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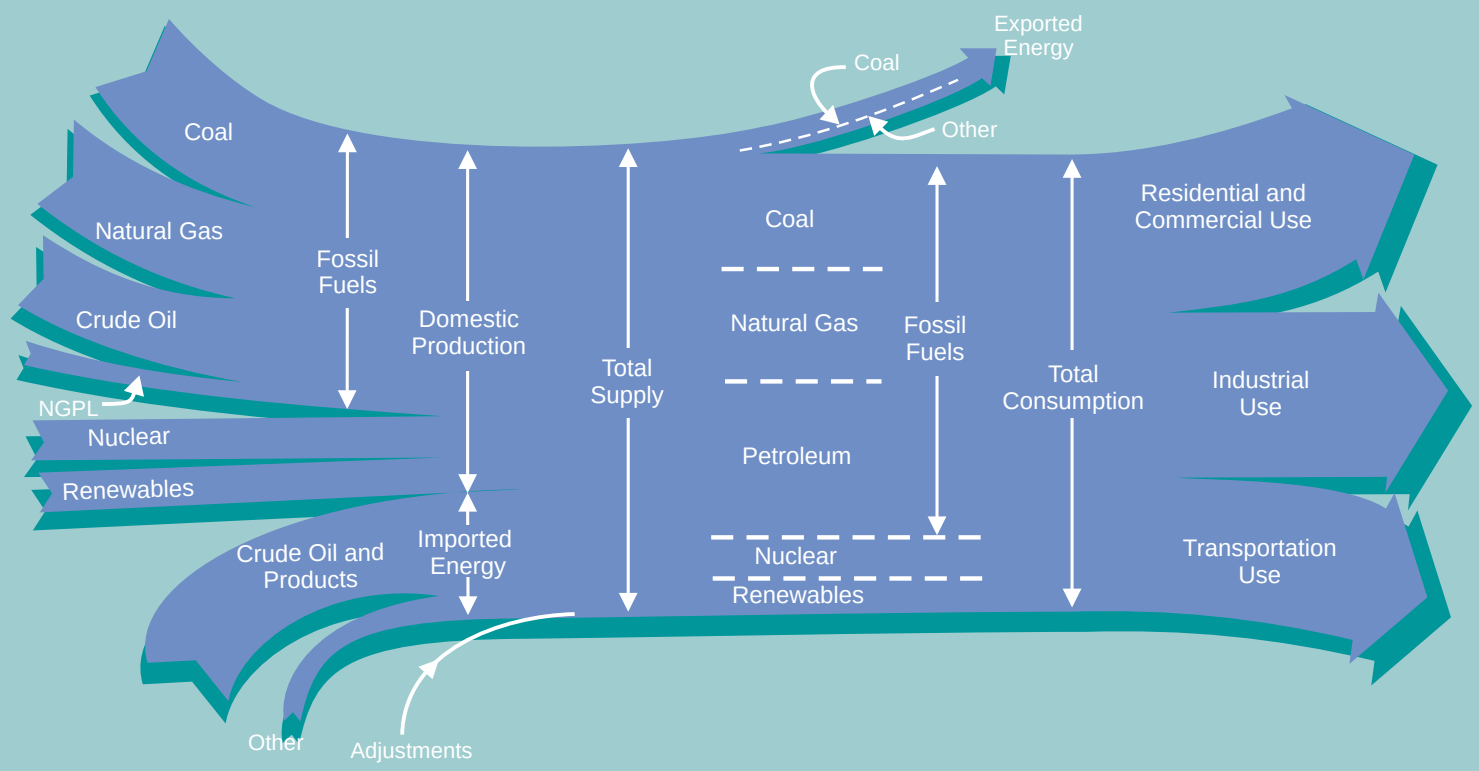

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Annual Energy Review 1997

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Preface

The *Annual Energy Review* (*AER*) is a historical data report that tells many stories. It describes, in numbers, the changes that have occurred in U.S. energy markets since the midpoint of the 20th century. In many cases, those markets differ vastly from those of a half-century ago.

By studying the graphs and data tables presented in this report, readers can learn about past energy supply and usage in the United States and gain an understanding of the issues in energy and the environment now before us. Energy markets will continue to evolve, and those who know the history of our Nation's energy markets will be better prepared to address the future.

While most of this year's report content is similar to last year's, there are some noteworthy developments. Table 1.1 has been restructured into more summarized groupings—fossil fuels, nuclear electric power, and renewable energy—to aid analysts in their examination of the basic trends in those broad categories. Readers' attention is also directed to the electricity section, where considerable reformatting of the tables and graphs has been carried out to help clarify past and recent trends in the electric power industry as it enters a period of radical restructuring. Table 9.l, which summarizes U.S. nuclear generating units, has been redeveloped to cover the entire history of the industry in this country and to provide categories relevant in assessing the future of the industry, such as the numbers of ordered generating units that have been canceled and those that were built and later shut down. Finally, the section-specific texts have been replaced by one consolidated narrative, which we hope readers will find more informative of energy history and trends and more interesting to read.

In general, the *AER* emphasizes *domestic* energy statistics. Sections 1 through 10 and Section 12 are devoted mostly to U.S. data; Section 11 reports on international statistics and world totals. Readers interested in more international data may wish to consult the Energy Information Administration's *International Energy Annual.*

Fuel-specific data in the *AER* are usually expressed in their common physical units, such as barrels of crude oil, cubic feet of natural gas, short tons of coal, and kilowatthours of electricity. Much of the integrated data in Sections 1 and 2 are expressed in British thermal units (Btu). Btu statistics are valuable because they make it possible to compare fuels that are otherwise in different data units and to calculate summaries of all energy, such as total energy production and consumption. Physical unit data are converted to Btu by applying the conversion factors shown in Appendix A.

The Energy Information Administration encourages you to contact us and let us know how this report fits your needs. We also invite you to access the *AER*, and our many other products, via our Internet homepage at http://www.eia.doe.gov.

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Energy in the United States: A Brief History and Current Trends

Energy is essential to life. Living creatures draw on energy flowing through the environment and convert it to forms they can use. The most fundamental energy flow for living creatures is the energy of sunlight, and the most important conversion is the act of primary production, in which plants and phytoplankton convert sunlight into biomass by photosynthesis. The Earth's web of life, including human beings, rests on this foundation.

Over millennia, humans have found ways to extend and expand their energy harvest, first by harnessing draft animals and later by inventing machines to tap the power of wind and water. The watershed economic event of the modern world, industrialization, was accompanied by the widespread and intensive use of fossil fuels. This development for the first time freed human society from the limitations of natural energy flows by unlocking the Earth's vast stores of coal, oil, and natural gas. By tapping these ancient, concentrated deposits of solar energy, the rate at which energy could be poured into the human economy was enormously multiplied.

The result was one of the most profound social transformations in history. The new river of energy wrought astonishing changes and did so with unprecedented speed. The energy transformations experienced by traditional societies—from human labor alone to animal musclepower and later windmills and watermills—were very slow, and their consequences were equally slow to take effect. In contrast, industrialization and its associated socioeconomic changes took place in the space of a few generations.

The history of the United States bears witness to both the rapidity and scope of the fossil-fuel revolution. In the middle of the 19th century, most Americans lived in the countryside and were employed in agriculture. The country ran mainly on wood fuel and was relatively unimportant in global affairs. A hundred years later, after the Nation had become the world's largest producer and consumer of fossil fuels, most Americans were city-dwellers and only a relative handful worked on farms. The United States had roughly tripled its per-capita consumption of energy and become a global superpower.

The dominance of coal, oil, and natural gas does not extend to all corners of the globe. In most places and times diversity and evolution in energy supplies has been the rule. Despite the primacy of fossil fuels in the industrialized world, for example, elsewhere musclepower and biomass energy are still indispensable. (In fact, biomass energy, especially fuelwood, dominated global energy production until the late 1800s.) The shifting emphasis over time is clear not only in the long sweep of history but also in the short term. Electricity was simply unavailable until the 1880s; now it is ubiquitous. As the data in this volume show, in the span of a few decades nuclear electric power in the United States was born, peaked, and began to decline in its contribution to total energy production.

No doubt we have not seen the end of evolution in energy sources. The pages that follow briefly discuss the major energy sources now in use in the United States, including a bit of history, current trends, and snapshots of current use patterns. The story they tell is one of diversity and shifting patterns of use, driven by chance, economic circumstance, and human ingenuity. Whatever energy future awaits us, that part of the story seems unlikely to change.

Total Energy

The United States has always been a resource-rich nation, but in 1776, the year the Nation declared its independence from Great Britain, nearly all energy was still supplied by musclepower and fuelwood. America's vast deposits of coal and petroleum lay untapped and mostly undiscovered, although small amounts of coal were used to make coke, critical to the job of making the cannon that helped win the war. Mills made use of waterpower, and of course the wind enabled long-distance ocean transport.

The growing nation's chronic shortage of people and their musclepower encouraged the search for other sources of energy. During the first 30 years or so of the 19th century, coal began to be used in blast furnaces and in making coal-gas for illumination. Natural gas also found limited application in lighting during the period. Even electricity sought a niche; for example, experiments were conducted with battery-powered electric trains in the 1840s and 1850s. Still, musclepower remained the chief source of energy for decades. The appearance of a number of mechanical innovations, including the cotton gin and the mechanical reaper, had the effect of multiplying the productivity of human and animal musclepower rather than spurring the development of machine power. It was not until well after the mid-1800s that the total work output from all types of engines exceeded that of work animals.

The westward expansion helped change that. As railroads drove west to the plains and the mountains, they left behind the fuelwood so abundant along the eastern seaboard. Coal became more attractive, both because deposits were often found near the new railroad rights of way and because its higher energy content increased the range and load of steam trains. Demand for coal also rose because the railroads were laying thousands of miles of new track, and the metals industry needed an economical source of coke to make iron and steel for the rails and spikes. The transportation and industrial sectors in general began to grow rapidly during the period after mid-century, and coal helped fuel their growth.

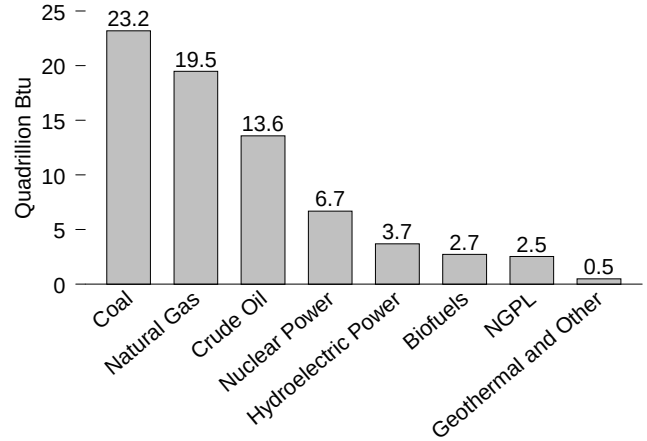
Petroleum got its start as an illuminant and ingredient in nostrums, and was not to catch on as a fuel for some time. At the end of World War I, coal still accounted for about 75 percent of U.S. total energy use. The same year (1918), the horse and mule population reached 26 million and then went into permanent decline. The beginning of the transition from musclepower was over.

America's appetite for energy as it industrialized was prodigious, roughly quadrupling between 1880 and 1918. Coal fed much of this growth, while electricity expanded in applications and total use alike. Petroleum got major boosts with the discovery of Texas's vast Spindletop Oil Field in 1901 and with the advent of mass-produced automobiles, several million of which had been built by 1918.

In the years before World War II, "Old King Coal" relinquished its place as the premier fuel in the United States. The railroads lost business to trucks that ran on petroleum and began switching to diesel locomotives themselves. Labor troubles and safety standards drove up coal production costs. The declining demand for natural gas as an illuminant caused that industry to look for other markets. Heating applications had obvious potential, and natural gas replaced coal in many household ranges and furnaces. The coal industry survived in part because nationwide electrification created new demand for coal among electric utilities despite regional competition from hydroelectric power and petroleum-fired generation.

Today the United States, like the rest of the industrialized world, relies heavily on these three fossil fuels. Although U.S. energy production taps many sources, the largest contributors are coal, natural gas, and crude oil.

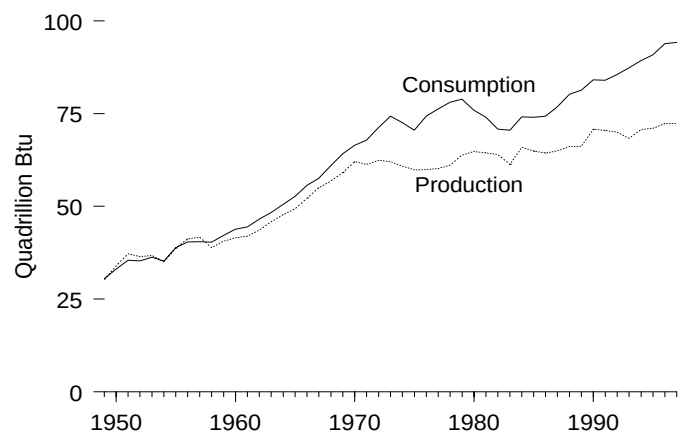
Energy Production, 1997



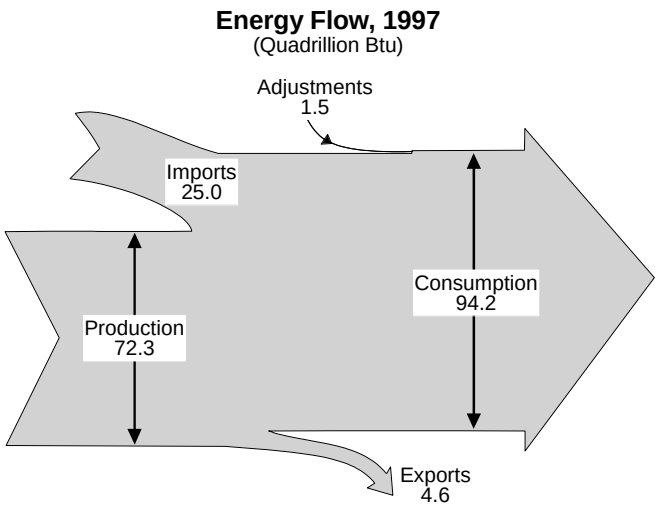
These three fuels and natural gas plant liquids (ethane, propane, butane, and others) accounted for over 80 percent of total energy production in 1997 and were valued at $108 billion (nominal dollars).

For much of its history, the United States was mostly self-sufficient in energy, although small amounts of coal were imported from Britain in colonial times. Through the late 1950s, production and consumption of energy were nearly in balance. Over the following decade, however, consumption slightly outpaced domestic production and by the early 1970s a more significant gap had developed, a gap which continues to widen.

Production and Consumption



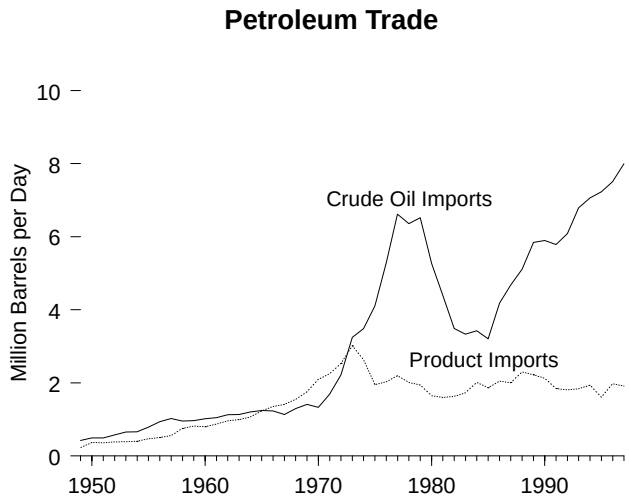
In 1997 the United States produced 72 quadrillion British thermal units (Btu) of energy and exported nearly 5 quadrillion Btu, almost half of it as coal. Consumption totaled 94 quadrillion Btu, requiring imports of 25 quadrillion Btu.



The 1997 import level of 25 quadrillion Btu represents a 16-fold increase over the 1949 level. This appetite for imported energy is driven by petroleum consumption. U.S. petroleum imports in 1973 totaled 6.3 million barrels per day (3.2 million barrels per day of crude oil and 3.0 million barrels per day of petroleum products).

In October 1973 the Arab members of the Organization of Petroleum Exporting Countries (OPEC) embargoed the sale of oil to the United States, prices rose sharply, and petroleum imports fell for two years. They increased again until the price of crude oil rose dramatically (roughly 1979 through 1981) and suppressed imports. The rising-import trend resumed by 1986, and in 1997 U.S. petroleum net imports reached an annual record level of 8.9 million barrels per day, valued at $67 billion (nominal dollars).

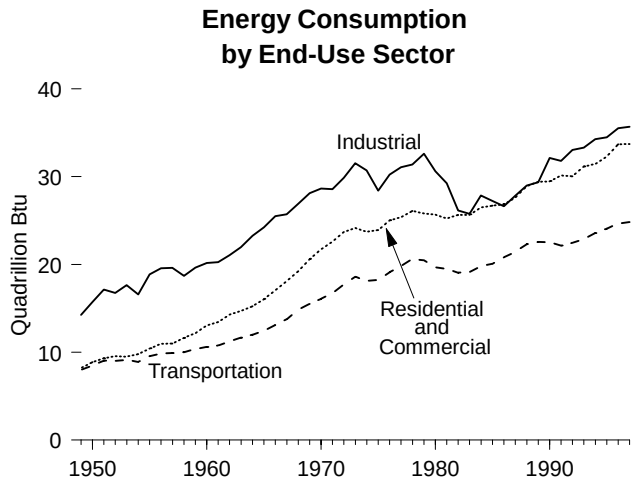
The efficiency with which Americans use energy has improved over the years. One such measure is the amount of energy consumed to produce a



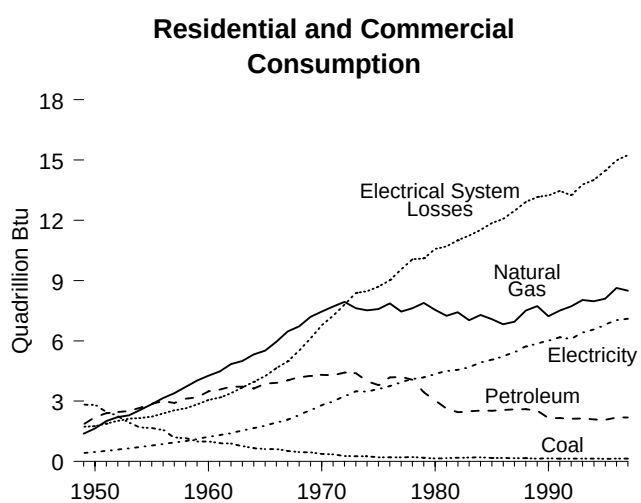
(constant) dollar's worth of gross domestic product (GDP). By that measure, efficiency improved by 36 percent between 1949 and 1997, as the amount of energy required to generate a dollar of output (chained 1992 dollars) fell from 20.6 thousand Btu to 13.1 thousand Btu. Nevertheless, a growing population and economy drove total energy use up. As the U.S. population expanded from 149 million people in 1949 to 268 million in 1997 (an increase of 79 percent), total energy consumption grew from 30 quadrillion Btu to 94 quadrillion Btu (up 209 percent). Per-capita energy consumption rose 73 percent, from 204 million Btu in 1949 to 352 million Btu in 1997.

Energy plays a central role in the operation of the industrialized U.S. economy, and energy spending is commensurately large. In recent years, American consumers have spent over half a trillion dollars a year on energy. That energy is used in three broad sectors: the residential and commercial sector, the industrial sector, and the transportation sector. Industry, historically the largest consuming sector of the economy, ran just ahead of the residential and commercial sector in recent years, followed by the transportation sector.

The industrial sector reveals occasional sharp fluctuations in its use of energy. In contrast, trends in the residential and commercial sector are smoother. Within the sectors, energy sources have changed dramatically over time. For example, in the residential and commercial sector, coal was the leading source



as late as 1951 but disappeared rapidly thereafter. Petroleum usage grew slowly to its peak in 1972 and then subsided. Natural gas became an important resource, growing strongly until 1972, when its growth stalled. Electricity, only an incidental source in 1949, expanded in every year except two (1974 and 1992) as did the energy losses associated with producing and distributing the electricity (see page xix for an explanation of these losses).

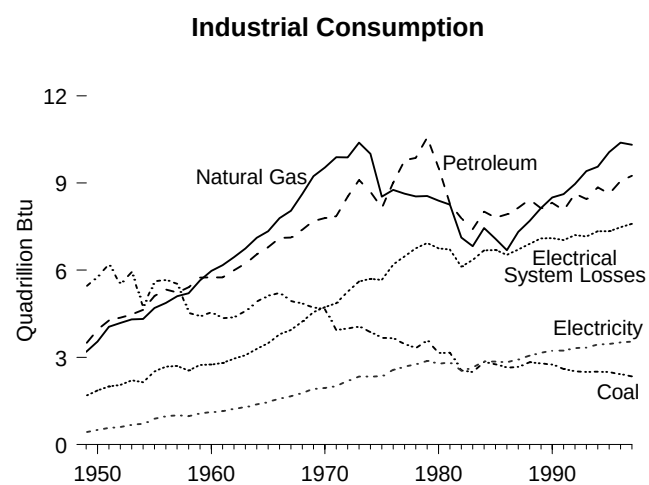


The expansion of electricity use reflects the increased electrification of U.S. households, which typically rely on a wide variety of electrical appliances and systems. In 1997, 99 percent of U.S. homes had a color television and 47 percent had central air conditioning. Eighty-five percent of all homes had one refrigerator; the remaining 15 percent had two or more. New products continued to penetrate the market; for example, in 1978, only 8 percent of U.S. homes had a microwave oven, but by 1997 microwaves could be found in 83 percent.

U.S. home heating underwent a big change, too. Over a third of all U.S. homes were warmed by coal in 1950, but by 1995 that share was only 0.2 percent. Distillate fuel oil lost half its share of the home-heating market during the same period, falling from 22 percent. Natural gas and electricity gained as home-heating sources: the share of natural gas rose from about a quarter of all homes to over half, while electricity's share shot up from only 0.6 percent in 1950 to 27 percent in 1995. In recent times, electricity and natural gas have been the most common sources of energy used by commercial buildings as well.

In the industrial sector, the consumption of both natural gas and petroleum rose steadily and in tandem until the oil embargo in 1973, after which their use moderated. Consumption of coal, once the leading source in the sector, shrank. Electricity (and its associated losses) grew steadily.

About two-thirds of the energy consumed in the industrial sector is used for manufacturing. The remainder goes to mining, construction, agriculture,

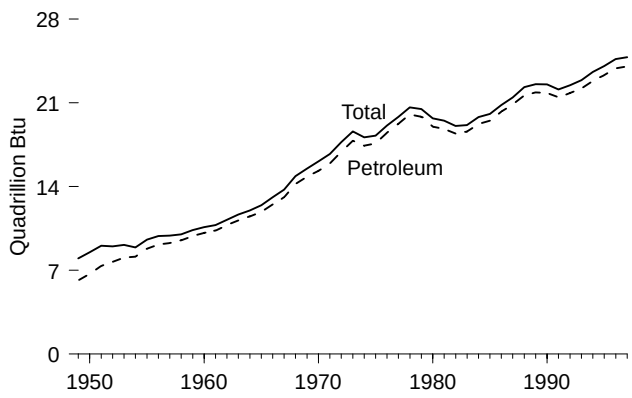


fisheries, and forestry. Within manufacturing, large consumers of energy are the petroleum and coal products, chemicals and allied products, paper and allied products, and primary metal industries. Natural gas is the most commonly consumed energy source in manufacturing. The predominant end-use activity is process heating, followed by machine drive and then facility heating, ventilation, and air conditioning combined.

Nearly 7 percent of all energy consumed in the United States is used for nonfuel purposes, such as asphalt and road oil for roofing products and road building and conditioning; liquefied gases for feedstocks at petrochemical plants; waxes for packaging, cosmetics, pharmaceuticals, inks, and adhesives; and still gas for chemical and rubber manufacture.

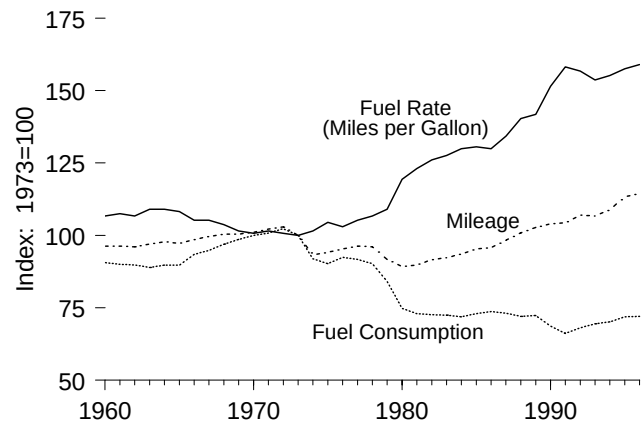
While variety and change in energy sources are the hallmarks of the industrial sector and the residential and commercial sector, transportation's reliance on petroleum has been nearly total since 1949.

Transportation Consumption



Compared with trends just prior to the oil embargo of 1973, fuel consumption per passenger car fell in the two decades that followed, miles traveled per car fell until the early 1980s and then resumed a pattern of increase, and the fuel rate (i.e., miles per gallon) improved greatly.

Passenger Car Efficiency



Petroleum

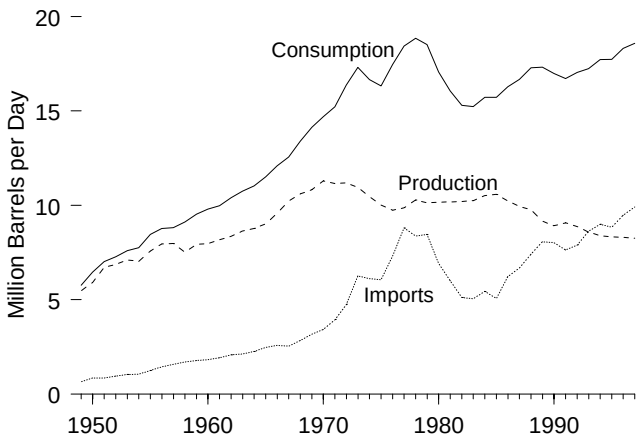
It is hard to imagine a world without petroleum, partly because humans have been using it for at least 5,000 years. Mesopotamians of that era used "rock oil" in architectural adhesives, ship caulks, medicines, and roads. The Chinese of two millennia ago refined crude oil for use in lamps and in heating homes. Seventh-century A.D. Arab and Persian chemists discovered that petroleum's lighter elements could be mixed with quicklime to make "Greek fire," the napalm of its day. From these scattered uses, petroleum has grown to occupy a central place in modern civilization. Today petroleum still finds applications in buildings, shipping, medicine, roads, and warfare. It is crucial to many industries, including chemicals and agriculture. Needless to say, it dominates the world energy scene.

The modern petroleum age began on a Sunday afternoon in August 1859 at Oil Creek, near Titusville in northwestern Pennsylvania. The credit has traditionally gone to "Colonel" Edwin L. Drake (who was, in fact, a railroad conductor on sick leave). After months of effort and many setbacks, Drake's homemade drilling rig drove down to 70 feet, and the bit came up coated with oil. Ironically, Drake wasn't there that day and didn't witness the historic event. And except for the slow and uncertain mails of the day, which delayed a letter from his backers ordering him to stop, it might not have happened in Oil Creek at all.

The oil boom that immediately followed Drake's achievement was driven by strong demand for lighting fuel and lubricants. Over the next four decades the boom spread to Texas and California in the United States and to Romania, Baku (in Azerbaijan) Sumatra, Mexico, Trinidad, Iran, and Venezuela. Overproduction temporarily drove prices down, but the rapid adoption and spread of internal combustion engines in the late 19th century helped create vast new markets. With only temporary interruptions, world petroleum consumption has expanded ever since.

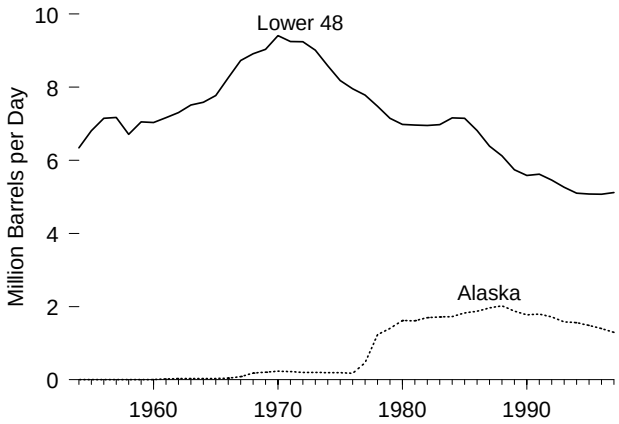
Until the 1950s, the United States produced nearly all the petroleum it needed. But by the end of the decade the gap between production and consumption began to widen and imported petroleum became a major component of the U.S. petroleum supply. After 1992, imports exceeded production.

Petroleum Production and Consumption



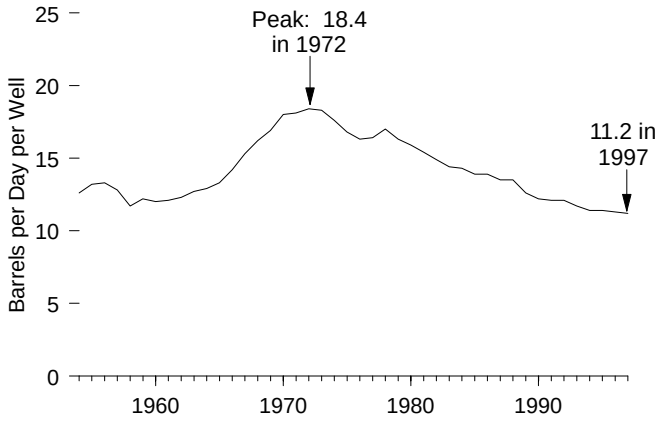
U.S. production of petroleum (crude oil and natural gas plant liquids) reached its highest level in 1970 at 11.3 million barrels per day and then turned downward. A surge in Alaskan oil field output at Prudhoe Bay beginning in the late 1970s helped postpone the decline, but Alaska's production peaked in 1988 at 2.0 million barrels per day and fell to 1.3 million barrels per day in 1997. By then U.S. total output had dropped to 8.3 million barrels per day, 27 percent below the peak.

Lower 48 and Alaskan Crude Oil Production



Another index of the Nation's petroleum output is oil well productivity, which fell from a high of 18.4 barrels per day per well in 1972 to 11.2 barrels per day per well in 1997.

Oil Well Productivity

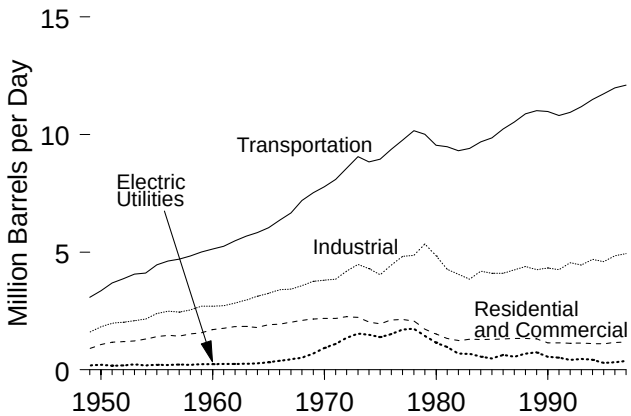


U.S. petroleum consumption rose annually until 1973, when the Arab OPEC embargo stalled the annual increases for two years. Consumption peaked in 1978 at 18.8 million barrels per day. Rising prices over the next

few years dampened consumption, which fell to15.2 million barrels per day in 1983. The price of crude oil plummeted in 1986 and petroleum consumption resumed its climb. By 1997 it had reached 18.6 million barrels per day, close to the all-time high.

In modern times, the transportation sector accounted for well over half of the use of petroleum in the United States. Motor gasoline alone was consumed at the rate of 8.0 million barrels per day in 1997.

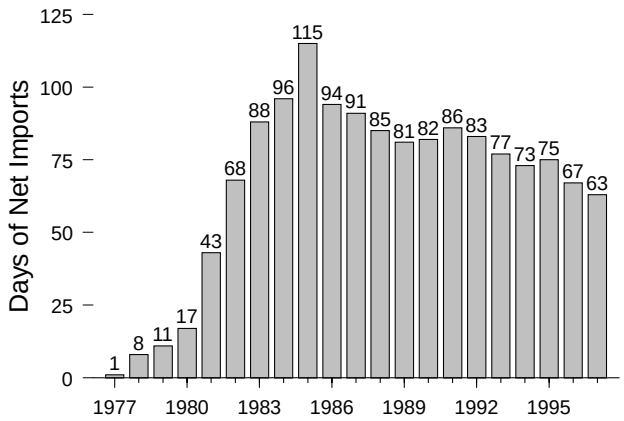
Petroleum Consumption by Sector



To meet demand, crude oil and petroleum products were imported at the all-time high rate of 9.9 million barrels per day in 1997, while exports measured 1.0 million barrels per day. Between 1985 and 1997, the rate of net importation of crude oil and products more than doubled from 4.3 million barrels per day to 8.9 million barrels per day. The share of U.S. net imports that came from OPEC nations peaked at 72 percent in 1977, subsided to 42 percent in 1985, and accounted for 50 percent in 1997. Total net imports as a share of petroleum consumption reached a record high of 48 percent in 1997. The five leading suppliers of petroleum to the United States in 1997 were Venezuela, Canada, Saudi Arabia, Mexico, and Nigeria.

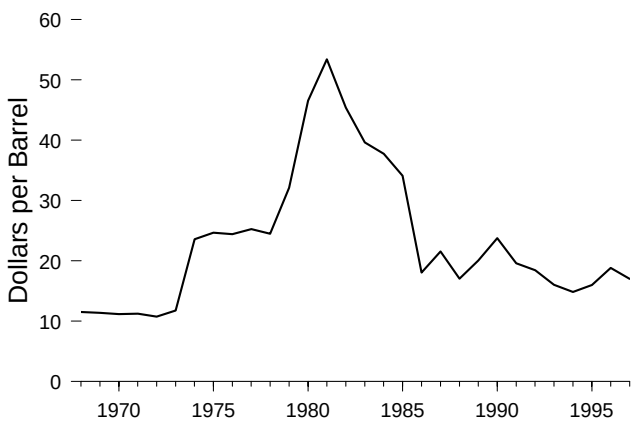
To protect against supply disruptions, the United States began to build a Strategic Petroleum Reserve in the late 1970s. By 1985, the reserve's holdings reached 493 million barrels, which would have provided enough crude oil to replace about 115 days' worth of net imports that year. In 1997, the reserve held 563 million barrels of crude oil. Due to the increased rate of imports, however, that amount would replace only 63 days' worth of net imported petroleum.

Strategic Petroleum Reserve Storage



Petroleum remains relatively cheap in the United States. The price paid by refiners for crude oil in 1997 averaged $19.08 per barrel. When adjusted for inflation , the price was $16.98 (chained 1992 dollars), 10 percent below the previous year's price and 68 percent lower than 1981's record inflation-adjusted price of $53.39 per barrel.

Inflation-Adjusted Price of Crude Oil



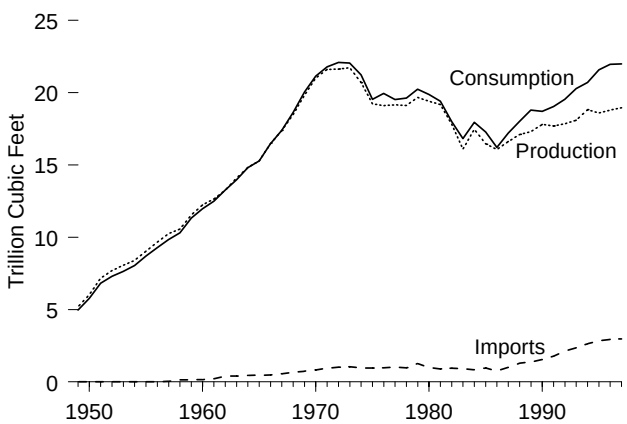
Natural Gas

Natural gas is mostly a mixture of methane, ethane, and propane, with methane making up 73 to 95 percent. Often encountered when drilling for oil, natural gas was once considered mainly a nuisance. When either uses or—more likely today—accessible markets were lacking, it was simply burned off (flared) at the wellhead. Even today, major flaring sites are sometimes easily the brightest areas visible in nighttime satellite images, outshining even the largest cities.

The practical use of natural gas dates to 200 B.C., when Chinese technicians bored shallow wells with crude percussion rigs and conveyed the released natural gas through bamboo pipes to gas-fired brine evaporators. Natural gas was used extensively in Europe and North America in the 19th century as a lighting fuel, until the rapid development of electricity beginning in the 1890's ended that era. The development of steel pipelines and related equipment, which allowed large volumes of gas to be easily and safely transported over many miles, launched the modern natural gas industry. The first all-welded pipeline over 200 miles in length was built in 1925, from Louisiana to Texas. U.S. demand grew rapidly thereafter, especially following World War II. Residential demand grew fifty-fold between 1906 and 1970.

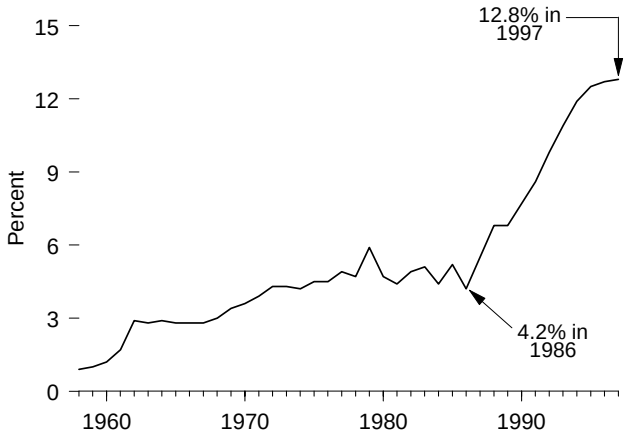
The United States had large natural-gas reserves and was essentially self-sufficient in natural gas until the late 1980s, when consumption began to outpace production.

Natural Gas Overview



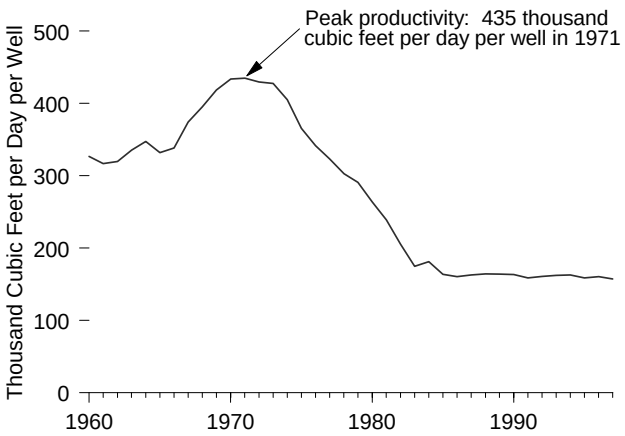
Imports rose to make up the difference, nearly all coming by pipeline from Canada, although small volumes were brought by tanker in liquefied form from Algeria and, in 1997, from Australia and the United Arab Emirates. Net imports as a share of consumption tripled from 1986 to 1997.

Natural Gas Net Imports as Share of Consumption



U.S. natural gas production in 1997 was 19.0 trillion cubic feet, well below the record-high 21.7 trillion cubic feet produced in 1973. Gas well productivity peaked at 435 thousand cubic feet per well per day in 1971, then fell steeply through the mid-1980s before stabilizing. Productivity in 1997 was 157 thousand cubic feet per well per day.

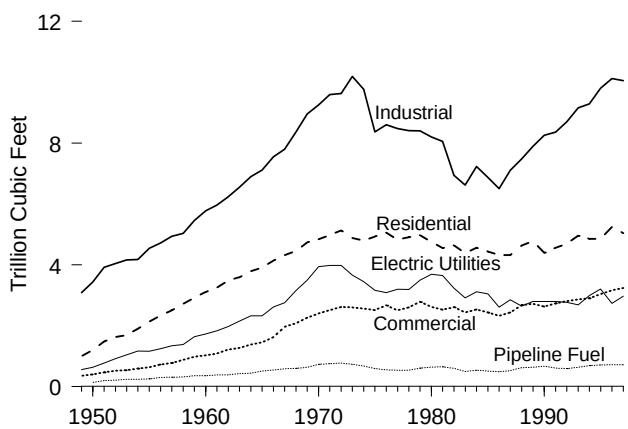
Natural Gas Well Productivity



Three States (Texas, Louisiana, and Oklahoma) account for over half of the natural gas produced in the United States. Texas alone produced 6.9 trillion cubic feet in 1997. Advancing drilling technology has made offshore sites more important, and over the last two decades about one-fifth of all U.S. production has come from offshore sites.

For decades, the industrial sector of the economy has been the heaviest user of natural gas. In 1997 industrial entities accounted for nearly half of all natural gas consumption, followed by the residential sector, which used another fourth of the total. In recent years, very small amounts of natural gas (about 3 billion cubic feet in 1996) have been reported for use in vehicles.

Natural Gas Consumption by Sector



The price of natural gas at the wellhead (i.e., the mouth of the well where the gas is produced) was $2.15 per thousand cubic feet in 1997, in real terms (chained 1992 dollars), well below the historical high of $3.54 per thousand cubic feet in 1983. In nominal dollars, the 1997 wellhead price was $2.42 per thousand cubic feet.

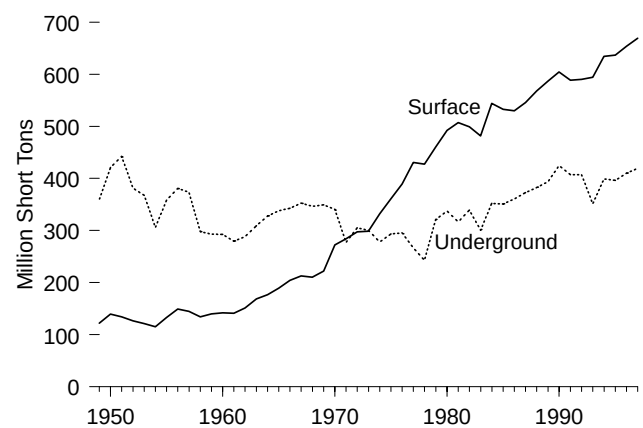
Coal

Scattered records of the use of coal as a fuel date from at least 1100 B.C. However, it was not used extensively until the Middle Ages, when small mining operations in Europe began to supply coal for forges, smithies, lime-burners, and breweries. The invention of firebricks in the late 1400s, which made chimneys cheap to build, helped create a home heating market for coal. Despite its drawbacks (smoke and fumes), coal was firmly established as a domestic fuel by the 1570s. By that time, production in England was high enough that exports were thriving. Eventually, some of that coal went to the American colonies.

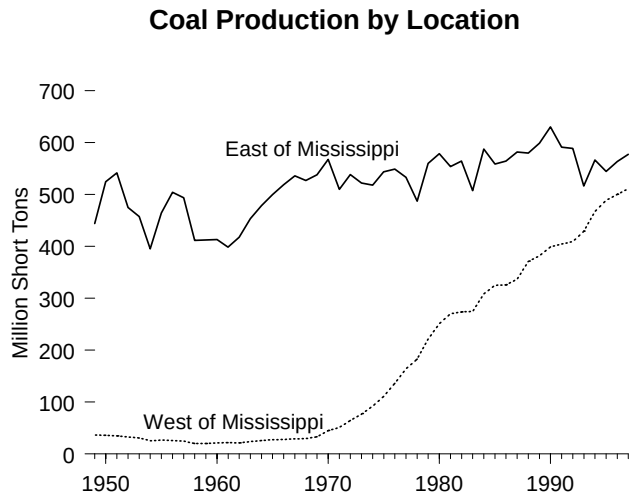
The total amount of coal consumed in the United States in all the years before 1800 was an estimated 108,000 tons, much of it imported. The U.S. market for coal expanded slowly and it was not until 1840 that the young and heavily forested nation burned more coal than wood. However, the arrival of the industrial revolution and the development of the railroads in the mid-nineteenth century inaugurated a period of generally growing production and consumption of coal that continues to the present time. Today, the United States extracts coal in prodigious quantities. In 1997 U.S. production of coal reached a record-high level of 1.09 billion short tons and was second worldwide after China.

From 1949 through 1951, coal was the leading source of energy produced in the United States. From 1952 through 1983, crude oil and natural gas vied for that role, but in 1984 coal regained the position of the top resource and has retained it since. At 23 quadrillion Btu in 1997, coal accounted for a third of all energy produced in the country. Over the past several decades, coal production shifted from primarily underground mines to surface mines.

