431.9	68.6	22.7	6.9	0.8	99.0
Other	279.2	87.0	128.9	3.9	499.1	72.8	12.0	47.3	1.0	133.3
Eastern Europe and U.S.S.R.	**1,597.0**	**274.5**	**249.1**	**[4]**	**2,120.5**	**329.0**	**47.2**	**79.5**	**[2]**	**455.7**
Czechoslovakia	56.5	23.2	4.2	0.0	83.9	11.2	3.5	2.9	0.0	17.7
East Germany	105.1	11.0	1.6	0.0	117.7	19.7	1.8	1.8	0.0	23.4
Poland	131.6	0.0	3.7	0.0	135.3	30.0	0.0	2.0	0.0	32.0
U.S.S.R.	1,204.2	212.6	220.7	0.0	1,637.5	239.2	37.4	64.4	0.0	341.0
Other	99.6	27.7	18.9	[4]	146.1	28.9	4.5	8.4	[2]	41.6
Middle East	**177.1**	**0.0**	**12.4**	**0.0**	**189.5**	**58.4**	**0.0**	**3.1**	**0.0**	**61.5**
Iraq	21.8	0.0	0.6	0.0	22.4	3.8	0.0	0.1	0.0	3.9
Saudi Arabia	46.1	0.0	0.0	0.0	46.1	16.5	0.0	0.0	0.0	16.5
Other	109.2	0.0	11.8	0.0	121.0	38.1	0.0	3.0	0.0	41.1
Africa	**240.9**	**11.1**	**43.7**	**0.3**	**296.0**	**50.5**	**1.9**	**18.9**	**[2]**	**71.4**
Egypt	28.6	0.0	6.3	0.0	34.9	9.4	0.0	2.4	0.0	11.8
South Africa	147.8	11.1	0.6	0.0	159.5	24.0	1.9	0.5	0.0	26.5
Other	64.5	0.0	36.8	0.3	101.6	17.1	0.0	16.0	[2]	33.1
Far East and Oceania	**1,420.0**	**250.5**	**394.4**	**8.3**	**2,073.2**	**336.3**	**43.3**	**121.3**	**1.3**	**502.2**
Australia	114.6	0.0	14.1	0.0	128.7	27.7	0.0	7.3	0.0	35.0
China	442.4	0.0	108.4	0.0	550.8	68.0	0.0	30.0	0.0	98.0
India	177.5	3.8	63.1	[4]	244.4	49.8	1.6	18.5	[2]	69.9
Japan	405.2	174.5	90.1	1.4	671.2	115.6	28.9	37.3	0.2	181.9
Other	280.3	72.2	118.7	6.9	478.1	75.2	12.8	28.2	1.1	117.4
World	**6,872.1**	**1,843.3**	**2,056.3**	**41.5**	**10,813.3**	**1,632.2**	**321.8**	**614.9**	**13.6**	**2,582.5**

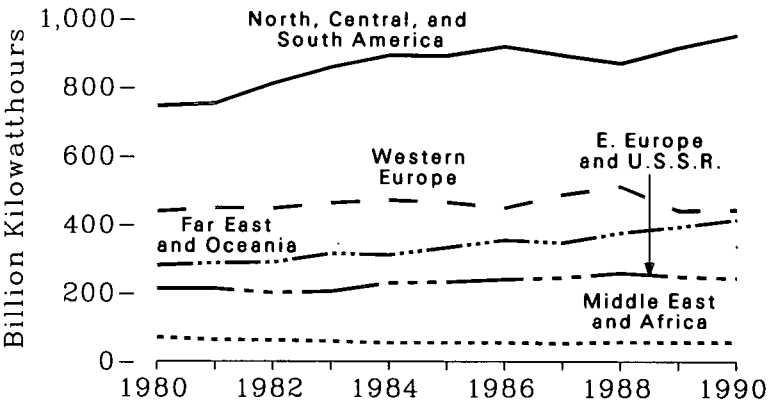
[1] Geothermal, solar, biomass, wind, and other renewable energy sources.
[2] Less than 0.5 million kilowatts.
[3] Net summer capability.
[4] Less than 0.5 billion kilowatthours.
Notes: • Electric utility and non-electric utility sources. • Sum of components may not equal total due to independent rounding.
Sources: Energy Information Administration (EIA), *International Energy Annual 1990* (January 1992), Tables 30 and 31, except U.S. capacity which is net summer capability from EIA, *Electric Power Annual 1990* (January 1992), Table 3.

Figure 134. World Hydroelectric Power Net Generation

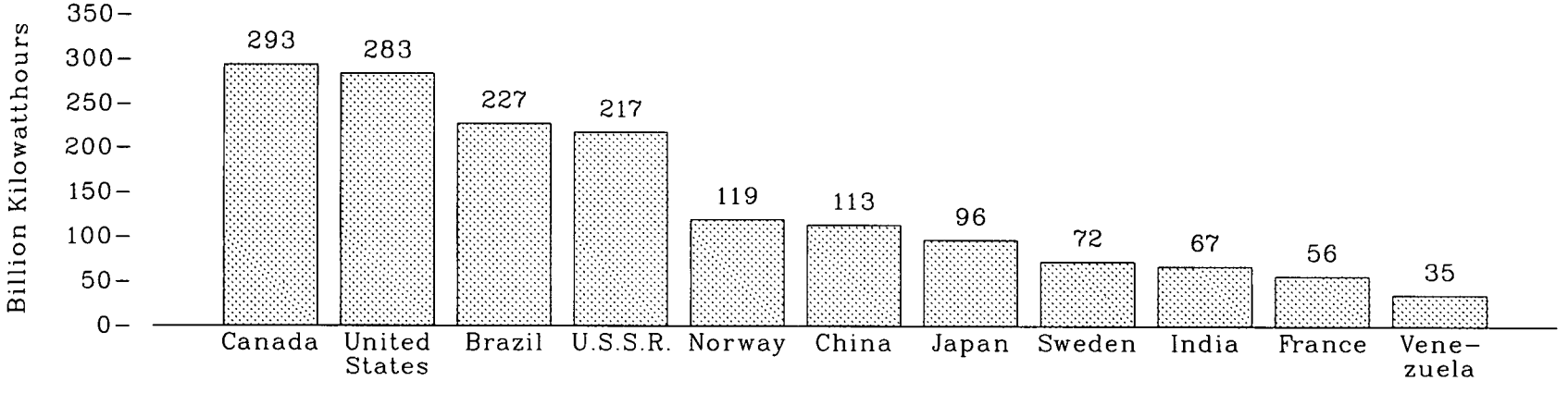
World and Leading Producers, 1980-1990



World Areas, 1980-1990



Top Generating Countries, 1990



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 134.

Table 134. World Hydroelectric Power Net Generation, 1980-1990

(Billion Kilowatthours)

Area and Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990 [1]
North, Central, and South America	**746**	**753**	**812**	**860**	**894**	**893**	**919**	**895**	**872**	**916**	**953**
Argentina	15	15	18	18	20	20	21	22	16	15	14
Brazil	128	129	140	150	165	177	181	184	197	212	227
Canada	251	263	255	263	283	301	308	313	304	288	293
Colombia	14	14	18	18	20	22	25	25	29	30	31
Mexico	17	24	23	21	23	26	20	18	21	23	24
United States	279	264	312	335	324	284	294	253	226	268	283
Venezuela	14	15	16	18	20	21	25	31	33	34	35
Other	28	29	30	37	39	42	45	49	46	46	46
Western Europe	**439**	**449**	**448**	**464**	**472**	**466**	**450**	**488**	**512**	**442**	**445**
Austria	29	31	30	30	29	31	31	36	33	33	34
Finland	10	14	13	13	13	12	12	14	13	13	11
France	70	73	71	71	67	64	65	72	77	50	56
Italy	47	45	44	44	45	44	44	42	36	31	27
Norway	84	93	93	106	106	103	97	103	109	118	119
Portugal	8	5	7	8	10	11	9	9	12	6	6
Spain	31	23	27	29	33	33	27	28	34	18	17
Sweden	58	59	54	63	67	70	60	71	70	71	72
Switzerland	33	36	37	36	31	32	33	35	36	30	25
West Germany	17	20	20	19	19	18	19	21	21	19	19
Yugoslavia	28	25	23	22	26	24	28	26	26	24	22
Other	24	25	29	23	26	24	25	32	45	29	37
Eastern Europe and U.S.S.R.	**213**	**213**	**201**	**205**	**229**	**232**	**240**	**245**	**259**	**249**	**244**
Romania	13	13	12	10	11	12	11	11	14	13	11
U.S.S.R.	184	185	175	180	203	205	214	218	229	221	217
Other	16	15	14	15	15	15	15	16	16	15	16
Middle East and Africa	**70**	**63**	**62**	**59**	**54**	**55**	**55**	**53**	**57**	**56**	**56**
Egypt	10	10	10	10	10	8	8	6	6	6	6
Zambia	9	10	10	10	10	10	10	8	8	7	6
Other	51	43	42	39	34	37	37	39	43	43	44
Far East and Oceania	**281**	**288**	**290**	**316**	**312**	**333**	**355**	**347**	**377**	**394**	**416**
Australia	13	15	14	13	12	14	15	14	14	14	14
China	58	66	74	86	87	92	95	100	108	108	113
India	47	50	48	50	53	51	53	47	57	63	67
Japan	92	80	74	82	66	78	85	77	84	90	96
Korea, North	22	23	25	26	27	28	29	29	31	31	32
New Zealand	20	20	18	20	20	20	22	22	22	21	22
Other	29	34	37	39	47	50	56	58	61	67	72
World	**1,748**	**1,766**	**1,812**	**1,904**	**1,961**	**1,979**	**2,019**	**2,028**	**2,077**	**2,056**	**2,113**

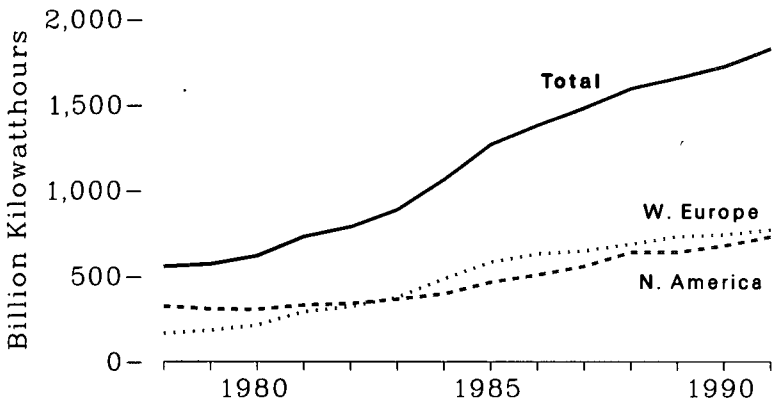
[1] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Notes: • See Appendix E, Note 1. • Generation data consist of both utility and non-utility sources. • Sum of components may not equal total due to independent rounding.

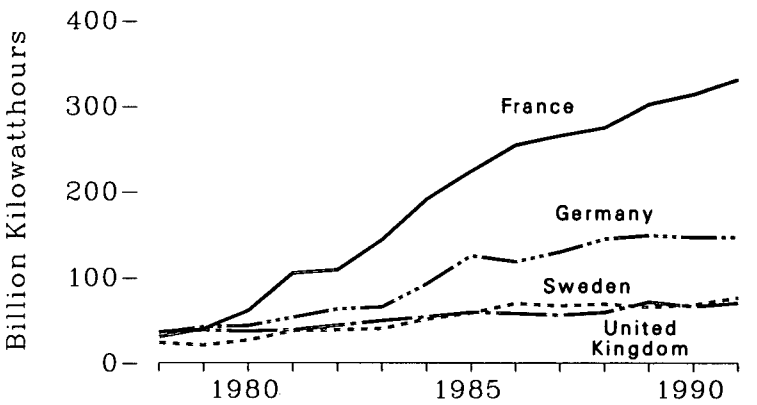
Sources: • 1980—Energy Information Administration (EIA), *International Energy Annual 1989* (February 1991), Table 5. • 1981 forward—EIA, *International Energy Annual 1990* (January 1992), Table 5.

Figure 135. Nuclear Electricity Gross Generation by Reporting Country

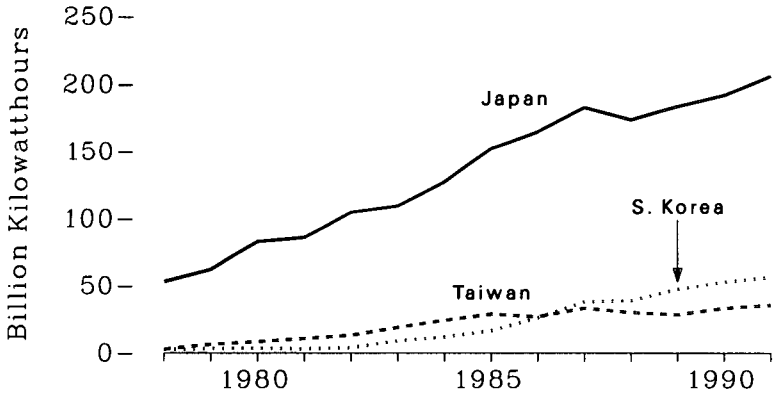
Total, W. Europe, and N. America, 1978-1991