Coal Production by Mining Method



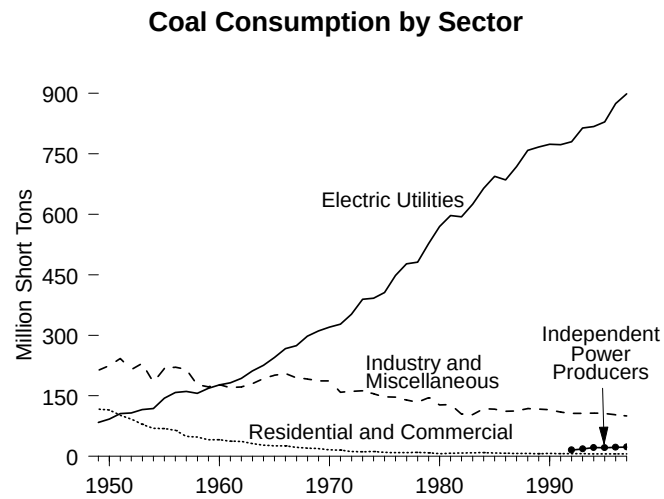
In addition, the coal resources of Wyoming and other areas west of the Mississippi River underwent tremendous development.



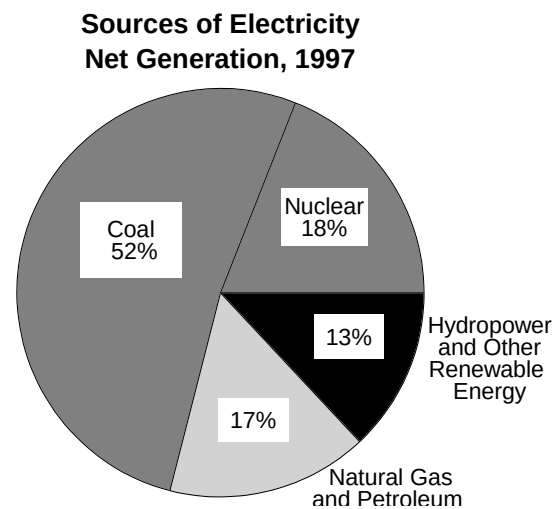
Technological improvements in mining and the shift toward more surface-mined coal have led to great improvements in coal mining productivity. In 1949, U.S. miners produced 0.7 short tons of coal per miner hour; by 1996, that rate had increased to 5.7 short tons per miner hour.

Since 1950, the United States has produced more coal than it has consumed. The excess production allowed the United States to become a significant exporter of coal to other nations. In 1997 U.S. coal exports totaled 84 million short tons, which, measured in Btu, accounted for 48 percent of all U.S. energy exports. Almost half of the year's coal exports went to Europe, while the individual nations buying the most American coal were Canada, Japan, Brazil, United Kingdom, and Italy. While the quantities of coal leaving the country are huge, they still represent only about 10 percent of the Btu content of the amount of petroleum coming *into* the United States every year.

The uses of coal in the United States have changed dramatically over the years. In the 1950s, most coal was consumed in the industrial sector, but many homes were still heated by coal and the transportation sector still consumed significant amounts in steam-driven trains and ships.



In 1997 the industrial sector used less than half as much coal as in 1949, and today less than 10 percent of all coal consumed in the United States goes into industrial processing. Nearly 90 percent is used to produce electricity; coal-fired units accounted for 52 percent of U.S. electricity generation in 1997.



Coal-fired electric generating units emit gases that are of environmental concern. In 1996 carbon dioxide emissions from the combustion of coal in

the United States reached nearly half a billion metric tons of carbon, 36 percent of total carbon dioxide emitted from all fuel sources.

Electric utilities paid an average of $26 per short ton for coal in 1997. In real (inflation adjusted) prices, the average price in 1997 was 30 percent less than it was in 1952. Coal is the least expensive of the major fossil fuels in this country: in 1997 dollars, the price for bituminous coal, subbituminous coal, and lignite was 85 cents per million Btu compared with $2.18 per million Btu for natural gas and $2.97 per million Btu for crude oil.

Electricity

Electric power arrived barely a hundred years ago, but it has radically transformed and expanded our energy use. To a large extent, electricity defines modern technological civilization.

The reasons may not be easy to appreciate for those who have never known the filth, hard labor, danger, scarcity and/or inconvenience historically associated with obtaining and deploying such fuels as wood, coal, and whale oil. By contrast, at the point of use electricity is clean, flexible, controllable, safe, effortless, and instantly available. In homes, it runs everything from toothbrushes and televisions to heating and cooling systems. Out of doors, electricity guides traffic, aircraft, and ships, and lights up the night. In business and industry, electricity enables virtually instantaneous global communication and powers everything from trains, auto plant assembly lines, and restaurant refrigerators to the computers that run the New York Stock Exchange and the automatic pin-setting machines at the local bowling alley.

But electric power began small. Humphrey Davy built a battery-powered arc lamp in 1808 and Michael Faraday an induction dynamo in 1831, but it was another half-century before Thomas Edison's primitive cotton-thread filament burned long enough to prove that a workable electric light could be made. Once past that hurdle, progress accelerated. Edison opened the first electricity generating plant (in London) less than 3 years later, in January 1882, and followed with the first American plant (in New York) in September. Within a month, electric current from New York's Pearl Street station was feeding 1,300 lightbulbs, and within a year, 11,000—each a hundred times brighter than a candle. Edison's goal, reportedly, was to "make electric light so cheap that only the rich will be able to burn candles."

Though he fathered the electric utility industry, Edison failed in his attempts to dominate its business and technical sides. Other companies surpassed him in building central power stations, and Edison's faith in direct current (DC) betrayed him. DC could only be transmitted 2 miles, while a rival alternating-current (AC) system developed by George Westinghouse and Nikola Tesla (whom Edison had fired) enabled long-distance transmission of high-voltage current and stepdowns to lower voltages at the point of use—essentially the system in place today. Edison even subsidized construction of an AC-powered electric chair to convince the public that AC was dangerous, but to no avail.

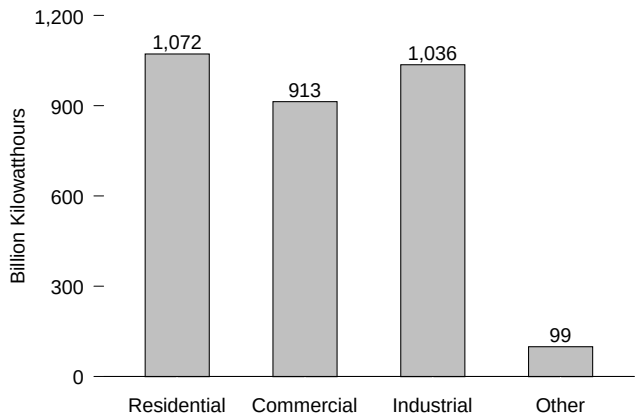
The process of electrification proceeded in fits and starts. Industries like mining, textiles, steel, and printing electrified rapidly during the years between 1890 and 1910. Electricity's penetration of the residential sector was slowed by competition from gas companies, which had a large stake in the lighting market. Nevertheless, by 1900 there were 25 million electric incandescent lamps in use and homeowners had been introduced to electric stoves, sewing machines, curling irons, and vacuum cleaners. In parallel, generating equipment and distribution systems developed to meet the demand. By 1903, utility executive Samuel Insull had commissioned a 5 megawatt steam-driven turbine generator, the first of its type and the largest of any generator then built, and launched a revolution in generating hardware.

The cities received electric service first, because it has always been cheaper, easier, and more profitable to supply large numbers of customers when they are close together. High costs and the Great Depression, which dried up most investment capital, delayed the arrival of electricity to rural Americans until President Franklin Roosevelt signed the law that created the Rural Electrification Administration in 1935. The REA helped to set up electricity cooperatives and loaned money at low interest. Though interrupted by World War II, rural electrification proceeded rapidly thereafter. By 1967 more than 98 percent of American farms were using electricity from central station power plants.

The profundity of electricity's penetration into our economy and way of life is reflected in the fact that, over the last half century, annual increases in total electricity sales faltered only twice, in 1974 and 1982; in every other year, sales grew. From 1949 to 1997, while the population of the United States grew by 79 percent, the total amount of electricity sold here grew by more than 1,100 percent. Per-capita average consumption of electricity was almost seven times higher in 1997 than in 1949.

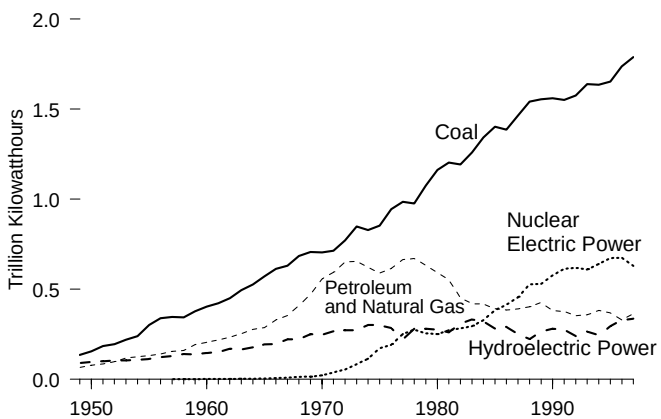
Electricity's broad usage in the economy can be seen in the sector totals. In 1997, the residential sector used the most, followed closely by the industrial sector, and then the commercial sector.

Retail Sales of Electricity, 1997



Where does all this electricity come from? In the United States, coal has been and continues to be the source of most electricity, accounting for over half of all electricity generated in 1997.

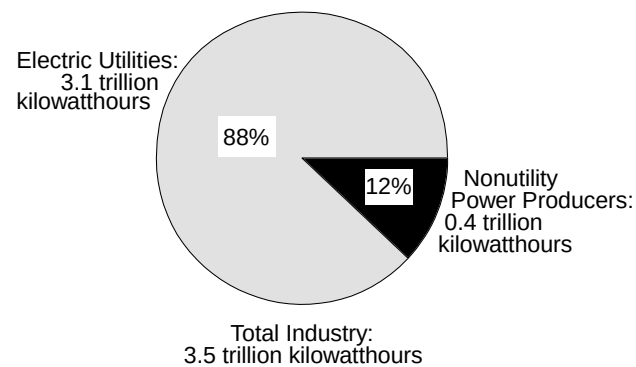
Electric Utility Net Generation



Hydroelectric power was an early source of U.S. electricity—accounting for almost a third of all electricity in 1949—and remains a dependable contributor (about 10 percent of the total in 1997). Natural gas and petroleum grew steadily as sources of electricity in the late 1960s, but their combined usage peaked at 37 percent of the total in 1972 and then declined. By 1997 their combined share stood at only 17 percent of the total. Meanwhile, a new source entered the picture: nuclear electric power. A trickle of nuclear electricity began flowing in 1957, and the stream widened steadily in the years that followed except for downturns in 1979 and 1980 following the accident at Three Mile Island. In 1997, however, the pattern of increasing use of nuclear electricity ended, as nuclear generation declined seven percent.

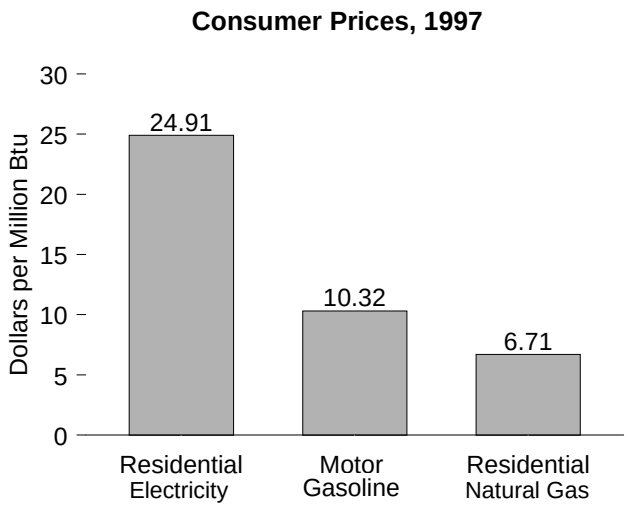
Just as electricity's applications and sources change over time, so is the structure of the electric power industry itself evolving. The industry is now moving away from the traditional, highly regulated entities known for many decades as electric utilities and toward an environment marked by lighter regulation and greater competition from and among nonutility power producers. In 1997 12 percent of the total net generation of electricity came from nonutility power producers, such as independent power producers and cogenerators.

Electric Power Industry Net Generation, 1997



Electricity's great assets as a form of energy are reflected in its cost to the end user. The price paid by the consumer includes the cost of converting

the energy from its original form, such as coal, into electricity and the cost of delivering it. In 1997 consumers paid an average of $24.91 per million Btu for the electricity delivered to their residences. In contrast, consumers paid an average of only $6.71 per million Btu for the natural gas purchased for their homes and an average of $10.32 per million Btu for the motor gasoline to fuel their vehicles.



The unit cost of electricity is high because most of the energy that must be purchased to generate it does not actually reach the end user but is expended in creating the electricity and moving it to the point of use. In 1997, for example, approximately 33 quadrillion Btu of energy were consumed to generate electricity at utilities in the United States, but only about 11 quadrillion Btu worth of electricity were actually used directly by consumers. Where did the other 22 quadrillion Btu go? Energy is never destroyed but it does change form. The chemical energy contained in fossil fuels, for example, is converted at the generator to the desired electric energy. Because of theoretical and practical limits on the efficiency of conversion equipment, much of the energy in the fossil fuels is "lost," mostly as waste heat. (In some cases, the production of electricity and industrial processing can be combined to increase the overall energy efficiency of a system. This process, known as cogeneration, reduces waste energy by utilizing otherwise unwanted heat in the form of steam, hot water, or hot air for other purposes, such as operating pumps or for space heating or cooling.)

In addition to the conversion losses, line losses occur during the transmission and distribution of electricity as it is transferred via connected wires from the generating plant to substations (transmission), where its voltage is lowered, and from the substations to the end user (distribution), such as homes, hospitals, stores, schools, and businesses. The generating plant itself uses some of the electricity. In the end, for every three units of energy that are converted to create electricity, only about one unit actually reaches the end user.

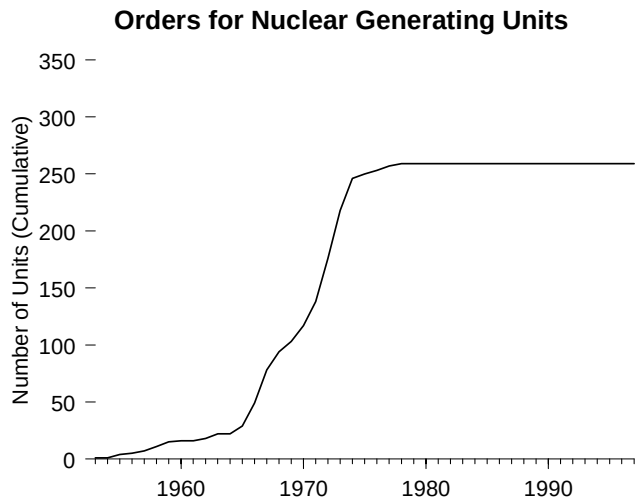
Nuclear Energy

Alone among all the major forms of energy now in use, nuclear power is native to the 20th century. The central insight—that the controlled fission of heavy elements could release enormous energies—came to British physicist Ernest Rutherford in 1904. Research during the 1930s convinced scientists that a controlled chain reaction was possible. Enrico Fermi's group achieved such a reaction for the first time in December 1942 at the University of Chicago in a primitive graphite-moderated reactor built on a vacant squash court.

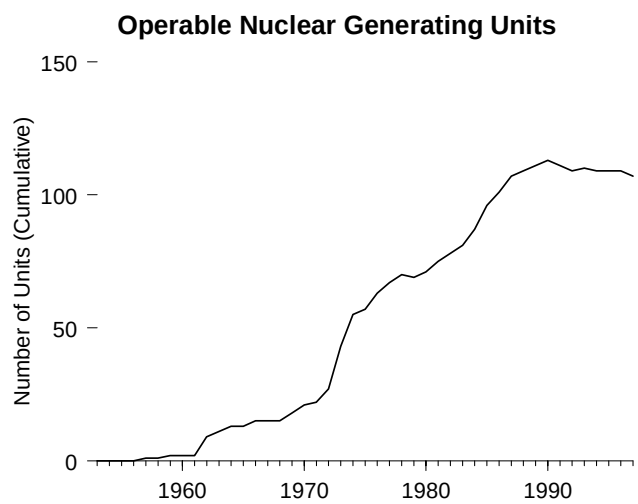
World War II postponed further progress, but the theoretical foundation had been established and several factors encouraged nuclear power's development when peace returned. It was believed that, because fuel costs would be negligible, nuclear power would be relatively inexpensive. Moreover, both the United States and Western Europe became net importers of crude oil in the early 1950's and nuclear power was seen as critical to avoiding energy dependence. Geopolitics appear to have played a role as well; President Dwight Eisenhower's Atoms for Peace program was intended in part to divert fissionable materials from bombs to peaceful uses such as civilian nuclear power.

In 1951 an experimental reactor sponsored by the U.S. Atomic Energy Commission generated the first electricity from nuclear power. The British completed the first operable commercial reactor, at Calder Hall, in 1956. The U.S. Shippingport unit, a design based on power plants used in nuclear submarines, followed a year later. In cooperation with the U.S. electric utility industry, reactor manufacturers then built several demonstration plants and made commitments to build additional plants at fixed prices. This commitment helped launch commercial nuclear power in the United States. The success of the demonstration plants and the growing awareness of U.S. dependency on imported crude oil led to a wave of

enthusiasm for nuclear electric power that sent orders for reactor units soaring between 1966 and 1974.



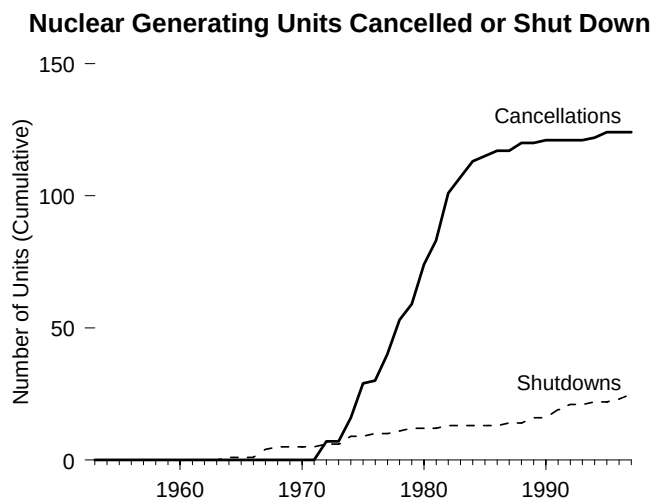
The number of operable units naturally began to climb as well, as ordered units were constructed, tested, licensed for full power operation, and connected to the electricity grid.



The curve of operable units lagged behind the curve of ordered units somewhat because of the long construction times required for the large, complex plants. The total number of U.S. operable reactor units peaked in 1990 at 112.

Orders for new units fell off sharply after 1974. Of the total of 259 units ordered to date, none was ordered after 1978. Although safety concerns, especially after the accident at Three Mile Island in 1979, reinforced a growing wariness of nuclear power, the chief reason for its declining momentum in the United States was economic. The promise of nuclear electric power had been that it would, in the now-famous phrase, make energy "too cheap to meter." In reality, nuclear power plants have always been costly to build and became radically more costly between the mid-1960s and the mid-1970s. There were several reasons. Utilities began building large plants before much experience had been gained with small ones. Expected economies of scale did not materialize. Many units were forced to undertake costly design changes and equipment retrofits, partially as a result of the Three Mile Island accident. Meanwhile, nuclear power plants have also had to compete with conventional coal- or natural gas-fired plants with declining operating costs.

These trends disillusioned many utilities and investors. Interest in further orders subsided and many ordered units were cancelled before they were built. By the end of 1997, 124 units had been cancelled, 48 percent of all ordered units.



As operable nuclear power plants have aged, some have become uneconomic to operate or have otherwise reached the end of their useful lives. By the end of 1997, 25 once-operable units had been shut down permanently. The joint effect of shutdowns and lack of new units coming on line is that the number of U.S. operable units has fallen off since 1990 to 107. EIA currently projects that 65 additional units will be retired, and no additional plants built, by 2020.

Renewable Energy

For all but the most recent fraction of humanity's time on Earth, virtually all energy was renewable energy. Prior to the widespread use of fossil fuels and nuclear power, which arrived only an eyeblink ago in relative terms, there was essentially nothing else. Our ancestors warmed themselves directly in the sun, burned brush and fuelwood fashioned by photosynthesis from sunlight and nutrients, harnessed the power of wind and water mainly created by sun-driven atmospheric and hydrologic cycles, and of course used their own musclepower and that of animals.

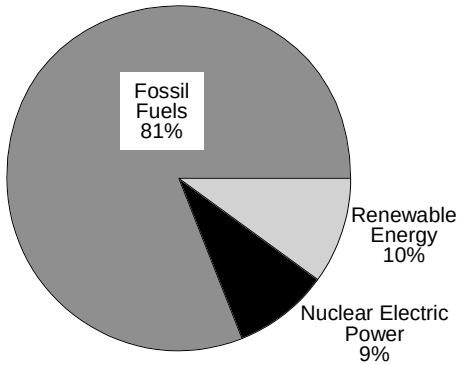
We still depend heavily on renewable energy in these primeval forms. But various cultures have also found more inventive means of harnessing renewable resources, from mounting sails on wheelbarrows, as did ancient Chinese laborers, to gathering and burning buffalo dung, as did American settlers making their way west. The story of renewable energy is one of the invention and refinement of technologies for extracting both more energy and more useful forms of it from a wider variety of renewable sources. Many energy experts believe that the age of fossil fuels is only a transition period between pre- and post-industrial eras dominated by the use of renewable energy.

Some renewable energy technologies, such as water- and wind-driven mills, have been in use for centuries. Grain mills powered by waterwheels have existed since at least the first century B.C. and became commonplace long ago. In England, for example, the Domesday Book survey of 1086 counted 5,624 mills in the south and east alone. They were to be found throughout Europe and elsewhere and were used for a wide variety of mechanical tasks in addition to milling, from pressing oil to making wire. Some installations were surprisingly large. The Romans built a mill with 16 wheels and an output of over 40 horsepower near Arles in France. A giant 72-foot waterwheel with an output of 572 horsepower, dubbed Lady Isabella, was erected at a mine site on the Isle of Man in 1854. Further development of waterwheels ended with the invention of water turbines. Both types of machines were supplanted by large steam engines, which could be sited nearly anywhere. Turbines, however, found an important niche with the development of hydroelectric power.

Windmills are a younger but still very old technology, dating at least to the 10th century in the Middle East, a bit later in Europe. In one form or another, windmills have remained in use ever since, for milling grain, pumping water, working metal, sawing, and crushing chalk or sugar cane. American farms of the 19th century erected millions of small windmills to pump water for livestock or household use. In the modern era, technologically advanced windmills have been developed for generating electricity.

Modern renewable sources in the United States contribute about as much (roughly 10 percent) to total energy production as does nuclear power.

Renewable Energy in Total Energy Production, 1997



Just as water power was relatively more important than wind energy in pre-industrial times, renewable energy today is dominated by hydroelectric power. Over half of the U.S. renewable total in 1997 came from hydroelectric power generation, which uses dam-impounded water to drive turbine generators that make electricity. The American hydropower infrastructure is extensive and includes the great dams of the intermountain West, the Columbia basin, and the Tennessee River valley, as well as hundreds of other smaller installations nationwide.

Most of the rest of the U.S. renewable energy total came from biofuels, a diverse category that includes not only the obvious candidates (such as wood and wood waste, methanol, and ethanol) but also peat, wood liquors, wood sludge, railroad ties, pitch, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oils, and other things. Wood and wood by-products are the most heavily used biofuel and figure prominently in the energy consumption of such industries as paper manufacturing and lumber, which have ready access to them. Geothermal energy was third in 1997, accounting for about 5 percent of U.S. renewable energy production.

Despite their prominence in the public mind, solar energy (photovoltaic and thermal) and wind energy contribute relatively little to the renewable total. Solar energy contributed about 1 percent to the total and wind energy about one-half percent. The peak year for U.S. manufacturers' shipments of solar thermal collectors was 1981, when 21 million square feet were shipped. From 1991 through 1996, about 7 million square feet were shipped each year. About 90 percent of the solar thermal collectors go to the residential sector. Eighty-nine percent of the collectors in the United States are used to heat swimming pools, while 10 percent are used for water heating and less than 1 percent for space heating. The number of U.S. companies making photovoltaic cells has edged up in recent years, and the volume of their shipments more than quintupled between 1982 and 1996. U.S. wind energy production increased more than half between 1990 and 1997 but remains a very small factor in renewable energy here.

Environmental Indicators

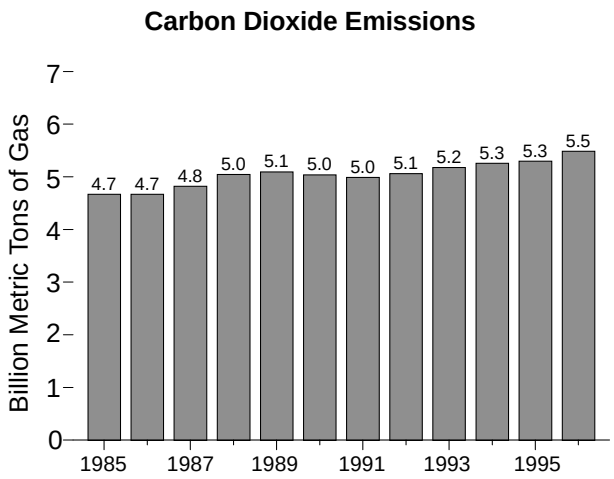
The use of energy brings undisputed benefits, but it also incurs costs. Some of these costs show up on consumers' utility bills. The charges levied on consumers by an energy producer (an electric utility with a coal-fired generating plant, for instance) are designed to cover the producer's costs of building the power plant, extracting coal from the ground, transporting it to the power plant, crushing it to the proper size for combustion, maintaining the generating turbines, paying workers and managers, and so on.

One important category of costs that often is not reflected in consumers' bills is energy-related environmental effects. These unwanted effects can be thought of as the tail end of the energy cycle, which begins with extraction and processing of fuels (or gathering of wind or solar energy), proceeds with conversion to useful forms by means of petroleum refining, electricity generation, and other processes, and then moves on to distribution to, and consumption by, end-users. Once the energy has rendered the services for which it is consumed, all that is left are the byproducts of energy use, i.e., waste heat, mine tailings, sulfur dioxide and carbon dioxide gases, spent nuclear fuel, and many others.

All energy use has unwanted effects of one kind or another; even a simple campfire produces eye-stinging smoke as well as warmth. And area-wide environmental effects are not only a recent problem. King Edward I of England, for instance, so objected to the noxious smoke and fumes from London's many coal-burning fires that in 1306 he banned its use by anyone except blacksmiths. But the enormous scale of modern energy use has increased concerns about unwanted environmental effects. No form of energy production is entirely free of them, including renewable energy. Damming rivers and streams for hydropower facilities radically alters natural stream flows in ways that can threaten or endanger aquatic species. Wind-turbine generators can kill birds. Biomass generating plants that rely on plantation forestry for fuel can displace natural forest habitat and reduce biological diversity.

Among the most significant environmental effects of energy production and consumption is the emission of greenhouse gases. Such gases—carbon dioxide, methane, nitrous oxide, carbon monoxide, and others—block infrared radiation from the Earth to space and retain the captured heat in the atmosphere. This greenhouse effect keeps the Earth's climate hospitable to life. But the possibility of carbon-dioxide-forced warming of the climate has been postulated since 1861, and in recent years many scientists have come to believe that anthropogenic (human-caused) additions to greenhouse gases are raising global average temperatures and may produce harmful changes in the global climate. Energy-related greenhouse gas emissions make up a significant fraction of all such emissions, and the United States, as one of the world's largest producers and consumers of fossil fuels, is responsible for a major portion of global energy-related emissions.

Carbon dioxide (CO_2) accounts for the largest share of combined anthropogenic greenhouse gas emissions. U.S. anthropogenic CO_2 emissions totaled about 5.5 billion metric tons in 1996, 3.5 percent higher than the year before and 18 percent higher than in 1985. Nearly 98 percent of this total was energy-related emissions, especially from petroleum consumed by the transportation sector, coal burned by electric utilities, and natural gas used by industry, homes, and businesses.



Energy-related emissions of methane, another important greenhouse gas, also rose in 1996, by 3.8 percent to 11.6 million metric tons. However, less than 38 percent of U.S. methane emissions stemmed from energy use; most came from landfills and such agricultural sources as ruminant animals (cattle and sheep) and their wastes. Emissions of a third potent greenhouse gas, nitrous oxide, declined in 1996.

All sectors of the U.S. economy contribute to energy-related greenhouse gas emissions, especially CO_2. Of 1996 total end-use CO_2 emissions of 1.5 billion metric tons of carbon (one ton of carbon equals 3.667 tons of carbon dioxide gas), the industrial sector accounted for 33 percent, the transportation sector for 32 percent, and the residential sector for 20 percent. The commercial sector accounted for the remaining 16 percent. Industry's emissions derive from a broad mix of fossil-origin energy, including electricity, petroleum, natural gas, and coal. Not surprisingly, the transportation sector emits carbon dioxide mostly via the consumption of petroleum (especially motor gasoline, distillate fuels such as diesel, and jet fuel). Residential- and commercial-sector emissions are owed mostly to the use of electricity and natural gas.

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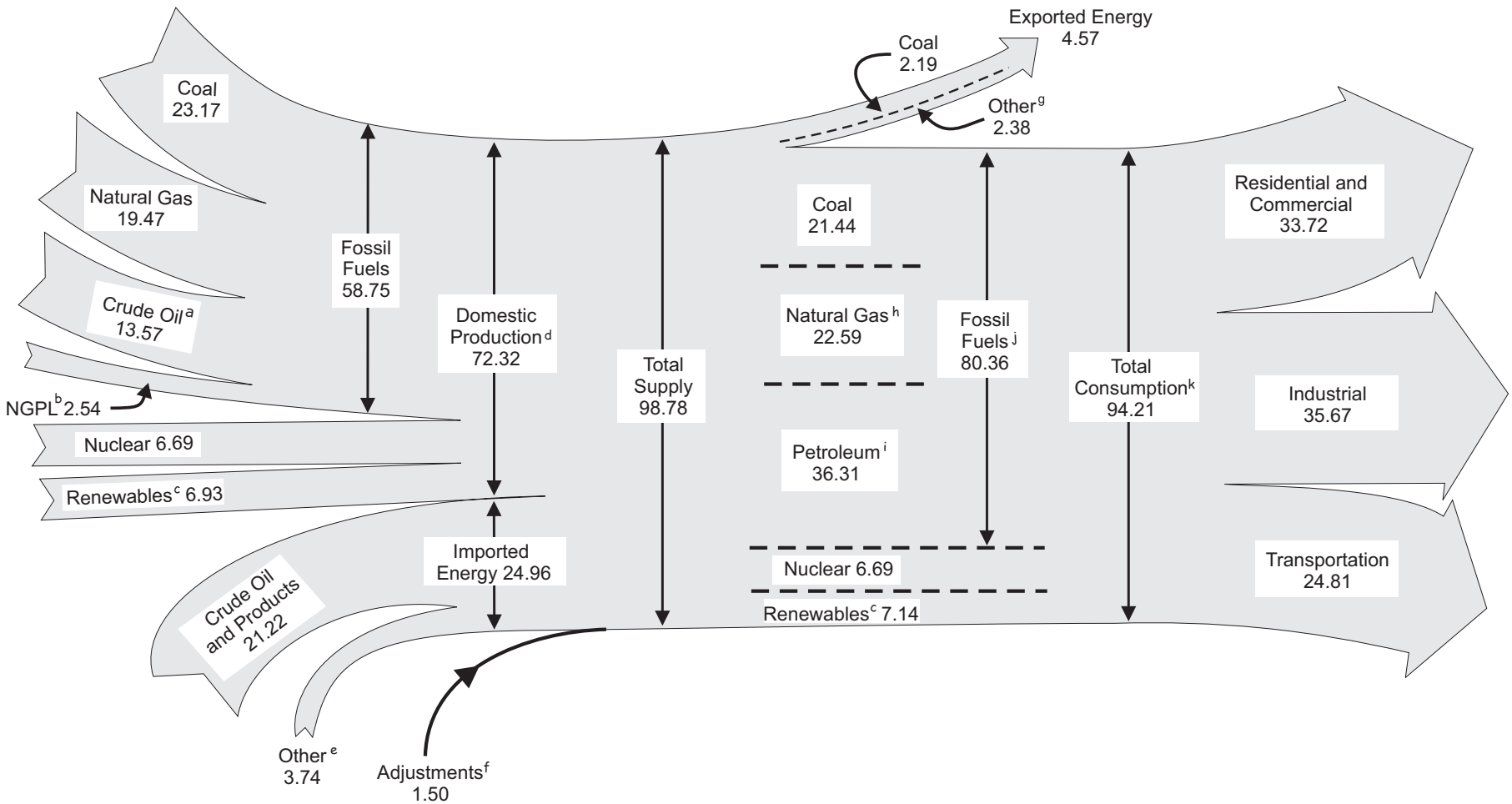
1 Energy Overview

The United States at night from orbit. Source: National Oceanographic and Atmospheric Administration satellite imagery; mosaic provided by U.S. Geological Survey.

Diagram 1. Energy Flow, 1997
(Quadrillion Btu)

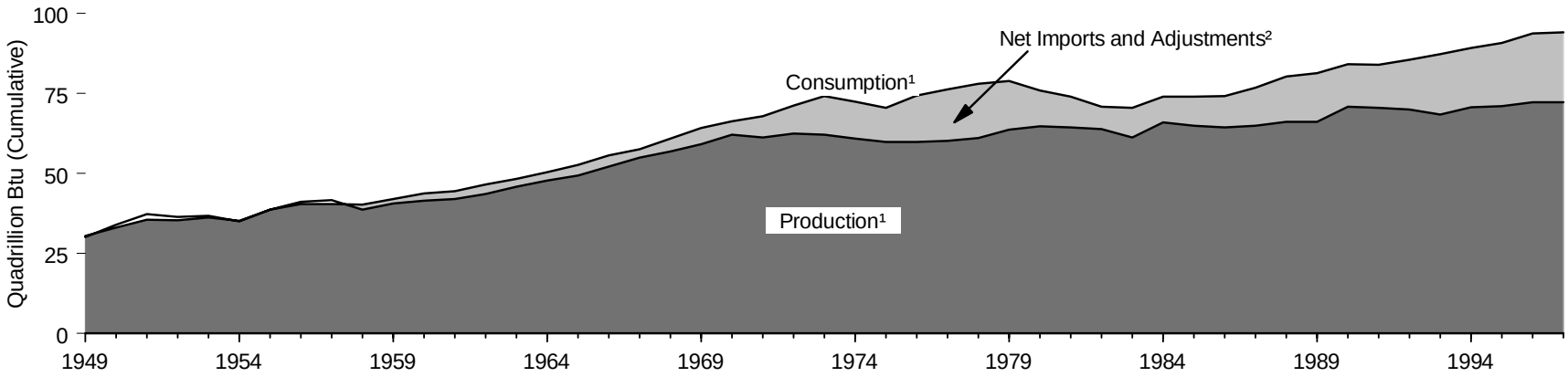


[a] Includes lease condensate.
[b] Natural gas plant liquids.
[c] Biofuels, conventional hydroelectric power, geothermal energy, solar energy, and wind energy.
[d] Includes -0.04 quadrillion Btu hydroelectric pumped storage.
[e] Natural gas, coal, coal coke, and electricity.
[f] Stock changes, losses, gains, miscellaneous blending components, and unaccounted-for supply.
[g] Crude oil, petroleum products, natural gas, electricity, and coal coke.
[h] Includes supplemental gaseous fuels.
[i] Petroleum products, including natural gas plant liquids and crude oil consumed directly as fuel.
[j] Includes 0.02 quadrillion Btu coal coke imports.
[k] Includes, in quadrillion Btu, 0.16 net imported electricity from nonrenewable sources; -0.04 hydroelectric pumped storage; and -0.10 ethanol blended into motor gasoline, which is accounted for in both fossil fuels and renewables.

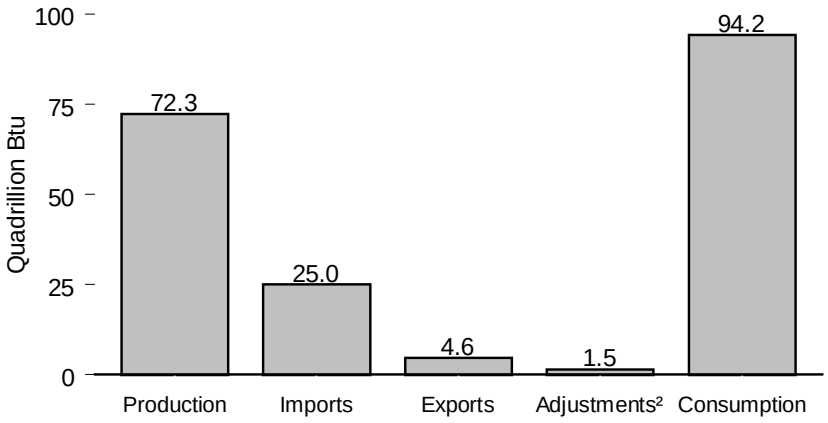
Notes: • Data are preliminary. • Totals may not equal sum of components due to independent rounding.
Sources: Tables 1.1, 1.2, 1.3, 1.4, and 2.1.

Figure 1.1 Energy Overview

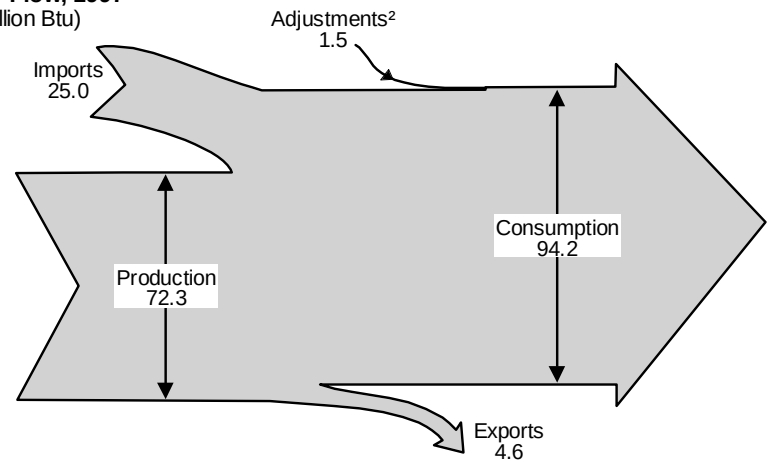
Overview, 1949-1997



Overview, 1997



Energy Flow, 1997
(Quadrillion Btu)



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

² Stock changes, losses, gains, miscellaneous blending components, and unaccounted-for supply.

Note: Data for 1997 are preliminary.
Source: Table 1.1.

Table 1.1 Energy Overview, 1949-1997

(Quadrillion Btu)

Year	Production				Imports		Exports		Adjustments [8]	Consumption			
	Fossil Fuels [1]	Nuclear Electric Power [2]	Renewable Energy [3]	Total [4]	Petroleum [5]	Total [6]	Coal	Total [7]		Fossil Fuels [9]	Nuclear Electric Power [2]	Renewable Energy [3]	Total [10]
1949	28.75	0	1.43	30.18	1.43	1.47	0.88	1.59	0.40	29.00	0	1.45	30.46
1950	32.56	0	1.42	33.98	1.89	1.93	0.79	1.47	-1.37	31.63	0	1.45	33.08
1951	35.79	0	1.43	37.22	1.87	1.92	1.68	2.62	-1.05	34.01	0	1.46	35.47
1952	34.98	0	1.47	36.45	2.11	2.17	1.40	2.37	-0.95	33.80	0	1.50	35.30
1953	35.35	0	1.42	36.77	2.28	2.34	0.98	1.87	-0.96	34.83	0	1.44	36.27
1954	33.76	0	1.36	35.13	2.32	2.37	0.91	1.70	-0.53	33.88	0	1.39	35.27
1955	37.36	0	1.36	38.73	2.75	2.83	1.46	2.29	-0.44	37.41	0	1.41	38.82
1956	39.77	0	1.44	41.21	3.17	3.25	1.98	2.95	-1.13	38.89	0	1.49	40.38
1957	40.13	(s)	1.52	41.65	3.46	3.57	2.17	3.45	-1.28	38.93	(s)	1.56	40.48
1958	37.22	(s)	1.59	38.81	3.72	3.92	1.42	2.06	-0.32	38.72	(s)	1.63	40.35
1959	39.05	(s)	1.55	40.60	3.91	4.11	1.05	1.54	-1.03	40.55	(s)	1.59	42.14
1960	39.87	0.01	1.61	41.49	4.00	4.23	1.02	1.48	-0.43	42.14	0.01	1.66	43.80
1961	40.31	0.02	1.66	41.99	4.19	4.46	0.98	1.38	-0.60	42.76	0.02	1.68	44.46
1962	41.73	0.03	1.82	43.58	4.56	5.01	1.08	1.48	-0.57	44.68	0.03	1.83	46.53
1963	44.04	0.04	1.78	45.85	4.65	5.10	1.36	1.85	-0.78	46.51	0.04	1.78	48.32
1964	45.79	0.04	1.89	47.72	4.96	5.49	1.34	1.84	-0.87	48.54	0.04	1.91	50.50
1965	47.23	0.04	2.07	49.34	5.40	5.92	1.38	1.85	-0.72	50.58	0.04	2.06	52.68
1966	50.04	0.06	2.07	52.17	5.63	6.18	1.35	1.85	-0.83	53.51	0.06	2.08	55.66
1967	52.60	0.09	2.36	55.04	5.56	6.19	1.35	2.15	-1.52	55.13	0.09	2.35	57.57
1968	54.31	0.14	2.36	56.81	6.21	6.93	1.38	2.03	-0.71	58.50	0.14	2.36	61.00
1969	56.29	0.15	2.66	59.10	6.90	7.71	1.53	2.15	-0.47	61.36	0.15	2.68	64.19
1970	59.19	0.24	2.65	62.07	7.47	8.39	1.94	2.66	-1.37	63.52	0.24	2.67	66.43
1971	58.04	0.41	2.84	61.29	8.54	9.58	1.55	2.18	-0.82	64.60	0.41	2.88	67.89
1972	58.94	0.58	2.90	62.42	10.30	11.46	1.53	2.14	-0.48	67.70	0.58	2.98	71.26
1973	58.24	0.91	2.91	62.06	13.47	14.73	1.43	2.05	-0.46	70.32	0.91	3.06	74.28
1974	56.33	1.27	3.23	60.84	13.13	14.41	1.62	2.22	-0.48	67.91	1.27	3.36	72.54
1975	54.73	1.90	3.23	59.86	12.95	14.11	1.76	2.36	-1.07	65.35	1.90	3.29	70.55
1976	54.72	2.11	3.06	59.89	15.67	16.84	1.60	2.19	-0.18	69.10	2.11	3.15	74.36
1977	55.10	2.70	2.42	60.22	18.76	20.09	1.44	2.07	-1.95	70.99	2.70	2.60	76.29
1978	55.07	3.02	3.00	61.10	17.82	19.25	1.08	1.93	-0.34	71.86	3.02	3.21	78.09
1979	58.01	2.78	3.02	63.80	17.93	19.62	1.75	2.87	-1.65	72.89	2.78	3.23	78.90
1980	59.01	2.74	3.01	64.76	14.66	15.97	2.42	3.72	-1.05	69.98	2.74	3.23	75.96
1981	58.53	3.01	2.88	64.42	12.64	13.97	2.94	4.33	-0.08	67.75	3.01	3.23	73.99
1982	57.46	3.13	3.37	63.96	10.78	12.09	2.79	4.63	-0.57	64.04	3.13	3.68	70.85
1983	54.42	3.20	3.66	61.28	10.65	12.03	2.04	3.72	0.94	63.29	3.20	4.03	70.52
1984	58.85	3.55	3.56	65.96	11.43	12.77	2.15	3.80	-0.78	66.62	3.55	3.97	74.14
1985	57.54	4.15	3.18	64.87	10.61	12.10	2.44	4.23	1.24	66.22	4.15	3.61	73.98
1986	56.58	4.47	3.30	64.35	13.20	14.44	2.25	4.06	-0.44	66.15	4.47	3.68	74.30
1987	57.17	4.91	2.88	64.95	14.16	15.76	2.09	3.85	0.03	68.63	4.91	3.36	76.89
1988	57.87	5.66	2.57	66.10	15.75	17.56	2.50	4.42	0.96	71.66	5.66	2.90	80.22
1989	57.47	5.68	[R]3.02	[R]66.16	17.16	18.95	2.64	4.77	1.01	72.55	5.68	[R]3.13	[R]81.35
1990	58.56	6.16	[R,11]6.09	[R,11]70.78	17.12	18.99	2.77	4.91	-0.75	71.95	6.16	[R,11]6.20	[R,11]84.12
1991	57.83	6.58	[R]6.09	[R]70.45	16.35	[R]18.59	2.85	5.22	0.21	71.23	6.58	[R]6.30	[R]84.03
1992	57.55	6.61	[R]5.86	[R]69.98	16.97	19.66	2.68	5.02	[R]0.93	[R]72.90	6.61	[R]6.13	[R]85.55
1993	55.71	6.52	[R]6.15	[R]68.34	18.51	21.54	1.96	4.35	[R]1.84	[R]74.52	6.52	[R]6.43	[R]87.37
1994	57.91	6.84	[R]6.00	[R]70.71	19.25	22.71	1.88	[R]4.13	-0.05	[R]76.07	6.84	[R]6.31	[R]89.25
1995	57.41	7.18	[R]6.48	[R]71.04	18.86	22.48	2.32	4.58	[R]1.93	76.94	7.18	[R]6.76	[R]90.86
1996	[R]58.20	7.17	[R]6.98	[R]72.32	[R]20.27	[R]23.97	2.37	[R]4.71	[R]2.29	[R]79.43	7.17	[R]7.31	[R]93.87
1997[P]	58.75	6.69	6.93	72.32	21.22	24.96	2.19	4.57	1.50	80.36	6.69	7.14	94.21

[1] Coal, natural gas (dry), crude oil, and natural gas plant liquids.
[2] See Note 1 at end of section.
[3] Conventional hydroelectric power, geothermal energy, biofuels, solar energy, and wind energy.
[4] Also includes hydroelectric pumped storage.
[5] Crude oil and petroleum products.
[6] Also includes natural gas, coal, coal coke and electricity.
[7] Also includes natural gas, petroleum, electricity, and coal coke.
[8] A balancing item. Includes stock changes, losses, gains, miscellaneous blending components, and unaccounted-for supply.
[9] Coal, coal coke net imports, natural gas, and petroleum.
[10] From 1990, includes net imported electricity from nonrenewable sources and hydroelectric pumped storage, and removes ethanol blended into motor gasoline, which would otherwise be double counted in both fossil fuels and renewable energy.
[11] There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

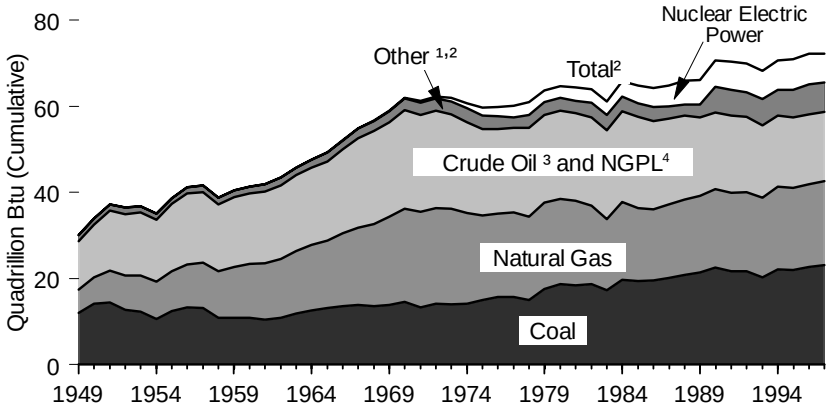
R=Revised. P=Preliminary. (s)=Less than 0.005 quadrillion Btu.