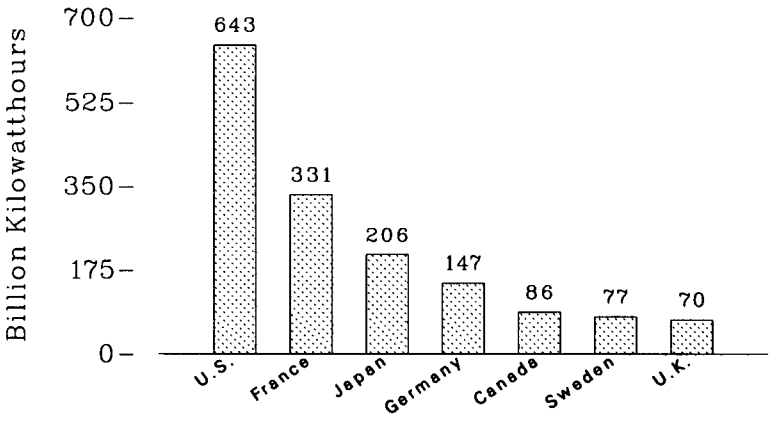
W. Europe, Selected Countries, 1978-1991



Japan, S. Korea, and Taiwan, 1978-1991



Top Generating Countries, 1991



Note: Because vertical scales differ, graphs should not be compared.
Source: Table 135.

Table 135. Nuclear Electricity Gross Generation by Reporting Country, 1978-1991

(Billion Kilowatthours)

Country	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
North America	**325.4**	**309.0**	**305.8**	**331.8**	**341.2**	**366.6**	**397.6**	**465.6**	**508.8**	**560.1**	**639.7**	**640.3**	**681.3**	**733.4**
Canada	33.0	38.4	40.4	43.3	42.6	53.0	53.8	62.9	74.6	80.6	85.6	83.2	75.8	86.1
United States	292.4	270.6	265.4	288.5	298.6	313.6	343.8	402.7	434.1	479.5	554.1	557.0	603.4	643.0
Mexico	0	0	0	0	0	0	0	0	0	0	0	0	2.1	4.2
Central and South America	**2.9**	**2.7**	**2.3**	**2.8**	**1.9**	**3.6**	**6.6**	**9.1**	**5.8**	**6.2**	**5.5**	**6.6**	**9.4**	**9.6**
Argentina	2.9	2.7	2.3	2.8	1.9	3.4	4.5	5.8	5.7	5.2	5.1	5.0	7.4	[1] 8.1
Brazil	0	0	0	0	0.1	0.2	2.1	3.4	0.1	1.0	0.3	1.6	2.0	1.4
Western Europe	**166.9**	**184.3**	**214.2**	**293.4**	**321.8**	**377.2**	**485.4**	**582.8**	**631.5**	**648.3**	**688.1**	**732.0**	**738.6**	**769.6**
Belgium	12.5	11.4	12.5	12.8	15.6	24.1	27.7	34.5	38.6	41.9	43.1	41.2	42.7	42.9
Finland	3.3	6.7	7.0	14.5	16.5	17.4	18.5	18.8	18.8	19.4	19.3	18.8	18.9	19.2
France	30.6	39.9	61.2	105.2	108.9	144.2	191.2	224.0	254.3	265.5	274.9	302.5	314.1	331.3
Germany [2]	35.7	42.2	43.7	53.4	63.4	65.8	92.6	125.8	118.9	130.2	145.2	149.5	147.2	147.3
Italy	4.5	2.6	2.2	2.7	6.8	5.8	6.9	7.0	8.7	0.2	0	0	0	0
Netherlands	4.1	3.5	4.2	3.7	3.9	3.6	3.8	3.9	4.2	3.6	3.7	4.0	3.4	3.3
Spain	7.6	6.7	5.2	9.4	8.8	10.7	23.1	28.0	37.5	41.3	50.4	56.1	54.3	55.6
Sweden	23.8	21.0	26.7	37.7	38.8	40.4	51.3	58.6	69.9	67.2	69.4	65.6	68.2	76.8
Switzerland	8.3	11.8	14.3	15.2	15.0	15.5	16.3	22.4	22.5	23.0	22.7	22.8	23.6	22.9
United Kingdom	36.6	38.5	37.2	38.9	44.1	49.6	54.1	59.7	58.2	56.2	59.4	71.6	66.1	70.4
Far East and Africa	**60.6**	**74.7**	**97.4**	**102.9**	**123.6**	**140.1**	**171.9**	**207.9**	**232.9**	**266.1**	**259.6**	**275.2**	**292.8**	**313.0**
India	2.3	3.2	2.9	3.1	2.2	2.9	4.1	4.5	5.1	5.5	6.1	4.0	5.9	5.4
Japan	53.1	62.0	82.8	86.0	104.5	109.1	127.2	152.0	164.8	182.8	173.6	183.7	191.9	205.8
Pakistan	0.2	[3]	0.1	0.2	0.1	0.2	0.3	0.3	0.5	0.3	0.2	0.1	0.4	0.4
South Africa	0	0	0	0	0	0	4.2	5.9	9.3	6.6	11.1	11.7	8.9	9.7
South Korea	2.3	3.2	3.5	2.9	3.8	9.0	11.8	16.5	26.1	37.8	38.7	47.4	52.8	56.3
Taiwan	2.7	6.3	8.2	10.7	13.1	18.9	24.3	28.7	26.9	33.1	29.9	28.3	32.9	35.3
Total [4]	**555.9**	**570.7**	**619.8**	**730.9**	**788.5**	**887.5**	**1,061.5**	**1,265.4**	**1,378.9**	**1,480.8**	**1,592.8**	**1,654.2**	**1,722.1**	[1] **1,825.6**

[1] Estimate.
[2] 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.
[3] Less than 0.05 billion gross kilowatthours.
[4] Total equals all countries with nuclear generating capacity except Bulgaria, China, Cuba, Czechoslovakia, the German Democratic Republic, Hungary, North Korea, Poland, Romania, the U.S.S.R., and Yugoslavia.
Notes: • See Appendix E, Note 1. • Sum of components may not equal total due to independent rounding.
Source: McGraw-Hill Publishing Co., Inc., *Nucleonics Week*.

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 a 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 Appendix B, "Energy Units in Perspective," and in the Glossary.