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

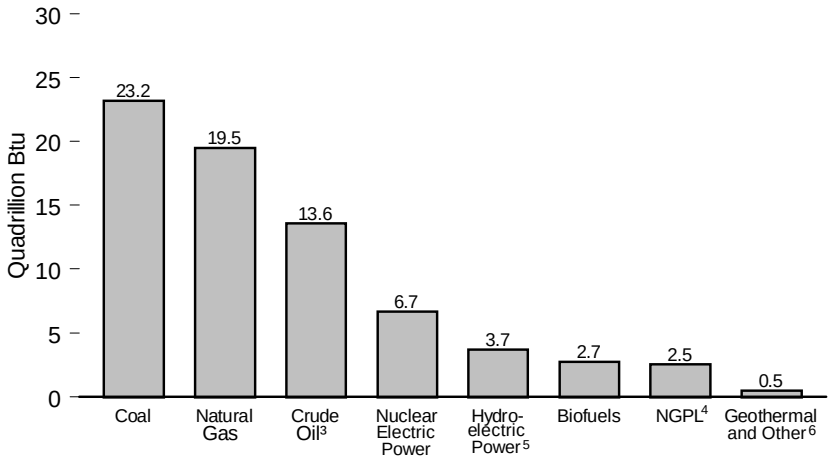
Sources: Tables 5.1, 6.1, 7.1, 7.7, 8.1, 8.3, 10.1, Energy Information Administration estimates for industrial hydroelectric power, and conversion factors in Appendix A.

Figure 1.2 Energy Production by Source

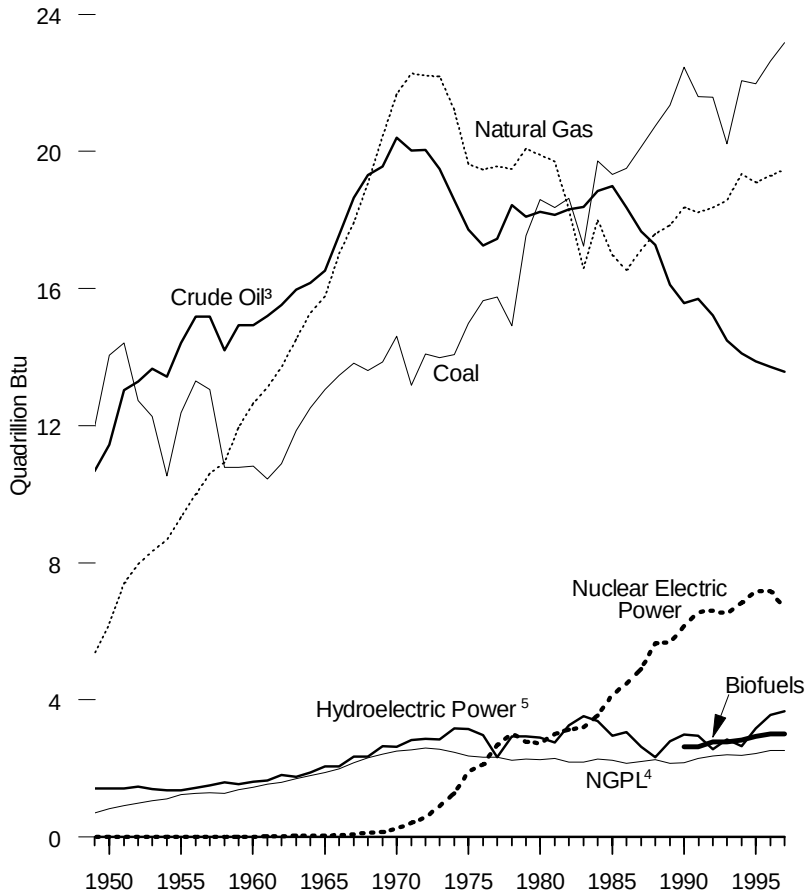
By Source, 1949-1997



By Source, 1997



By Major Source, 1949-1997



[1] Renewable energy and pumped-storage hydroelectric power.

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

[3] Includes lease condensate.

[4] Natural gas plant liquids.

[5] Conventional and pumped-storage hydroelectric power.

[6] Solar energy and wind energy.

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

Source: Table 1.2.

Table 1.2 Energy Production by Source, 1949-1997

(Quadrillion Btu)

Year	Fossil Fuels					Nuclear Electric Power [2]	Hydroelectric Pumped Storage [3]	Renewable Energy						Total
	Coal	Natural Gas (Dry)	Crude Oil [1]	Natural Gas Plant Liquids	Total Fossil Fuels			Conventional Hydroelectric Power	Geothermal Energy	Biofuels [4]	Solar Energy	Wind Energy	Total Renewable Energy	
1949	11.974	5.377	10.683	0.714	28.748	0	([5])	1.425	0	0.006	0	0	1.431	30.179
1950	14.060	6.233	11.447	0.823	32.563	0	([5])	1.415	0	0.005	0	0	1.421	33.983
1951	14.419	7.416	13.037	0.920	35.792	0	([5])	1.424	0	0.005	0	0	1.429	37.221
1952	12.735	7.964	13.281	0.998	34.977	0	([5])	1.466	0	0.006	0	0	1.472	36.449
1953	12.278	8.339	13.671	1.062	35.349	0	([5])	1.413	0	0.005	0	0	1.418	36.767
1954	10.542	8.682	13.427	1.113	33.764	0	([5])	1.360	0	0.003	0	0	1.363	35.127
1955	12.370	9.345	14.410	1.240	37.364	0	([5])	1.360	0	0.003	0	0	1.363	38.727
1956	13.306	10.002	15.180	1.283	39.771	0	([5])	1.435	0	0.002	0	0	1.436	41.208
1957	13.061	10.605	15.178	1.289	40.133	(s)	([5])	1.516	0	0.002	0	0	1.518	41.651
1958	10.783	10.942	14.204	1.287	37.216	0.002	([5])	1.592	0	0.002	0	0	1.594	38.812
1959	10.778	11.952	14.933	1.383	39.045	0.002	([5])	1.548	0	0.002	0	0	1.550	40.598
1960	10.817	12.656	14.935	1.461	39.869	0.006	([5])	1.608	0.001	0.002	0	0	1.610	41.485
1961	10.447	13.105	15.206	1.549	40.307	0.020	([5])	1.656	0.002	0.001	0	0	1.660	41.987
1962	10.901	13.717	15.522	1.593	41.732	0.026	([5])	1.816	0.002	0.001	0	0	1.820	43.578
1963	11.849	14.513	15.966	1.709	44.037	0.038	([5])	1.771	0.004	0.001	0	0	1.776	45.852
1964	12.524	15.298	16.164	1.803	45.789	0.040	([5])	1.886	0.005	0.002	0	0	1.892	47.721
1965	13.055	15.775	16.521	1.883	47.235	0.043	([5])	2.059	0.004	0.003	0	0	2.066	49.344
1966	13.468	17.011	17.561	1.996	50.036	0.064	([5])	2.062	0.004	0.003	0	0	2.069	52.169
1967	13.826	17.943	18.651	2.177	52.597	0.088	([5])	2.347	0.007	0.003	0	0	2.357	55.043
1968	13.608	19.068	19.308	2.321	54.306	0.142	([5])	2.349	0.009	0.004	0	0	2.362	56.809
1969	13.864	20.446	19.556	2.420	56.286	0.154	([5])	2.648	0.013	0.003	0	0	2.665	59.104
1970	14.607	21.666	20.401	2.512	59.186	0.239	([5])	2.634	0.011	0.004	0	0	2.649	62.074
1971	13.185	22.280	20.033	2.544	58.041	0.413	([5])	2.824	0.012	0.003	0	0	2.839	61.294
1972	14.091	22.208	20.041	2.598	58.938	0.584	([5])	2.864	0.031	0.003	0	0	2.899	62.420
1973	13.993	22.187	19.493	2.569	58.242	0.910	([5])	2.861	0.043	0.003	0	0	2.907	62.060
1974	14.074	21.210	18.575	2.471	56.331	1.272	([5])	3.177	0.053	0.003	0	0	3.232	60.835
1975	14.990	19.640	17.729	2.374	54.734	1.900	([5])	3.155	0.070	0.002	0	0	3.227	59.860
1976	15.654	19.480	17.262	2.327	54.723	2.111	([5])	2.976	0.078	0.003	0	0	3.057	59.892
1977	15.755	19.565	17.454	2.327	55.101	2.702	([5])	2.333	0.077	0.005	0	0	2.416	60.219
1978	14.910	19.485	18.434	2.245	55.074	3.024	([5])	2.937	0.064	0.003	0	0	3.005	61.103
1979	17.539	20.076	18.104	2.286	58.005	2.776	([5])	2.931	0.084	0.005	0	0	3.020	63.801
1980	18.597	19.908	18.249	2.254	59.007	2.739	([5])	2.900	0.110	0.005	0	0	3.014	64.761
1981	18.376	19.699	18.146	2.307	58.529	3.008	([5])	2.758	0.123	0.004	0	0	2.885	64.421
1982	18.639	18.319	18.309	2.191	57.458	3.131	([5])	3.266	0.105	0.003	0	0	3.374	63.962
1983	17.246	16.593	18.392	2.184	54.416	3.203	([5])	3.527	0.129	0.004	0	(s)	3.661	61.279
1984	19.719	18.008	18.848	2.274	58.849	3.553	([5])	3.386	0.165	0.009	0	(s)	3.560	65.962
1985	19.325	16.980	18.992	2.241	57.539	4.149	([5])	2.970	0.198	0.014	0	(s)	3.183	64.871
1986	19.510	16.541	18.376	2.149	56.576	4.471	([5])	3.071	0.219	0.012	0	(s)	3.303	64.350
1987	20.142	17.136	17.675	2.215	57.167	4.906	([5])	2.635	0.229	0.015	0	(s)	2.879	64.952
1988	20.737	17.599	17.279	2.260	57.874	5.661	([5])	2.334	0.217	0.017	0	(s)	2.569	66.105
1989	21.345	17.847	16.117	2.158	57.468	5.677	([5])	[R]2.798	0.197	0.020	(s)	(s)	[R]3.015	[R]66.160
1990	22.456	18.362	15.571	2.175	58.564	6.161	-0.036	[R,6]3.032	[R,7]0.344	[7]2.632	[R,7]0.063	[7]0.023	[R,7]6.094	[R,7]70.782
1991	21.594	18.229	15.701	2.306	57.829	6.579	-0.047	[R]3.005	[R]0.349	2.642	0.066	0.027	[R]6.089	[R]70.450
1992	21.593	18.375	15.223	2.363	57.554	6.607	-0.043	[R]2.618	[R]0.361	2.788	0.068	0.030	[R]5.864	[R]69.983
1993	20.221	18.584	14.494	2.408	55.708	6.519	-0.042	[R]2.893	[R]0.375	2.784	0.071	0.031	[R]6.154	[R]68.339
1994	22.068	19.348	14.103	2.391	57.909	6.837	-0.035	[R]2.683	[R]0.370	2.838	0.072	0.036	[R]5.999	[R]70.711
1995	21.978	19.101	13.887	2.442	57.408	7.177	-0.028	3.206	[R]0.321	[R]2.846	0.073	0.033	[R]6.479	[R]71.035
1996	[R]22.646	[R]19.300	[R]13.723	2.530	[R]58.199	7.168	-0.032	3.594	0.339	[R]2.938	0.075	0.035	[R]6.981	[R]72.315
1997[P]	23.173	19.474	13.572	2.535	58.754	6.686	-0.042	3.723	0.366	2.723	0.075	0.039	6.925	72.324

[1] Includes lease condensate.
[2] See Note 1 at end of section.
[3] Represents total pumped storage facility production minus energy used for pumping.
[4] Includes wood, wood waste, peat, wood liquors, railroad ties, pitch, wood sludge, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oil, and/or other waste.
[5] Through 1989, pumped storage is included in conventional hydroelectric power.
[6] There is a discontinuity in this time series between 1989 and 1990; beginning in 1990, pumped storage is removed and expanded coverage of industrial use of hydroelectric power is included.
[7] There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

R=Revised. P=Preliminary. (s)=Less than 0.0005 quadrillion Btu.

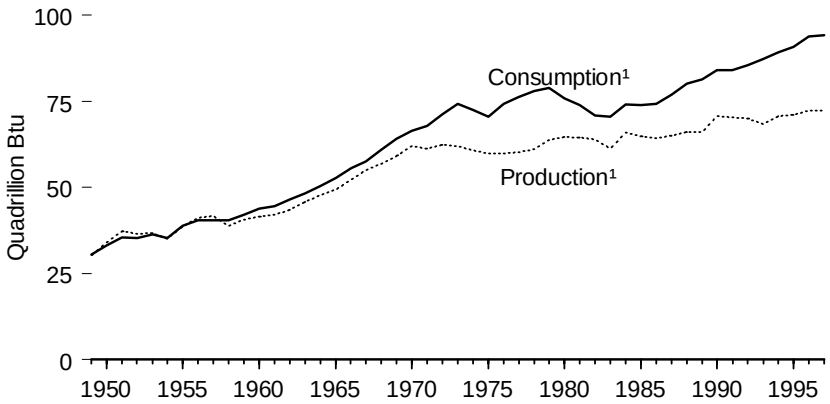
Note: • Totals may not equal sum of components due to independent rounding.

Web Page: http//www.eia.doe.gov/fueloverview.html#state.

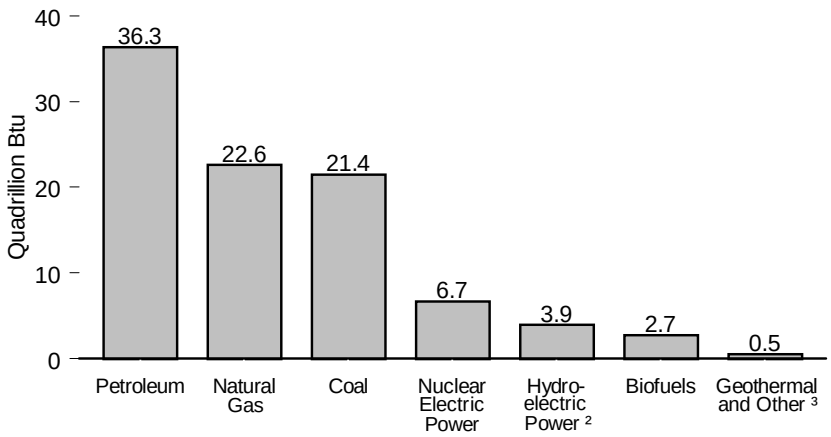
Sources: Tables 5.1, 6.1, 7.1, 7.7, 8.1, 8.4, 10.1, Energy Information Administration estimates for industrial hydroelectric power, and conversion factors in Appendix A.

Figure 1.3 Energy Consumption by Source

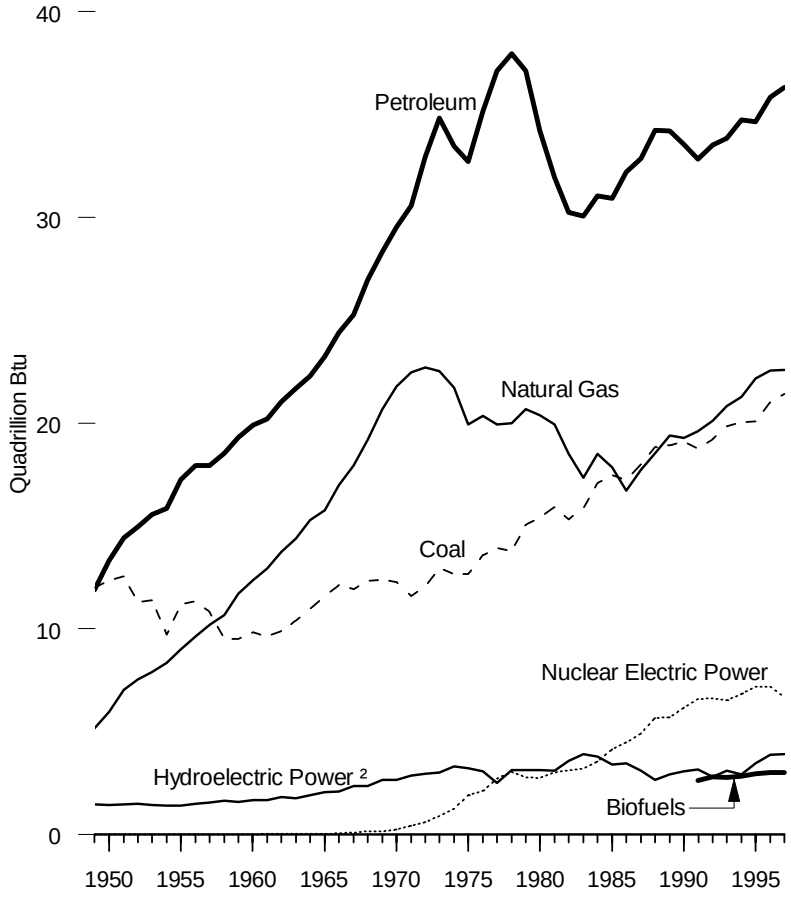
Production and Consumption, 1949-1997



By Source, 1997



By Major Source, 1949-1997



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

² Conventional and pumped-storage hydroelectric power.

³ Solar energy and wind energy.

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

Sources: Tables 1.2 and 1.3.

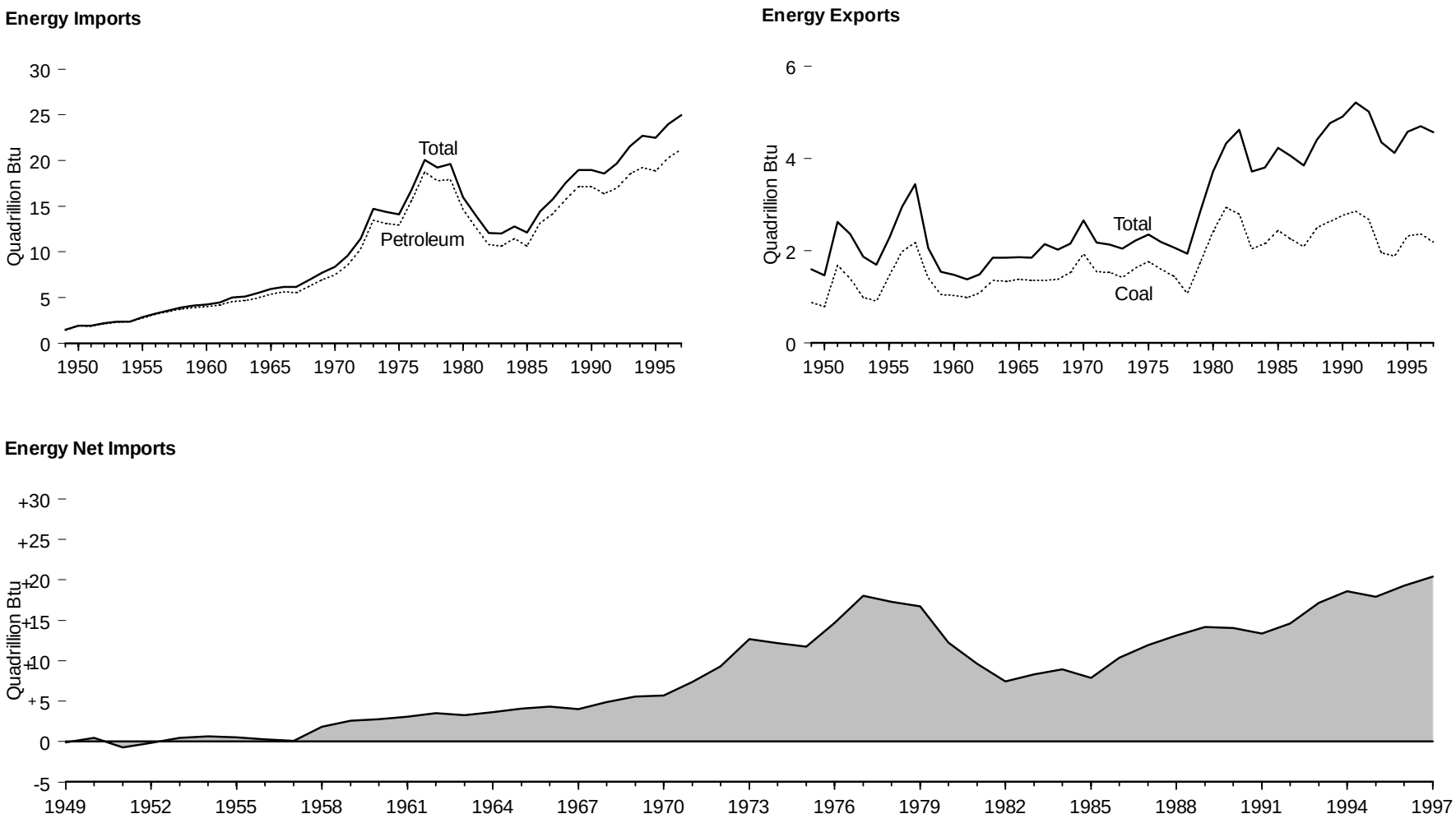
Table 1.3 Energy Consumption by Source, 1949-1997

(Quadrillion Btu)

	Fossil Fuels							Renewable Energy						
Year	Coal	Coal Coke Net Imports	Natural Gas [1]	Petroleum [2]	Total Fossil Fuels	Nuclear Electric Power	Hydroelectric Pumped Storage [3]	Conventional Hydroelectric Power [4]	Geothermal Energy[5]	Biofuels [6]	Solar Energy	Wind Energy	Total Renewable Energy	Total [7]
1949	11.981	-0.007	5.145	11.883	29.002	0	([8])	1.449	0	0.006	0	0	1.454	30.457
1950	12.347	0.001	5.968	13.315	31.632	0	([8])	1.440	0	0.005	0	0	1.446	33.078
1951	12.553	-0.021	7.049	14.428	34.008	0	([8])	1.454	0	0.005	0	0	1.459	35.467
1952	11.307	-0.012	7.550	14.956	33.800	0	([8])	1.496	0	0.006	0	0	1.503	35.302
1953	11.373	-0.009	7.907	15.556	34.826	0	([8])	1.439	0	0.005	0	0	1.444	36.270
1954	9.715	-0.007	8.330	15.839	33.877	0	([8])	1.388	0	0.003	0	0	1.391	35.269
1955	11.167	-0.010	8.998	17.255	37.410	0	([8])	1.407	0	0.003	0	0	1.411	38.821
1956	11.350	-0.013	9.614	17.937	38.888	0	([8])	1.487	0	0.002	0	0	1.489	40.377
1957	10.821	-0.017	10.191	17.932	38.926	(s)	([8])	1.557	0	0.002	0	0	1.559	40.484
1958	9.533	-0.007	10.663	18.527	38.717	0.002	([8])	1.629	0	0.002	0	0	1.631	40.349
1959	9.518	-0.008	11.717	19.323	40.550	0.002	([8])	1.587	0	0.002	0	0	1.589	42.141
1960	9.838	-0.006	12.385	19.919	42.137	0.006	([8])	1.657	0.001	0.002	0	0	1.659	43.802
1961	9.623	-0.008	12.926	20.216	42.758	0.020	([8])	1.680	0.002	0.001	0	0	1.684	44.462
1962	9.906	-0.006	13.731	21.049	44.681	0.026	([8])	1.822	0.002	0.001	0	0	1.825	46.533
1963	10.412	-0.007	14.403	21.701	46.509	0.038	([8])	1.772	0.004	0.001	0	0	1.777	48.325
1964	10.965	-0.010	15.288	22.301	48.543	0.040	([8])	1.907	0.005	0.002	0	0	1.913	50.496
1965	11.580	-0.018	15.769	23.246	50.576	0.043	([8])	2.058	0.004	0.003	0	0	2.065	52.684
1966	12.143	-0.025	16.995	24.401	53.514	0.064	([8])	2.073	0.004	0.003	0	0	2.081	55.659
1967	11.914	-0.015	17.945	25.284	55.127	0.088	([8])	2.344	0.007	0.003	0	0	2.354	57.569
1968	12.331	-0.017	19.210	26.979	58.502	0.142	([8])	2.342	0.009	0.004	0	0	2.355	60.999
1969	12.382	-0.036	20.678	28.338	61.362	0.154	([8])	2.659	0.013	0.003	0	0	2.676	64.191
1970	12.264	-0.058	21.795	29.521	63.522	0.239	([8])	2.654	0.011	0.004	0	0	2.669	66.431
1971	11.599	-0.033	22.469	30.561	64.596	0.413	([8])	2.861	0.012	0.003	0	0	2.876	67.885
1972	12.077	-0.026	22.698	32.947	67.696	0.584	([8])	2.944	0.031	0.003	0	0	2.979	71.258
1973	12.971	-0.007	22.512	34.840	70.316	0.910	([8])	3.010	0.043	0.003	0	0	3.056	74.282
1974	12.663	0.056	21.732	33.455	67.906	1.272	([8])	3.309	0.053	0.003	0	0	3.365	72.543
1975	12.663	0.014	19.948	32.731	65.355	1.900	([8])	3.219	0.070	0.002	0	0	3.291	70.546
1976	13.584	(s)	20.345	35.175	69.104	2.111	([8])	3.066	0.078	0.003	0	0	3.146	74.362
1977	13.922	0.015	19.931	37.122	70.989	2.702	([8])	2.515	0.077	0.005	0	0	2.597	76.288
1978	13.765	0.125	20.000	37.965	71.856	3.024	([8])	3.141	0.064	0.003	0	0	3.209	78.089
1979	15.040	0.063	20.666	37.123	72.892	2.776	([8])	3.141	0.084	0.005	0	0	3.230	78.898
1980	15.423	-0.035	20.394	34.202	69.985	2.739	([8])	3.118	0.110	0.005	0	0	3.232	75.956
1981	15.907	-0.016	19.928	31.931	67.750	3.008	([8])	3.105	0.123	0.004	0	0	3.232	73.990
1982	15.321	-0.022	18.505	30.232	64.037	3.131	([8])	3.572	0.105	0.003	0	0	3.680	70.848
1983	15.895	-0.016	17.357	30.054	63.290	3.203	([8])	3.899	0.129	0.004	0	(s)	4.032	70.525
1984	17.070	-0.011	18.507	31.051	66.617	3.553	([8])	3.800	0.165	0.009	0	(s)	3.974	74.144
1985	17.478	-0.013	17.834	30.922	66.221	4.149	([8])	3.398	0.198	0.014	0	(s)	3.611	73.980
1986	17.260	-0.017	16.708	32.196	66.148	4.471	([8])	3.446	0.219	0.012	0	(s)	3.678	74.297
1987	18.008	0.009	17.744	32.865	68.626	4.906	([8])	3.117	0.229	0.015	0	(s)	3.362	76.894
1988	18.846	0.040	18.552	34.222	71.660	5.661	([8])	2.662	0.217	0.017	0	(s)	2.897	80.218
1989	18.921	0.030	19.384	34.211	72.546	5.677	([8])	[R]2.912	0.197	0.020	(s)	(s)	[R]3.130	[R]81.353
1990	19.101	0.005	19.296	33.553	71.955	6.161	-0.036	[R,9]3.123	[R,10]0.355	[10]2.632	[R,10]0.063	[10]0.023	[R,10]6.197	[R,10]84.118
1991	18.770	0.009	19.606	32.845	71.230	6.579	-0.047	[R]3.205	[R]0.365	2.642	0.066	0.027	[R]6.304	[R]84.026
1992	[R,11]19.217	0.027	20.131	33.527	[R,11]72.902	6.607	-0.043	[R]2.863	[R]0.379	2.788	0.068	0.030	[R]6.128	[R,11]85.554
1993	[R]19.837	0.017	20.827	33.841	[R]74.522	6.519	-0.042	[R]3.147	[R]0.393	2.784	0.071	0.031	[R]6.426	[R]87.368
1994	[R]20.027	0.024	21.288	34.735	[R]76.073	6.837	-0.035	[R]2.969	[R]0.395	2.838	0.072	0.036	[R]6.309	[R]89.250
1995	[R]20.090	0.026	22.163	34.663	76.943	7.177	-0.028	3.472	[R]0.339	[R]2.846	0.073	0.033	[R]6.763	[R]90.864
1996	[R]21.011	(s)	[R]22.560	[R]35.864	[R]79.434	7.168	-0.032	3.914	0.352	[R]2.938	0.075	0.035	[R]7.315	[R]93.871
1997[P]	21.439	0.018	22.588	36.314	80.360	6.686	-0.042	3.942	0.366	2.723	0.075	0.039	7.145	94.209

[1] Includes supplemental gaseous fuels.
[2] Petroleum products supplied, including natural gas plant liquids and crude oil burned as fuel.
[3] Represents total pumped storage facility production minus energy used for pumping.
[4] Through 1989, includes all net imports of electricity. From 1990, includes only the portion of net imports of electricity that is derived from hydroelectric power.
[5] Includes electricity imports from Mexico that are derived from geothermal energy.
[6] Includes wood, wood waste, peat, wood liquors, railroad ties, pitch, wood sludge, municipal solid waste, agricultural waste, straw, tires, landfill gases, fish oil, and/or other waste.
[7] From 1990, includes net imported electricity from nonrenewable sources and removes ethanol blended into motor gasoline, which would otherwise be double counted in both petroleum and renewable energy.
[8] Through 1989, pumped storage is included in conventional hydroelectric power.
[9] There is a discontinuity in this time series between 1989 and 1990; beginning in 1990, pumped storage is removed and expanded coverage of industrial use of hydroelectric power is included.
[10] There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of nonutility use of renewable energy beginning in 1990.
[11] Independent power producers' use of coal is included beginning in 1992. See Table 7.3.
R=Revised. P=Preliminary. (s)=Less than 0.0005 quadrillion Btu.
Note: Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fueloverview.html#state.
Sources: Tables 5.1, 6.1, 7.1, 7.7, 8.1, 8.3, 10.1, Energy Information Administration estimates for industrial hydroelectric power, and conversion factors in Appendix A.

Figure 1.4 Energy Imports, Exports, and Net Imports, 1949-1997



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

Source: Table 1.4.

Table 1.4 Energy Imports, Exports, and Net Imports, 1949-1997

(Quadrillion Btu)

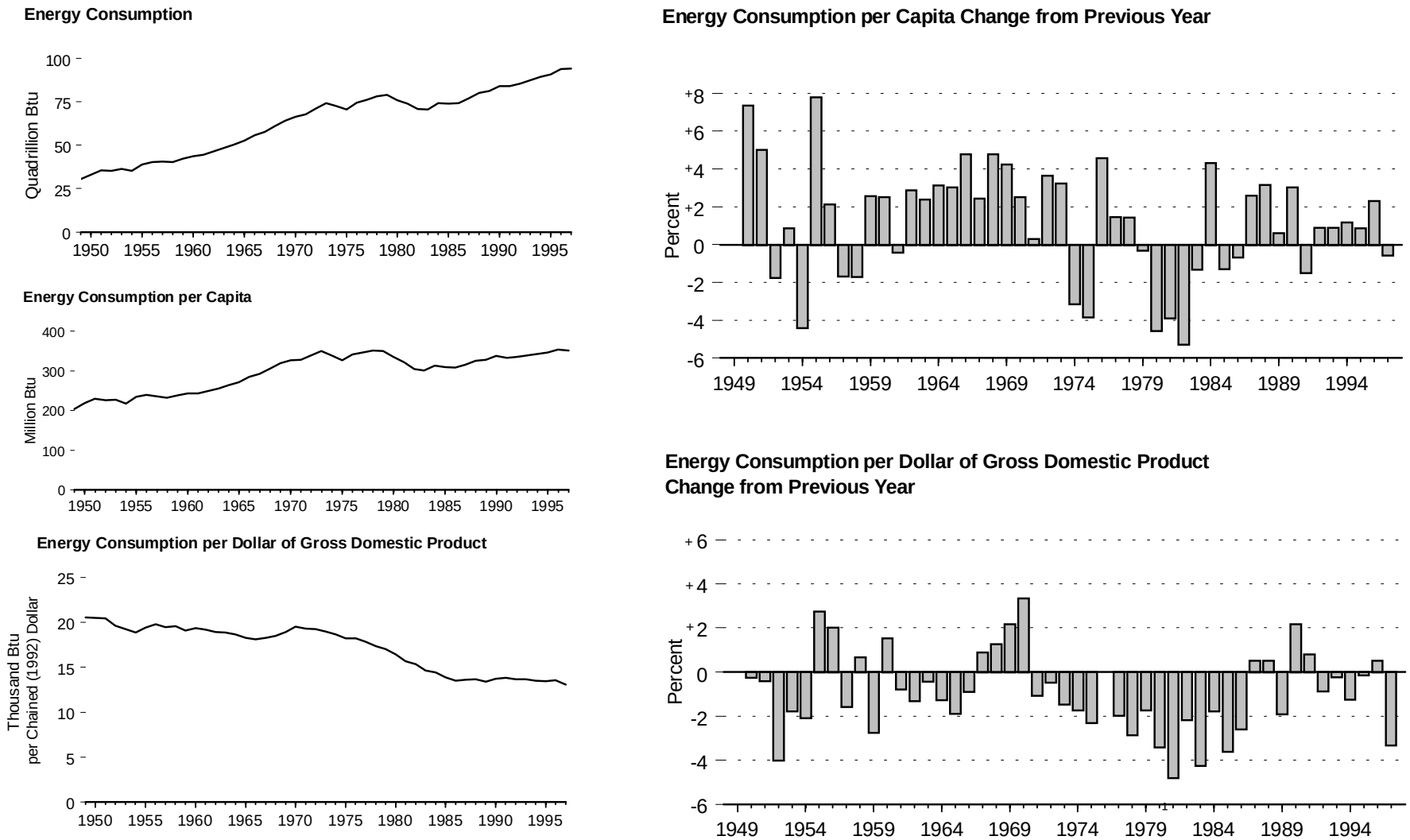
Year	Imports					Exports					Net Imports [1]				
	Coal	Natural Gas (Dry)	Petroleum [2]	Other [3]	Total	Coal	Natural Gas (Dry)	Petroleum	Other [3]	Total	Coal	Natural Gas (Dry)	Petroleum [2]	Other [3]	Total
1949	0.01	0.00	1.43	0.03	1.47	0.88	0.02	0.68	0.02	1.59	-0.87	-0.02	0.75	0.02	-0.13
1950	0.01	0.00	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	(s)	2.26	0.02	0.12
1958	0.01	0.14	3.72	0.05	3.92	1.42	0.04	0.58	0.02	2.06	-1.41	0.10	3.14	0.03	1.86
1959	0.01	0.14	3.91	0.05	4.11	1.05	0.02	0.45	0.02	1.54	-1.04	0.12	3.46	0.03	2.57
1960	0.01	0.16	4.00	0.06	4.23	1.02	0.01	0.43	0.02	1.48	-1.02	0.15	3.57	0.04	2.74
1961	(s)	0.23	4.19	0.04	4.46	0.98	0.01	0.37	0.02	1.38	-0.98	0.22	3.82	0.02	3.08
1962	0.01	0.42	4.56	0.03	5.01	1.08	0.02	0.36	0.03	1.48	-1.08	0.40	4.20	(s)	3.53
1963	0.01	0.42	4.65	0.03	5.10	1.36	0.02	0.44	0.03	1.85	-1.35	0.40	4.21	-0.01	3.25
1964	0.01	0.46	4.96	0.07	5.49	1.34	0.02	0.43	0.06	1.84	-1.33	0.44	4.53	0.01	3.65
1965	(s)	0.47	5.40	0.04	5.92	1.38	0.03	0.39	0.06	1.85	-1.37	0.44	5.01	-0.02	4.06
1966	(s)	0.50	5.63	0.05	6.18	1.35	0.03	0.41	0.06	1.85	-1.35	0.47	5.21	-0.01	4.32
1967	0.01	0.58	5.56	0.04	6.19	1.35	0.08	0.65	0.06	2.15	-1.35	0.50	4.91	-0.02	4.04
1968	0.01	0.67	6.21	0.04	6.93	1.38	0.10	0.49	0.06	2.03	-1.37	0.58	5.73	-0.02	4.90
1969	(s)	0.75	6.90	0.06	7.71	1.53	0.05	0.49	0.08	2.15	-1.53	0.70	6.42	-0.02	5.56
1970	(s)	0.85	7.47	0.07	8.39	1.94	0.07	0.55	0.11	2.66	-1.93	0.77	6.92	-0.04	5.72
1971	(s)	0.96	8.54	0.08	9.58	1.55	0.08	0.47	0.07	2.18	-1.54	0.88	8.07	(s)	7.41
1972	(s)	1.05	10.30	0.11	11.46	1.53	0.08	0.47	0.06	2.14	-1.53	0.97	9.83	0.05	9.32
1973	(s)	1.06	13.47	0.20	14.73	1.43	0.08	0.49	0.06	2.05	-1.42	0.98	12.98	0.14	12.68
1974	0.05	0.99	13.13	0.25	14.41	1.62	0.08	0.46	0.06	2.22	-1.57	0.91	12.66	0.19	12.19
1975	0.02	0.98	12.95	0.16	14.11	1.76	0.07	0.44	0.08	2.36	-1.74	0.90	12.51	0.08	11.75
1976	0.03	0.99	15.67	0.15	16.84	1.60	0.07	0.47	0.06	2.19	-1.57	0.92	15.20	0.09	14.65
1977	0.04	1.04	18.76	0.26	20.09	1.44	0.06	0.51	0.06	2.07	-1.40	0.98	18.24	0.20	18.02
1978	0.07	0.99	17.82	0.36	19.25	1.08	0.05	0.77	0.03	1.93	-1.00	0.94	17.06	0.33	17.32
1979	0.05	1.30	17.93	0.33	19.62	1.75	0.06	1.00	0.06	2.87	-1.70	1.24	16.93	0.27	16.75
1980	0.03	1.01	14.66	0.28	15.97	2.42	0.05	1.16	0.09	3.72	-2.39	0.96	13.50	0.18	12.25
1981	0.03	0.92	12.64	0.39	13.97	2.94	0.06	1.26	0.06	4.33	-2.92	0.86	11.38	0.33	9.65
1982	0.02	0.95	10.78	0.35	12.09	2.79	0.05	1.73	0.06	4.63	-2.77	0.90	9.05	0.28	7.46
1983	0.03	0.94	10.65	0.41	12.03	2.04	0.06	1.57	0.05	3.72	-2.01	0.89	9.08	0.36	8.31
1984	0.03	0.85	11.43	0.46	12.77	2.15	0.06	1.54	0.05	3.80	-2.12	0.79	9.89	0.40	8.96
1985	0.05	0.95	10.61	0.49	12.10	2.44	0.06	1.66	0.08	4.23	-2.39	0.90	8.95	0.41	7.87
1986	0.06	0.75	13.20	0.43	14.44	2.25	0.06	1.67	0.08	4.06	-2.19	0.69	11.53	0.36	10.38
1987	0.04	0.99	14.16	0.57	15.76	2.09	0.05	1.63	0.08	3.85	-2.05	0.94	12.53	0.49	11.91
1988	0.05	1.30	15.75	0.47	17.56	2.50	0.07	1.74	0.10	4.42	-2.45	1.22	14.01	0.37	13.15
1989	0.07	1.39	17.16	0.33	18.95	2.64	0.11	1.84	0.18	4.77	-2.57	1.28	15.33	0.14	14.18
1990	0.07	1.55	17.12	0.26	18.99	2.77	0.09	1.82	0.23	4.91	-2.70	1.46	15.29	0.03	14.08
1991	0.08	1.80	16.35	[R]0.36	[R]18.59	2.85	0.13	2.13	0.11	5.22	-2.77	1.67	14.22	0.25	[R]13.37
1992	0.10	2.16	16.97	0.44	19.66	2.68	0.22	2.01	0.11	5.02	-2.59	1.94	14.96	0.33	14.64
1993	0.18	2.40	18.51	0.45	21.54	1.96	0.14	2.12	0.13	4.35	-1.78	2.25	16.40	0.32	17.19
1994	0.19	2.68	19.25	0.59	22.71	1.88	0.16	1.99	0.09	[R]4.13	-1.69	2.52	17.26	[R]0.50	18.58
1995	0.18	2.90	18.86	0.54	22.48	2.32	0.16	1.99	0.11	4.58	-2.14	2.74	16.87	0.42	17.90
1996	0.18	[R]3.00	[R]20.27	[R]0.52	[R]23.97	2.37	[R]0.16	2.06	[R]0.12	[R]4.71	-2.19	[R]2.85	[R]18.21	[R]0.39	[R]19.26
1997[P]	0.19	3.04	21.22	0.52	24.96	2.19	0.16	2.10	0.13	4.57	-2.00	2.88	19.12	0.39	20.39

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

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

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

Figure 1.5 Energy Consumption per Capita and per Dollar of Gross Domestic Product, 1949-1997



Note: There is a discontinuity in the energy consumption time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.