Table A1. Approximate Heat Content of Petroleum Products and Wood

Energy Source	Heat Content
Million Btu per Barrel	
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 and Isopentane	4.620
Pentane 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
Million Btu per Short Ton	
Hardwood, dry (average)	17.2

Table A2. Approximate Heat Content of Crude Oil, Crude Oil and Products, and Natural Gas Plant Liquids, 1949-1991

(Million Btu per Barrel)

Year	Crude Oil Only			Crude Oil and Products		Natural Gas Plant Liquids Production
	Production	Imports	Exports	Imports	Exports	
1949	5.8	5.952	5.8	6.059	5.692	4.544
1950	5.8	5.943	5.8	6.080	5.766	4.522
1951	5.8	5.938	5.8	6.075	5.762	4.495
1952	5.8	5.938	5.8	6.067	5.774	4.464
1953	5.8	5.924	5.8	6.052	5.742	4.450
1954	5.8	5.931	5.8	6.052	5.745	4.415
1955	5.8	5.924	5.8	6.040	5.768	4.406
1956	5.8	5.916	5.8	6.024	5.754	4.382
1957	5.8	5.918	5.8	6.023	5.780	4.369
1958	5.8	5.916	5.8	5.993	5.779	4.366
1959	5.8	5.916	5.8	6.020	5.829	4.311
1960	5.8	5.911	5.8	6.021	5.834	4.295
1961	5.8	5.900	5.8	5.991	5.832	4.283
1962	5.8	5.890	5.8	6.004	5.841	4.273
1963	5.8	5.894	5.8	6.002	5.840	4.264
1964	5.8	5.882	5.8	5.998	5.844	4.268
1965	5.8	5.872	5.8	5.997	5.743	4.264
1966	5.8	5.863	5.8	5.993	5.729	4.259
1967	5.8	5.838	5.8	5.999	5.777	4.232
1968	5.8	5.836	5.8	5.977	5.763	4.218
1969	5.8	5.825	5.8	5.974	5.714	4.170
1970	5.8	5.822	5.8	5.985	5.810	4.146
1971	5.8	5.824	5.8	5.961	5.775	4.117
1972	5.8	5.809	5.8	5.935	5.741	4.070
1973	5.8	5.817	5.8	5.897	5.752	4.049
1974	5.8	5.827	5.8	5.884	5.774	4.011
1975	5.8	5.821	5.8	5.858	5.748	3.984
1976	5.8	5.808	5.8	5.856	5.745	3.964
1977	5.8	5.810	5.8	5.834	5.797	3.941
1978	5.8	5.802	5.8	5.839	5.808	3.925
1979	5.8	5.810	5.8	5.810	5.832	3.955
1980	5.8	5.812	5.8	5.796	5.820	3.914
1981	5.8	5.818	5.8	5.775	5.821	3.930
1982	5.8	5.826	5.8	5.775	5.820	3.872
1983	5.8	5.825	5.8	5.774	5.800	3.839
1984	5.8	5.823	5.8	5.745	5.850	3.812
1985	5.8	5.832	5.8	5.736	5.814	3.815
1986	5.8	5.903	5.8	5.808	5.832	3.797
1987	5.8	5.901	5.8	5.820	5.858	3.804
1988	5.8	5.900	5.8	5.820	5.840	3.800
1989	5.8	5.906	5.8	5.833	5.857	3.826
1990	5.8	5.934	5.8	5.849	5.833	3.822
1991[1]	5.8	5.948	5.8	5.878	5.823	3.805

[1] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Note: Includes lease condensate.
Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

Table A3. Approximate Heat Content of Petroleum Product Weighted Averages, 1949-1991

(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	5.318	5.253	5.430	6.249	5.403	5.599	5.860
1988	5.323	5.247	5.434	6.250	5.410	5.618	5.842
1989	5.260	5.233	5.440	6.241	5.410	5.641	5.869
1990	5.212	5.272	5.445	6.247	5.411	5.614	5.838
1991[1]	5.167	5.205	5.440	6.248	5.387	5.652	5.826

[1] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Note: Weighted averages of the products included in each category are calculated 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, 1949-1991

(Btu per Cubic Foot)

Year	Production		Consumption			Imports	Exports
	Dry	Marketed (Wet)	Non-Electric Utility Users	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]	1,031	1,106	1,030	1,034	1,031	1,012	1,018

[1] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
— = Not applicable.
Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

Table A5. Approximate Heat Content of Coal and Coal Coke, 1949-1991

(Million Btu per Short Ton)

	Coal								Coal Coke
		Consumption							
Year	Production	Residential and Commercial	Coke Plants	Other Industries [1]	Electric Utilities	Total	Imports	Exports	Imports and Exports
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	21.827	23.137	26.799	22.457	20.929	21.331	25.000	26.202	24.800
1991[2]	21.690	23.204	26.800	22.276	20.801	21.169	25.000	26.188	24.800

[1] Includes transportation.

[2] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

Table A6. Approximate Heat Content of Coal by Type, 1949-1991

(Million Btu per Short Ton)

Year	Bituminous Coal [1] and Lignite								Anthracite				
		Consumption								Consumption			
	Production	Residential and Commercial	Coke Plants	Other Industry [2]	Electric Utilities	Total	Imports	Exports	Production	Non-Electric Utility Users	Electric Utilities	Total	Imports and Exports
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[3]	21.687	22.579	26.800	22.260	20.807	21.167	25.000	26.192	22.572	26.011	15.858	21.706	25.400

[1] Including subbituminous coal.
[2] Includes transportation.
[3] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

Table A7. Approximate Heat Rates for Electricity, 1949-1991

(Btu per Kilowatthour)

Year	Electricity Generation			Electricity Consumption
	Fossil-Fueled Steam-Electric Plants [1]	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	10,323	10,843	21,303	3,412
1985	10,339	10,813	21,263	3,412
1986	10,261	10,799	21,263	3,412
1987	10,253	10,776	21,263	3,412
1988	10,235	10,743	21,096	3,412
1989	10,331	10,724	21,096	3,412
1990	10,335	10,680	21,096	3,412
1991[2]	10,335	10,680	21,096	3,412

[1] This is 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.
[2] Previous-year data may have been revised. Current-year data are preliminary and may be revised in future publications.
— = 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 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 Value 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 as published for "Jet Fuel, Commercial" 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 as published for "Jet Fuel, Military" 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 as published for "Gasoline, Motor Fuel" 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 naphtha. 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 Value of Various Fuels, adopted January 3, 1950." The Bureau of Mines calculated this factor by dividing the 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, 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. • 1949-1959: Calculated 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. •1960-1990: Calculated from the State Energy Data System as documented in the *State Energy Data Report, Consumption Estimates, 1960-1990.* • 1991: EIA, Integrated Modeling Data System output for the *Monthly Energy Review* (March 1992).

Petroleum Products, Consumption by Industrial Users. • 1949-1959: Calculated 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. • 1960-1990: Calculated from the State Energy Data System as documented in the *State Energy Data Report, Consumption Estimates, 1960-1990.* • 1991: EIA, Integrated Modeling Data System output for the *Monthly Energy Review* (March 1992).