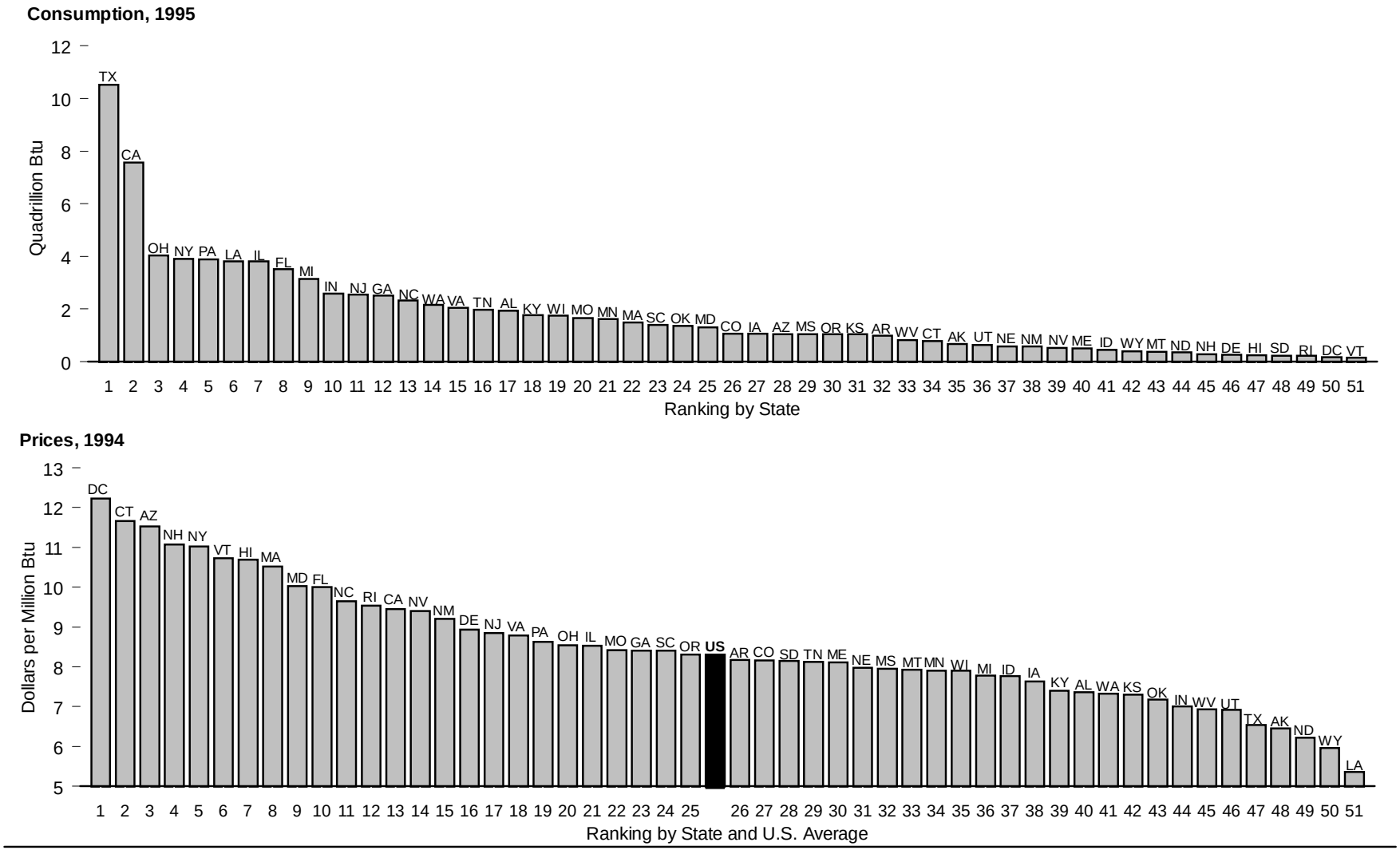
Source: Table 1.5.

Table 1.5 Energy Consumption per Capita and per Dollar of Gross Domestic Product, 1949-1997

Year	Total Energy Consumption (Quadrillion Btu)	Per Capita Indicator			Gross Domestic Product (GDP) Indicator		
		Population [1] (Million People)	Energy Consumption per Capita (Million Btu)	Change from Previous Year (Percent) [2]	GDP (Billion Chained (1992) Dollars)	Energy Consumption per Dollar of GDP (Thousand Btu per Chained (1992) Dollar)	Changed from Previous year (Percent) [2]
1949	30.46	149.3	204	—	R1,479.8	R20.58	—
1950	33.08	151.3	219	7.4	R1,611.3	R20.53	R-0.2
1951	35.47	154.0	230	5.0	R1,734.0	R20.45	R-0.4
1952	35.30	156.4	226	-1.7	R1,798.7	R19.63	R-4.0
1953	36.27	159.0	228	0.9	R1,881.4	R19.28	R-1.8
1954	35.27	161.9	218	-4.4	R1,868.2	R18.88	R-2.1
1955	38.82	165.1	235	7.8	R2,001.1	R19.40	R2.8
1956	40.38	168.1	240	2.1	R2,040.2	R19.79	R2.0
1957	40.48	171.2	236	-1.7	R2,078.5	R19.48	R-1.6
1958	40.35	174.1	232	-1.7	R2,057.5	R19.61	R0.7
1959	42.14	177.1	238	2.6	R2,210.2	R19.07	R-2.8
1960	43.80	179.3	244	2.5	R2,262.9	R19.36	R1.5
1961	44.46	183.0	243	-0.4	R2,314.3	R19.21	R-0.8
1962	46.53	185.8	250	2.9	R2,454.8	R18.96	-1.3
1963	48.32	188.5	256	2.4	R2,559.4	R18.88	-0.4
1964	50.50	191.1	264	3.1	R2,708.4	R18.64	-1.3
1965	52.68	193.5	272	3.0	R2,881.1	R18.29	-1.9
1966	55.66	195.6	285	4.8	R3,069.2	R18.13	R-0.9
1967	57.57	197.5	292	2.5	R3,147.2	R18.29	R0.9
1968	61.00	199.4	306	4.8	R3,293.9	R18.52	R1.3
1969	64.19	201.4	319	4.2	R3,393.6	R18.92	2.2
1970	66.43	203.2	327	2.5	R3,397.6	R19.55	R3.3
1971	67.89	206.8	328	0.3	R3,510.0	R19.34	-1.1
1972	71.26	209.3	340	3.7	R3,702.3	R19.25	-0.5
1973	74.28	211.4	351	3.2	R3,916.3	R18.97	R-1.5
1974	72.54	213.3	340	-3.1	R3,891.2	R18.64	R-1.7
1975	70.55	215.5	327	-3.8	R3,873.9	R18.21	R-2.3
1976	74.36	217.6	342	4.6	R4,082.9	R18.21	0.0
1977	76.29	219.8	347	1.5	R4,273.6	R17.85	R-2.0
1978	78.09	222.1	352	1.4	R4,503.0	R17.34	R-2.9
1979	78.90	224.6	351	-0.3	R4,630.6	R17.04	R-1.7
1980	75.96	226.5	335	-4.6	R4,615.0	R16.46	R-3.4
1981	73.99	229.6	322	-3.9	R4,720.7	R15.67	R-4.8
1982	70.85	232.0	305	-5.3	R4,620.3	R15.33	-2.2
1983	70.52	234.3	301	-1.3	R4,803.7	R14.68	R-4.2
1984	74.14	236.5	314	4.3	R5,140.1	R14.42	R-1.8
1985	73.98	238.7	310	-1.3	R5,323.5	R13.90	R-3.6
1986	74.30	241.1	308	-0.6	R5,487.7	R13.54	R-2.6
1987	76.89	243.4	316	2.6	R5,649.5	13.61	R0.5
1988	80.22	245.8	326	3.2	R5,865.2	13.68	0.5
1989	R81.35	248.2	328	0.6	R6,062.0	13.42	-1.9
1990	[3]84.12	R248.8	[3]338	[3]3.0	R6,136.3	[3]13.71	[3]2.2
1991	R84.03	252.1	333	-1.5	R6,079.4	13.82	R0.8
1992	R85.55	255.0	R336	R0.9	6,244.4	13.70	-0.9
1993	R87.37	257.8	339	R0.9	R6,389.6	R13.67	R-0.2
1994	R89.25	R260.3	343	1.2	R6,610.7	13.50	R-1.2
1995	R90.86	R262.8	346	0.9	R6,742.1	R13.48	-0.1
1996	R93.87	R265.2	354	2.3	R6,928.4	R13.55	R0.5
1997P	94.21	267.6	352	-0.6	7,189.6	13.10	-3.3

[1] Resident population of the 50 States and the District of Columbia estimated for July 1 of each year, except for the April 1 census count in 1950, 1960, 1970, 1980, and 1990.
[2] Percent change calculated from data prior to rounding.
[3] There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990.
R=Revised. P=Preliminary. — = Not applicable.
Note: See "Chained Dollars" in the Glossary.
Sources: **Total Energy Consumption:** Table 1.3. **Population:** • 1949—Bureau of the Census, *Current Population Reports,* "Population Estimates and Projections," Series P-25, No. 802, May 1979. • 1950-1979—Bureau of the Census, *Current Population Reports,* "Population Estimates and Projections," Series P-25, No. 990, July 1986. • 1980-1989—*Current Population Reports,* "Population Estimates and Projections," Series P-25, No. 1058, March 1990. • 1990-forward—unpublished data consistent with the Bureau of the Census Press Release CB96-224, December 1996. **Gross Domestic Product:** • 1949-1994—Department of Commerce (DOC), Bureau of Economic Analysis (BEA), *Survey of Current Business,* "Real Gross Domestic Product" (August 1997), Table 2A. • 1995-1997—*DOC, BEA News Release* (Washington DC, March 12, 1998), Table 2. **Energy Consumption per Capita and Energy Consumption per Dollar GDP:** calculated by Energy Information Administration.

Figure 1.6 Energy Consumption and Prices by State



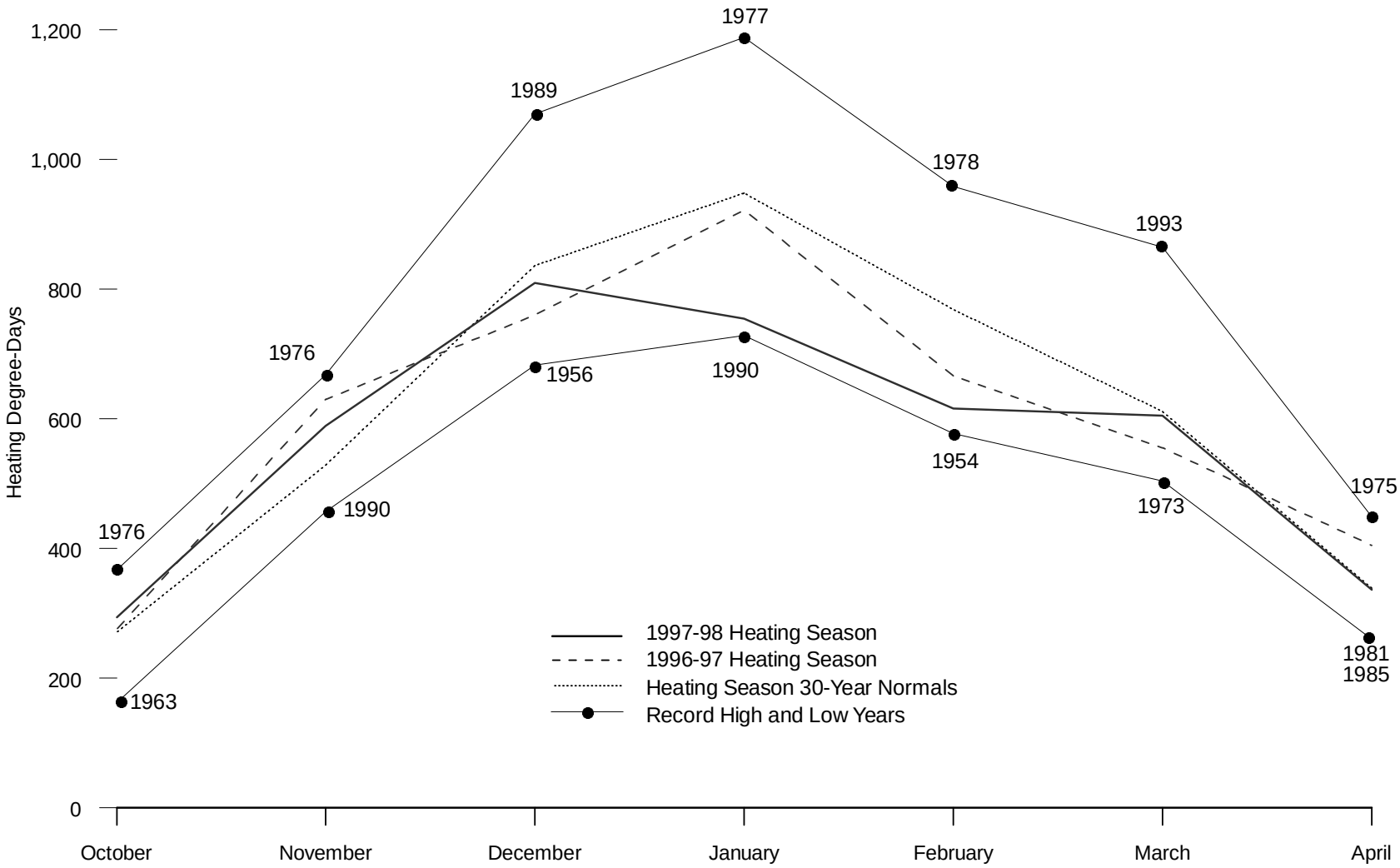
Source: Table 1.6.

Table 1.6 Energy Consumption, Prices, and Expenditures by State

Consumption, 1995			Prices, 1994			Expenditures, 1994		
Rank	State	Trillion Btu	Rank	State	Dollars per Million Btu	Rank	State	Million Dollars
1	Texas	10,511.5	1	District of Columbia	12.23	1	California	50,216
2	California	7,577.0	2	Connecticut	11.67	2	Texas	47,246
3	Ohio	4,038.0	3	Arizona	11.53	3	New York	31,041
4	New York	3,913.4	4	New Hampshire	11.08	4	Pennsylvania	23,542
5	Pennsylvania	3,885.7	5	New York	11.03	5	Ohio	22,892
6	Louisiana	3,813.6	6	Vermont	10.73	6	Illinois	22,632
7	Illinois	3,804.3	7	Hawaii	10.70	7	Florida	21,654
8	Florida	3,518.6	8	Massachusetts	10.52	8	Michigan	17,777
9	Michigan	3,157.0	9	Maryland	10.03	9	New Jersey	17,190
10	Indiana	2,592.1	10	Florida	10.01	10	Georgia	13,777
11	New Jersey	2,542.9	11	North Carolina	9.65	11	North Carolina	13,677
12	Georgia	2,512.1	12	Rhode Island	9.54	12	Louisiana	13,320
13	North Carolina	2,328.1	13	California	9.46	13	Indiana	12,825
14	Washington	2,158.6	14	Nevada	9.41	14	Virginia	11,858
15	Virginia	2,056.0	15	New Mexico	9.21	15	Massachusetts	11,580
16	Tennessee	1,975.2	16	Delaware	8.94	16	Tennessee	10,203
17	Alabama	1,933.3	17	New Jersey	8.85	17	Missouri	9,856
18	Kentucky	1,770.4	18	Virginia	8.79	18	Washington	9,185
19	Wisconsin	1,749.1	19	Pennsylvania	8.63	19	Wisconsin	8,956
20	Missouri	1,662.8	20	Ohio	8.55	20	Alabama	8,912
21	Minnesota	1,622.1	21	Illinois	8.54	21	Maryland	8,692
22	Massachusetts	1,493.8	22	Missouri	8.42	22	Minnesota	8,502
23	South Carolina	1,400.7	23	Georgia	8.41	23	Kentucky	8,046
24	Oklahoma	1,359.6	24	South Carolina	8.41	24	Arizona	7,545
25	Maryland	1,311.9	25	Oregon	8.31	25	South Carolina	7,245
26	Colorado	1,075.2	26	Arkansas	8.18	26	Connecticut	6,620
27	Iowa	1,067.3	27	Colorado	8.17	27	Oklahoma	6,450
28	Arizona	1,058.9	28	South Dakota	8.15	28	Colorado	6,100
29	Mississippi	1,058.8	29	Tennessee	8.13	29	Iowa	5,944
30	Oregon	1,048.2	30	Maine	8.12	30	Oregon	5,528
31	Kansas	1,040.6	31	Nebraska	7.98	31	Kansas	5,391
32	Arkansas	997.9	32	Mississippi	7.96	32	Mississippi	5,282
33	West Virginia	818.9	33	Montana	7.93	33	Arkansas	5,147
34	Connecticut	786.3	34	Minnesota	7.91	34	West Virginia	3,858
35	Alaska	686.3	35	Wisconsin	7.91	35	Nebraska	3,279
36	Utah	638.4	36	Michigan	7.79	36	New Mexico	3,113
37	Nebraska	580.3	37	Idaho	7.77	37	Nevada	3,099
38	New Mexico	575.0	38	Iowa	7.64	38	Utah	2,959
39	Nevada	537.2	39	Kentucky	7.40	39	Maine	2,807
40	Maine	513.3	40	Alabama	7.37	40	New Hampshire	2,180
41	Idaho	456.2	41	Washington	7.33	41	Idaho	2,176
42	Wyoming	405.2	42	Kansas	7.30	42	Hawaii	2,065
43	Montana	378.9	43	Oklahoma	7.18	43	Montana	1,918
44	North Dakota	350.1	44	Indiana	7.01	44	Rhode Island	1,894
45	New Hampshire	284.5	45	West Virginia	6.94	45	Alaska	1,765
46	Delaware	264.0	46	Utah	6.92	46	Wyoming	1,672
47	Hawaii	254.8	47	Texas	6.55	47	North Dakota	1,645
48	South Dakota	235.8	48	Alaska	6.46	48	Delaware	1,510
49	Rhode Island	235.1	49	North Dakota	6.23	49	South Dakota	1,429
50	District of Columbia	177.8	50	Wyoming	5.97	50	District of Columbia	1,241
51	Vermont	149.9	51	Louisiana	5.36	51	Vermont	1,158
	United States	**90,547.4**		**United States**	**8.31**		**United States**	**504,688**

Note: Rankings based on unrounded data.
Web Page: http://www.eia.doe.gov/fueloverview.html#state.
Sources: • **Consumption:** Energy Information Administration (EIA), *State Energy Data Report 1995, Consumption Estimates,* Table 9 • **Prices and Expenditures:** EIA, *State Energy Price and Expenditure Report 1994,* Table 1. • Both publications include State-level data by end-use sector and type of energy. Consumption estimates are annual 1960 through 1995, and price and expenditures estimates are annual 1970 through 1994.

Figure 1.7 Heating Degree-Days by Month, 1949-1998



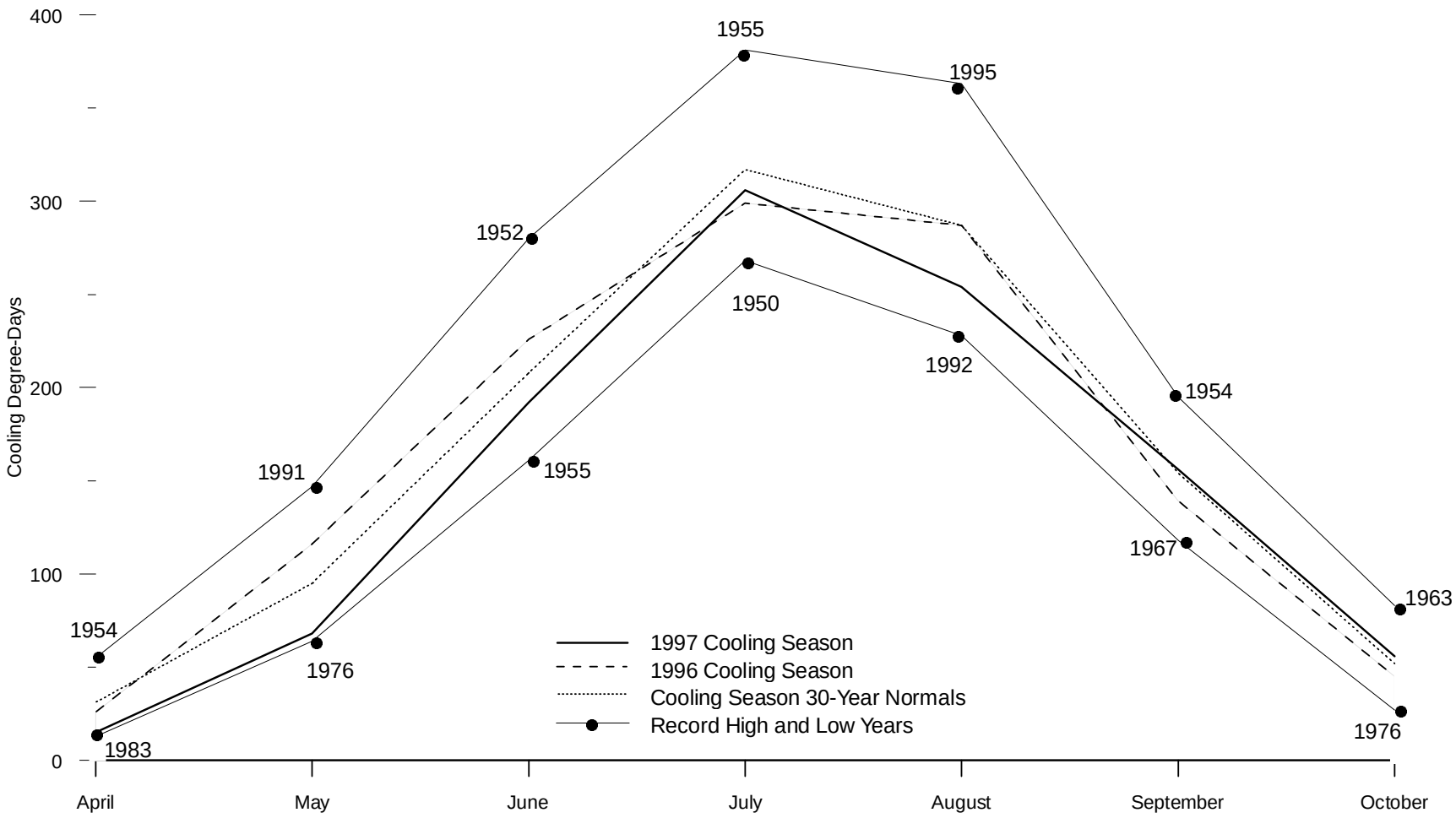
Source: Table 1.7.

Table 1.7 Heating Degree-Days by Month, 1949-1998

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
1949	858	701	611	330	128	21	7	9	94	209	503	763	4,234
1950	761	721	693	412	162	40	11	18	85	196	565	872	4,536
1951	863	724	632	359	135	45	8	17	74	231	645	814	4,547
1952	807	677	670	315	154	32	5	11	54	324	540	785	4,374
1953	754	667	557	378	142	33	5	11	51	208	492	765	4,063
1954	886	577	646	261	192	32	8	18	56	224	523	809	4,232
1955	927	759	600	272	121	48	9	6	56	237	600	886	4,521
1956	900	723	648	387	157	27	10	14	82	215	541	683	4,387
1957	977	628	610	308	148	23	6	16	61	315	536	711	4,339
1958	909	866	690	324	143	54	7	8	60	250	484	917	4,712
1959	944	762	619	305	112	26	4	6	48	249	594	734	4,403
1960	884	780	831	278	160	33	7	11	48	254	502	936	4,724
1961	982	670	565	413	199	29	5	7	48	238	532	852	4,540
1962	976	747	689	337	118	35	14	13	91	234	554	886	4,694
1963	1,061	841	562	325	163	35	8	18	76	162	471	1,012	4,734
1964	871	803	636	339	124	39	5	22	72	301	489	814	4,515
1965	907	780	738	355	114	48	11	14	78	271	494	739	4,549
1966	1,010	790	580	377	188	30	6	14	81	298	496	830	4,700
1967	816	820	600	352	229	34	8	17	82	270	588	793	4,609
1968	979	832	567	309	192	35	6	14	59	240	548	894	4,675
1969	939	778	735	307	134	47	7	9	60	296	564	860	4,736
1970	1,063	758	685	344	120	31	4	9	55	253	541	801	4,664
1971	976	760	681	375	194	29	10	12	47	187	553	723	4,547
1972	890	785	608	377	137	49	7	12	65	330	613	832	4,705
1973	893	772	504	356	182	22	6	9	61	212	497	799	4,313
1974	838	754	556	310	171	42	6	13	94	303	524	795	4,406
1975	821	742	686	449	117	37	5	13	100	235	462	805	4,472
1976	974	609	544	309	178	28	8	19	81	367	668	941	4,726
1977	1,188	751	529	270	119	38	6	13	59	295	493	844	4,605
1978	1,061	958	677	350	157	31	7	11	59	283	517	847	4,958
1979	1,079	950	575	364	148	37	6	15	58	271	528	750	4,781
1980	887	831	680	338	142	49	5	10	54	316	564	831	4,707
1981	984	689	620	260	165	25	6	11	76	327	504	845	4,512
1982	1,067	776	620	408	114	62	7	19	75	264	515	692	4,619
1983	874	706	588	421	189	35	6	5	53	251	509	990	4,627
1984	1,000	645	704	371	172	28	7	7	88	223	565	704	4,514
1985	1,057	807	557	260	123	47	5	17	69	243	506	951	4,642
1986	859	734	542	295	123	30	9	18	76	258	558	793	4,295
1987	920	714	573	309	107	20	8	13	61	345	491	773	4,334
1988	1,004	778	594	344	134	30	3	5	72	352	506	831	4,653
1989	789	832	603	344	163	32	5	14	73	259	542	1,070	4,726
1990	728	655	535	321	184	29	6	10	56	246	457	789	4,016
1991	921	639	564	287	98	30	6	7	69	242	586	751	4,200
1992	852	644	603	345	152	46	14	24	74	301	564	822	4,441
1993	860	827	664	368	128	38	11	9	89	302	580	824	4,700
1994	1,031	813	594	293	174	21	6	16	65	268	479	723	4,483
1995	847	750	556	375	174	31	4	7	77	233	605	872	4,531
1996	R945	R748	R713	R360	R165	R27	R8	R9	R72	R276	R630	R760	R4,713
1997P	922	666	555	405	R209	R55	R19	R25	R78	R294	R589	R809	R4,626
1998P	754	616	605	336	NA	NA	NA	NA	NA	NA	NA	NA	NA
Normals[1]	948	768	611	339	150	36	7	13	69	271	528	836	4,576

[1] Based on calculations of data from 1961 through 1990.
R=Revised. P=Preliminary. NA=Not available.
Notes: • This table excludes Alaska and Hawaii. • Degree-days are relative measurements of outdoor air temperature. Heating degree-days are deviations of the mean daily temperature below 65 F. For example, a weather station recording a mean daily temperature of 40 F would report 25 heating degree-days. • Temperature information recorded by weather stations is used to calculate State-wide degree-day averages based on resident State population estimated for 1990. The population-weighted State figures are aggregated into Census divisions and the national average.
Sources: • 1949-1996 and Normals—U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center, Asheville, North Carolina. Historical Climatology Series 5-1. • 1997 and 1998—Energy Information Administration, *Monthly Energy Review,* February 1997-May 1998 issues, Table 1.11, which reports data from NOAA, National Weather Service Climate Analysis Center, Camp Springs, Maryland.

Figure 1.8 Cooling Degree-Days by Month, 1949-1997



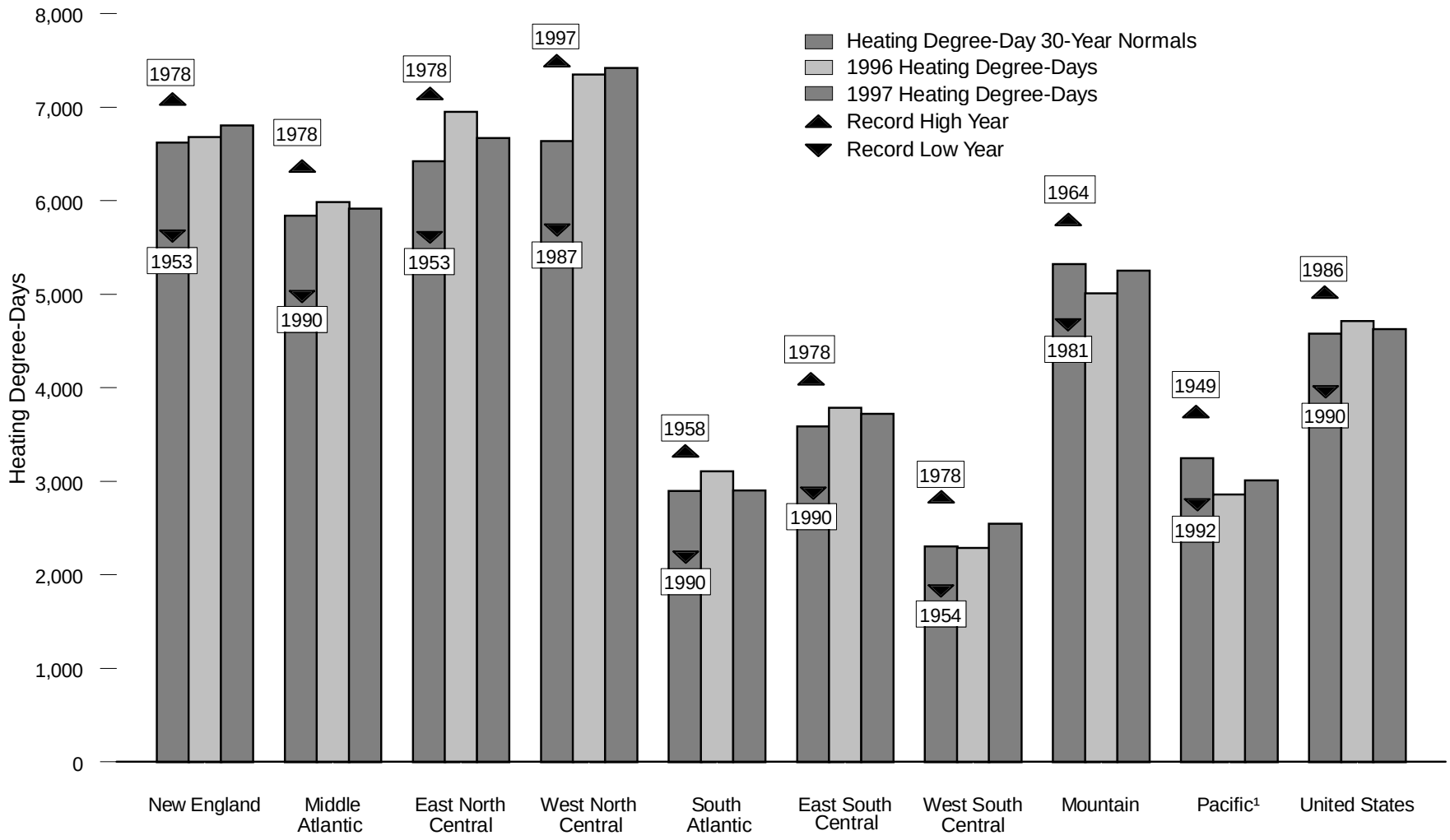
Source: Table 1.8.

Table 1.8 Cooling Degree-Days by Month, 1949-1998

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
1949	16	14	14	27	110	253	367	294	131	70	12	10	1,318
1950	27	12	13	21	105	201	268	244	128	78	9	4	1,110
1951	8	5	15	22	95	198	318	293	158	65	7	11	1,195
1952	17	8	15	20	96	280	368	303	159	38	10	4	1,318
1953	12	8	26	25	118	263	338	292	168	58	11	7	1,326
1954	11	12	11	55	65	241	356	296	195	60	9	4	1,315
1955	6	7	20	45	121	161	381	355	182	50	10	6	1,344
1956	4	12	14	23	112	232	297	290	151	66	9	11	1,221
1957	12	17	13	33	96	243	337	275	155	30	13	6	1,230
1958	3	1	8	27	101	187	315	304	166	53	18	6	1,189
1959	6	12	13	31	129	228	325	344	179	64	12	5	1,348
1960	7	4	6	37	76	215	301	302	181	59	15	3	1,206
1961	5	9	23	20	71	195	306	287	186	47	12	7	1,168
1962	6	15	9	26	144	204	276	289	136	64	7	3	1,179
1963	5	5	22	42	94	213	308	266	153	83	11	2	1,204
1964	6	3	14	37	114	214	327	256	146	42	17	9	1,185
1965	9	7	10	42	125	179	280	273	155	48	19	6	1,153
1966	4	5	12	28	81	201	353	273	132	43	12	4	1,148
1967	9	5	24	48	70	206	278	253	118	45	12	9	1,077
1968	6	3	9	32	75	204	307	292	145	53	7	4	1,137
1969	7	4	4	33	94	200	331	304	153	48	8	4	1,190
1970	3	4	10	36	104	201	323	313	185	48	6	9	1,242
1971	8	7	10	22	68	244	288	269	182	77	12	17	1,204
1972	15	6	22	36	88	174	299	276	169	44	9	8	1,146
1973	7	3	24	18	75	236	318	303	166	66	21	4	1,241
1974	21	6	28	29	101	173	317	267	120	40	10	5	1,117
1975	14	11	14	24	117	203	301	296	120	55	12	5	1,172
1976	5	11	23	27	64	208	282	243	127	27	8	4	1,029
1977	2	5	21	35	121	212	351	293	180	44	15	6	1,285
1978	3	1	10	31	93	218	310	300	180	52	19	9	1,226
1979	4	4	13	32	82	187	295	266	160	53	11	6	1,113
1980	9	4	13	23	95	199	374	347	192	42	10	5	1,313
1981	3	6	10	52	75	257	333	275	138	43	12	5	1,209
1982	6	10	21	26	115	165	318	262	140	47	15	11	1,136
1983	6	5	9	13	72	193	353	362	172	58	12	5	1,260
1984	5	6	14	24	92	233	291	312	143	70	9	15	1,214
1985	3	5	22	39	108	193	313	269	145	68	25	4	1,194
1986	8	10	17	33	106	231	340	259	161	52	23	9	1,249
1987	5	7	13	23	127	244	334	298	156	40	14	8	1,269
1988	5	5	13	28	89	218	359	348	149	45	18	6	1,283
1989	15	7	19	36	88	208	312	266	138	49	16	2	1,156
1990	15	14	21	29	86	234	316	291	172	57	16	9	1,260
1991	10	9	19	42	147	235	336	305	149	62	8	9	1,331
1992	6	10	15	29	77	170	286	228	150	49	13	7	1,040
1993	13	5	11	19	91	207	347	317	146	47	11	4	1,218
1994	7	9	18	37	76	262	328	263	141	50	20	9	1,220
1995	7	7	18	29	91	202	348	363	150	61	12	5	1,293
1996	R7	R6	R8	R26	R116	R226	R299	R287	R139	R45	R14	R7	R1,180
1997P	5	8	16	R15	R68	R192	R306	R254	R156	R56	R8	R4	R1,090
1998P	5	4	15	19	NA	NA	NA	NA	NA	NA	NA	NA	NA
Normals[1]	7	7	16	31	95	208	317	287	154	52	13	7	1,193

[1] Based on calculations of data from 1961 through 1990.
R=Revised. P=Preliminary. NA=Not available.
Notes: • This table excludes Alaska and Hawaii. • Degree-days are relative measurements of outdoor air temperature. Cooling degree-days are deviations of the mean daily temperature above 65 F. For example, a weather station recording a mean daily temperature of 78 F would report 13 cooling degree-days. • Temperature information recorded by weather stations is used to calculate State-wide degree-day averages based on resident State population estimated for 1990. The population-weighted State figures are aggregated into Census divisions and the national average.
Sources: • 1949-1996 and Normals—U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center, Asheville, North Carolina. Historical Climatology Series 5-2. • 1997 and 1998—Energy Information Administration, *Monthly Energy Review,* February 1997-May 1998 issues, Table 1.12, which reports data from NOAA, National Weather Service Climate Analysis Center, Camp Springs, Maryland.

Figure 1.9 Heating Degree-Days by Census Division, 1949-1997



[1] Excludes Alaska and Hawaii.

Note: See Appendix D for Census divisions.

Source: Table 1.9.

Table 1.9 Heating Degree-Days by Census Division, 1949-1997

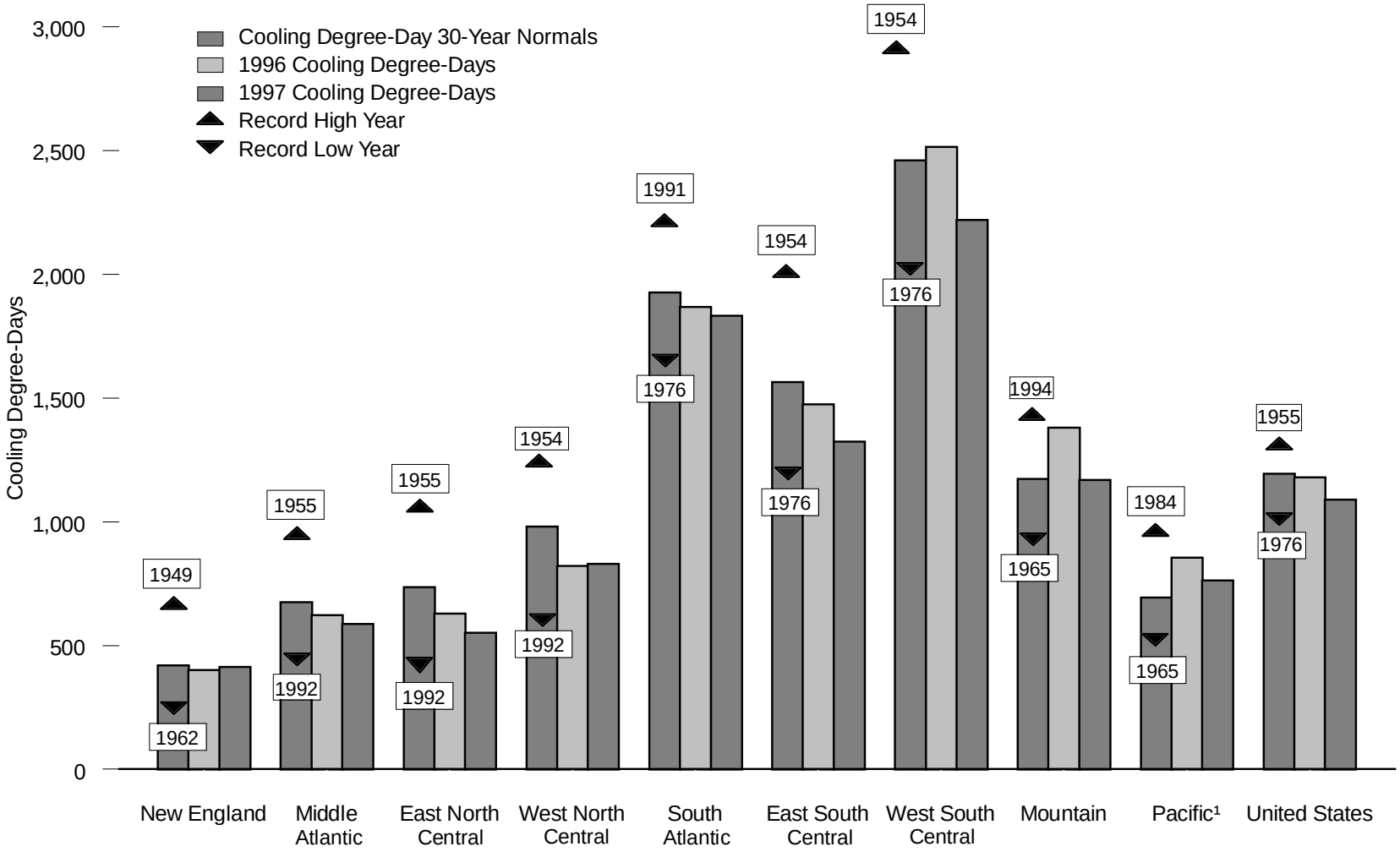
Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific [1]	United States [1]
1949	5,829	5,091	5,801	6,479	2,367	2,942	2,133	5,483	3,729	4,234
1950	6,470	5,765	6,619	7,136	2,713	3,315	1,974	4,930	3,355	4,536
1951	6,137	5,497	6,549	7,246	2,728	3,340	2,154	5,513	3,469	4,547
1952	6,180	5,443	5,977	6,386	2,684	3,276	2,074	5,404	3,586	4,374
1953	5,650	5,027	5,626	5,994	2,486	3,132	2,024	4,925	3,224	4,063
1954	6,291	5,473	5,841	6,063	2,713	3,211	1,876	4,679	3,296	4,232
1955	6,577	5,708	6,101	6,630	2,786	3,314	2,083	5,517	3,723	4,521
1956	6,702	5,731	6,019	6,408	2,642	3,113	2,032	5,146	3,382	4,387
1957	6,158	5,469	6,166	6,525	2,594	3,112	2,068	5,203	3,322	4,339
1958	6,907	6,237	6,585	6,585	3,271	4,004	2,590	4,929	2,819	4,712
1959	6,363	5,535	6,303	6,665	2,698	3,415	2,398	5,138	2,925	4,403
1960	6,561	5,901	6,544	6,884	3,147	3,958	2,551	5,328	3,309	4,724
1961	6,632	5,895	6,275	6,591	2,869	3,497	2,296	5,299	3,221	4,540
1962	6,981	6,089	6,545	6,691	3,022	3,627	2,264	5,165	3,400	4,694
1963	6,816	6,103	6,691	6,485	3,138	3,890	2,438	5,060	3,326	4,734
1964	6,594	5,694	6,030	6,303	2,828	3,462	2,272	5,769	3,583	4,515
1965	6,825	5,933	6,284	6,646	2,830	3,374	2,078	5,318	3,378	4,549
1966	6,662	6,012	6,606	6,872	3,118	3,758	2,416	5,275	3,170	4,700
1967	6,987	6,127	6,477	6,569	2,864	3,403	2,082	5,232	3,316	4,609
1968	6,800	5,981	6,331	6,556	3,160	3,927	2,522	5,415	3,198	4,675
1969	6,593	5,933	6,603	6,903	3,205	3,910	2,325	5,324	3,377	4,736
1970	6,839	5,943	6,455	6,835	2,997	3,685	2,396	5,436	3,257	4,664
1971	6,695	5,761	6,236	6,594	2,763	3,395	1,985	5,585	3,698	4,547
1972	7,001	6,064	6,772	7,094	2,759	3,438	2,259	5,352	3,376	4,705
1973	6,120	5,327	5,780	6,226	2,718	3,309	2,256	5,562	3,383	4,313
1974	6,621	5,670	6,259	6,478	2,551	3,171	2,080	5,281	3,294	4,406
1975	6,362	5,477	6,169	6,678	2,640	3,336	2,187	5,693	3,623	4,472
1976	6,839	6,097	6,768	6,670	3,040	3,881	2,446	5,303	3,115	4,726
1977	6,579	5,889	6,538	6,506	3,047	3,812	2,330	5,060	3,135	4,605
1978	7,061	6,330	7,095	7,324	3,187	4,062	2,764	5,370	3,168	4,958
1979	6,348	5,851	6,921	7,369	2,977	3,900	2,694	5,564	3,202	4,781
1980	6,900	6,143	6,792	6,652	3,099	3,855	2,378	5,052	2,986	4,707
1981	6,612	5,989	6,446	6,115	3,177	3,757	2,162	4,671	2,841	4,512
1982	6,697	5,866	6,542	7,000	2,721	3,357	2,227	5,544	3,449	4,619
1983	6,305	5,733	6,423	6,901	3,057	3,892	2,672	5,359	3,073	4,627
1984	6,442	5,777	6,418	6,582	2,791	3,451	2,194	5,592	3,149	4,514
1985	6,571	5,660	6,546	7,119	2,736	3,602	2,466	5,676	3,441	4,642
1986	6,517	5,665	6,150	6,231	2,686	3,294	2,058	4,870	2,807	4,295
1987	6,546	5,699	5,810	5,712	2,937	3,466	2,292	5,153	3,013	4,334
1988	6,715	6,088	6,590	6,634	3,122	3,800	2,346	5,148	2,975	4,653
1989	6,887	6,134	6,834	6,996	2,944	3,713	2,439	5,173	3,061	4,726
1990	5,848	4,998	5,681	6,011	2,230	2,929	1,944	5,146	3,148	4,016
1991	5,960	5,177	5,906	6,319	2,503	3,211	2,178	5,259	3,109	4,200
1992	6,844	5,964	6,297	6,262	2,852	3,498	2,145	5,054	2,763	4,441
1993	6,728	5,948	6,646	7,168	2,981	3,768	2,489	5,514	3,052	4,700
1994	6,672	5,934	6,378	6,509	2,724	3,394	2,108	5,002	3,155	4,483
1995	6,559	5,831	6,664	6,804	2,967	3,626	2,145	4,953	2,784	4,531
1996	R6,679	R5,986	R6,947	R7,345	R3,106	R3,782	R2,285	R5,011	R2,860	R4,713
1997P	6,803	5,915	6,671	7,415	2,905	3,722	2,549	5,249	3,008	4,626
Normals[2]	6,621	5,839	6,421	6,635	2,895	3,589	2,306	5,321	3,245	4,576

[1] Excludes Alaska and Hawaii.
[2] Normals are based on calculations of data from 1961 through 1990.
R=Revised. P=Preliminary.