Petroleum Products, Consumption by Residential and Commercial Users. • 1949-1959: Calculated by EIA as the average of the thermal

conversion factors for all petroleum products consumed by the residential and commercial sector, weighted by the estimated quantity of each petroleum product consumed in the residential and commercial sector. • 1960-1990: Calculated from the State Energy Data System as documented in the *State Energy Data Report, Consumption Estimates, 1960-1990.* • 1991: EIA, Integrated Modeling Data System output for the *Monthly Energy Review* (March 1992).

Petroleum Products, Consumption by Transportation Users. • 1949-1959: Calculated by EIA as the average of the thermal conversion factor for all petroleum products consumed in the transportation sector, weighted by the estimated quantity of each petroleum product consumed in the transportation sector. • 1960-1990: Calculated from the State Energy Data System as documented in the *State Energy Data Report, Consumption Estimates, 1960-1990.* • 1991: EIA, Integrated Modeling Data System output for the *Monthly Energy Review* (March 1992).

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 Naphtha. 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 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 and was 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 in the *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 in the *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, 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. • 1980-1990: Calculated annually by EIA by dividing the total heat content of natural gas consumed by the total quantity of natural gas consumed. The heat content and quantity consumed are from Form EIA-176. Published sources are: • 1980-1990: EIA, *Natural Gas Annual 1990, Volume 2*, Table 15. • 1991: 1990 value used as an estimate.

Natural Gas, Consumption by Electric Utilities. • 1949-1972: Assumed by EIA to be equal to the thermal conversion factor for the consumption of dry natural gas. See "Natural Gas, Consumption." • 1973-1990: Calculated annually by EIA by dividing the total heat content of natural gas received at electric utilities by the total quantity received at electric utilities. The heat contents and receipts are from Form FERC-423 and predecessor forms. • 1991: 1990 value used as an estimate.

Natural Gas, Consumption by Non-Electric Utility Users. • 1949-1972: Assumed by EIA to be equal to the thermal conversion factor for the consumption of dry natural gas. See "Natural Gas, Consumption." •1973-1990: Calculated annually by EIA by subtracting the heat content of natural gas consumed at electric utilities from the heat content of total natural gas consumed and dividing the result by the quantity of non-utility natural gas consumption (total consumption less electric utility consumption). • 1991: 1990 value used as an estimate.

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, Consumption." • 1973-1990: 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. • 1991: 1990 value used as an estimate.

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, Consumption." • 1973-1990: 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. • 1991: 1990 value used as an estimate.

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, Consumption."

Natural Gas, Production (Wet). • 1949-1990: 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. • 1991: 1990 value used as an estimate.

Approximate Heat Content of Coal and Coal Coke

Anthracite, Consumption. Calculated annually by EIA by dividing the sum of the heat content of anthracite consumed by electric utilities and non-electric utilities 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 Non-Electric Utility Users. 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 non-electric utility anthracite consumption 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 production.

Bituminous Coal and Lignite, 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 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 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.

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 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.

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 the consumption sector. Producers' stock changes and unaccounted for were assumed to have the same conversion factor as consumption by all users.

Coal, 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 Non-Electric Utility Users. Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and

lignite and anthracite consumed by nonelectric utility users 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 production 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. EIA has selected a rate 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 per kilowatthour. • 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 Cost and Annual Production Expenses-1981* and *Steam-Electric Plant Construction Cost and Annual Production Expenses-1978.* • 1956 through 1989: The weighted annual average heat rate for fossil-fueled steam-electric power plants in the United States, as published in EIA, *Electric Plant Cost and Power Production Expenses 1989*, Table 11. • 1990: Prepublished data. • 1991: 1990 value used as an estimate.

Geothermal Energy Plant Generation. • 1960-1981: Calculated annually by EIA by weighting the annual average heat rates of operating geothermal units by the installed nameplate capacities as reported on Form FPC-12. • 1982 forward: Estimated annually by EIA based on an informal survey of relevant plants.

Nuclear Steam-Electric Plant Generation. • 1957-1989: Calculated annually by EIA by dividing the total heat content consumed in nuclear generating units by the total (net) electricity generated by nuclear generating units. The heat content and electricity generation are reported on Form FERC-1, Form EIA-412, and predecessor forms. The factors, beginning with 1982 data, are published in the following EIA reports–1982: *Historical Plant Cost and Annual Production Expenses for Selected Electric Plants 1982*, page 215. 1983-1989: *Electric Plant Cost and Power Production Expenses 1989*, Table 15. • 1990: Prepublished data. •1991: 1990 value used as an estimate.

Appendix B
Energy Units in Perspective

Using Appendix B

The three tables in this appendix are intended to help the nontechnical reader understand the value of the various energy units used in the *Annual Energy Review*. The values (especially the equivalents in Table B3) shown here are approximations intended to convey a general idea of the magnitude of energy units.

The tables can be used to relate a familiar measure of energy, such as gallons, to energy measures used in this report. For example, Table B1 shows that 8 gallons of motor gasoline is equal to roughly one-fifth of a barrel of crude oil.[1] Using information from Table B2, the reader can calculate that the 8 gallons of motor gasoline was, on average, a six-and-a-half-day supply per capita in 1991. Table B3 indicates that 8 gallons of motor gasoline equals about 10 therms of natural gas or approximately 1 million British thermal units (see Glossary).

[1]However, due to the nature of the refining process, one-fifth of a barrel of crude oil would yield less than 8 gallons of motor gasoline.

Table B1. Physical Conversion Factors for Energy Units

Type of Unit	Factor
Weight	2,000 pounds/short ton
	1.102 short tons/metric ton
	1.120 short tons/long ton
Volume	0.028 cubic meters/cubic foot
	35.315 cubic feet/cubic meter
	42 U.S. gallons/U.S. barrel
	128 cubic feet/cord
Weight and Volume	0.136 metric tons/U.S. barrel[1]
	0.150 short tons/U.S. barrel[1]
	7.33 U.S. barrels/metric ton[1]
	6.65 U.S. barrels/short ton[1]
	1.25 short tons/cord[2]

[1]For crude oil (average gravity).
[2]For dry hardwood (average).

Table B2. U.S. Daily Per Capita Consumption of Energy by Type, 1973, 1980, and 1991

Type of Energy	1973	1980	1991	Percent Change 1973-1980	Percent Change 1980-1991
		Gallons			
Petroleum Products	3.4	3.2	2.8	-0.8	-12.6
Motor Gasoline	1.3	1.2	1.2	-7.8	-2.0
		Cubic Feet			
Natural Gas (dry)	286	240	212	-16.1	-11.6
		Pounds			
Coal	1.6	17.0	19.3	16.5	13.8
		Kilowatthours			
Hydroelectricity	3.5	3.4	3.0	-4.1	-11.6
Nuclear Electricity	1.1	3.0	5.8	180.6	119.5
Electricity (all)	22.2	25.3	29.8	14.1	17.8
		Thousand Btu			
Industrial Energy[1]	409	370	322	-9.5	-13.0
Total Energy	963	919	886	-4.6	-3.6

[1]Includes electrical system energy losses.
Note: Percent change is calculated from data prior to rounding.
Sources: Tables 5, 8, 52, 62, 74, 83, 91, and 92.