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

Sources: • 1949-1996 and Normals—U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center, Asheville, North Carolina. Historical Climatology Series 5-1. • 1997—Energy Information Administration, *Monthly Energy Review,* February 1997-January 1998 issues, Table 1.11, which reports data from NOAA, National Weather Service Climate Analysis Center, Camp Springs, Maryland. Data for 1997 are the sums of the current year monthly statistics shown in the cited issues of the *MER.*

Figure 1.10 Cooling Degree-Days by Census Division, 1949-1997



[1] Excludes Alaska and Hawaii.
Note: See Appendix D for Census divisions.

Source: Table 1.10.

Table 1.10 Cooling Degree-Days by Census Division, 1949-1997

Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific [1]	United States [1]
1949	654	901	949	1,038	2,128	1,776	2,510	1,198	593	1,318
1950	353	542	602	729	1,919	1,568	2,473	1,120	597	1,110
1951	400	653	644	777	2,028	1,781	2,684	1,137	593	1,195
1952	581	825	897	1,109	2,097	1,864	2,543	1,278	657	1,318
1953	441	768	945	1,183	2,137	1,893	2,727	1,193	571	1,326
1954	303	646	858	1,250	2,082	1,998	2,907	1,292	590	1,315
1955	602	934	1,043	1,238	2,045	1,791	2,643	1,124	560	1,344
1956	336	566	750	1,155	1,913	1,685	2,833	1,247	596	1,221
1957	428	738	754	1,004	2,050	1,692	2,465	1,155	660	1,230
1958	344	592	638	878	1,922	1,582	2,517	1,328	836	1,189
1959	532	903	997	1,083	2,128	1,745	2,456	1,258	776	1,348
1960	368	640	722	961	1,926	1,613	2,492	1,308	770	1,206
1961	482	787	745	867	1,888	1,370	2,230	1,223	709	1,168
1962	264	561	742	974	1,908	1,738	2,700	1,147	559	1,179
1963	373	571	712	1,196	1,812	1,580	2,899	1,235	605	1,204
1964	312	634	787	1,030	1,905	1,591	2,608	1,095	574	1,185
1965	352	638	688	914	1,931	1,634	2,579	961	542	1,153
1966	421	731	724	919	1,788	1,440	2,309	1,239	680	1,148
1967	420	602	548	713	1,697	1,257	2,385	1,120	817	1,077
1968	410	725	740	902	1,842	1,517	2,247	1,015	632	1,137
1969	447	706	701	940	1,887	1,572	2,505	1,228	680	1,190
1970	479	779	827	1,066	2,007	1,662	2,375	1,163	689	1,242
1971	465	730	783	960	1,932	1,577	2,448	1,074	685	1,204
1972	364	614	643	908	1,843	1,525	2,513	1,141	698	1,146
1973	551	830	864	1,009	2,000	1,665	2,359	1,123	624	1,241
1974	393	614	626	878	1,842	1,382	2,342	1,188	690	1,117
1975	467	708	788	1,003	2,011	1,520	2,261	1,031	547	1,172
1976	402	597	619	939	1,675	1,232	2,035	1,058	620	1,029
1977	407	689	823	1,122	2,020	1,808	2,720	1,256	715	1,285
1978	378	615	741	1,027	1,972	1,685	2,638	1,174	738	1,226
1979	434	588	618	871	1,833	1,412	2,242	1,164	770	1,113
1980	487	793	816	1,217	2,075	1,834	2,734	1,202	658	1,313
1981	436	657	658	924	1,889	1,576	2,498	1,331	876	1,209
1982	321	541	643	859	1,958	1,537	2,502	1,121	619	1,136
1983	538	799	934	1,178	1,925	1,579	2,288	1,174	776	1,260
1984	468	649	724	955	1,865	1,508	2,469	1,190	956	1,214
1985	372	627	643	830	2,004	1,596	2,599	1,210	737	1,194
1986	301	626	738	1,021	2,149	1,792	2,618	1,188	664	1,249
1987	406	729	918	1,115	2,067	1,718	2,368	1,196	706	1,269
1988	545	782	975	1,230	1,923	1,582	2,422	1,320	729	1,283
1989	426	658	652	864	1,977	1,417	2,295	1,330	685	1,156
1990	477	656	647	983	2,143	1,622	2,579	1,294	827	1,260
1991	511	854	959	1,125	2,197	1,758	2,499	1,182	672	1,331
1992	276	460	449	637	1,777	1,293	2,201	1,206	905	1,040
1993	486	764	735	817	2,092	1,622	2,369	1,113	708	1,218
1994	548	722	664	887	2,005	1,448	2,422	1,436	801	1,220
1995	507	803	921	985	2,081	1,671	2,448	1,234	754	1,293
1996	R400	R623	629	R821	R1,867	R1,474	R2,515	R1,381	R856	R1,180
1997P	413	588	552	830	1,832	1,324	2,220	1,169	762	1,090
Normals[2]	421	675	736	981	1,926	1,565	2,460	1,174	694	1,193

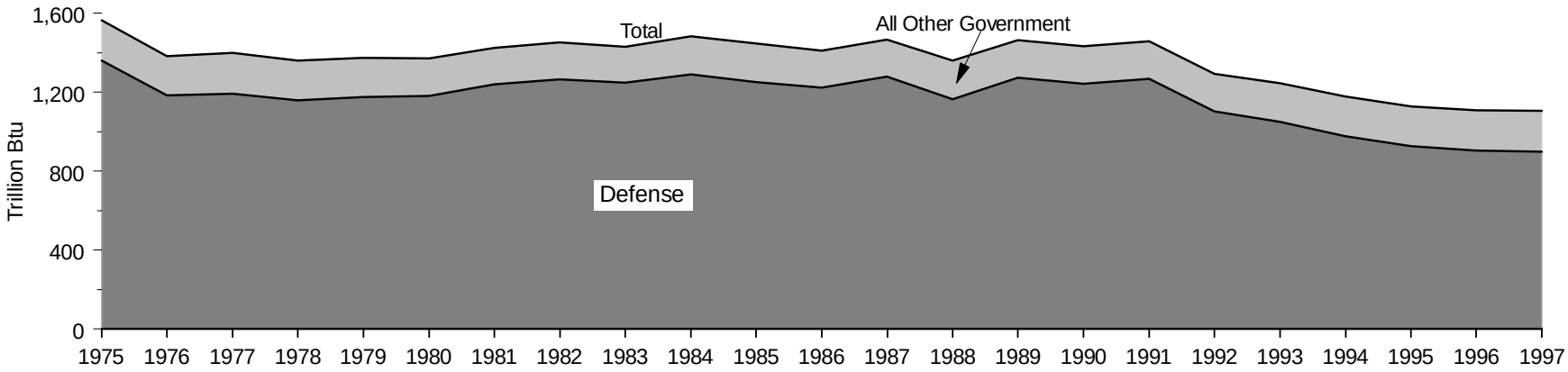
[1] Excludes Alaska and Hawaii.
[2] Normals are based on calculations of data from 1961 through 1990.
R=Revised. P=Preliminary.

Notes: • Degree-days are relative measurements of outdoor air temperature. Cooling degree-days are deviations of the mean daily temperature above 65 F. For example, a weather station recording a mean daily temperature of 78 F would report 13 cooling degree-days. • Temperature information recorded by weather stations is used to calculate State-wide degree-day averages based on resident State population estimated for 1990. The population-weighted State figures are aggregated into Census divisions and the national average. • See Appendix D for Census divisions.

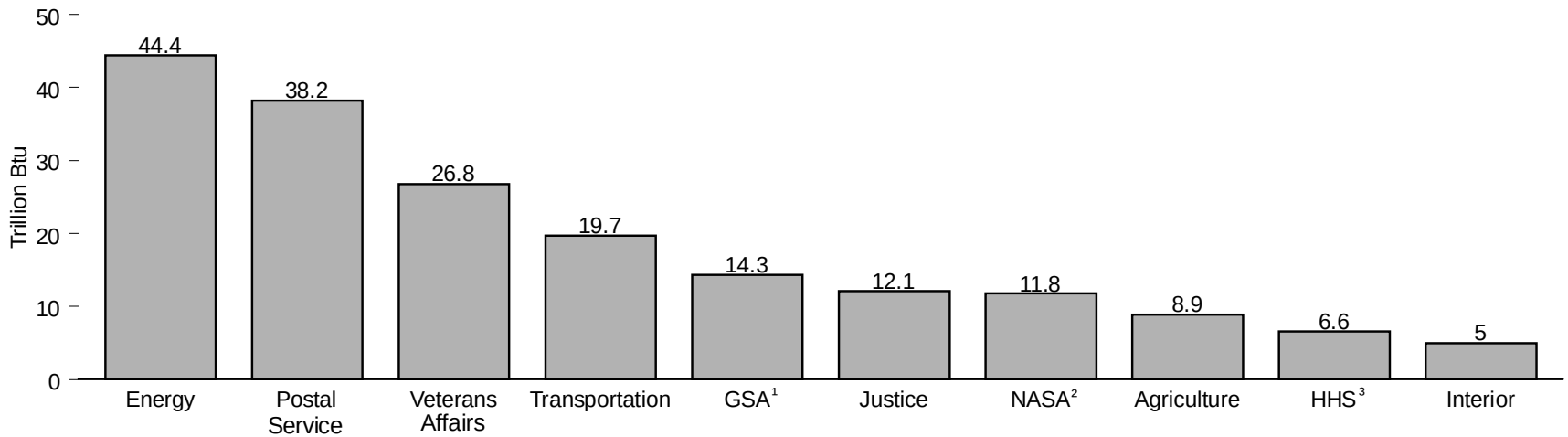
Sources: • 1949-1996 and Normals—U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center, Asheville, North Carolina. Historical Climatology Series 5-2. • 1997—Energy Information Administration, *Monthly Energy Review,* January 1998 issue, Table 1.12, which reports data from NOAA, National Weather Service Climate Analysis Center, Camp Springs, Maryland.

Figure 1.11 U.S. Government Energy Consumption by Agency

Total and U.S. Department of Defense, Fiscal Years 1975-1997



Selected Non-Defense Agencies, Fiscal Year 1997



[1] General Services Administration.
[2] National Aeronautics and Space Administration.
[3] Health and Human Services.

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

Source: Table 1.11.

Table 1.11 U.S. Government Energy Consumption by Agency, Fiscal Years 1975-1997

(Trillion Btu)

Year	Agencies												
	Agriculture	Defense	Energy	GSA [1]	HHS [2]	Interior	Justice	NASA [3]	Postal Service	Trans-portation	Veterans Affairs	Other [4]	Total
1975	9.5	1,360.2	50.4	22.3	6.5	9.4	5.9	13.4	30.5	19.3	27.1	10.5	1,565.0
1976	9.3	R1,183.3	50.3	20.6	6.7	9.4	5.7	12.4	30.0	19.5	25.0	11.2	R1,383.4
1977	8.9	1,192.3	51.6	20.4	6.9	9.5	5.9	12.0	32.7	20.4	25.9	11.9	R1,398.5
1978	9.1	1,157.8	50.1	20.4	6.5	9.2	5.9	11.2	30.9	20.6	26.8	12.4	1,360.9
1979	9.2	1,175.8	49.6	19.6	6.4	10.4	6.4	11.1	29.3	19.6	25.7	12.3	1,375.4
1980	8.6	1,183.1	47.4	18.1	6.0	8.5	5.7	10.4	27.2	19.2	24.8	12.3	R1,371.2
1981	7.9	1,239.5	47.3	18.0	6.7	7.6	5.4	10.0	27.9	18.8	24.0	11.1	1,424.2
1982	7.6	1,264.5	49.0	18.1	6.4	7.4	5.8	10.1	27.5	19.1	24.2	11.6	1,451.4
1983	7.4	1,248.3	49.5	16.1	6.2	7.7	5.5	10.3	26.5	19.4	24.1	10.8	1,431.8
1984	7.9	1,292.1	51.6	16.2	6.4	8.4	6.4	10.6	27.7	19.8	24.6	10.7	1,482.5
1985	8.4	1,250.6	52.3	17.3	7.0	7.8	8.2	10.8	27.8	R19.3	25.1	11.0	R1,445.7
1986	6.8	1,222.8	R50.4	14.0	6.2	6.9	8.6	11.2	28.0	19.4	25.0	10.8	R1,410.1
1987	7.3	1,280.5	R48.6	13.1	6.6	6.6	8.1	11.1	28.5	19.0	24.9	11.9	R1,466.2
1988	7.8	1,165.8	R49.9	12.4	6.4	7.0	9.4	11.2	29.6	18.7	26.3	15.8	R1,360.3
1989	8.7	1,274.4	R44.3	12.7	6.7	7.1	7.7	12.1	30.3	18.5	26.2	15.6	R1,464.4
1990	9.5	1,241.7	R43.5	14.2	8.0	7.4	7.0	12.3	30.6	19.0	24.9	15.4	R1,433.4
1991	9.6	1,269.3	R42.2	14.0	7.1	7.1	8.0	12.4	30.8	19.0	25.1	13.8	R1,458.3
1992	9.1	1,104.0	R44.3	13.8	8.0	7.0	7.5	12.5	31.7	17.0	25.3	14.0	1,294.3
1993	9.3	1,048.8	R43.7	14.1	8.1	7.5	9.1	12.4	33.7	19.4	25.7	14.7	R1,246.6
1994	9.4	977.0	R42.3	14.0	8.4	7.9	10.3	12.6	35.0	19.8	25.6	17.0	R1,179.1
1995	9.7	926.0	R47.1	13.7	6.1	6.4	10.2	12.4	36.2	18.4	25.4	R17.0	R1,129.5
1996	9.1	R904.2	R44.4	14.5	R6.6	4.3	R12.1	11.5	R36.4	19.4	26.8	R18.4	R1,107.7
1997P	8.9	899.6	44.4	14.3	6.6	5.0	12.1	11.8	38.2	19.7	26.8	18.7	1,106.1

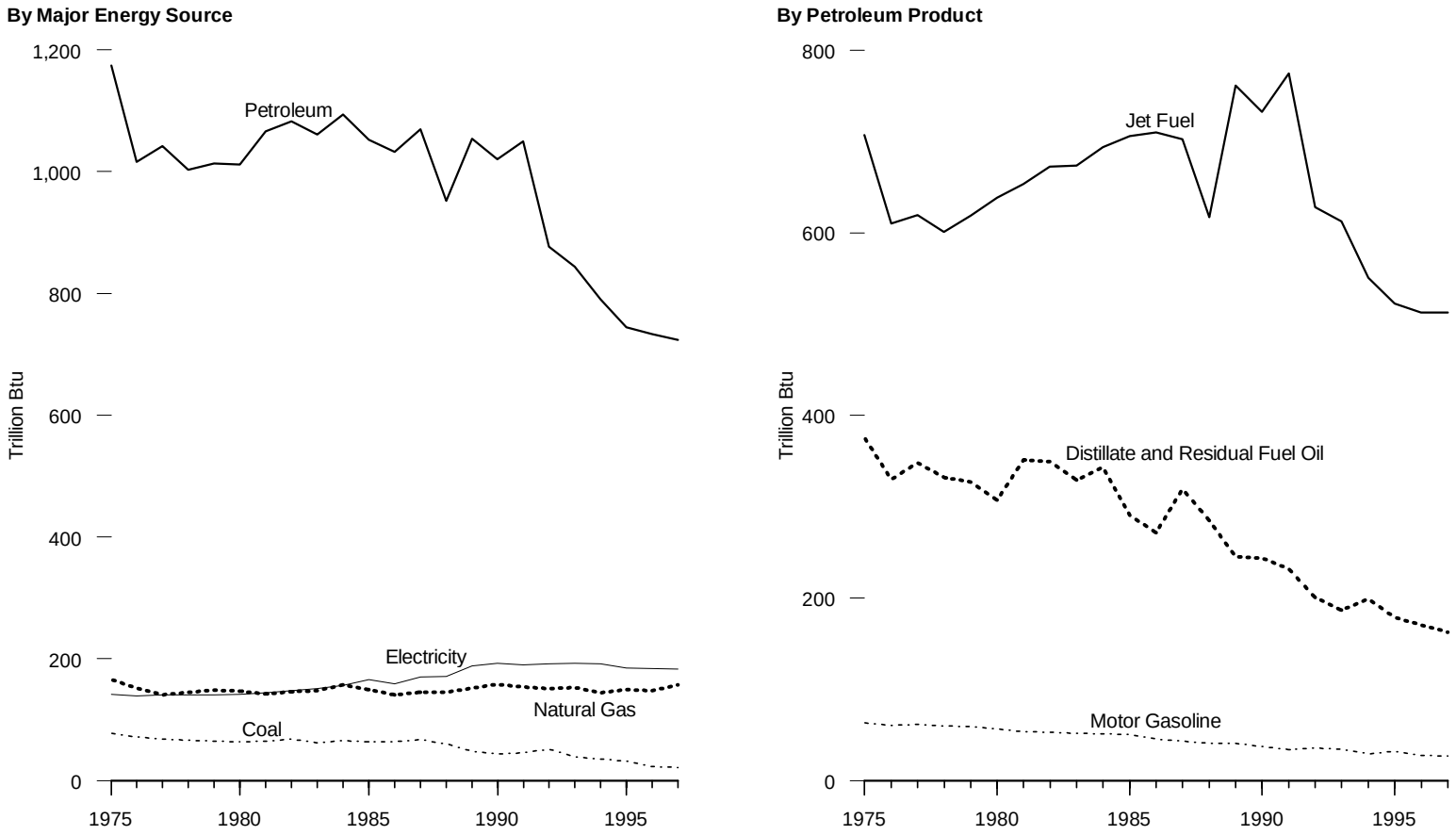
[1] General Services Administration.
[2] Health and Human Services.
[3] National Aeronautics and Space Administration.
[4] Includes National Archives and Records Administration, U.S. Department of Commerce, Panama Canal Commission, Tennessee Valley Authority, U.S. Department of Labor, National Science Foundation, Federal Trade Commission, Federal Communications Commission, Environmental Protection Agency, U.S. Department of Housing and Urban Development, Railroad Retirement Board, Commodity Futures Trading Commission, Equal Employment Opportunity Commission, Nuclear Regulatory Commission, U.S. Department of State, U.S. Department of the Treasury, Small Business Administration, Office of Personnel Management, Federal Emergency Management Agency, and U.S. Information Agency.

R = Revised. P = Preliminary.

Notes: • The U.S. Government's fiscal year was October 1 through September 30, except in 1975 and 1976, when it was July 1 through June 30. • Data include energy consumed at foreign installations and in foreign operations, including aviation and ocean bunkering, primarily by the U.S. Department of Defense. U.S. Government energy use for electricity generation and uranium enrichment is excluded. However, other energy used by U.S. agencies that produce electricity or enriched uranium is included. • Totals may not equal sum of components due to independent rounding.

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

Figure 1.12 U.S. Government Energy Consumption by Source, Fiscal Years 1975-1997



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

Source: Table 1.12.

Table 1.12 U.S. Government Energy Consumption by Source, Fiscal Years 1975-1997

(Trillion Btu)

Year	Coal	Natural Gas	Petroleum						Electricity	Purchased Steam	Total
			Aviation Gasoline	Distillate and Residual Fuel Oil	Jet Fuel	LPG [1] and Other	Motor Gasoline	Total			
1975	77.9	[R]166.2	22.0	376.0	707.4	5.6	63.2	1,174.2	141.5	5.1	1,565.0
1976	71.3	151.8	11.6	329.7	610.0	4.7	60.4	1,016.4	139.3	4.6	[R]1,383.4
1977	68.4	141.2	8.8	348.5	619.2	4.1	61.4	[R]1,042.1	141.1	5.7	[R]1,398.5
1978	66.0	144.7	6.2	332.3	601.1	3.0	60.1	[R]1,002.9	141.0	6.4	1,360.9
1979	65.1	148.9	4.7	327.1	618.6	3.7	59.1	[R]1,013.1	141.2	7.1	1,375.4
1980	63.5	147.3	4.9	307.7	638.7	4.0	56.5	1,011.8	141.9	6.8	[R]1,371.2
1981	65.1	142.2	4.6	351.3	653.3	3.7	53.2	[R]1,066.2	144.5	6.2	1,424.2
1982	68.6	146.2	3.6	349.4	672.7	3.9	53.1	[R]1,082.8	147.5	6.2	1,451.4
1983	62.4	147.8	2.6	329.5	673.4	4.0	51.6	1,061.1	151.5	9.0	1,431.8
1984	65.3	157.4	1.9	342.9	693.7	4.1	51.2	1,093.8	155.9	10.1	1,482.5
1985	64.0	149.5	1.9	[R]290.5	705.7	4.0	50.5	[R]1,052.6	[R]165.8	13.8	[R]1,445.7
1986	63.8	140.9	1.4	[R]271.6	710.2	3.9	45.3	[R]1,032.4	[R]159.2	[R]13.7	[R]1,410.1
1987	67.0	145.6	1.0	[R]319.5	702.3	4.0	43.1	1,069.8	[R]169.9	[R]13.9	[R]1,466.2
1988	60.2	144.6	6.0	284.7	617.2	3.2	41.2	952.3	[R]171.3	[R]32.0	[R]1,360.3
1989	[R]48.7	[R]152.4	0.8	[R]245.1	761.7	5.7	41.1	[R]1,054.4	188.4	20.6	[R]1,464.4
1990	44.2	[R]157.6	0.5	[R]243.7	732.4	6.3	37.2	[R]1,020.1	192.6	[R]18.9	[R]1,433.4
1991	45.9	154.0	0.4	[R]231.9	774.5	9.0	[R]34.1	[R]1,049.9	190.1	[R]18.4	[R]1,458.3
1992	[R]51.7	[R]151.0	1.0	200.5	628.2	11.4	35.6	[R]876.8	[R]191.7	22.8	1,294.3
1993	38.5	153.1	0.7	187.1	612.4	9.3	34.5	[R]843.9	[R]192.4	18.7	[R]1,246.6
1994	35.0	[R]144.0	0.6	198.6	550.7	10.9	29.5	790.3	[2]191.6	18.3	[R]1,179.1
1995	31.7	[R]149.2	0.3	[R]178.6	522.3	11.4	31.9	[R]744.5	[R]185.2	18.9	[R]1,129.5
1996	[R]23.3	[R]147.4	[R]0.2	[R]170.6	[R]513.0	[R]21.7	[R]27.6	[R]733.2	[R]184.0	[R]19.8	[R]1,107.7
1997[P]	21.4	157.1	0.2	162.4	513.0	21.6	26.7	724.0	182.9	20.8	1,106.1

[1] Liquefied petroleum gases.

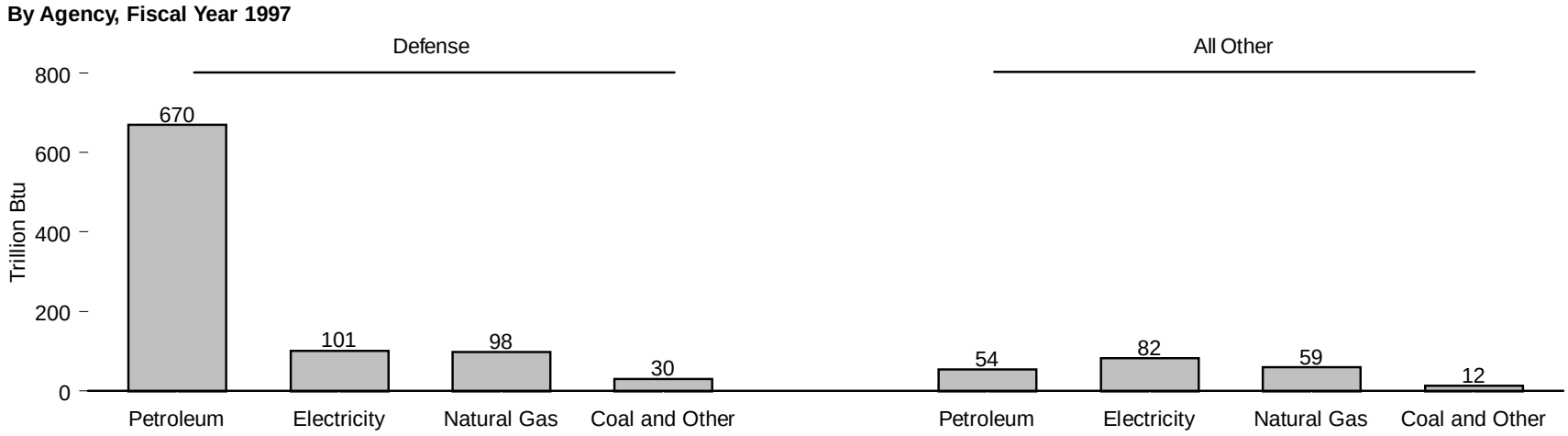
[2] Increase from previous years is result of initial reporting by TVA of electricity consumed for utility station service use.

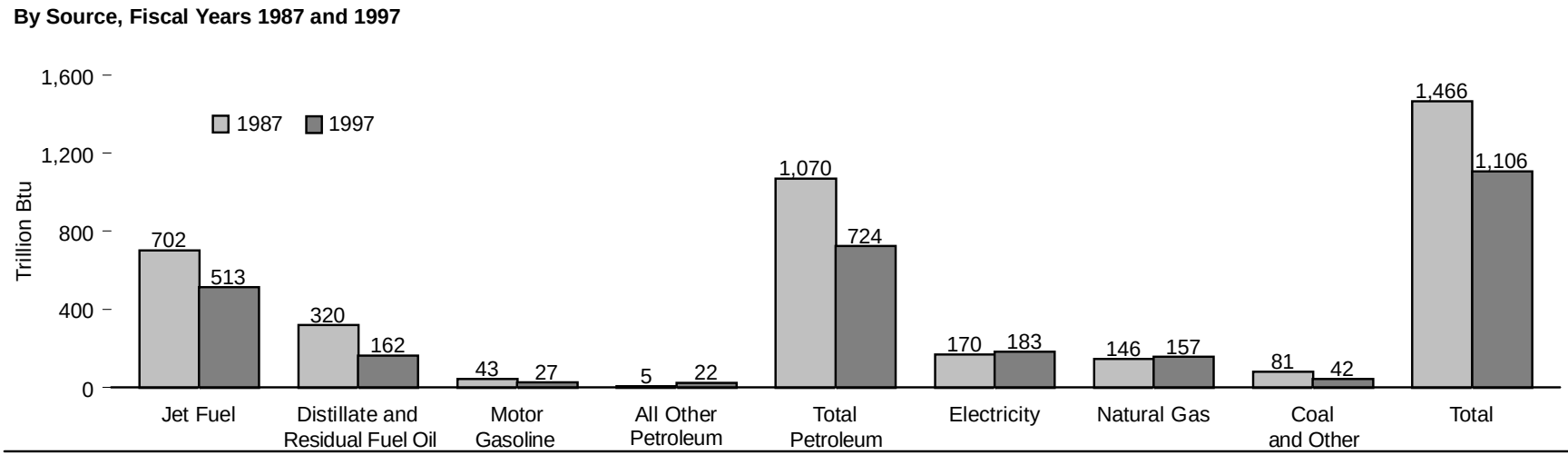
R = Revised. P = Preliminary.

Notes: • The U.S. Government's fiscal year was October 1 through September 30, except in 1975 and 1976, when it was July 1 through June 30. • This table uses a conversion factor for electricity of 3,412 Btu per kilowatthour and a conversion factor for purchased steam of 1,000 Btu per pound. • Data include energy consumed at foreign installations and in foreign operations, including aviation and ocean bunkering, primarily by the U.S. Department of Defense. U.S. Government energy use for electricity generation and uranium enrichment is excluded. However, other energy used by U.S. agencies that produce electricity or enriched uranium is included. • Totals may not equal sum of components due to independent rounding.

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

Figure 1.13 U.S. Government Energy Consumption by Agency and Source





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

Source: Table 1.13.

Table 1.13 U.S. Government Energy Consumption by Agency and Source, Fiscal Years 1987 and 1997

(Trillion Btu)

Agency	Petroleum						Electricity	Natural Gas	Coal and Other [2]	Total
	Aviation Gasoline	Distillate and Residual Fuel Oil	Jet Fuel	Motor Gasoline	LPG [1] and Other	Total				
Total, 1987	**1.0**	**319.5**	**702.3**	**43.1**	**4.0**	**1,069.8**	**169.9**	**145.6**	**80.9**	**1,466.2**
Defense	0.6	294.5	694.7	20.2	2.3	1,012.3	106.1	105.4	56.8	1,280.5
Energy	0.0	3.1	0.5	1.4	0.2	5.1	18.8	6.1	18.6	48.6
Postal Service	0.0	3.9	0.0	9.2	0.2	13.3	10.3	4.3	0.7	28.5
Veterans Affairs	0.0	2.4	0.0	0.5	0.0	2.9	7.1	13.7	1.2	24.9
Transportation	0.2	7.4	5.1	1.2	0.0	14.0	4.0	1.0	0.0	19.0
General Services Administration	0.0	0.5	0.0	0.1	0.0	0.6	7.7	2.4	2.3	13.1
NASA	0.0	0.9	1.3	0.2	0.0	2.3	5.8	2.6	0.3	11.1
Justice	0.1	0.5	0.1	1.9	0.1	2.7	1.4	3.6	0.5	8.1
Agriculture	0.1	0.3	0.0	3.4	0.2	3.9	1.7	1.6	0.1	7.3
Interior	0.0	1.3	0.1	2.0	0.8	4.2	1.2	1.0	0.2	6.6
Health and Human Services	0.0	2.5	0.0	0.4	0.1	3.0	1.9	1.6	0.0	6.6
Other [3]	0.1	2.2	0.6	2.6	0.0	5.5	3.7	2.3	0.4	11.9
Total, 1997 [P]	**0.2**	**162.4**	**513.0**	**26.7**	**21.6**	**724.0**	**182.9**	**157.1**	**42.2**	**1,106.1**
Defense	0.0	148.9	504.8	3.3	13.3	670.4	101.3	97.9	30.0	899.6
Energy	0.0	1.7	0.3	1.0	0.3	3.4	17.5	16.6	6.9	44.4
Postal Service	0.0	2.8	0.0	12.3	0.0	16.0	15.2	7.4	0.5	38.2
Veterans Affairs	0.0	1.3	0.0	0.6	0.0	1.9	9.1	14.2	1.5	26.8
Transportation	0.0	1.0	4.8	0.5	6.9	13.2	5.0	1.4	0.1	19.7
General Services Administration	0.0	0.2	0.0	0.1	0.0	0.3	9.2	3.4	1.5	14.3
NASA	0.1	0.5	0.9	0.1	0.0	1.6	6.8	3.0	0.2	11.8
Justice	0.0	0.5	1.3	2.7	0.0	4.0	3.5	4.3	0.3	12.1
Agriculture	0.1	0.4	0.0	4.3	0.2	5.0	2.0	1.5	0.3	8.9
Interior	0.0	0.7	0.0	0.8	0.6	2.1	1.4	1.3	0.1	5.0
Health and Human Services	0.0	1.6	0.1	0.0	0.1	1.7	2.5	2.4	0.0	6.6
Other [4]	0.0	2.9	0.9	1.1	0.1	5.0	9.4	3.6	0.7	18.7

[1] Liquefied petroleum gases.
[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 the Treasury, Small Business Administration, and Environmental Protection Agency.
[4] Includes National Archives and Records Administration, U.S. Department of Commerce, U.S. Department of Labor, U.S. Department of State, Environmental Protection Agency, Federal Communications Commission, Federal Trade Commission, Panama Canal Commission, Equal Employment Opportunity Commission, Nuclear Regulatory Commission, Office of Personnel Management, U.S. Department of Housing and Urban Development, U.S. Department of the Treasury, Railroad Retirement Board, Tennessee Valley Authority, Federal Emergency Management Agency, and U.S. Information Agency.

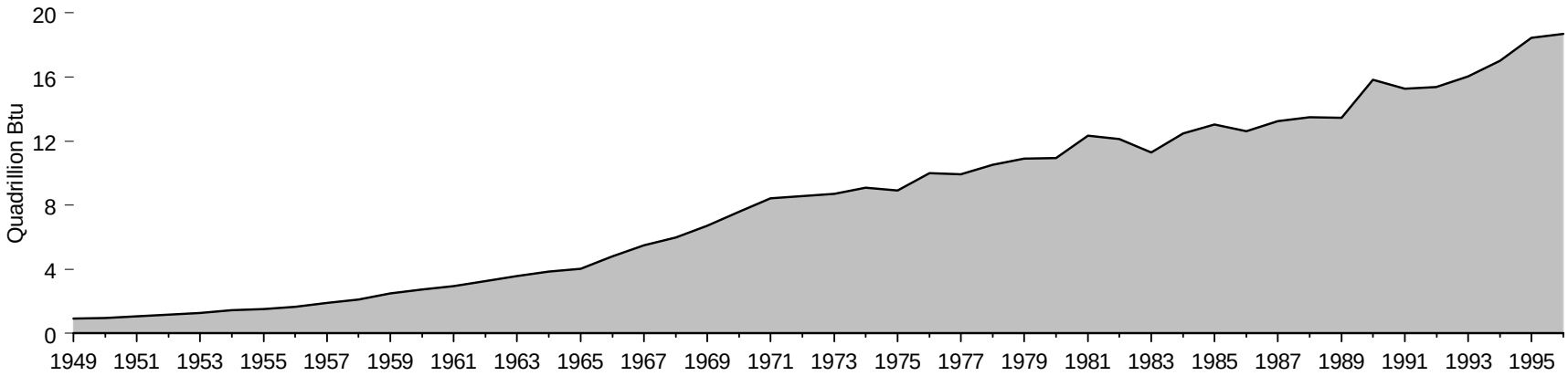
P=Preliminary.

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

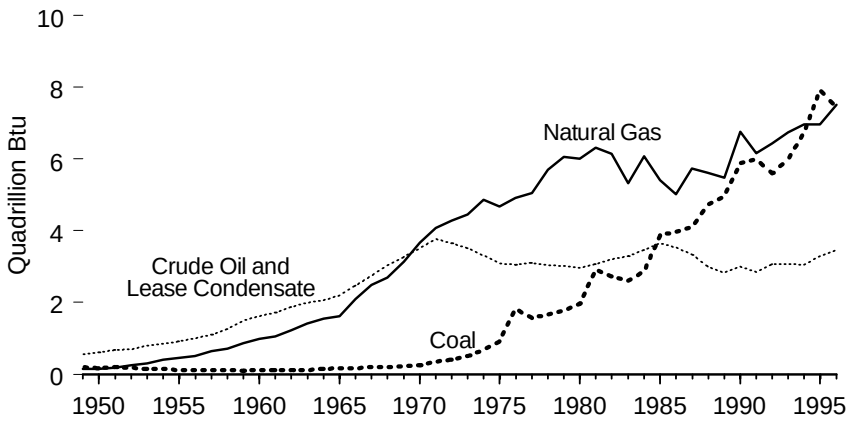
Source: U.S. Department of Energy, Energy Efficiency and Renewable Energy, Office of Federal Energy Management Programs.

Figure 1.14 Fossil Fuel Production on Federally Administered Lands

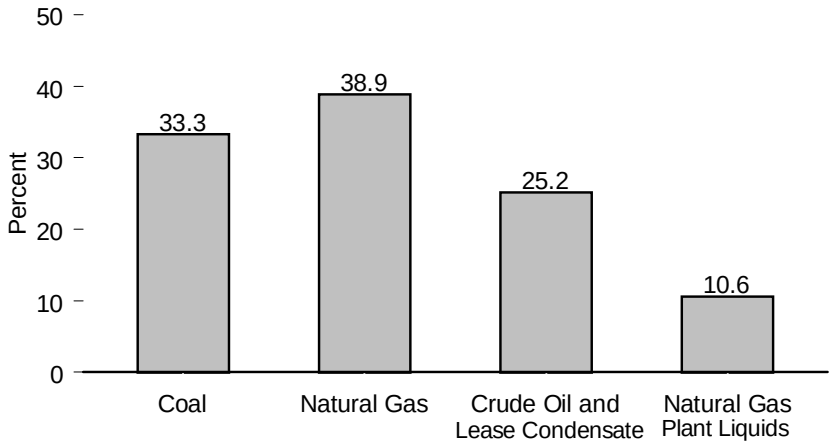
Total, 1949-1996



By Source, 1949-1996



Production on Federal Lands as Share of U.S. Total Production, by Source, 1996



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

• Because vertical scales differ, graphs should not be compared.

Source: Table 1.14.

Table 1.14 Fossil Fuel Production on Federally Administered Lands, 1949-1996

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
1991	491.0	2.85	18.1	72.7	0.28	12.0	5.99	6.17	33.8	285.1	5.99	28.6	15.28	26.4
1992	529.1	3.07	20.2	70.7	0.27	11.4	6.25	6.43	35.0	266.7	5.60	26.7	15.37	26.7
1993	529.3	3.07	21.2	64.4	0.24	10.2	6.56	6.74	36.3	285.7	6.00	30.2	16.05	28.8
1994	527.7	3.06	21.7	60.0	0.23	9.5	6.78	6.97	36.0	321.4	6.75	31.1	17.01	29.4
1995	567.4	3.29	23.7	74.0	0.28	11.5	6.78	6.96	36.4	376.9	7.91	36.5	18.45	32.1
1996	596.5	3.46	25.2	71.2	0.27	10.6	7.31	7.51	38.9	354.5	7.44	33.3	18.68	32.1

[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 on the basis of the value of the natural gas plant liquids produced. Additional quantities of natural gas plant liquids were produced; however, the royalties paid were based on the value of natural gas processed. These latter quantities are included with natural gas.

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

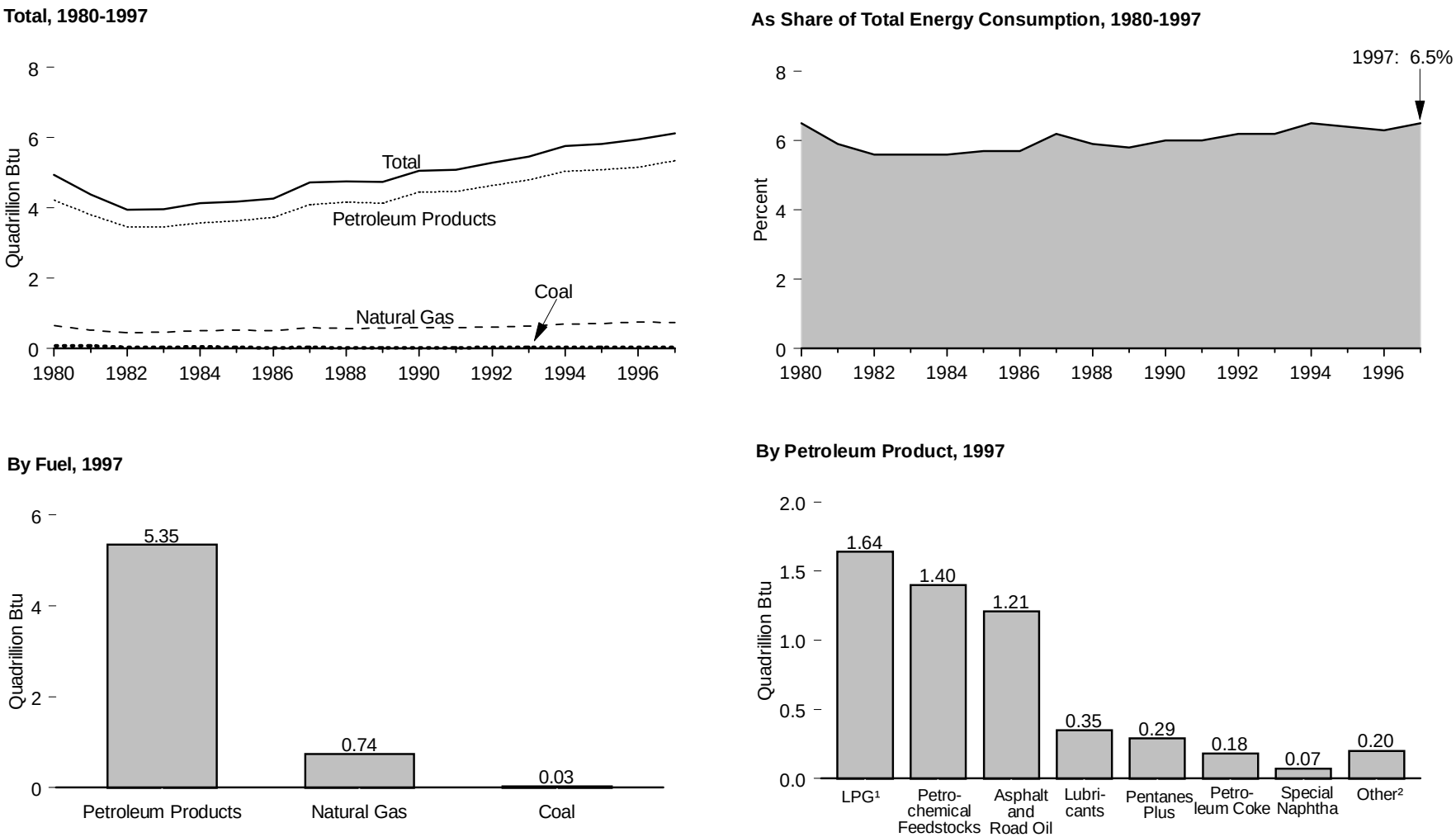
[4] Converted to British thermal units (Btu) on the basis of an estimated heat content of coal produced on Federally administered lands of 21.0 million Btu per short ton.

[5] Based on physical units.

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

Source: See Note 2 at end of section.

Figure 1.15 Fossil Fuel Consumption for Nonfuel Use



[1] Liquefied petroleum gases.
[2] Distillate fuel, residual fuel oil, waxes, and miscellaneous products.

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

Table 1.15 Fossil Fuel Consumption for Nonfuel Use, 1980-1997

Year	Petroleum Products									Natural Gas	Coal	Total	Percent of Total Energy Consumption
	Asphalt and Road Oil	Liquefied Petroleum Gases	Pentanes Plus	Lubricants	Petro-chemical Feedstocks	Petroleum Coke	Special Naphtha	Other [2]	Total				
	Physical Units [3]												
1980	145	R230	(1)	58	253	R24	37	R62	R809	R639	R2.4	—	—
1981	125	R229	(1)	56	R216	R29	27	R58	R740	R507	R2.1	—	—
1982	125	R256	(1)	51	R157	R23	25	R52	R690	R440	R1.4	—	—
1983	136	R264	(1)	53	R151	R10	30	R47	R692	R443	R1.2	—	—
1984	R150	R247	10	57	R145	R16	40	R42	R706	R496	R1.5	—	—
1985	R156	R265	13	53	R144	R15	30	R41	R718	R500	R1.1	—	—
1986	164	R248	17	R52	R169	R14	R25	41	R730	R496	R0.7	—	—
1987	170	R303	12	59	170	24	28	R43	R809	R578	R0.8	—	—
1988	171	R319	21	R57	R173	25	22	R40	R827	R554	R0.7	—	—
1989	165	R332	17	58	172	23	20	R39	R827	R563	R0.6	—	—
1990	R176	R344	18	60	R199	R30	20	R39	R887	R572	R0.6	—	—
1991	162	R394	10	53	R200	27	17	R44	R907	R573	R0.6	—	—
1992	166	R397	13	54	214	R41	20	35	R940	R594	R1.2	—	—
1993	R174	R389	60	R55	R216	R27	20	R33	R976	R608	R0.9	—	—
1994	176	R437	56	58	R222	R30	15	R35	R1,029	R673	R0.9	—	—
1995	178	R450	66	57	R215	R32	13	R33	R1,044	R693	R0.9	—	—
1996	177	R469	69	55	R217	R35	14	R33	R1,070	R743	R0.9	—	—
1997P	183	466	64	58	251	30	14	35	1,101	723	0.9	—	—
	Quadrillion Btu												
1980	0.96	R0.78	(1)	0.35	1.43	R0.14	0.19	R0.36	R4.22	R0.65	R0.08	R4.95	R6.5
1981	0.83	R0.77	(1)	0.34	R1.21	R0.17	0.14	R0.34	R3.80	R0.52	0.07	R4.39	R5.9
1982	0.83	R0.87	(1)	0.31	R0.88	R0.14	0.13	R0.30	R3.46	R0.45	0.04	R3.95	R5.6
1983	0.90	R0.89	(1)	0.32	R0.85	R0.06	0.16	R0.28	R3.46	R0.46	0.04	R3.96	5.6
1984	0.99	R0.84	0.05	0.35	R0.82	R0.09	0.21	R0.24	R3.58	R0.51	R0.05	R4.14	R5.6
1985	R1.03	R0.90	0.06	0.32	R0.82	R0.09	0.16	R0.24	R3.63	R0.52	R0.03	R4.18	R5.7
1986	1.09	R0.85	0.08	R0.31	R0.95	0.08	0.13	R0.24	R3.73	R0.51	0.02	R4.26	R5.7
1987	1.13	R1.06	0.06	R0.36	R0.96	0.14	0.14	R0.25	R4.10	R0.60	0.03	R4.73	R6.2
1988	1.14	R1.11	0.10	R0.34	R0.97	0.15	0.11	R0.23	R4.16	R0.57	0.02	R4.75	5.9
1989	1.10	R1.18	0.08	0.35	R0.96	0.14	0.11	R0.23	R4.14	R0.58	0.02	R4.74	R5.8
1990	R1.17	R1.20	0.08	R0.36	R1.12	R0.18	0.11	R0.22	R4.45	R0.59	0.02	R5.06	R6.0
1991	1.08	R1.38	0.04	R0.32	1.15	0.16	0.09	R0.25	R4.47	R0.59	0.02	R5.08	6.0
1992	1.10	R1.39	0.06	0.33	1.20	R0.25	0.10	R0.20	R4.64	R0.61	R0.04	R5.29	R6.2
1993	1.15	R1.35	0.28	0.34	R1.22	R0.17	0.10	R0.19	R4.80	R0.63	R0.03	R5.46	R6.2
1994	1.17	R1.55	0.26	0.35	1.26	R0.18	0.08	R0.20	R5.05	R0.69	R0.03	R5.77	R6.5
1995	1.18	R1.59	0.30	0.35	R1.21	R0.19	0.07	R0.19	5.08	R0.71	R0.03	R5.82	R6.4
1996	R1.18	R1.65	0.32	R0.34	R1.21	R0.21	0.07	R0.19	R5.16	R0.76	R0.03	R5.95	R6.3
1997P	1.21	1.64	0.29	0.35	1.40	0.18	0.07	0.20	5.35	0.74	0.03	6.12	6.5

[1] Included in liquefied petroleum gases.
[2] Distillate fuel oil, residual fuel oil, waxes, and miscellaneous products.
[3] Petroleum - million barrels; natural gas - billion cubic feet; and coal - million short tons.
R=Revised. P=Preliminary. — = Not applicable.

Notes: • See Energy Information Administration (EIA), *Emissions of Greenhouse Gases in the United States 1996* (October 1997), Appendix A, for a discussion of the estimates in the table. • 1997 is an early estimate by EIA and may differ from the emissions inventory to be published in late 1998.

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. **Coal:** • 1960-1995—U.S. International Trade Commission, *Synthetic Organic Chemicals, United States Production and Sales, 1995* (January 1997). • 1996 forward—Estimated because the data series has been discontinued. **Percent of Total Energy Consumption:** Derived by dividing total by total consumption on Table 1.3.

Energy Overview Notes

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

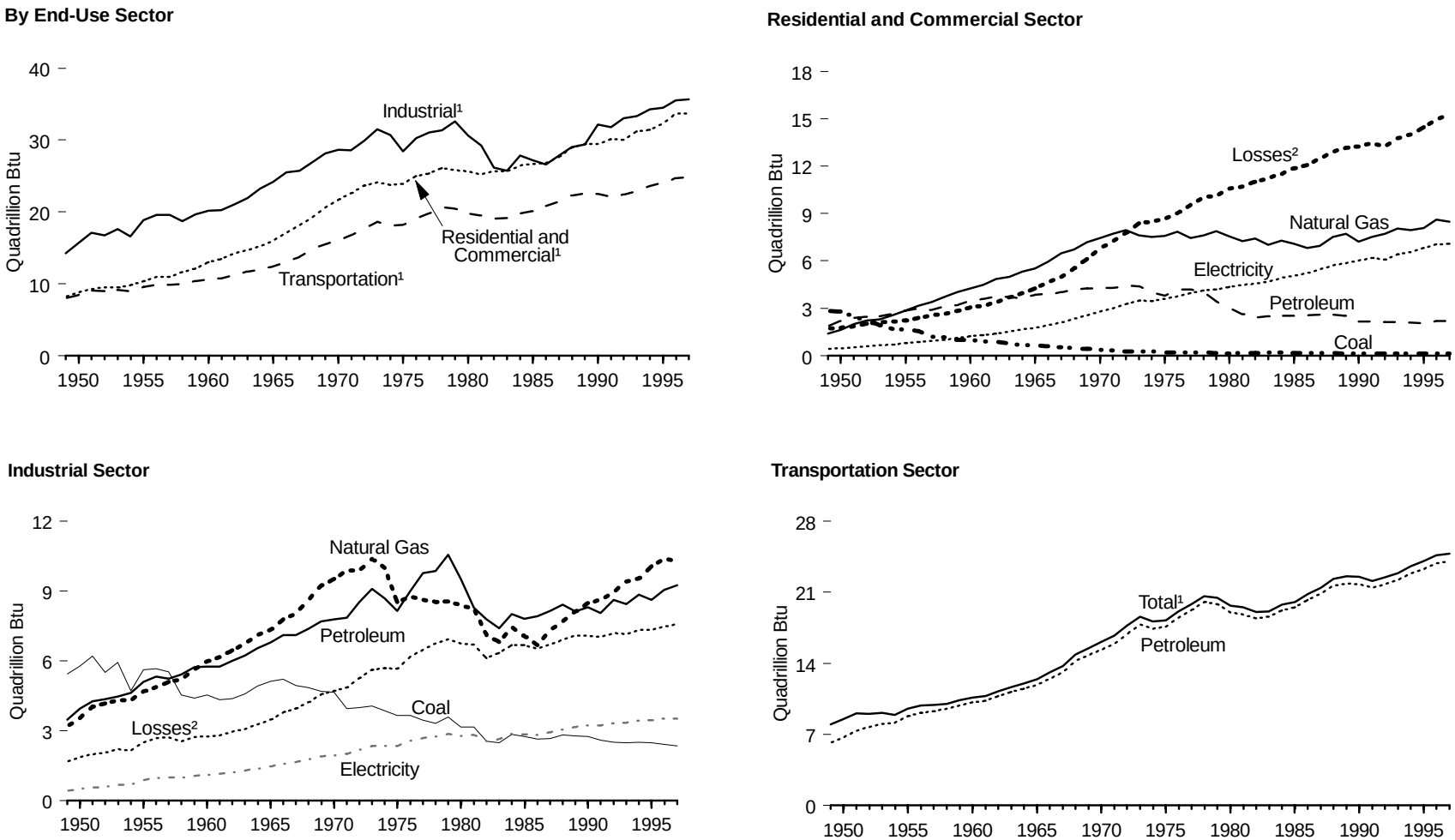
2. Table 1.14 Sources: Coal: 1949-1980–U.S. Geological Survey, *Coal, Phosphate, Potash, Sodium, and Other Mineral Production, Royalty Income, and Related Statistics,* June 1981. 1981 forward–U.S. Minerals Management Service, *Mineral Revenues–The 1995 Report on Receipts from Federal and Indian Leases,* and predecessor annual reports.

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

2 End-Use Energy Consumption

Office buildings, industries, residences, and transport systems, Baltimore, Maryland; east view from the Inner Harbor.
Source: U.S. Department of Energy.

Figure 2.1 Energy Consumption by End-Use Sector, 1949-1997



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

² Electrical system energy losses associated with the generation, transmission, and distribution of energy in the form of electricity.

Note: Because vertical scales differ, graphs should not be compared.
Source: Table 2.1.

Table 2.1 Energy Consumption by End-Use Sector, 1949-1997

(Quadrillion Btu)

Year	Residential and Commercial						Industrial						Transportation		
	Coal	Natural Gas [1]	Petroleum	Electricity	Losses [2]	Total [3]	Coal	Natural Gas [1]	Petroleum	Electricity	Losses [2]	Total [3,4]	Petroleum	Total [5]	Total [3]
1949	2.83	1.39	1.85	0.43	1.72	8.21	5.43	3.19	3.47	0.42	1.68	14.26	6.15	7.99	30.46
1950	2.80	1.64	2.20	0.47	1.76	8.87	5.78	3.55	3.95	0.50	1.86	15.71	6.69	8.49	33.08
1951	2.47	2.01	2.40	0.54	1.89	9.30	6.20	4.05	4.27	0.57	2.00	17.13	7.36	9.04	35.47
1952	2.25	2.21	2.46	0.59	2.02	9.54	5.52	4.18	4.36	0.60	2.05	16.76	7.71	9.00	35.30
1953	1.93	2.29	2.50	0.65	2.12	9.50	5.93	4.30	4.48	0.68	2.20	17.65	8.06	9.12	36.27
1954	1.68	2.57	2.67	0.72	2.15	9.78	4.73	4.32	4.63	0.71	2.14	16.58	8.12	8.90	35.27
1955	1.67	2.85	2.87	0.79	2.23	10.41	5.62	4.70	5.11	0.89	2.51	18.86	8.80	9.55	38.82
1956	1.55	3.15	3.00	0.87	2.39	10.96	5.67	4.87	5.34	0.98	2.68	19.55	9.15	9.86	40.38
1957	1.19	3.39	2.91	0.95	2.55	10.98	5.54	5.11	5.24	1.00	2.70	19.60	9.29	9.90	40.48
1958	1.16	3.71	3.12	1.01	2.64	11.65	4.53	5.21	5.41	0.98	2.54	18.70	9.51	10.00	40.35
1959	0.99	4.02	3.18	1.12	2.84	12.15	4.41	5.65	5.74	1.08	2.73	19.64	9.85	10.35	42.14
1960	0.99	4.27	3.49	1.23	3.06	13.04	4.54	5.97	5.75	1.11	2.76	20.16	10.13	10.60	43.80
1961	0.90	4.48	3.58	1.30	3.18	13.44	4.35	6.17	5.75	1.15	2.80	20.25	10.32	10.77	44.46
1962	0.88	4.85	3.72	1.41	3.40	14.27	4.38	6.45	6.00	1.23	2.95	21.04	10.77	11.23	46.53
1963	0.76	5.01	3.72	1.54	3.68	14.71	4.59	6.75	6.23	1.29	3.08	21.95	11.17	11.66	48.32
1964	0.65	5.33	3.62	1.67	3.96	15.23	4.91	7.11	6.55	1.38	3.29	23.27	11.50	12.00	50.50
1965	0.62	5.52	3.87	1.78	4.25	16.03	5.13	7.34	6.79	1.46	3.49	24.22	11.87	12.43	52.68
1966	0.61	5.95	3.91	1.94	4.65	17.06	5.21	7.80	7.11	1.58	3.79	25.50	12.50	13.10	55.66
1967	0.52	6.47	4.04	2.09	4.98	18.10	4.93	8.04	7.12	1.65	3.95	25.72	13.11	13.75	57.57
1968	0.47	6.73	4.20	2.32	5.52	19.23	4.85	8.63	7.39	1.78	4.24	26.90	14.21	14.86	61.00
1969	0.44	7.20	4.26	2.57	6.12	20.59	4.71	9.23	7.70	1.91	4.56	28.10	14.81	15.50	64.19
1970	0.37	7.46	4.31	2.79	6.78	21.71	4.66	9.54	7.79	1.95	4.72	28.63	15.31	16.09	66.43
1971	0.35	7.71	4.29	2.99	7.25	22.59	3.94	9.89	7.86	2.01	4.87	28.57	15.92	16.72	67.89
1972	0.27	7.94	4.43	3.25	7.80	23.69	3.99	9.88	8.53	2.19	5.25	29.86	16.89	17.71	71.26
1973	0.25	7.63	4.39	3.50	8.38	24.14	4.06	10.39	9.10	2.34	5.61	31.53	17.83	18.60	74.28
1974	0.26	7.52	4.00	3.47	8.48	23.72	3.87	10.00	8.69	2.34	5.70	30.70	17.40	18.12	72.54
1975	0.21	7.58	3.80	3.60	8.70	23.90	3.67	8.53	8.15	2.35	5.66	28.40	17.62	18.25	70.55
1976	0.20	7.87	4.18	3.75	9.02	25.02	3.66	8.76	9.01	2.57	6.20	30.24	18.51	19.10	74.36
1977	0.21	7.46	4.21	3.96	9.56	25.39	3.45	8.64	9.78	2.68	6.48	31.08	19.24	19.82	76.29
1978	0.21	7.62	4.07	4.12	10.07	26.09	3.31	8.54	9.87	2.76	6.75	31.39	20.04	20.61	78.09
1979	0.19	7.89	3.45	4.18	10.10	25.81	3.59	8.55	10.57	2.87	6.94	32.61	19.82	20.47	78.90
1980	0.15	7.54	3.04	4.35	10.58	25.65	3.16	8.39	9.53	2.78	6.76	30.61	19.01	19.69	75.96
1981	0.17	7.24	2.63	4.50	10.70	25.24	3.16	8.26	8.29	2.82	6.70	29.24	18.81	19.51	73.99
1982	0.19	7.43	2.45	4.57	11.00	25.63	2.55	7.12	7.80	2.54	6.12	26.14	18.42	19.07	70.85
1983	0.19	7.02	2.50	4.68	11.24	25.63	2.49	6.83	7.42	2.65	6.36	25.75	18.59	19.13	70.52
1984	0.21	7.29	2.54	4.93	11.51	26.48	2.84	7.45	8.01	2.86	6.68	27.86	19.22	19.80	74.14
1985	0.18	7.08	2.52	5.06	11.87	26.70	2.76	7.08	7.81	2.86	6.69	27.22	19.50	20.07	73.98
1986	0.18	6.82	2.56	5.24	12.06	26.85	2.64	6.69	7.92	2.83	6.53	26.63	20.27	20.81	74.30
1987	0.16	6.95	2.59	5.44	12.48	27.62	2.67	7.32	8.15	2.93	6.71	27.83	20.87	21.45	76.89
1988	0.17	7.51	2.60	5.72	12.92	28.92	2.83	7.70	8.43	3.06	6.90	28.99	21.63	22.30	80.22
1989	0.15	7.73	2.53	5.86	R13.16	R29.42	2.79	8.13	8.13	3.16	R7.09	R29.36	21.87	22.56	R81.35
1990	0.16	7.22	2.17	6.02	R13.24	R,6 29.45	2.76	8.50	8.32	3.23	R7.10	R,6 32.12	21.81	6 22.54	R,6 84.12
1991	0.14	7.51	2.15	6.18	R13.46	R30.12	2.60	8.62	8.06	3.23	R7.03	R31.78	21.46	22.12	R84.03
1992	0.14	7.73	2.13	6.10	R13.25	R30.05	2.51	8.97	8.64	3.32	R7.21	R33.03	21.81	22.46	R85.55
1993	0.14	8.04	2.14	6.42	R13.77	R31.17	2.50	9.41	8.45	3.33	R7.16	R33.31	22.20	22.88	R87.37
1994	0.14	7.97	2.09	6.56	R14.00	R31.42	2.51	9.56	8.85	3.44	R7.34	R34.26	22.82	23.57	R89.25
1995	0.13	8.09	R2.08	6.81	R14.47	R32.30	R2.49	10.06	R8.62	3.46	R7.34	R34.48	R23.31	R24.07	R90.86
1996	0.14	R8.63	R2.18	7.04	R14.98	R33.69	R2.42	R10.39	R9.07	R3.52	R7.48	R35.51	R23.89	R24.66	R93.87
1997P	0.14	8.50	2.19	7.10	15.25	33.72	2.35	10.32	9.25	3.53	7.59	35.67	24.04	24.81	94.21

[1] Includes supplemental natural gas.
[2] Electrical system energy losses. See Glossary and Diagram 5. Total losses are calculated as the sum of energy consumed at electric utilities to generate electricity, utility purchases of electricity from nonutility power producers, and imported electricity, minus exported electricity and electricity consumed by end users. Total losses are allocated to the end-use sectors in proportion to each sector's share of total electricity use.
[3] Beginning in 1990, includes renewable energy. See Table 10.2.
[4] Also includes hydroelectric power and net imports of coal coke.
[5] Also includes coal, natural gas, electricity, and electrical system energy losses.
[6] There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of non-electric utility use of renewable energy beginning in 1990. See Table 10.2 for quantities.

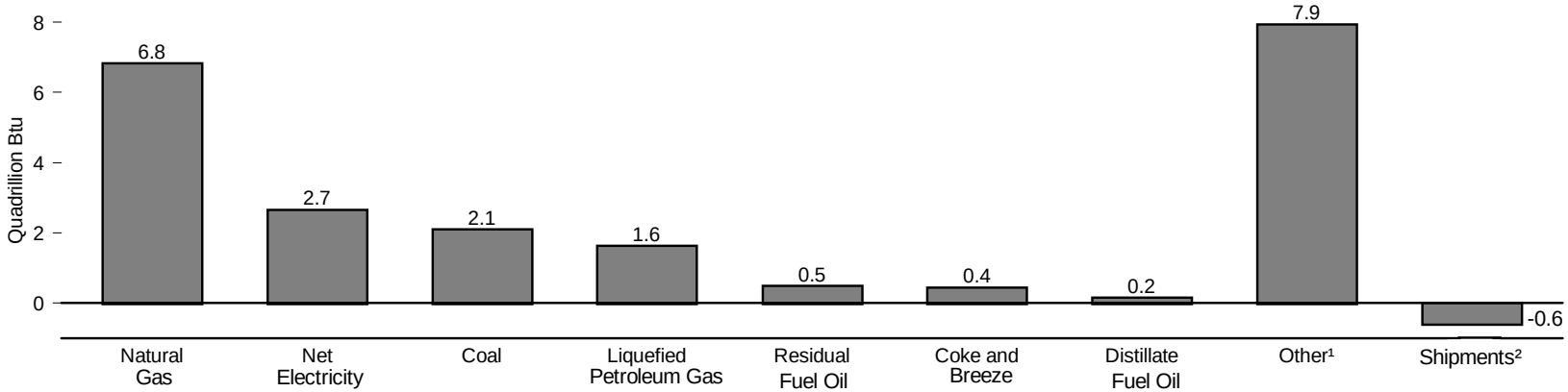
R=Revised. P=Preliminary.

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

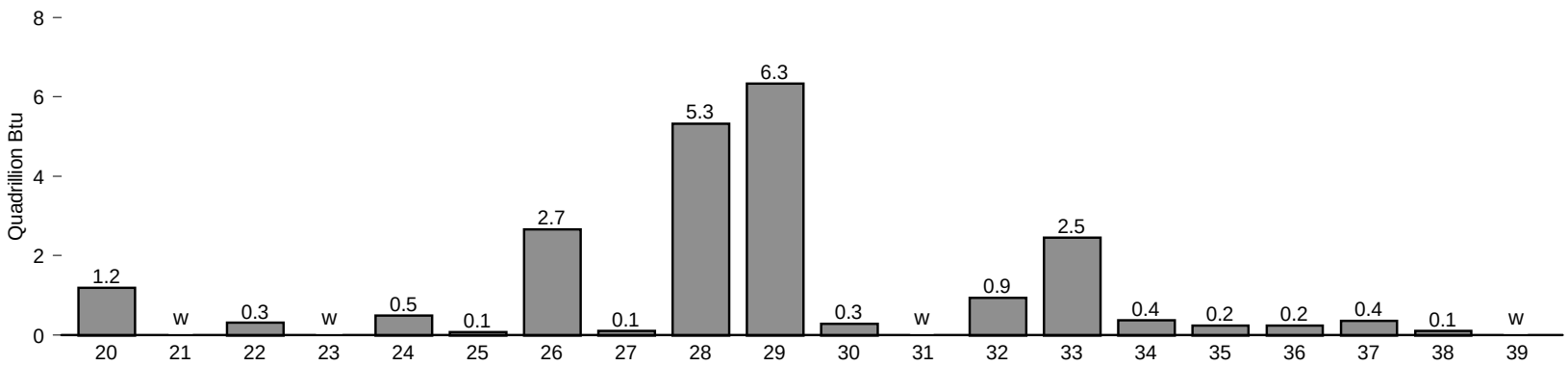
Sources: Tables 5.12a, 5.12b, 6.6, 7.3, 7.7, 8.1, 8.4, 8.6, 10.9, A3-A7, and Energy Information Administration estimates for industrial hydroelectric power. "Other" from Table 8.6 is allocated to the Residential and Commercial Sector, except for approximately 4 percent used by railroads and railways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

Figure 2.2 Manufacturing Total First Use of Energy for All Purposes, 1994

By Energy Source



By Standard Industrial Classification (SIC) Code³



[1] Includes all other types of energy that respondents indicated were consumed.
[2] Energy sources produced onsite but sold to another entity.
[3] See Table 2.2 for Major Group titles of industries that correspond to the 2-digit SIC codes.

W=Withheld to avoid disclosure of data for individual establishments.
Source: Table 2.2.

Table 2.2 Manufacturing Total First Use of Energy for All Purposes, 1994

(Trillion Btu)

SIC [1] Code	Major Group	Net Electricity [2]	Residual Fuel Oil	Distillate Fuel Oil	Natural Gas	Liquefied Petroleum Gas	Coal	Coke and Breeze	Other [3]	Shipments of Energy Sources [4]	Total [5]
20	Food and Kindred Products	198	30	19	631	W	165	W	141	0	1,193
21	Tobacco Products	3	1	W	W	W	W	0	W	0	W
22	Textile Mill Products	111	17	7	117	4	40	0	14	0	310
23	Apparel and Other Textile Products	26	W	1	25	W	W	0	W	0	W
24	Lumber and Wood Products	68	2	25	48	W	W	0	341	0	491
25	Furniture and Fixtures	22	(s)	1	24	1	3	0	18	0	69
26	Paper and Allied Products	223	173	9	575	5	307	0	1,373	0	2,665
27	Printing and Publishing	59	W	2	48	W	0	0	2	0	112
28	Chemicals and Allied Products	520	110	14	2,569	1,535	293	11	442	166	5,328
29	Petroleum and Coal Products	121	71	22	811	47	W	W	5,344	87	6,339
30	Rubber and Miscellaneous Plastics Products	149	10	4	110	3	5	0	6	0	287
31	Leather and Leather Products	3	2	W	W	W	0	0	(s)	0	W
32	Stone, Clay, and Glass Products	123	7	23	432	4	274	8	73	0	944
33	Primary Metal Industries	493	43	13	811	5	922	424	85	334	2,462
34	Fabricated Metal Products	115	W	4	220	5	W	W	Q	0	367
35	Industrial Machinery and Equipment	109	W	4	111	3	11	W	5	0	246
36	Electronic and Other Electric Equipment	113	3	2	88	2	W	W	Q	0	243
37	Transportation Equipment	132	11	7	157	3	28	2	23	0	363
38	Instruments and Related Products	46	4	1	29	W	W	0	3	0	107
39	Miscellaneous Manufacturing Industries	19	1	1	19	1	1	0	W	0	W
—	Total Manufacturing	2,656	490	158	6,835	1,631	2,105	449	7,926	587	21,663

[1] Based on 1987 Standard Industrial Classification system.

[2] "Net Electricity" is obtained by summing purchases, transfers in, and generation from noncombustible renewable resources, minus quantities sold and transferred out. It excludes electricity generated from combustible fuels.

[3] Includes all other types of energy that respondents indicated were consumed.

[4] Energy sources produced onsite from the use of other energy sources but sold to another entity.

[5] The sum of net electricity, fuel oil, natural gas, coal, and other minus shipments of energy sources. Previous surveys did not subtract shipments.

(s)=Less than 0.5 trillion Btu. W=Withheld to avoid disclosure of data for individual establishments. Q=Data withheld because the relative standard error was greater than 50 percent.

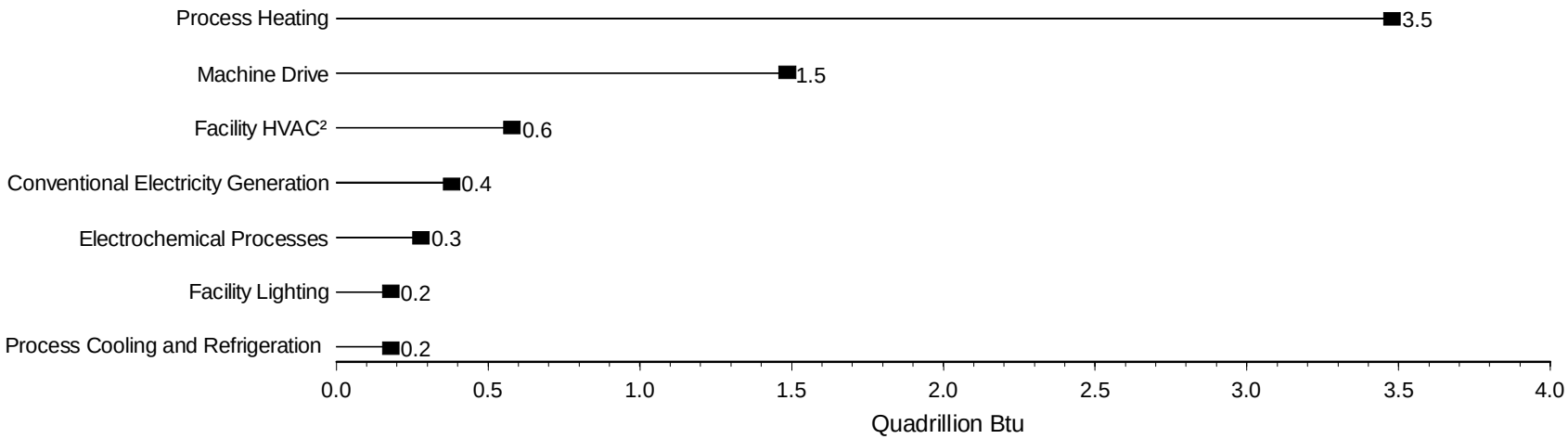
Note: • "First Use" was "Primary Consumption" in previous releases of this table. The estimates are for the primary consumption of energy for heat and power and as feedstocks or raw material inputs. Primary consumption is defined as the consumption of the energy that was originally produced offsite or was produced onsite from input materials not classified as energy. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/emeu/consumption.

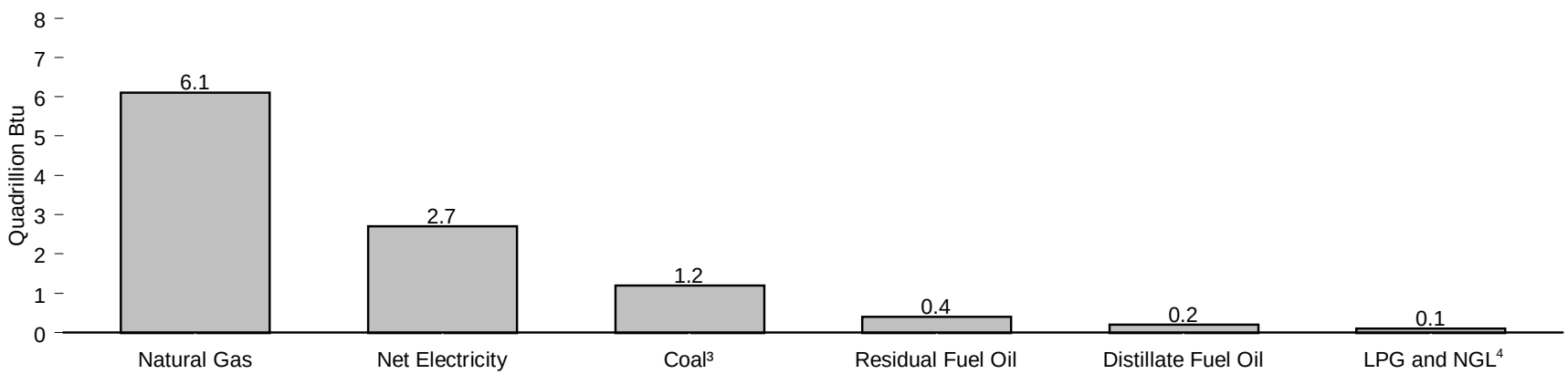
Source: Energy Information Administration, Form EIA-846, "1994 Manufacturing Energy Consumption Survey."

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

By Selected End Uses[1]



By Energy Source



[1]Excludes inputs of unallocated energy sources (5,828 trillion Btu).
[2]Heating, ventilation, and air conditioning.
[3]Excluding coal coke and breeze.
[4] Liquefied petroleum gases and natural gas liquids.
Source: Table 2.3.

Table 2.3 Manufacturing Sector Inputs for Heat, Power, and Electricity Generation by End Use, 1994

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

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

[2] Total of listed energy sources. Excludes inputs of unallocated energy sources (5,828 trillion Btu). The top half of the "Total" column is blank because different physical units cannot be added.

[3] Excludes steam and hot water.

— = Estimation of energy input quantity is not applicable. (s)=Less than 0.5 rounded to zero. Q=Withheld because relative standard error is greater than 50 percent.

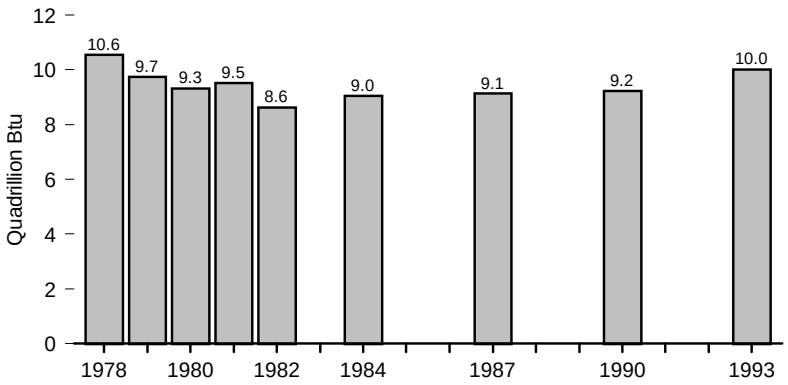
Notes: • Totals may not equal sum of components due to independent rounding. • The estimates presented in this table are for the total consumption of energy for the production of heat and power, regardless of where the energy was produced. Specifically, the estimates include the quantities of energy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

Web Page: http://www.eia.doe.gov/emeu/consumption.

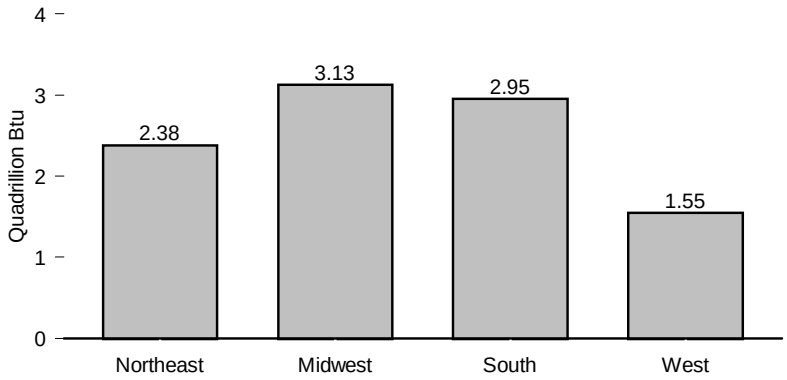
Source: Energy Information Administration, Form EIA-846, "1994 Manufacturing Energy Consumption Survey."

Figure 2.4 Household Energy Consumption

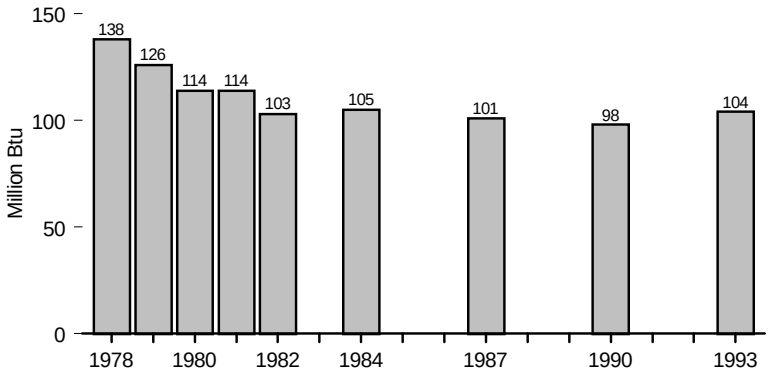
Consumption by All Households, Selected Years, 1978-1993



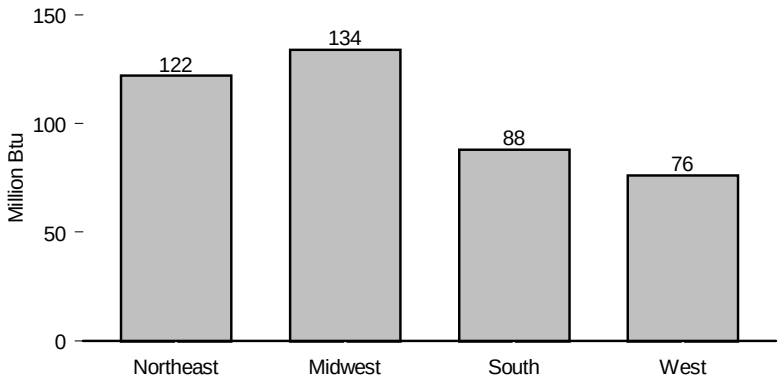
Consumption by All Households, by Census Region, 1993



Consumption per Household, Selected Years, 1978-1993



Consumption per Household, by Census Region, 1993



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

Source: Table 2.4. See Appendix D for Census regions.

Table 2.4 Household Energy Consumption by Census Region, Selected Years, 1978-1993

(Quadrillion Btu, Except as Noted)

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

[1] See Appendix D for Census regions.

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

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

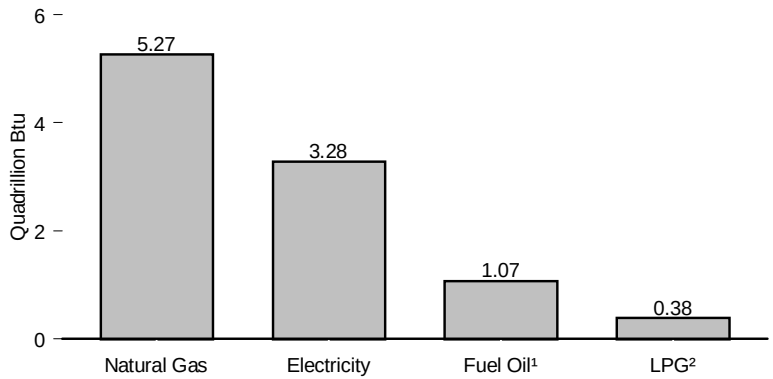
Notes: • This table shows major energy items only. • No data are available for years not shown. • One Btu of electricity = 0.000293 (1 3,412) kWh. • Data for 1978-1984 are for April of year shown through March of following year; data for 1987, 1990, and 1993 are for the calendar year. • Totals may not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

Web Page: http://www.eia.doe.gov/emeu/consumption.

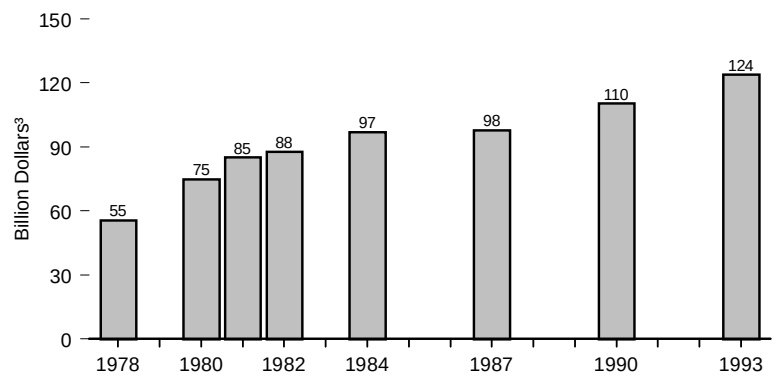
Sources: • 1978 and 1979—Energy Information Administration (EIA), Form EIA-84, "Residential Energy Consumption Survey." • 1980 forward—EIA, Form EIA-457, "Residential Energy Consumption Survey."

Figure 2.5 Household Energy Consumption and Expenditures

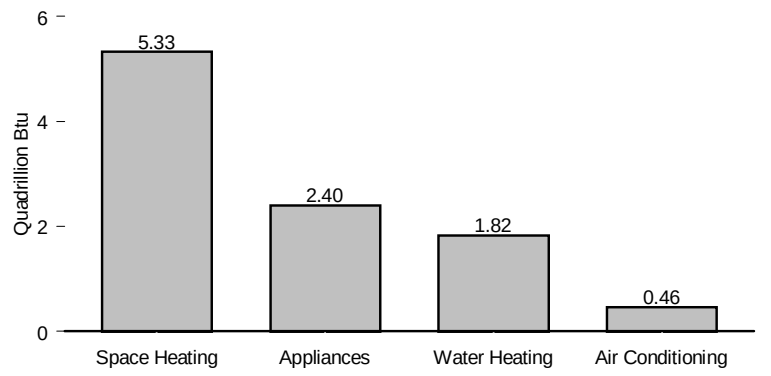
Consumption by Energy Source, 1993



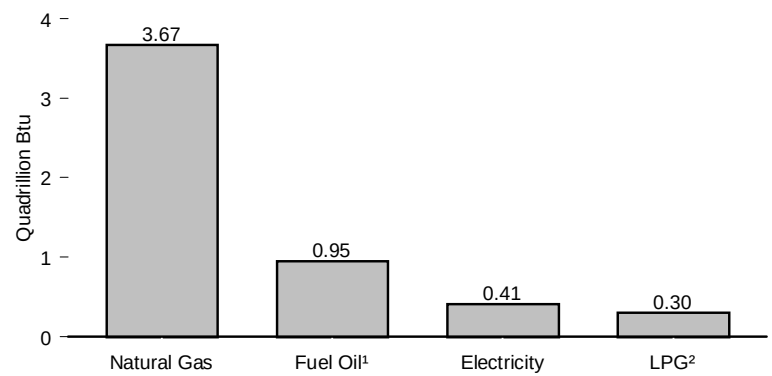
Expenditures, Selected Years, 1978-1993



Consumption by End Use, 1993



Consumption for Space Heating, 1993



¹ Fuel oil is distillate fuel oil and kerosene.
² Liquefied petroleum gases.
³ Nominal dollars.

Notes: • No data are available for years not shown. • Because vertical scales differ, graphs should not be compared.
Source: Table 2.5.

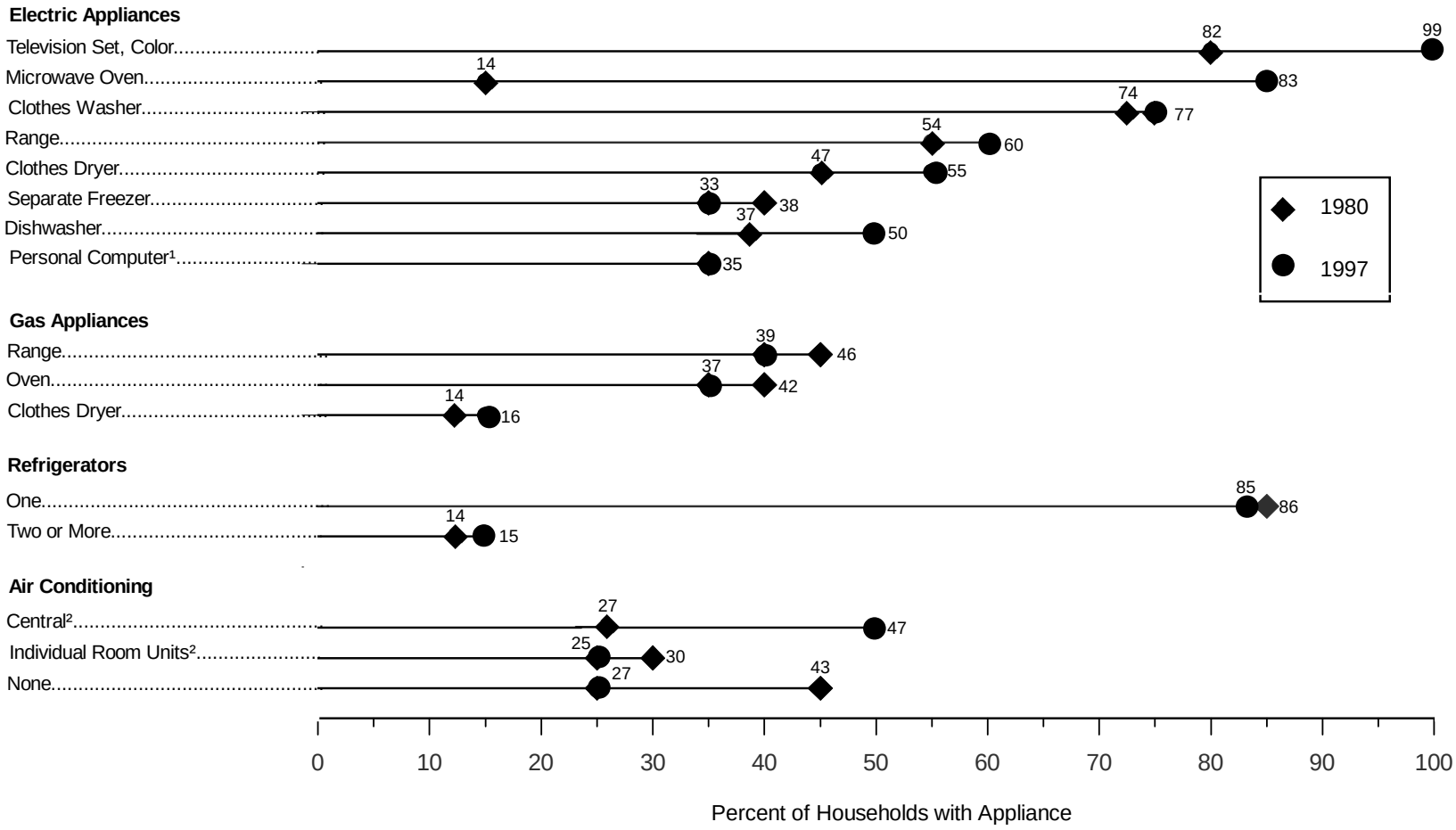
Table 2.5 Household Energy Consumption and Expenditures by End Use and Energy Source, Selected Years, 1978-1993

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

[1] A small amount of natural gas used for air conditioning is included in "Natural Gas" under "Total."
[2] Includes refrigerators.
[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. Includes a small amount of fuel oil or kerosene used for appliances.
[5] Liquefied petroleum gases.
[6] Nominal dollars.

Notes: • No data are available for years not shown. Consumption totals for 1979 are available on Table 2.7. • One Btu of electricity = 0.000293 (1 3,412) kWh. • Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/emeu/consumption.
Sources: • 1978—Energy Information Administration (EIA), Form EIA-84, "Residential Energy Consumption Survey." • 1980 forward—EIA, Form EIA-457, "Residential Energy Consumption Survey."

Figure 2.6 Households With Selected Appliances, 1980 and 1997



¹ Not collected in 1980.
² Households with both central and individual room units are counted only under "central."

Source: Table 2.6.