Table B3. Energy Equivalents

Energy Unit	Equivalent[1]	
1 Btu of Energy	1	match tip
	250	calories (international Steam Table)
	0.25	kilocalories (food calor Btu of energy)
1,000 Btu of Energy	250	kilocalories (food calories)
1 Million Btu of Energy	90	pounds of coal
	8	gallons of motor gasoline – enough to move the average U.S. passenger car about 167 miles (1990)
	10	therms of dry natural gas
	11	gallons of propane
	1.1	days of U.S. energy consumption per capita
1 Quadrillion[2] Btu of Energy	45	million short tons of coal
	60	million short tons of oven-dried hardwood
	1	trillion cubic feet of dry natural gas
	170	million barrels of crude oil
	470	thousand barrels of crude oil per day for 1 year
	24	days of U.S. petroleum imports
	26	days of U.S. motor gasoline use
	25	hours of world energy use (1990)
1 Barrel of Crude Oil	15	days of US. petroleum consumption per capita
	5.6	thousand cubic feet of dry natural gas
	0.26	short tons (520 pounds) of coal
	1,700	kilowatthours of electricity
1 Short Ton of Coal	104	days of U.S. coal consumption per capita
	3.8	barrels of crude oil
	21	thousand cubic feet of dry natural gas
	6,500	kilowatthours of electricity
1,000 Cubic Feet of Natural Gas	4.7	days of U.S. natural gas use per capita
	0.18	barrels (7.4 gallons) of crude oil
	0.047	short tons (93 pounds) of coal
	300	kilowatthours of electricity
1,000 Kilowatthours (kWh) of Electricity	33	days of U.S. electricity use per capita
	0.59	barrels of crude oil[3]
	0.15	short tons (310 pounds) of coal[3]
	3,300	cubic feet of dry natural gas[3]

[1]Equivalents are approximate.

[2]One quadrillion equals 1,000,000,000,000,000.

[3]However, because of net energy losses associated with the generation of electricity, about three times as much fossil fuel is required to generate 1,000 kWh: 1.8 barrels of oil, 0.47 short tons of coal, or 10,000 cubic feet of natural gas.

Note: • One million Btu of fossil fuels burned at electric utilities can generate about 100 kilowatthours of electricity, while it takes about 300 kilowatthours of electricity generated at electric utilities to produce 1 million Btu of heat. • Calculations are based on 1991 data where applicable, unless otherwise noted.

Appendix C

Gross Domestic Product and Implicit Price Deflator

Table C1. Gross Domestic Product and Implicit Price Deflator, 1949-1991

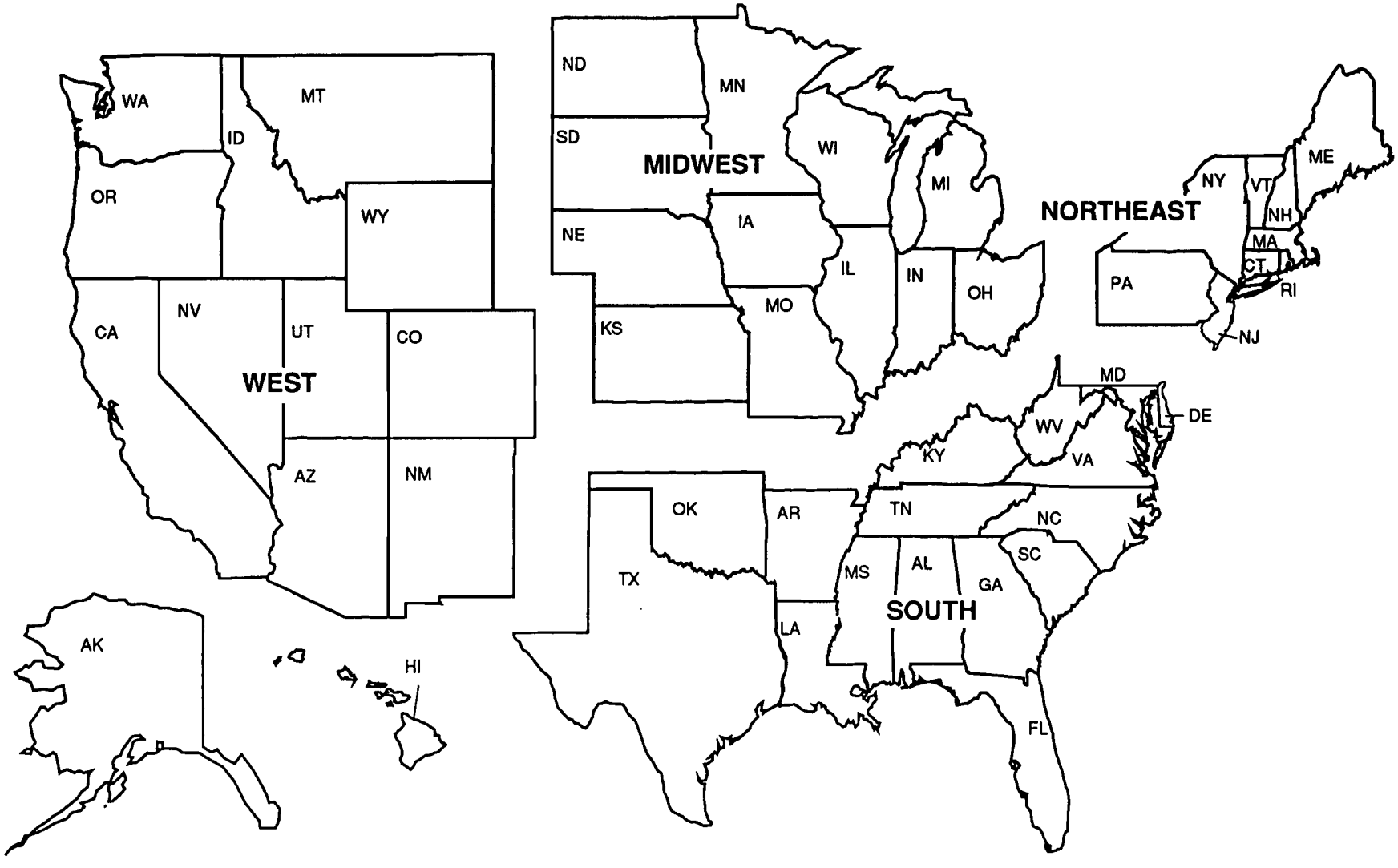
Years 1949-1969	Gross Domestic Product (billion 1987 dollars)	Implicit Price Deflator (1987=100)	Years 1970-1991	Gross Domestic Product (billion 1987 dollars)	Implicit Price Deflator (1987=100)
1949	(1)	(1)	1970	2,875.8	35.1
			1971	2,959.3	37.1
1950	(1)	(1)	1972	3,107.1	38.8
1951	(1)	(1)	1973	3,268.6	41.3
1952	(1)	(1)	1974	3,248.1	44.9
1953	(1)	(1)	1975	3,221.7	49.2
1954	(1)	(1)	1976	3,380.8	52.3
1955	(1)	(1)	1977	3,533.3	55.9
1956	(1)	(1)	1978	3,703.5	60.3
1957	(1)	(1)	1979	3,796.8	65.5
1958	(1)	(1)			
1959	1,931.3	25.6	1980	3,776.3	71.7
			1981	3,843.1	78.9
1960	1,973.2	26.0	1982	3,760.3	83.8
1961	2,025.6	26.3	1983	3,906.6	87.2
1962	2,129.8	26.8	1984	4,148.5	91.0
1963	2,218.0	27.2	1985	4,279.8	94.4
1964	2,343.3	27.7	1986	4,404.5	96.9
1965	2,473.5	28.4	1987	4,540.0	100.0
1966	2,622.3	29.4	1988	4,718.6	103.9
1967	2,690.3	30.3	1989	4,836.9	108.4
1968	2,801.0	31.7			
1969	2,871.1	33.3	1990	4,884.9	112.9
			1991	4,848.8	117.0

[1]Data for 1949-1958 were not available in time for publication in the Annual Energy Review 1991.

Sources: **Gross Domestic Product:** • 1959-1990–Bureau of Economic Analysis (BEA), U.S. Department of Commerce (DOC), *Survey of Current Business* (February 1992), Table 2. • 1991–BEA, DOC, *United States Department of Commerce News* (February 28, 1992), Table 2. **Implicit Price Deflators:** • 1959-1981–BEA, DOC, *Survey of Current Business* (February 1992) Tables 1 and 2; calculated by dividing gross domestic product in current dollars by gross domestic product in 1987 dollars. • 1982-1990–BEA, DOC, *Survey of Current Business* (February 1992), Table 4. •1991–BEA, DOC, *United States Department of Commerce News* (February 28, 1992), Table 2.

Appendix D

U.S. Census Region Map



Source: U.S. Department of Commerce, Bureau of the Census

Appendix E
Explanatory Notes

1. Electricity Generation. Data on the generation of electricity in the United States represents gross electricity output measured at the generator terminals, minus power plant use (net electricity generated). Nuclear electricity generation data identified by individual countries in this report are gross electricity output. (See Tables 2, 91, 92, 134, and 135.)

2. Consumption of Primary Energy by End-Use Sector. Sector data are derived from the end-use sector table of each energy commodity. The "Other" sector in the Electric Utility Sales table is allocated to the Residential and Commercial Sector, except for the railways' portion of "Other," which is allocated to the Transportation Sector. (See Table 5.)

3. Financial Reporting System (FRS) Companies. The FRS data system is designed to permit review of the financial performance of energy companies. Data are disaggregated both by line of business and by geographic area of operation. Domestic operations include Puerto Rico and the Virgin Islands; foreign operations exclude those areas.

The 23 companies included in the FRS for the 1990 reporting year are the following:

Amerada Hess Corporation
American Petrofina Inc.
Amoco Corporation
Ashland Oil Inc.
Atlantic Richfield Company
BP America Inc.
Burlington Resources Inc.
Chevron Corporation
Coastal Corporation
E.I. du Pont de Nemours and Company (Du Pont)
Exxon Corporation
Kerr-McGee Corporation
Mobil Corporation
Occidental Petroleum Corporation
Oryx Energy Company
Phillips Petroleum Company
Shell Oil Company
Sun Company
Texaco Inc.
Total Petroleum (North America) Ltd.
Union Pacific Corporation
Unocal Corporation
USX Corporation

Prior to 1983, the reporting group included 26 companies. Conoco and Marathon were replaced by Du Pont and the United States Steel Corporation, due to the merger of the former companies with the latter companies, respectively, beginning in 1982. Although Occidental acquired Cities Service in 1982, separate financial reports were available for 1982, so each company continued to be treated as a separate FRS company until 1983. In 1984, three more intragroup mergers occurred: (1) Chevron acquired Gulf Oil, (2) Mobil acquired Superior Oil, and (3) Texaco acquired Getty Oil. Since financial reports for 1984 were available for the three acquired companies, they are treated as separate companies through 1984. (See Tables 37 through 40 and 47.)

4. Well Completions. For 1970 forward, annual well completions are estimated by the Energy Information Administration (EIA) using the American Petroleum Institute's drilling data files. For more recent years, these files are not complete, due to delays in the reporting of wells drilled. Based on statistical analysis, EIA employs an adjustment process to impute missing data to show total well completions and footages for current years. (See Tables 44 and 45.)

5. Reclassified. 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 of 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. (See Tables 59, 62, and 64.)

6. Gross Input to Distillation Units (GIDU). The methods for deriving 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. (See Table 60.)

7. Petroleum Products Supplied. 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, 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. (See Explanatory Notes 5 and 8 and Tables 62 through 64.)

8. Joint Petroleum Reporting System. 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. These changes affect production and product supplied statistics for motor gasoline, distillate fuel oil, and residual fuel oil, and stocks of motor gasoline. On the new basis, 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. (See Tables 59, 62, and 64.)

9. Crude Oil Domestic First Purchase Prices. 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. (See Table 68.)

10. Refiner Acquisition Cost of Crude Oil. This cost 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 based on quantities produced and imported. (See Table 71.)

11. Natural Gas Consumption. Natural gas consumption statistics are compiled from a survey 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. (See Tables 79 and 82.)

12. Natural Gas Prices by National Gas Policy Act of 1978 (NGPA) Categories. Old Gas: Includes natural gas dedicated to interstate commerce and natural gas purchased under existing interstate or rollover contracts (Section NGPA 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 (Section NGPA 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). (See Table 81.)

13. Coal Consumption. 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 sector data are the following: Electric Utility Sector–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. (See Table 85.)

14. Electricity Statistics. Prior to 1985, electricity 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 only data for those organizations that generate electricity primarily for public use. (See Tables 91 through 97 and 99.)

15. Electrical System Energy Losses. Electrical system energy losses are calculated 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. (See Table 94.)

16. Electricity Sales. Data on the sales of electric utility electricity represent gross electricity output 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 to Government, railways, street lighting authorities, and sales not elsewhere included. (See Table 96.)