Table 2.6 Household Main Heating Fuel and Presence of Selected Appliances, Selected Years, 1978-1997

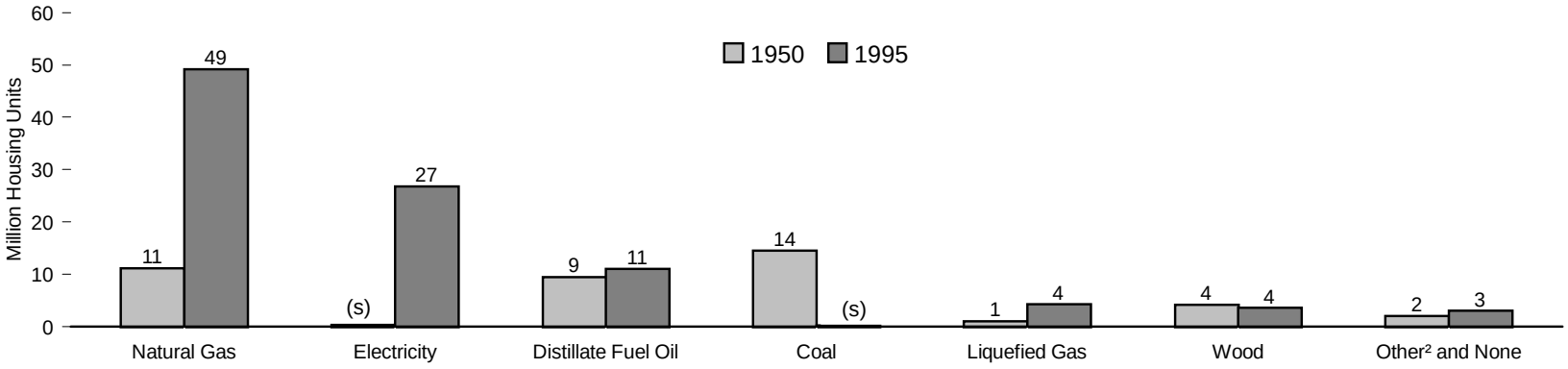
Appliance	Year										Change
	1978	1979	1980	1981	1982	1984	1987	1990	1993	1997	1980 to 1997
Total Households (millions)	76	78	82	83	84	86	90	94	97	101	+20
	Percent of Households										
Type of Main Heating Fuel											
Natural Gas	55	55	55	56	57	55	55	55	53	52	-2
Electricity	16	17	18	17	16	17	20	23	26	30	+12
Liquefied Petroleum Gas	4	5	5	4	5	5	5	5	5	4	0
Fuel Oil	20	17	15	14	13	12	12	11	11	9	-6
Wood	2	4	6	6	7	7	6	4	3	2	-4
Type of Appliances											
Electric Appliances											
Television Set (Color)	NA	NA	82	82	85	88	93	96	98	99	+17
Television Set (B/W)	NA	NA	51	48	47	43	36	31	20	NA	NA
Clothes Washer	75	NA	74	74	72	74	76	76	77	77	+3
Range (Stove-Top Burner)	53	NA	54	54	53	54	57	58	61	60	+7
Oven, Regular or Microwave	54	NA	59	58	59	63	79	88	91	91	+32
Oven, Microwave	8	NA	14	17	21	34	61	79	84	83	+69
Clothes Dryer	45	NA	47	45	45	46	51	53	57	55	+8
Separate Freezer	35	NA	38	38	37	37	34	35	35	33	-5
Dishwasher	35	NA	37	37	36	38	43	45	45	50	+13
Dehumidifier	NA	NA	9	9	9	9	10	12	9	NA	NA
Waterbed Heaters	NA	NA	NA	NA	NA	10	14	15	12	8	NA
Window or Ceiling Fan	NA	NA	NA	NA	28	35	46	51	60	NA	NA
Whole House Fan	NA	NA	NA	NA	8	8	9	10	4	NA	NA
Evaporative Cooler	NA	NA	4	4	4	4	3	4	3	NA	NA
Personal Computer	NA	NA	NA	NA	NA	NA	NA	16	23	35	NA
Pump for Well Water	NA	NA	NA	NA	NA	NA	NA	15	13	14	NA
Swimming-Pool Pump [1]	NA	NA	3	4	3	NA	NA	5	5	5	+2
Gas Appliances [2]											
Range (Stove-Top or Burner)	48	NA	46	46	47	45	43	42	38	39	-7
Oven	47	NA	42	40	42	42	41	41	36	37	-5
Clothes Dryer	14	NA	14	16	15	16	15	16	15	16	+2
Outdoor Gas Grill	NA	NA	9	9	11	13	20	26	29	NA	NA
Outdoor Gas Light	2	NA	2	2	2	1	1	1	1	1	-1
Swimming Pool Heater [3]	NA	NA	(s)	NA	NA	1	1	2	1	1	0
Refrigerators [4]											
One	86	NA	86	87	86	88	86	84	85	85	-1
Two or More	14	NA	14	13	13	12	14	15	15	15	+1
Air Conditioning (A/C)											
Central [5]	23	24	27	27	28	30	36	39	44	47	20
Individual Room Units [5]	33	31	30	31	30	30	30	29	25	25	-5
None	44	45	43	42	42	40	36	32	32	27	-15
Portable Kerosene Heaters	(s)	NA	(s)	1	3	6	6	5	2	2	+2

[1] All reported swimming pools were assumed to have an electric pump for filtering and circulating the water, except for 1993, when a filtering system was made explicit.
[2] Includes natural gas or liquefied petroleum gases.
[3] In 1984 and 1987, also includes heaters for jacuzzis and hot tubs.
[4] Fewer than 0.5 percent of the households do not have a refrigerator.
[5] Households with both central and individual room units are counted only under "Central."

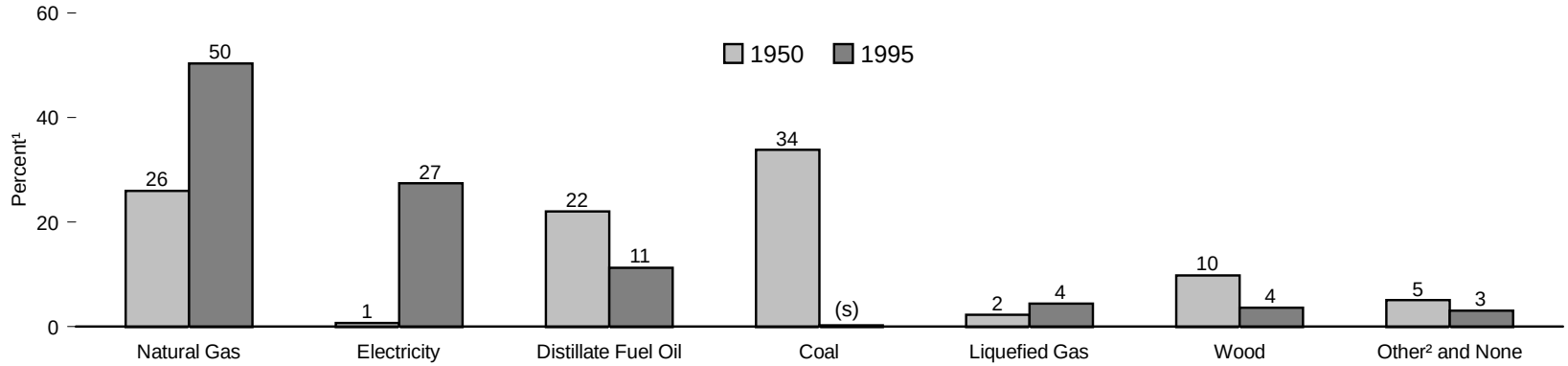
NA=Not available. (s)=Less than 0.5 percent.
Note: No data are available for years not shown.
Web Page: http://www.eia.doe.gov/emeu/consumption.
Sources: • 1978 and 1979—Energy Information Administration (EIA), Form EIA-84, "Residential Energy Consumption Survey." • 1980 forward—EIA, Form EIA-457, "Residential Energy Consumption Survey."

Figure 2.7 Type of Heating in Occupied Housing Units, 1950 and 1995

By Fuel Type



By Fuel Type, Share of Total



¹ Sum of components may not equal 100 percent due to independent rounding.
² Kerosene, solar, and other.
(s)=Less than 0.5.

Source: Table 2.7.

Table 2.7 Type of Heating in Occupied Housing Units, Selected Years, 1950-1995

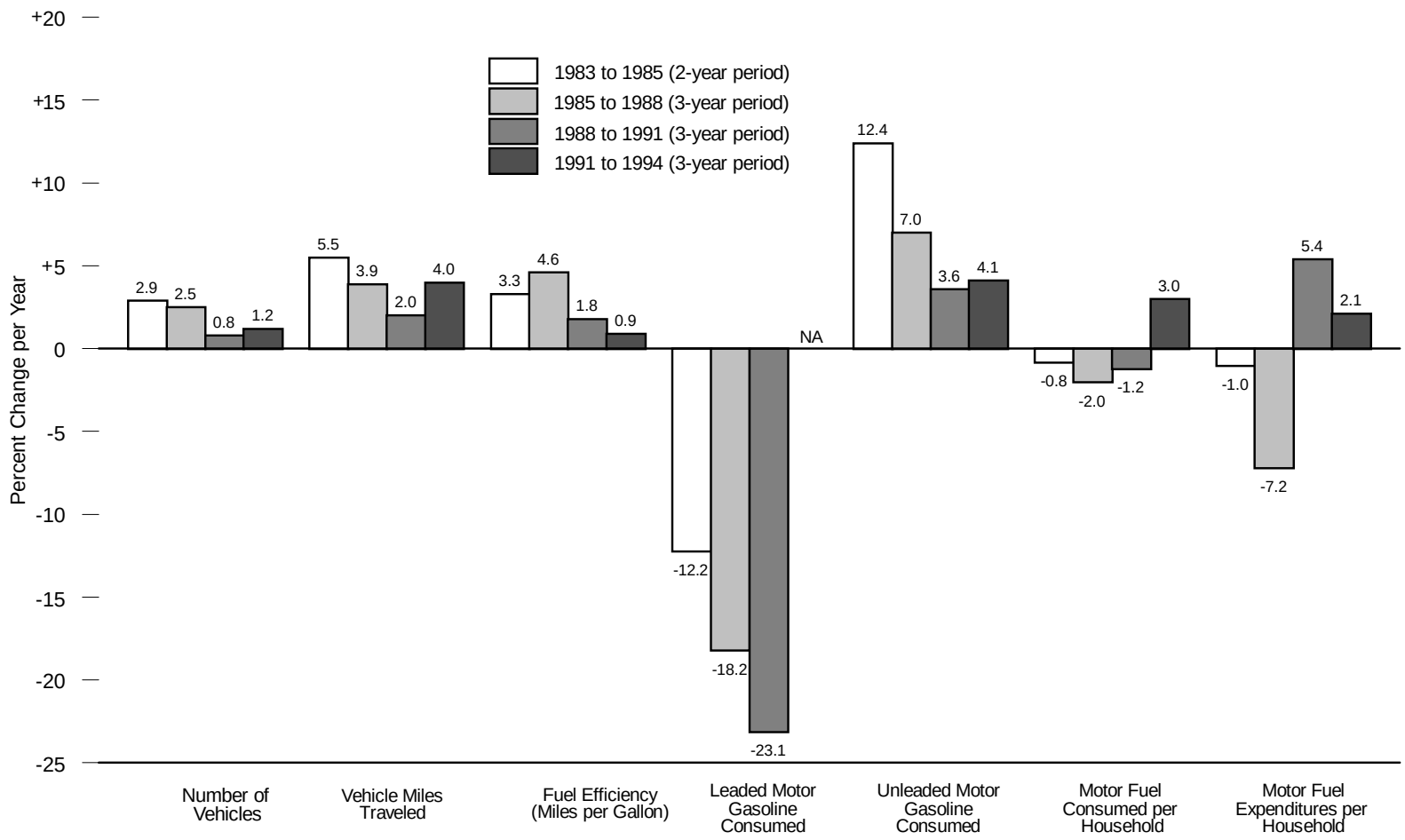
Year	Coal [1]	Natural Gas	Liquefied Gas	Distillate Fuel Oil	Kerosene	Electricity	Wood	Solar	Other	None [2]	Total
						Million					
1950	14.48	11.12	0.98	9.46	([3])	0.28	4.17	NA	0.77	1.57	42.83
1960	6.46	22.85	2.69	17.16	([3])	0.93	2.24	NA	0.22	0.48	53.02
1970	1.82	35.01	3.81	16.47	([3])	4.88	0.79	NA	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 [4]	0.43	46.70	3.87	12.59	0.45	15.68	4.09	NA	0.16	0.68	84.64
1985	0.45	45.33	3.58	12.44	1.06	18.36	6.25	0.05	0.37	0.53	88.43
1987	0.41	45.96	3.66	12.74	1.08	20.61	5.45	0.05	0.28	0.66	90.89
1989	0.34	47.40	3.66	12.47	1.07	23.06	4.59	(s)	0.40	0.66	93.68
1991	0.32	47.02	3.88	11.47	0.99	23.71	4.44	(s)	0.41	0.86	93.15
1993	0.30	47.67	3.92	11.17	1.02	25.11	4.10	(s)	0.50	0.91	94.73
1995	0.21	49.20	4.25	10.98	1.06	26.77	3.53	(s)	0.64	1.04	97.69
						Percent					
1950	33.8	26.0	2.3	22.1	([3])	0.6	9.7	NA	1.8	3.7	100.0
1960	12.2	43.1	5.1	32.4	([3])	1.8	4.2	NA	0.4	0.9	100.0
1970	2.9	55.2	6.0	26.0	([3])	7.7	1.3	NA	0.4	0.6	100.0
1973	1.2	55.5	6.4	24.9	([3])	10.4	0.9	NA	0.2	0.7	100.0
1974	1.0	55.7	5.8	23.8	([3])	11.9	0.9	NA	0.1	0.7	100.0
1975	0.8	56.4	5.7	22.5	([3])	12.6	1.2	NA	0.1	0.6	100.0
1976	0.7	55.7	5.7	22.2	([3])	13.7	1.2	NA	0.1	0.6	100.0
1977	0.6	55.2	5.6	20.7	0.6	14.8	1.6	NA	0.2	0.7	100.0
1978	0.5	55.1	5.4	20.3	0.5	15.9	1.4	NA	0.2	0.8	100.0
1979	0.5	55.1	5.3	19.5	0.5	16.9	1.4	NA	0.1	0.7	100.0
1980	0.4	55.4	5.2	18.1	0.5	17.7	1.7	NA	0.1	0.8	100.0
1981	0.4	55.4	5.0	17.0	0.4	18.6	2.3	NA	0.1	0.7	100.0
1983 [4]	0.5	55.2	4.6	14.9	0.5	18.5	4.8	NA	0.2	0.8	100.0
1985	0.5	51.3	4.1	14.1	1.2	20.8	7.1	0.1	0.4	0.6	100.0
1987	0.4	50.6	4.0	14.0	1.2	22.7	6.0	0.1	0.3	0.7	100.0
1989	0.4	50.6	3.9	13.3	1.1	24.6	4.9	(s)	0.4	0.7	100.0
1991	0.3	50.5	4.2	12.3	1.1	25.5	4.8	(s)	0.4	0.9	100.0
1993	0.3	50.3	4.1	11.8	1.1	26.5	4.3	(s)	0.5	1.0	100.0
1995	0.2	50.4	4.4	11.2	1.1	27.4	3.6	(s)	0.7	1.1	100.0

[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] Since 1983, the *American Housing Survey for the United States* has been a biennial survey.
NA=Not available. (s)=Less than 0.05 million or less than 0.05 percent.

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

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

Figure 2.8 Household Motor Vehicle Data



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

NA=Not Available.
Source: Table 2.8.

Table 2.8 Household Motor Vehicle Data, 1983, 1985, 1988, 1991, and 1994

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

[1] Nominal dollars.

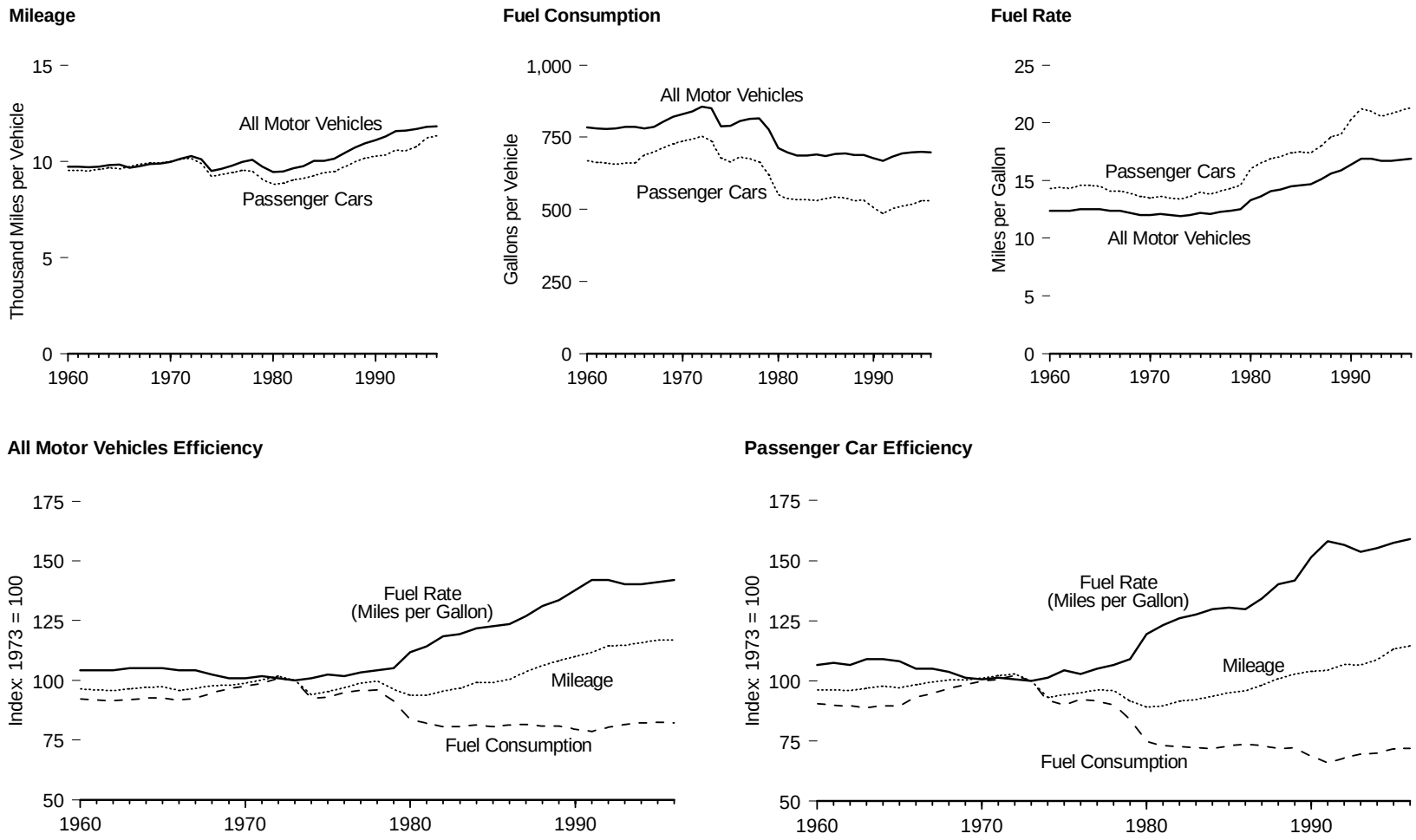
Q=Data withheld because either the relative standard error was greater than 50 percent or fewer than 10 households were sampled.

Notes: • Included are passenger cars, minivans, passenger vans, cargo vans, motor homes, pickup trucks, and sport-utility vehicles (i.e., jeeplike vehicles, usually four-wheel drive). Excluded are motorcycles, mopeds, large trucks, and buses. • Motor fuel includes motor gasoline and a small amount of other fuels, such as diesel, gasohol, and propane. These data for 1983 differ from previously published 1983 data in that the basis for estimating the number of vehicle-owning households was changed to conform with that being used for 1985. Purchase diaries, which were fuel purchase logs retained by drivers in 1983 and 1985, were used as the basis for estimating data for those years. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/emeu/consumption.

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

Figure 2.9 Motor Vehicle Efficiency, 1960-1996



Source: Table 2.9.

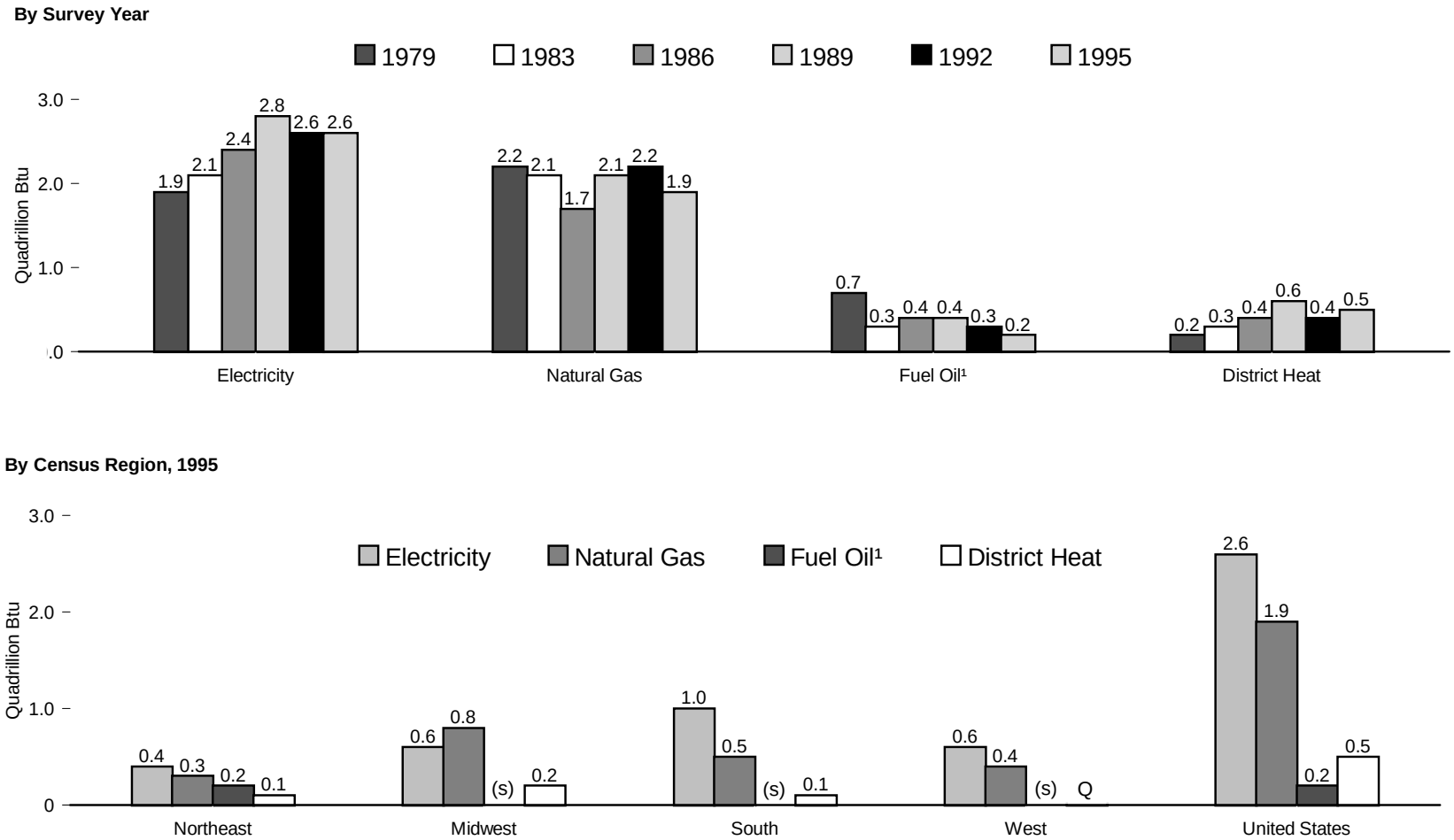
Table 2.9 Motor Vehicle Efficiency, 1960-1996

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	R9,518	R96.3	R668	R90.6	R14.3	R106.7	R9,732	R96.4	R784	R92.2	R12.4	R104.2
1961	R9,521	R96.3	R663	R90.0	R14.4	R107.5	R9,708	R96.1	R781	R91.9	R12.4	R104.2
1962	R9,494	R96.1	R662	R89.8	R14.3	R106.7	R9,687	R95.9	R779	R91.6	R12.4	R104.2
1963	R9,587	R97.0	R655	R88.9	R14.6	R109.0	R9,737	R96.4	R780	R91.8	R12.5	105.0
1964	R9,665	R97.8	R661	R89.7	R14.6	R109.0	R9,805	R97.1	R787	R92.6	R12.5	R105.0
1965	R9,603	R97.2	R661	R89.7	R14.5	R108.2	R9,826	R97.3	R787	R92.6	R12.5	105.0
1966	R9,733	R98.5	R688	R93.4	R14.1	R105.2	9,675	95.8	780	91.8	R12.4	104.2
1967	R9,849	R99.6	R699	R94.8	R14.1	R105.2	9,751	96.6	786	92.5	R12.4	104.2
1968	R9,922	R100.4	R714	R96.9	R13.9	R103.7	9,864	97.7	805	94.7	R12.2	R102.5
1969	R9,921	R100.4	R727	R98.6	R13.6	R101.5	9,885	97.9	821	96.6	R12.0	R100.8
1970	R9,989	R101.1	R737	R100.0	R13.5	R100.7	9,976	98.8	830	R97.6	R12.0	R100.8
1971	R10,097	R102.2	R743	R100.8	R13.6	R101.5	10,133	100.3	839	98.7	R12.1	R101.7
1972	R10,171	R102.9	R754	R102.3	R13.5	R100.7	10,279	101.8	857	R100.8	R12.0	100.8
1973	R9,884	100.0	R737	100.0	R13.4	100.0	10,099	100.0	850	100.0	R11.9	100.0
1974	R9,221	R93.3	R677	R91.9	R13.6	R101.5	9,493	94.0	788	92.7	R12.0	R100.8
1975	R9,309	R94.2	R665	R90.2	R14.0	R104.5	9,627	95.3	790	92.9	R12.2	R102.5
1976	R9,418	R95.3	R681	R92.4	R13.8	R103.0	9,774	96.8	806	94.8	R12.1	R101.7
1977	R9,517	96.3	R676	R91.7	R14.1	R105.2	9,978	98.8	814	95.8	R12.3	R103.4
1978	R9,500	R96.1	R665	R90.2	R14.3	R106.7	10,077	99.8	816	96.0	R12.4	R104.2
1979	R9,062	91.7	R620	R84.1	R14.6	R109.0	9,722	96.3	776	91.3	R12.5	R105.0
1980	R8,813	R89.2	R551	R74.8	R16.0	R119.4	9,458	93.7	712	83.8	R13.3	111.8
1981	R8,873	R89.8	R538	R73.0	R16.5	R123.1	R9,477	R93.8	697	82.0	R13.6	R114.3
1982	R9,050	R91.6	R535	R72.6	R16.9	R126.1	9,644	95.5	686	80.7	R14.1	R118.5
1983	R9,118	R92.3	R534	R72.5	R17.1	R127.6	R9,760	R96.6	686	80.7	R14.2	R119.3
1984	R9,248	R93.6	R530	R71.9	R17.4	R129.9	10,017	99.2	691	81.3	R14.5	R121.8
1985	R9,419	R95.3	R538	R73.0	R17.5	R130.6	R10,020	99.2	685	80.6	R14.6	R122.7
1986	R9,464	R95.8	R543	R73.7	R17.4	R129.9	R10,143	R100.4	R692	R81.4	R14.7	R123.5
1987	R9,720	R98.3	R539	R73.1	R18.0	R134.3	R10,453	103.5	694	81.6	R15.1	R126.9
1988	R9,972	R100.9	R531	R72.0	R18.8	R140.3	R10,721	R106.2	688	80.9	R15.6	R131.1
1989	R10,157	R102.8	R533	R72.3	R19.0	R141.8	R10,932	R108.2	688	80.9	R15.9	R133.6
1990	R10,277	R104.0	R506	R68.7	R20.3	R151.5	11,107	110.0	677	R79.6	R16.4	R137.8
1991	R10,322	R104.4	R487	R66.1	R21.2	R158.2	11,294	111.8	R669	R78.7	R16.9	R142.0
1992	R10,571	R107.0	R502	R68.1	R21.0	R156.7	11,558	114.4	683	80.4	R16.9	R142.0
1993	R10,545	R106.7	R512	R69.5	R20.6	R153.7	R11,595	114.8	693	81.5	R16.7	R140.3
1994	R10,759	R108.9	R517	R70.1	R20.8	R155.2	11,683	115.7	698	82.1	R16.7	R140.3
1995	R11,203	R113.3	R530	R71.9	R21.1	R157.5	R11,793	R116.8	R700	R82.4	R16.8	R141.2
1996P	11,314	114.5	531	72.0	21.3	159.0	11,807	116.9	698	82.1	16.9	142.0

[1] From 1960 to 1965, passenger cars category also includes motorcycles.
[2] Passenger cars, motorcycles, buses, other 2-axle 4-tire vehicles (including vans, minivans, pickup trucks, and sport-utility vehicles), single-unit trucks with six or more tires, and combination trucks.

R=Revised. P=Preliminary.
Sources: • 1960-1994—Federal Highway Administration, *Highway Statistics Summary to 1995,* Table VM-201A. • 1995 forward—Federal Highway Administration, *Highway Statistics,* annual, Table VM-1.

Figure 2.10 Commercial Buildings Consumption by Energy Source



[1] Distillate fuel oil, residual fuel oil, and kerosene.

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

(s)=Less than 50 trillion Btu.

Source: Table 2.10. See Appendix D for Census regions.

Table 2.10 Commercial Buildings Consumption by Energy Source, Selected Years, 1979-1995

(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	Northeast	Midwest	South	West	
Major Sources [2]												
1979	1,255	2,202	1,508	894	861	511	2,699	1,217	1,826	1,395	526	4,965
1983	1,242	1,935	1,646	812	1,018	480	2,513	858	1,821	1,462	682	4,823
1986	1,273	2,008	1,696	985	1,008	633	2,351	1,037	1,585	1,459	896	4,977
1989	1,259	2,402	2,127	1,048	1,230	704	2,806	1,354	1,659	1,648	1,126	5,788
1992	1,258	2,301	1,932	892	1,247	637	2,714	1,090	1,578	1,825	998	5,490
1995 [3]	1,332	2,152	1,838	973	1,019	614	2,716	1,035	1,497	1,684	1,106	5,321
Electricity												
1979	429	872	608	361	424	163	961	425	593	662	227	1,908
1983	469	903	758	426	509	152	1,041	324	673	801	331	2,129
1986	654	927	809	536	641	179	1,035	430	584	867	510	2,390
1989	572	1,145	1,056	550	781	217	1,225	586	609	975	604	2,773
1992	586	991	1,033	444	704	235	1,226	419	622	1,002	566	2,609
1995 [3]	618	1,064	926	508	676	221	1,204	436	558	1,027	587	2,608
Natural Gas												
1979	646	996	532	422	272	214	1,266	443	1,007	470	255	2,174
1983	684	809	597	327	365	246	1,152	278	978	523	311	2,091
1986	485	715	523	332	258	254	879	244	742	426	311	1,723
1989	568	836	670	417	238	323	1,095	353	831	498	391	2,073
1992	572	1,017	586	381	388	291	1,115	354	747	697	376	2,174
1995 [3]	535	830	580	395	239	245	1,066	297	750	528	371	1,946
Fuel Oil [4]												
1979	177	272	231	103	107	107	364	285	133	237	26	681
1983	85	140	90	43	75	61	135	172	28	104	Q	314
1986	114	206	121	105	39	103	194	270	63	86	23	442
1989	101	170	86	76	43	71	167	237	61	50	Q	357
1992	86	111	75	55	47	62	109	194	26	48	Q	272
1995 [3]	71	104	60	49	28	57	101	168	16	45	7	235
District Heat [5]												
1979	Q	61	136	Q	58	27	108	64	93	Q	Q	201
1983	Q	83	202	Q	68	21	184	84	141	34	30	289
1986	Q	159	243	12	71	97	243	94	196	81	51	422
1989	19	252	315	Q	167	Q	319	179	159	126	121	585
1992	Q	182	238	Q	109	49	264	123	183	78	51	435
1995 [3]	Q	154	271	Q	75	91	346	135	173	83	Q	533
Propane												
1979	23	15	5	10	Q	2	29	Q	16	15	10	43
1983	20	12	2	6	Q	2	24	Q	7	21	Q	34
1986	44	18	1	17	Q	3	42	9	19	26	Q	63

[1] See Appendix D for Census regions.
[2] For 1979, 1983, and 1986 includes electricity, natural gas, fuel oil, district heat, and propane. For 1989, 1992, and 1995 includes electricity, natural gas, fuel oil, and district heat. Propane consumption statistics were not collected after 1986.
[3] Parking garages and commercial buildings on multibuilding manufacturing facilities were excluded in the 1995 survey.
[4] Distillate fuel oil, residual fuel oil, and kerosene.
[5] For 1979 and 1983, includes only purchased steam. For 1986, 1989, 1992, and 1995 includes purchased and nonpurchased steam and purchased and nonpurchased hot water.

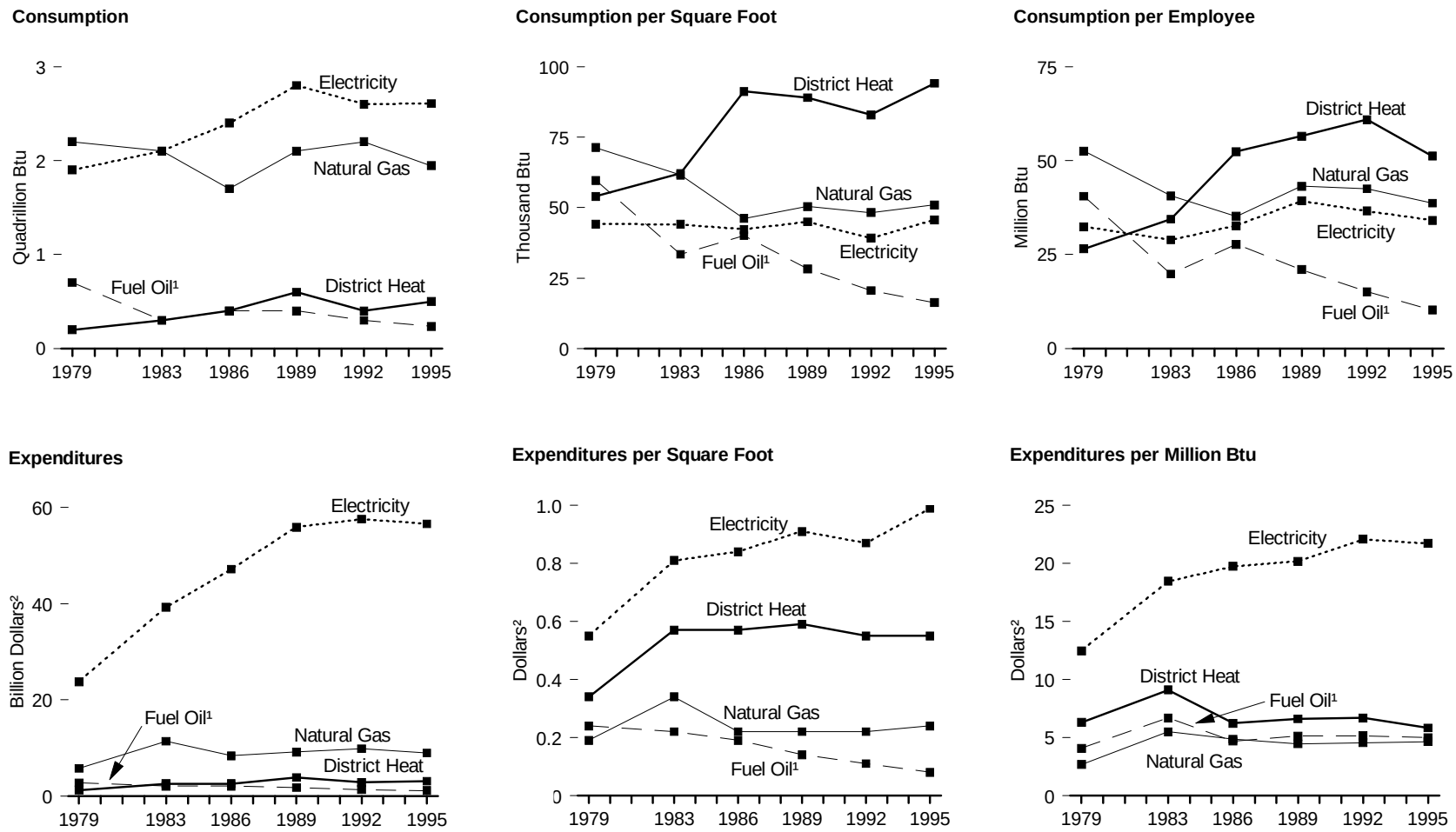
Q=Data withheld because either the relative standard error was greater than 50 percent or fewer than 20 buildings were sampled.

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.

Web Page: http://www.eia.doe.gov/emeu/consumption.

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

Figure 2.11 Commercial Buildings Energy Consumption and Expenditure Indicators, Selected Years, 1979-1995



¹ Distillate fuel oil, residual fuel oil, and kerosene.
² Nominal dollars.

Notes: • No data are available for 1980-1982, 1984, 1985, 1987, 1988, 1990, 1991, 1993, and 1994. • Because vertical scales differ, graphs should not be compared.
Source: Table 2.11.

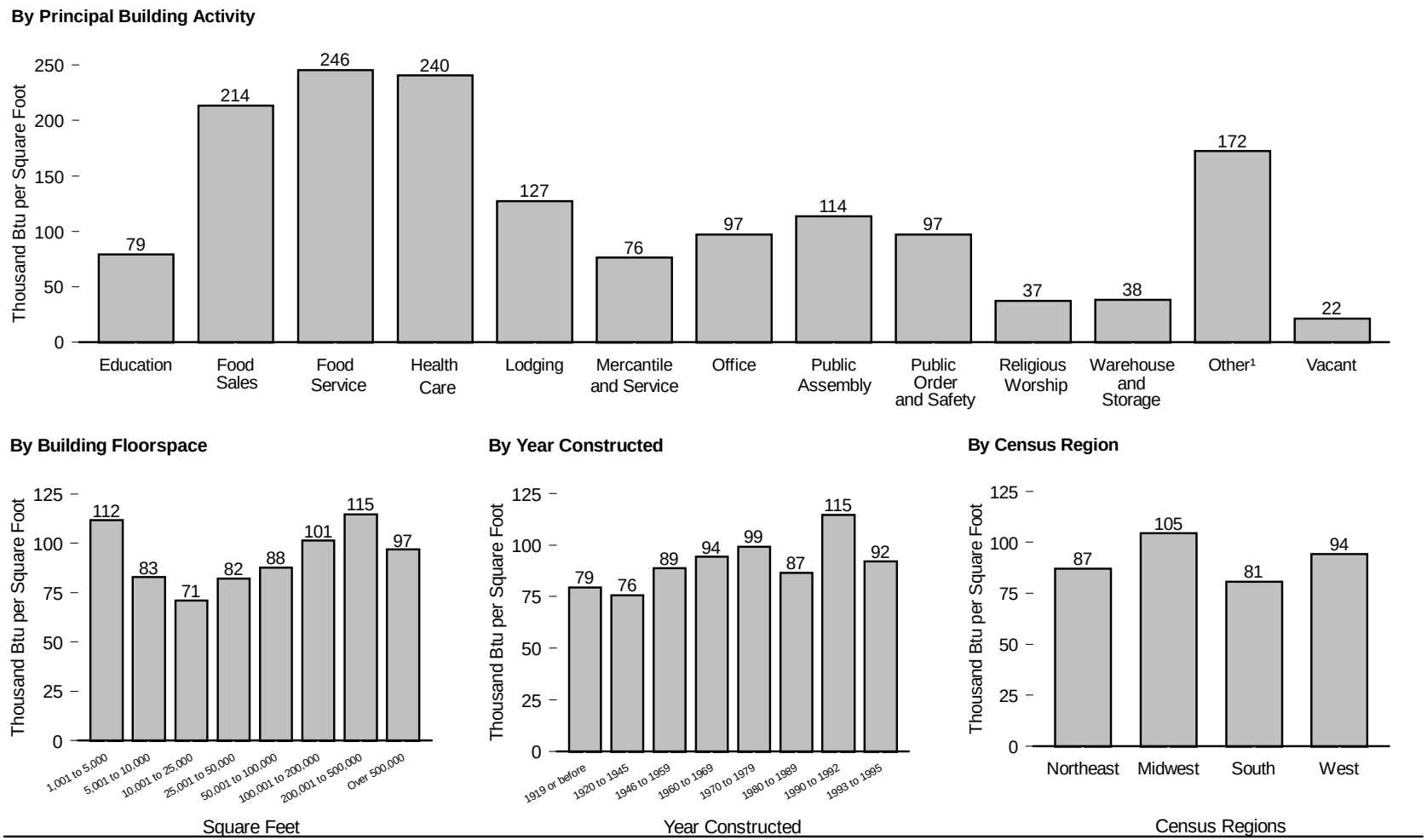
Table 2.11 Commercial Buildings Energy Consumption and Expenditure Indicators, Selected Years, 1979-1995

Energy Source and Year	Building Characteristics			Energy Consumption				Energy Expenditures			
	Number of Buildings (thousand)	Total Square Feet (million)	Square Feet per Building (thousand)	Total (trillion Btu)	Per Building (million Btu)	Per Square Foot (thousand Btu)	Per Employee (million Btu)	Total (million dollars[1])	Per Building (thousand dollars[1])	Per Square Foot (dollars[1])	Per Million Btu (dollars[1])
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
1992	4,806	67,876	14.1	5,490	1,142	80.9	77.1	71,821	14.9	1.06	13.08
1995 [3]	4,579	58,772	12.8	5,321	1,162	90.5	69.3	69,918	15.3	1.19	13.14
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
1992	4,611	66,525	14.4	2,609	566	39.2	36.6	57,619	12.5	0.87	22.09
1995 [3]	4,343	57,076	13.1	2,608	600	45.7	34.1	56,621	13.0	0.99	21.71
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
1992	2,657	44,994	16.9	2,174	818	48.3	42.5	9,901	3.7	0.22	4.55
1995 [3]	2,478	38,145	15.4	1,946	785	51.0	38.7	9,018	3.6	0.24	4.63
Fuel Oil [4]											
1979	641	11,397	17.8	681	1,063	59.7	40.5	2,765	4.3	0.24	4.06
1983	441	9,409	21.3	314	714	33.4	19.8	2,102	4.8	0.22	6.68
1986	534	11,005	20.6	442	827	40.1	27.7	2,059	3.9	0.19	4.66
1989	581	12,600	21.7	357	614	28.3	21.0	1,822	3.1	0.14	5.11
1992	560	13,215	23.6	272	487	20.6	15.1	1,400	2.5	0.11	5.14
1995 [3]	607	14,421	23.7	235	387	16.3	10.2	1,175	1.9	0.08	5.00
District Heat [5]											
1979	47	3,722	79.0	201	4,267	54.0	26.5	1,267	26.9	0.34	6.30
1983	64	4,643	72.9	289	4,530	62.1	34.4	2,627	41.2	0.57	9.10
1986	77	4,625	59.7	422	5,446	91.2	52.4	2,620	33.8	0.57	6.21
1989	98	6,578	67.0	585	5,964	89.0	56.5	3,857	39.3	0.59	6.59
1992	95	5,245	55.4	435	4,596	82.9	60.9	2,901	30.7	0.55	6.67
1995 [3]	110	5,658	51.5	533	4,849	94.1	51.2	3,103	28.3	0.55	5.83
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
1992	337	3,393	10.1	NA	NA	NA	NA	NA	NA	NA	NA

[1] Nominal dollars.
[2] For 1979, 1983, and 1986 includes electricity, natural gas, fuel oil, district heat, and propane. For 1989, 1992, and 1995 includes electricity, natural gas, fuel oil, and district heat. Propane consumption statistics were not collected after 1986.
[3] Parking garages and commercial buildings on multibuilding manufacturing facilities were excluded in the 1995 survey.
[4] Distillate fuel oil, residual fuel oil, and kerosene.
[5] For 1979 and 1983, includes only purchased steam. For 1986, 1989, 1992, and 1995 includes purchased and nonpurchased steam and purchased and nonpurchased hot water.

NA=Not available.
Note: Statistics for individual fuels are for all buildings using each fuel. Statistics for major sources are for all buildings, even buildings using no major fuel.
Web Page: http://www.eia.doe.gov/emeu/cbecs/contents.html.
Sources: • 1979—EIA, Form EIA-143, "Nonresidential Buildings Energy Consumption Survey." • 1983—EIA, Form EIA-788, "Nonresidential Buildings Energy Consumption Survey." • 1986—EIA, Form EIA-871, "Nonresidential Buildings Energy Consumption Survey." • 1989, 1992, and 1995—EIA, Form EIA-871A-F, "Commercial Buildings Energy Consumption Survey."