17. Net Summer Capability. Net summer capabilities were first collected on Form EIA-860 for the 1984 data year. Units not assigned a net summer capability rating by the utility were given an estimated rating using 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 ag-

gregate 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 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. (See Tables 97 and 105.)

18. Operable Units. Prior to 1973, the number of "Operable Units at End of Year" includes units that were in commercial operation by December 31 of the stated year. Units decommissioned or inoperative for extended periods were generally included. Also included are two U.S. Department of Energy (DOE)-operated plants that supply electricity to the commercial grid. A third DOE plant, which does not distribute electricity to the grid, is excluded. For 1973 and forward, the number of units includes units issued full-power or operating licenses and generally does not include units in long-term shutdown status. (See Table 105.)

19. World Primary Energy Production. Includes only crude oil and lease condensate, natural gas plant liquids, dry natural gas, coal, and electricity from hydroelectric power and nuclear electric power. 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 production that is available to be marketed and consumed as a gas. Coal (anthracite, subanthracite, bituminous, subbituminous, lignite, 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 production of electricity from hydroelectric power and nuclear electric power includes 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. (See Tables 115 and 116.)

20. Primary Stocks of Petroleum OECD. 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. (See Table 124.)

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; CH_3-$(CH_2)_n$-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): The total of an individual nation's marketed natural gas production plus imports less exports.

Apparent Consumption, Petroleum (international): Consumption which includes internal consumption, refinery fuel and loss, 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). 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, liquefied petroleum gases sold directly from natural gas processing plants, for fuel or chemical uses.

Asphalt: A dark-brown-to-black cement-like material containing bitumens as the predominant constituents 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 reformate). 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.

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: Wood, waste, and alcohol 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_4H_{10}). 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_4H_8) recovered from refinery processes.

Capacity Factor: The ratio of the electrical energy produced by a generating unit for the period of time considered to the electrical energy that could have been produced at continuous full-power operation during the same period.

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.

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.

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 Loading 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 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.

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 presently 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.

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 the generating station or stations, measured at the generator terminals.

Electricity Generation, Net: Gross generation less electricity consumed at the generating plant for station use. Electricity required for pumping at pumped-storage plants is regarded as plant use and is deducted from 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, 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: 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 consumption 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 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 between 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 °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.**

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—e.g., 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 costs of production nor the market price at which the uranium will be sold.

Fossil Fuel: Any naturally occurring organic fuel, 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 in-

curred 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-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, one or more combustion chambers where liquid or gaseous fuel is burned and 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 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 (such as shale oil, tar sands oils, and gilsonite).

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: The implicit price deflator, published by the U.S. Department of Commerce, Bureau of Economic Analysis, is used to convert nominal figures to real figures.

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 in EIA represent gross heat content.

Heat Content of a Quantity of Fuel, Net: The amount of useable 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 in 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.

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.

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 the sector range from steel mills, to small farms, to companies assembling electronic components. The Standard Industrial Classification (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 primarily used for heating ambient air in the 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 Standard Industrial Classification (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.

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 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, and reformate). 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. The Reid Vapor Pressure ranges from 9 to 15 pounds per square inch. Motor gasoline includes finished leaded gasoline, finished unleaded gasoline, and 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 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.

Naphtha: A generic term applied to a petroleum fraction with an approximate boiling range between 122 °F 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 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 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 Price: The price paid for a product or service at the time of the transaction.

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.

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 multiunit 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): Current members are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, the United States and its territories (Guam, Puerto Rico, and the Virgin Islands), and Germany.

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, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the 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.

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: 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.

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.

Processed Gas: Natural gas that has gone through a processing plant.

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 ouput 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 °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. A real price usually reflects buying power relative to a base year.

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, 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 975. 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, electricity generation, and to power ships. Imports of residual fuel oil include imported crude oil burned as fuel.

Residue Gas: Natural gas from which natural gas processing plant liquid products and, in some cases, nonhydrocarbon components have been extracted.

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 1970 U.S. Census.

Short Ton (coal): A unit of weight equal to 2,000 pounds.

SIC: See **Standard Industrial Classification.**

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, which 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 °F 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 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.

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: 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 Standard Industrial Classification (SIC) codes used to classify establishments as belonging to the transportation sector are 40 through 49.

Unaccounted-for Crude Oil: 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 a different location 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.

Unprocessed Gas: Natural gas that has not gone through a processing plant.

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 is 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.

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.

Wind Energy (as used at electric utilities): The kinetic energy of wind converted at electric utilities into mechanical energy by wind turbines (i.e., blades rotating from a hub) that drive generators to produce electricity for distribution.

Wood and Waste (as used at electric utilities): Wood energy, garbage, bagasse, sewerage gas, and other industrial, agricultural, and urban refuse used to generate electricity for distribution.

Wood Energy: Wood and wood products used as fuel, including round- wood (cord wood), limb wood, wood chips, bark, sawdust, forest residues, charcoal, pulp waste, and spent pulping liquor.

Working Gas: The gas in a reservoir that is in addition to the base (cushion) gas. It may or may not be completely withdrawn during any particular withdrawal season. Conditions permitting, the total working capacity could be used more than once during any given season.

Working Interest: An interest in a mineral property that entitles the owner to explore, develop, and operate a property. The working interest owner bears the costs of exploration, development, and operation of the property and, in return, is entitled to a share of the mineral production from the property or to a share of the proceeds.

Yellowcake: A uranium oxide concentrate that results from milling (concentrated) uranium ore. It is the final precipitate formed in the milling process. U_3O_8, a common form of triuranium oxide, is the powder obtained by evaporating an ammonia solution of the oxide. Yellowcake typically contains 80 percent to 90 percent U_3O_8.

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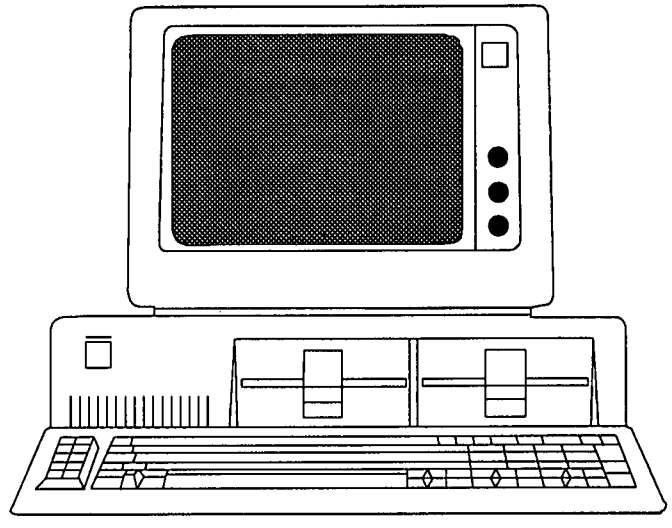

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