Figure 2.12 Commercial Buildings Energy Intensities by Building Characteristic, 1995



¹ Includes buildings that do not fit into any of the other named categories.

Notes: •See Appendix D for Census regions. •Because vertical scales differ, graphs should not be compared.

Source: Table 2.12.

Table 2.12 Commercial Buildings Energy Intensities by Building Characteristic, 1995

(Thousand Btu per Square Foot)

Building Characteristic	Space Heating	Cooling	Ventilation	Water Heating	Lighting	Cooking	Refrigeration	Office Equipment	Other [1]	All End Uses
All Buildings	**29.0**	**6.0**	**2.8**	**13.8**	**20.4**	**3.7**	**3.1**	**5.7**	**6.1**	**90.5**
Building Floorspace (square feet)										
1,001 to 5,000	39.5	7.0	2.9	9.7	22.7	8.9	10.4	5.4	5.1	111.7
5,001 to 10,000	38.5	4.4	1.7	11.1	13.6	4.3	2.5	3.8	2.9	82.8
10,001 to 25,000	27.4	4.8	1.7	9.1	14.7	2.6	2.5	4.3	3.7	70.9
25,001 to 50,000	28.2	6.7	2.1	11.6	18.5	2.1	2.5	5.0	5.2	82.0
50,001 to 100,000	27.0	7.0	3.2	12.9	21.3	2.0	2.1	6.1	6.0	87.6
100,001 to 200,000	26.6	6.2	3.3	19.6	25.0	3.1	1.4	7.2	8.9	101.4
200,001 to 500,000	24.0	6.7	4.5	25.2	27.4	4.6	1.6	8.5	11.9	114.6
Over 500,000	18.5	6.0	3.9	18.0	28.6	3.5	2.2	7.0	9.1	96.8
Principal Building Activity										
Education	32.8	4.8	1.6	17.4	15.8	1.4	1.0	1.5	2.9	79.3
Food Sales	27.5	13.4	4.4	9.1	33.9	5.6	110.9	1.3	7.4	213.5
Food Service	30.9	19.5	5.3	27.5	37.0	77.5	31.6	2.6	13.7	245.5
Health Care	55.2	9.9	7.2	63.0	39.3	11.2	4.7	15.5	34.4	240.4
Lodging	22.7	8.1	1.7	51.4	23.2	6.6	2.3	3.8	7.5	127.3
Mercantile and Service	30.6	5.8	2.5	5.1	23.4	1.5	0.9	2.9	3.7	76.4
Office	24.3	9.1	5.2	8.7	28.1	1.1	0.4	15.1	5.2	97.2
Public Assembly	53.6	6.3	3.5	17.5	21.9	2.8	1.8	2.4	3.8	113.7
Public Order and Safety	27.8	6.1	2.3	23.4	16.4	Q	0.2	5.8	12.7	97.2
Religious Worship	23.7	1.9	0.9	3.2	5.0	0.5	0.6	0.4	1.1	37.4
Warehouse and Storage	15.7	0.9	0.3	2.0	9.8	0.0	1.7	4.4	3.4	38.3
Other [2]	59.6	9.3	8.3	15.3	26.7	Q	0.7	15.2	35.9	172.2
Vacant	11.9	0.6	0.3	2.4	3.6	Q	0.2	0.5	1.9	21.5
Year Constructed										
1919 or Before	34.2	2.6	1.6	10.0	14.9	4.0	1.3	3.2	7.5	79.4
1920 to 1945	37.0	3.4	1.6	10.7	12.3	1.8	1.6	3.3	4.1	75.7
1946 to 1959	37.2	4.4	2.1	14.1	15.5	3.0	2.7	4.6	5.2	88.9
1960 to 1969	30.2	5.7	2.7	16.8	20.4	4.0	3.0	5.3	6.1	94.3
1970 to 1979	26.0	7.2	3.6	15.8	25.6	3.2	3.7	6.7	7.5	99.3
1980 to 1989	19.8	7.8	3.2	11.5	23.5	4.2	3.0	7.6	5.9	86.5
1990 to 1992	26.6	8.4	3.5	17.2	28.7	9.3	5.6	7.9	7.4	114.6
1993 to 1995	24.3	7.9	3.2	11.7	22.7	3.3	7.4	4.9	6.8	92.2
Census Region [3]										
Northeast	32.4	4.0	2.0	14.2	17.7	2.7	3.0	4.5	6.4	87.1
Midwest	46.7	4.3	2.5	15.6	18.8	3.5	2.4	5.1	5.6	104.5
South	18.0	8.4	3.2	10.5	21.3	4.0	3.4	5.9	6.0	80.8
West	23.4	5.5	3.1	17.0	23.6	4.3	3.4	7.2	6.5	94.2

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

[2] Includes buildings that do not fit into any of the other named categories.

[3] See Appendix D for Census regions.

Q=Data withheld because there were fewer than 20 buildings sampled.

Web Page: http://www.eia.doe.gov/emeu/consumption.

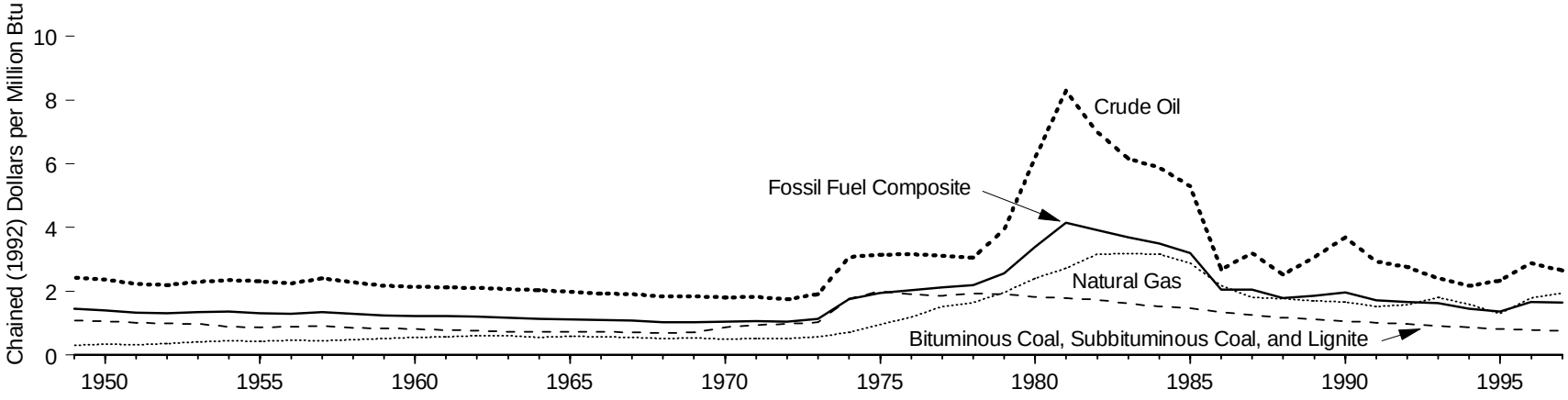
Source: Energy Information Administration, Form EIA-871A/F, "Commercial Buildings Energy Consumption Survey."

3 Financial Indicators

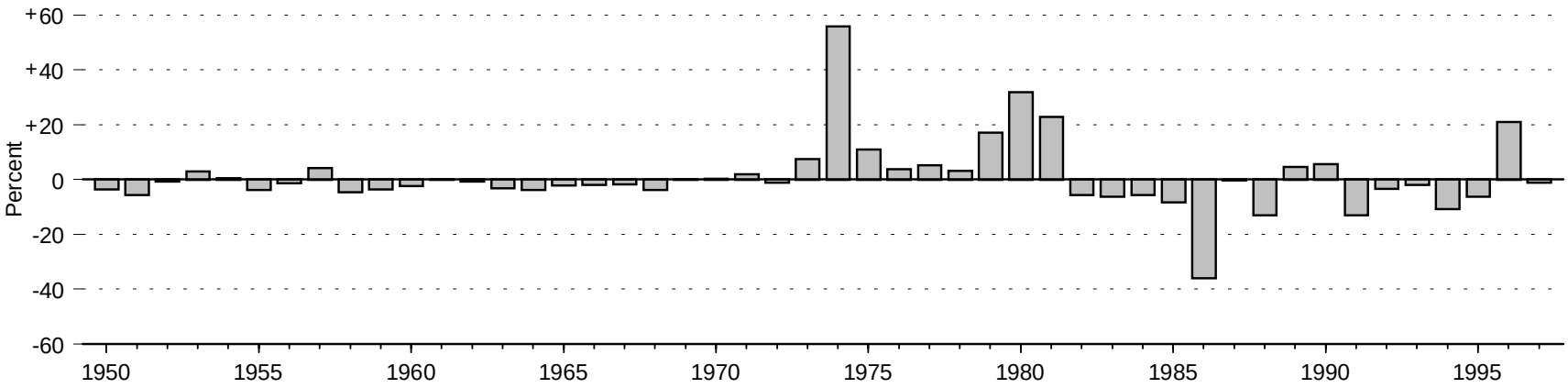
Gas pump, Oregon, 1969. Source: U.S. Department of Energy.

Figure 3.1 Fossil Fuel Production Prices

Prices, 1949-1997



Fossil Fuel Composite Price, Change from Previous Year, 1950-1997



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

Source: Table 3.1.

Table 3.1 Fossil Fuel Production Prices, 1949-1997

(Dollars per Million Btu)

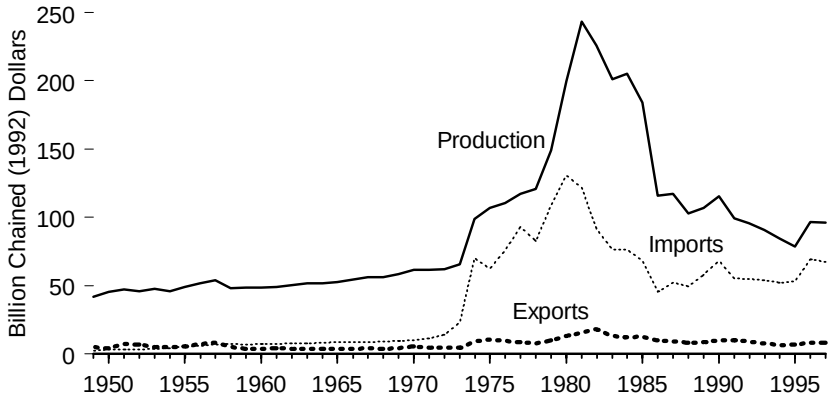
Year	Gross Domestic Product Implicit Price Deflator [1] (1992 = 1.000)	Crude Oil [2]		Natural Gas [3]		Bituminous Coal, Subbituminous Coal, and Lignite [4]		Anthracite [5]		Fossil Fuel Composite [6]		
		Nominal	Real [7]	Nominal	Real [7]	Nominal	Real [7]	Nominal	Real [7]	Nominal	Real [7]	Percent Change [8]
1949	R0.181	0.44	R2.42	0.05	R0.30	0.20	R1.08	0.36	R2.01	0.26	R1.45	–
1950	R0.183	0.43	R2.37	0.06	R0.34	0.19	R1.06	0.38	R2.07	0.26	R1.40	R-3.4
1951	R0.196	0.44	R2.22	0.06	R0.32	0.20	R1.00	0.41	R2.08	0.26	R1.32	R-5.6
1952	R0.199	0.44	R2.19	0.07	R0.36	0.20	R0.98	0.39	R1.98	0.26	R1.31	R-0.7
1953	R0.202	0.46	R2.29	0.08	R0.40	0.20	R0.96	0.41	R2.02	0.27	R1.35	R3.0
1954	R0.204	0.48	R2.35	0.09	R0.44	0.18	R0.88	0.36	R1.77	0.28	R1.36	R0.5
1955	R0.207	0.48	R2.31	0.09	R0.43	0.18	R0.86	0.33	R1.60	0.27	R1.31	R-3.6
1956	R0.215	0.48	R2.24	0.10	R0.46	0.19	R0.89	0.35	R1.62	0.28	R1.29	R-1.2
1957	R0.222	0.53	R2.40	0.10	R0.45	0.20	R0.90	0.38	R1.72	0.30	R1.35	R4.2
1958	R0.227	0.52	R2.29	0.11	R0.48	0.19	R0.86	0.38	R1.67	0.29	R1.29	R-4.5
1959	R0.230	0.50	R2.17	0.12	R0.51	0.19	R0.83	0.36	R1.56	0.29	R1.24	R-3.3
1960	0.233	0.50	2.13	0.13	0.54	0.19	0.81	0.34	1.45	0.28	1.22	R-2.3
1961	R0.235	0.50	R2.12	0.14	R0.57	0.18	R0.78	0.35	R1.47	0.29	R1.22	0.2
1962	R0.238	0.50	R2.10	0.14	R0.61	0.18	R0.76	0.34	R1.41	0.29	R1.21	-0.6
1963	R0.241	0.50	R2.07	0.14	R0.60	0.18	R0.73	0.37	R1.52	0.28	R1.17	-3.0
1964	0.245	0.50	2.03	0.14	0.56	0.18	0.73	0.38	1.55	0.28	1.13	R-3.7
1965	0.250	0.49	1.97	0.14	0.58	0.18	0.72	0.36	1.45	0.28	1.11	-2.0
1966	0.257	0.50	1.93	0.14	0.56	0.18	0.72	0.35	1.35	0.28	1.09	-1.7
1967	0.265	0.50	1.90	0.14	0.55	0.19	0.71	0.36	1.36	0.28	1.07	-1.6
1968	R0.276	0.51	R1.84	0.14	R0.52	0.19	R0.69	0.39	R1.42	0.28	R1.03	R-3.6
1969	R0.289	0.53	R1.84	0.15	R0.53	0.20	R0.71	0.44	R1.52	0.30	R1.04	0.2
1970	R0.305	0.55	R1.80	0.15	R0.50	0.26	R0.86	0.49	R1.60	0.32	R1.04	R0.4
1971	R0.321	0.58	R1.82	0.16	R0.51	0.30	R0.94	0.53	R1.66	0.34	R1.06	1.9
1972	R0.334	0.58	R1.75	0.17	R0.52	0.33	R0.98	0.55	R1.66	0.35	R1.05	-1.0
1973	R0.353	0.67	R1.90	0.20	R0.57	0.36	R1.03	0.62	R1.75	0.40	R1.13	R7.5
1974	0.385	1.18	3.08	0.27	0.71	0.68	1.77	1.02	2.66	0.68	1.76	R55.8
1975	R0.421	1.32	R3.14	0.40	R0.96	0.84	R1.99	1.50	R3.55	0.82	R1.95	R11.0
1976	0.446	1.41	3.17	0.53	1.19	0.85	1.91	1.54	3.45	0.90	2.02	R3.7
1977	0.474	1.48	3.12	0.72	1.52	0.88	1.85	1.54	3.24	1.01	2.13	5.2
1978	R0.509	1.55	R3.05	0.84	R1.64	0.98	R1.92	1.53	R3.00	1.12	R2.19	R3.1
1979	R0.552	2.18	R3.95	1.08	R1.96	1.05	R1.91	1.77	R3.21	1.42	R2.57	17.1
1980	R0.603	3.72	R6.17	1.45	R2.40	1.09	R1.81	1.86	R3.08	2.04	R3.39	R31.9
1981	R0.660	5.48	R8.30	1.80	R2.72	1.18	R1.79	1.90	R2.88	2.74	R4.16	R22.8
1982	R0.702	4.92	R7.00	2.22	R3.16	1.22	R1.74	2.14	R3.05	2.76	R3.93	-5.6
1983	R0.732	4.52	R6.17	2.32	R3.17	1.17	R1.60	2.30	R3.14	2.70	R3.69	R-6.0
1984	0.759	4.46	5.88	2.40	3.16	1.16	1.53	2.09	2.75	2.65	3.49	R-5.5
1985	R0.785	4.15	R5.29	2.26	R2.88	1.15	R1.46	2.04	R2.60	2.51	R3.20	R-8.2
1986	0.806	2.16	2.68	1.75	2.17	1.08	1.34	1.91	2.37	1.65	2.05	R-35.9
1987	0.831	2.66	3.20	1.50	1.81	1.05	1.26	1.89	2.27	1.70	2.05	-0.2
1988	0.861	2.17	2.52	1.52	1.77	1.01	1.17	1.90	2.20	1.53	1.78	-13.0
1989	0.897	2.73	3.05	1.53	1.70	1.00	1.12	1.84	2.05	1.67	1.86	4.7
1990	0.936	3.45	3.69	1.55	1.65	1.00	1.06	1.74	1.86	1.84	1.97	5.7
1991	0.973	2.85	2.93	1.48	1.52	0.99	1.02	1.61	1.66	1.67	1.72	-12.8
1992	1.000	2.76	2.76	1.57	1.57	R0.97	R0.97	1.52	1.52	R1.66	R1.66	R-3.3
1993	1.026	2.46	2.40	1.84	1.80	0.93	0.90	1.46	1.42	1.67	1.63	R-1.8
1994	R1.051	2.27	R2.16	1.67	R1.59	0.91	R0.86	1.60	R1.52	1.53	R1.46	R-10.7
1995	R1.078	2.52	R2.34	1.40	R1.30	0.88	R0.82	1.76	R1.64	1.47	R1.37	-6.0
1996	R1.102	3.18	R2.89	R1.96	R1.78	R0.87	R0.79	R1.63	R1.48	R1.82	R1.65	R21.0
1997P	1.124	2.97	2.64	2.18	1.94	0.85	0.76	1.51	1.34	1.84	1.64	-1.0

[1] See Glossary.
[2] Domestic first purchase prices.
[3] Wellhead prices.
[4] Prices are based on the value of coal produced at free-on-board (f.o.b.) mines.
[5] Through 1978, prices are f.o.b. preparation plants; for 1979 forward, prices are f.o.b. mines.
[6] 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.
[7] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators.
[8] Based on real values.
R=Revised. P=Preliminary. — = Not applicable.

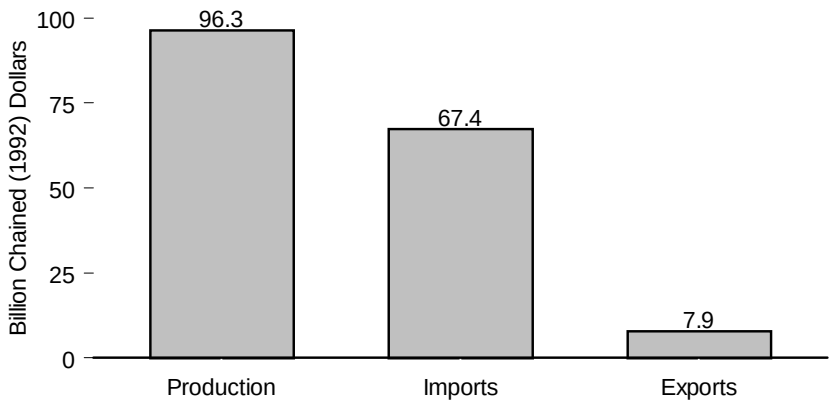
Sources: **Gross Domestic Product Implicit Price Deflator** • 1949-1994—Department of Commerce (DOC), Bureau of Economic Analysis (BEA), *Survey of Current Business,* "Price Indexes and the Gross Domestic Product and Gross Purchases Implicit Price Deflators" (August 1997), Table 3. • 1995-1997—*DOC,BEA News Release* (Washington DC, March 12, 1998), Table 4. **Fuel Prices:** Tables 5.16, 6.8, and 7.8, and Appendix A.

Figure 3.2 Value of Fossil Fuel Production

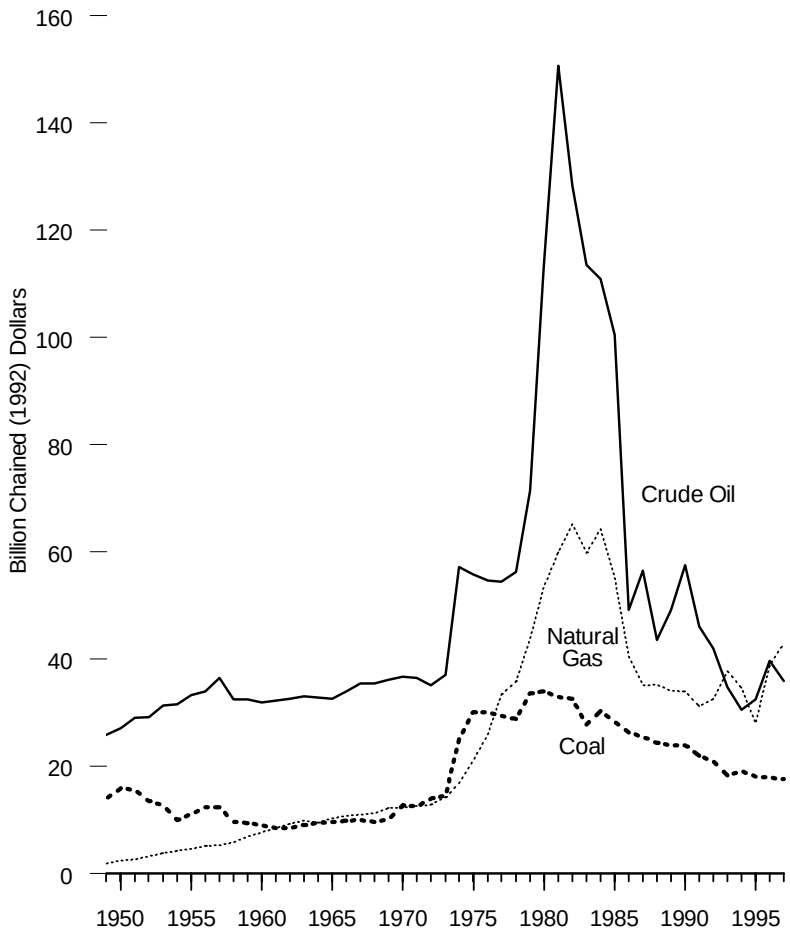
Overview, 1949-1997



Overview, 1997



Production by Fuel, 1949-1997



Notes: • Prices are in chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1. • Because vertical scales differ, graphs should not be compared.

Sources: Tables 3.2, 3.5, and 3.6.

Table 3.2 Value of Fossil Fuel Production, 1949-1997

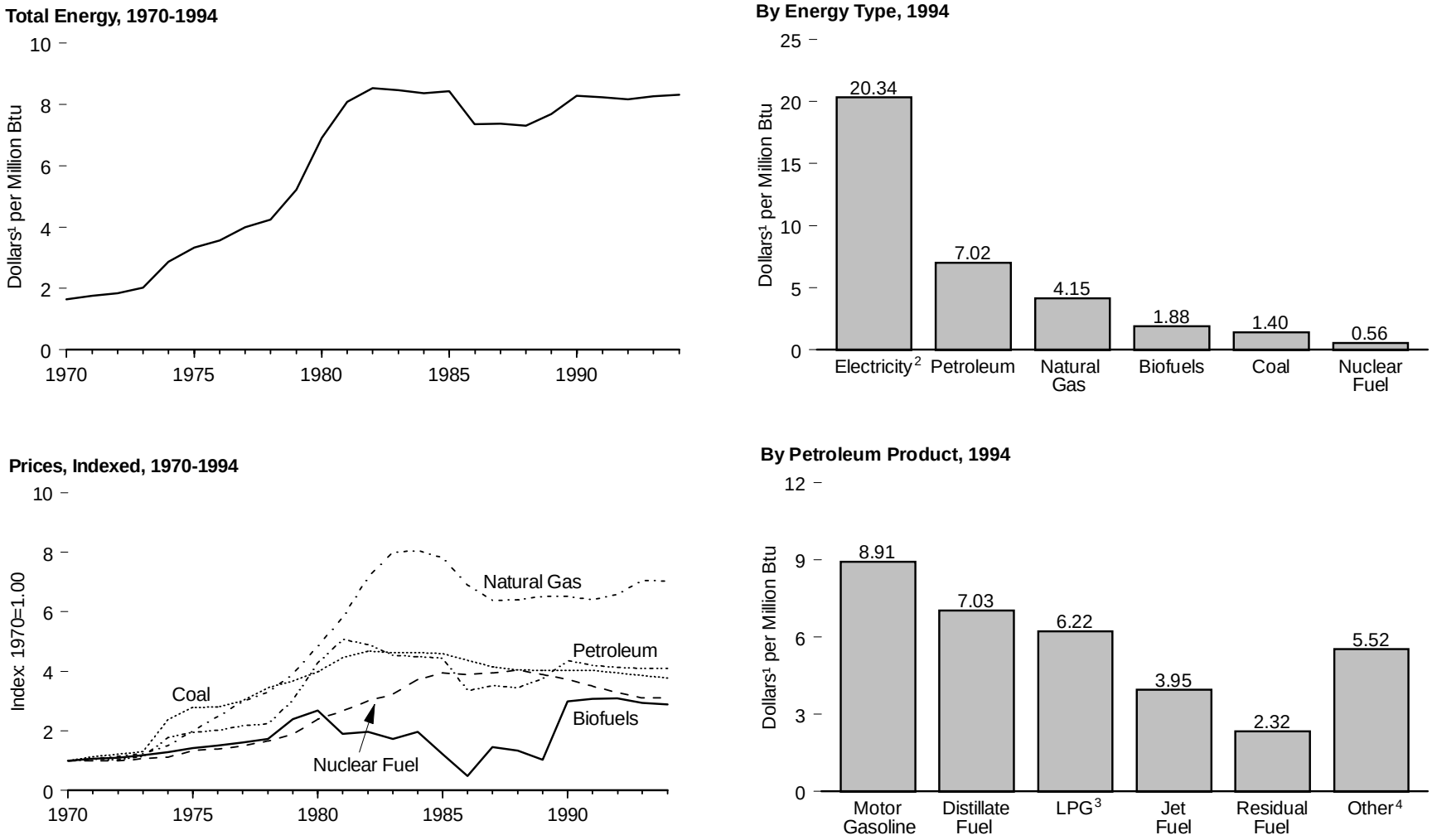
(Billion Dollars)

	Crude Oil [1]		Natural Gas (Marketed Production)		Coal						Total	
					Bituminous Coal, Subbituminous Coal, and Lignite		Anthracite		Total			
Year	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]
1949	4.68	R25.86	0.33	R1.82	2.14	R11.82	0.38	R2.10	2.52	R13.92	7.53	R41.60
1950	4.95	R27.05	0.44	R2.40	2.50	R13.66	0.41	R2.24	2.91	R15.90	8.30	R45.35
1951	5.69	R29.03	0.52	R2.65	2.63	R13.42	0.42	R2.14	3.05	R15.56	9.26	R47.24
1952	5.79	R29.10	0.64	R3.22	2.29	R11.51	0.39	R1.96	2.68	R13.47	9.11	R45.79
1953	6.32	R31.29	0.76	R3.76	2.25	R11.14	0.31	R1.53	2.56	R12.67	9.64	R47.72
1954	6.44	R31.57	0.87	R4.26	1.77	R8.68	0.25	R1.23	2.02	R9.91	9.33	R45.74
1955	6.88	R33.24	0.94	R4.54	2.09	R10.10	0.21	R1.01	2.30	R11.11	10.12	R48.89
1956	7.30	R33.95	1.11	R5.16	2.41	R11.21	0.24	R1.12	2.65	R12.33	11.06	R51.44
1957	8.09	R36.44	1.17	R5.27	2.50	R11.26	0.23	R1.04	2.73	R12.30	11.99	R54.01
1958	7.37	R32.47	1.32	R5.81	1.99	R8.77	0.19	R0.84	2.18	R9.61	10.87	R47.89
1959	7.47	R32.48	1.57	R6.83	1.97	R8.57	0.18	R0.78	2.15	R9.35	11.19	R48.66
1960	7.42	31.85	1.79	7.68	1.95	8.37	0.15	0.64	2.10	9.01	11.31	48.54
1961	7.58	R32.26	1.99	R8.47	1.85	R7.87	0.14	R0.60	1.99	R8.47	11.56	R49.20
1962	7.76	R32.61	2.22	R9.33	1.89	R7.94	0.13	R0.55	2.02	R8.49	12.00	R50.43
1963	7.96	R33.03	2.36	R9.79	2.01	R8.34	0.16	0.66	2.17	R9.00	12.49	R51.82
1964	8.03	32.78	2.33	9.51	2.17	8.86	0.15	0.61	2.32	9.47	12.68	51.76
1965	8.15	32.60	2.57	10.28	2.27	9.08	0.13	0.52	2.40	9.60	13.12	52.48
1966	8.72	33.93	2.75	10.70	2.42	9.42	0.10	0.39	2.52	9.81	13.99	54.44
1967	9.39	35.43	2.91	10.98	2.55	9.62	0.10	0.38	2.65	10.00	14.95	56.41
1968	9.79	R35.47	3.09	R11.20	2.55	R9.24	0.10	0.36	2.65	R9.60	15.53	R56.27
1969	10.42	R36.06	3.52	R12.18	2.80	R9.69	0.10	R0.35	2.90	R10.04	16.84	R58.28
1970	11.19	R36.69	3.73	R12.23	3.77	R12.36	0.11	0.36	3.88	R12.72	18.80	R61.64
1971	11.71	R36.48	4.05	R12.62	3.90	R12.15	0.11	0.34	4.01	R12.49	19.77	R61.59
1972	11.71	R35.06	4.28	R12.81	4.56	R13.65	0.09	0.27	4.65	R13.92	20.64	R61.79
1973	13.07	R37.03	4.98	R14.11	5.05	R14.31	0.09	0.25	5.14	R14.56	23.19	R65.70
1974	22.00	57.14	6.48	16.83	9.50	24.68	0.15	0.39	9.65	25.07	38.13	99.04
1975	23.45	R55.70	8.85	R21.02	12.47	R29.62	0.20	R0.48	12.67	R30.10	44.97	R106.82
1976	24.37	54.64	11.57	25.94	13.19	29.57	0.21	0.47	13.40	30.04	49.34	110.62
1977	25.79	54.41	15.82	33.38	13.70	28.90	0.20	0.42	13.90	29.32	55.51	117.11
1978	28.60	R56.19	18.18	R35.72	14.49	R28.47	0.18	0.35	14.67	R28.82	61.45	R120.73
1979	39.45	R71.47	24.16	R43.77	18.36	R33.26	0.20	0.36	18.56	R33.62	82.17	R148.86
1980	67.93	R112.65	32.09	R53.22	20.20	R33.50	0.26	0.43	20.46	R33.93	120.48	R199.80
1981	99.40	R150.61	39.51	R59.86	21.51	R32.59	0.24	0.36	21.75	R32.95	160.66	R243.42
1982	90.03	R128.25	45.71	R65.11	22.62	R32.22	0.23	0.33	22.85	R32.55	158.59	R225.91
1983	83.05	R113.46	43.73	R59.74	20.11	R27.47	0.21	0.29	20.32	R27.76	147.10	R200.96
1984	84.10	110.80	48.69	64.15	22.75	29.97	0.20	0.26	22.95	30.23	155.74	205.18
1985	78.88	R100.48	43.35	R55.22	22.06	R28.10	0.22	0.28	22.28	R28.38	144.51	R184.08
1986	39.63	49.17	32.71	40.58	21.00	26.05	0.19	0.24	21.19	26.29	93.53	116.04
1987	46.93	56.47	29.11	35.03	21.05	25.33	0.16	0.19	21.21	25.52	97.25	117.02
1988	37.48	43.53	30.28	35.17	20.83	24.19	0.16	0.19	20.99	24.38	88.75	103.08
1989	44.07	49.13	30.58	34.09	21.27	23.71	0.14	0.16	21.41	23.87	96.06	107.09
1990	53.77	57.45	31.80	33.97	22.27	23.79	0.14	0.15	22.41	23.94	107.98	115.36
1991	44.77	46.01	30.39	31.23	21.29	21.88	0.13	0.13	21.42	22.01	96.58	99.25
1992	41.97	41.97	32.56	32.56	R20.87	R20.87	0.12	0.12	R20.99	R20.99	R95.52	R95.52
1993	35.61	34.71	38.72	37.74	18.62	18.15	0.14	0.14	18.76	18.29	93.09	90.74
1994	32.07	R30.51	36.46	R34.69	R19.90	R18.93	0.17	0.16	R20.07	R19.09	R88.60	R84.29
1995	35.00	R32.47	30.24	R28.05	19.27	R17.88	0.19	0.18	19.46	R18.06	84.70	R78.58
1996	R43.68	R39.64	R42.86	R38.89	R19.51	R17.70	0.17	0.15	R19.68	R17.85	R106.22	R96.38
1997P	40.34	35.89	48.13	42.82	19.63	17.46	0.17	0.15	19.80	17.61	108.27	96.32

[1] Includes lease condensate.
[2] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.
R=Revised. P=Preliminary.

Note: Value is based on fuel prices taken as closely as possible to the point of production.
Web Page: http://www.eia.doe.gov/
Sources: Tables 5.1, 5.16, 6.2, 6.8, 7.2, and 7.8.

Figure 3.3 Consumer Price Estimates for Energy



[1] Nominal dollars.
[2] Electricity purchased by end users.
[3] Liquefied petroleum gases.
[4] Asphalt, road oil, aviation gasoline and aviation gasoline blending components, crude oil, kerosene, lubricants, motor gasoline blending components, pentanes plus, petrochemical waxes, and miscellaneous petroleum products.

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

Source: Table 3.3

Table 3.3 Consumer Price Estimates for Energy, 1970-1994

(Nominal Dollars per Million Btu)

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

[1] Primary energy is all energy, including that consumed to produce electricity but excluding the electricity produced.

[2] Liquefied petroleum gases.

[3] "Other" is asphalt and road oil, aviation gasoline, kerosene, lubricants, petrochemical feedstocks, petroleum coke, special naphthas, waxes, and miscellaneous petroleum products.

[4] The "Primary Energy Total" and "Total Energy" prices include consumption-weighted average prices for coal coke imports and coal coke exports that are not shown in the other columns. In 1994, coal coke imports averaged 3.31 dollars per million Btu and coal coke exports averaged 2.46 dollars per million Btu.

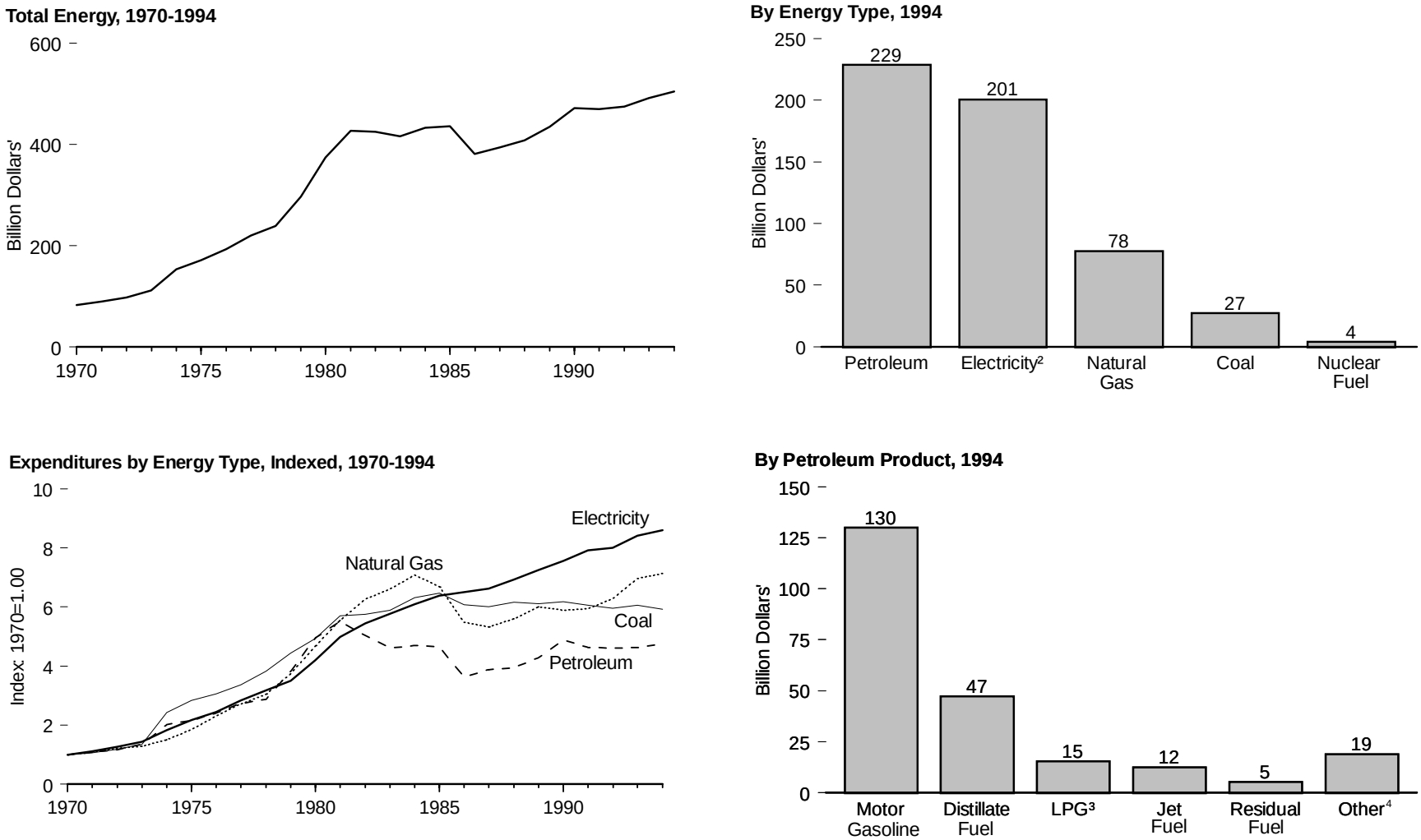
[5] There is a discontinuity in this time series between 1989 and 1990 due to expanded coverage of non-electric utility use of biofuels beginning in 1990.

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

Web Page: http://www.eia.doe.gov/emeu/sep/states.html

Sources: Energy Information Administration, *State Energy Price and Expenditure Report 1994* (June 1997), Table 5.

Figure 3.4 Consumer Expenditure Estimates for Energy



[1] Nominal dollars.
[2] Electricity purchased by end users.
[3] Liquefied petroleum gases.

[4] Asphalt, road oil, aviation gasoline and aviation gasoline blending components, crude oil, kerosene, lubricants, motor gasoline blending components, pentanes plus, petrochemical waxes, and miscellaneous petroleum products.

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

Source: Table 3.4.

Table 3.4 Consumer Expenditure Estimates for Energy, 1970-1994

(Million Nominal Dollars)

	Primary Energy [1]															
				Petroleum												
Year	Coal	Net Imports of Coal Coke [2]	Natural Gas	Distillate Fuel	Jet Fuel	LPG [3]	Motor Gasoline	Residual Fuel	Other [4]	Total	Nuclear Fuel	Biofuels	Total	Electric Utility Fuel	Electricity Purchased by End-Users	Total Energy
1970	4,594	-75	10,891	6,253	1,441	2,446	31,596	2,046	4,306	48,088	44	2	63,544	-4,316	23,351	82,579
1971	4,883	-40	12,065	6,890	1,582	2,531	33,478	2,933	4,616	52,030	73	2	69,013	-5,441	26,208	89,781
1972	5,412	-26	13,198	7,552	1,682	2,889	35,346	3,458	4,939	55,866	104	2	74,556	-6,473	29,718	97,801
1973	6,251	7	13,933	9,524	2,001	3,933	39,667	4,667	5,512	65,304	177	3	85,675	-7,817	33,780	111,638
1974	11,145	150	16,380	15,217	3,208	5,273	54,194	10,547	8,504	96,943	259	2	124,880	-14,391	42,589	153,078
1975	13,047	82	20,061	15,680	4,193	5,231	59,446	10,374	8,934	103,858	448	2	137,499	-16,396	50,680	171,782
1976	14,079	44	25,097	18,402	4,567	5,993	64,977	11,648	10,421	116,008	520	3	155,751	-18,923	56,971	193,799
1977	15,448	67	29,602	22,004	5,517	6,824	70,591	14,381	12,377	131,694	743	5	177,560	-23,392	66,225	220,393
1978	17,595	362	33,185	23,587	6,205	6,621	74,513	13,747	13,881	138,554	915	4	190,615	-25,746	74,164	239,033
1979	20,421	259	40,785	32,854	8,603	9,383	95,916	17,656	19,354	183,766	941	8	246,180	-31,031	82,050	297,199
1980	22,648	-78	51,061	40,797	13,923	10,926	124,408	21,573	26,781	238,408	1,189	8	313,237	-37,435	98,098	373,900
1981	26,231	-31	60,544	48,200	15,607	11,900	138,138	22,668	28,571	265,084	1,436	5	353,268	-43,275	116,453	426,446
1982	26,426	-52	68,292	44,087	14,974	12,925	130,305	17,632	22,449	242,372	1,684	4	338,726	-41,311	127,394	424,809
1983	27,051	-44	72,000	41,846	13,979	14,083	115,816	14,099	21,691	221,514	1,859	4	322,384	-41,336	134,746	415,794
1984	29,049	-22	77,169	44,580	15,097	14,143	114,438	14,410	22,892	225,560	2,384	12	334,151	-43,378	142,438	433,211
1985	29,719	-34	72,938	43,759	14,747	13,108	118,044	11,493	22,199	223,350	2,930	11	328,914	-42,558	149,242	435,597
1986	27,905	-40	59,702	34,995	10,505	12,283	91,526	7,486	17,720	174,515	3,125	4	265,210	-35,793	151,806	381,224
1987	27,585	7	58,019	37,587	11,448	12,412	99,809	8,062	17,419	186,737	3,486	15	275,848	-36,692	154,692	393,848
1988	28,370	116	61,089	38,593	11,318	12,301	103,211	7,259	16,816	189,498	4,111	15	283,199	-37,435	162,070	407,833
1989	28,106	137	65,383	43,246	13,434	11,772	112,585	8,354	17,197	206,588	3,992	14	304,219	-38,895	169,340	434,664
1990	28,381	22	64,102	49,430	17,784	13,187	126,472	8,707	19,413	234,993	4,142	[5]1,645	[5]333,286	-38,441	176,742	[5]471,586
1991	27,866	42	64,697	45,181	14,609	14,372	123,051	6,786	18,376	222,375	4,172	1,809	320,962	-36,500	184,822	469,283
1992	27,417	99	68,401	45,110	13,559	13,628	125,158	5,575	18,867	221,897	3,878	1,828	323,519	-35,763	186,957	474,713
1993	27,857	56	75,941	45,885	13,002	13,432	126,397	5,439	18,463	222,618	3,658	1,737	331,866	-36,651	196,586	491,801
1994	27,251	92	77,753	47,235	12,474	15,286	129,900	5,289	18,856	229,040	3,858	1,750	339,744	-35,951	200,894	504,688

[1] Primary energy is all energy, including that consumed to produce electricity but excluding the electricity produced.

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

[3] Liquefied petroleum gases.

[4] "Other" is asphalt and road oil, aviation gasoline, kerosene, lubricants, petrochemical feedstocks, petroleum coke, special naphthas, waxes, and miscellaneous petroleum products.

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

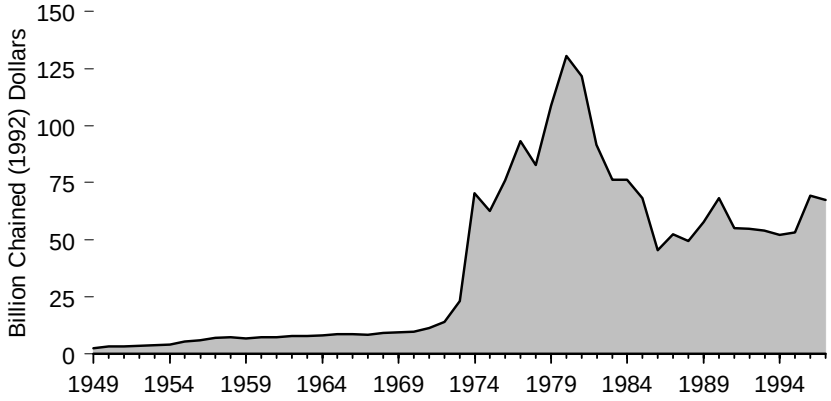
Notes: • There are no direct fuel costs for hydroelectric, geothermal, wind, photovoltaic, or solar thermal energy. • Totals may not equal the sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/emeu/sep/states.html.

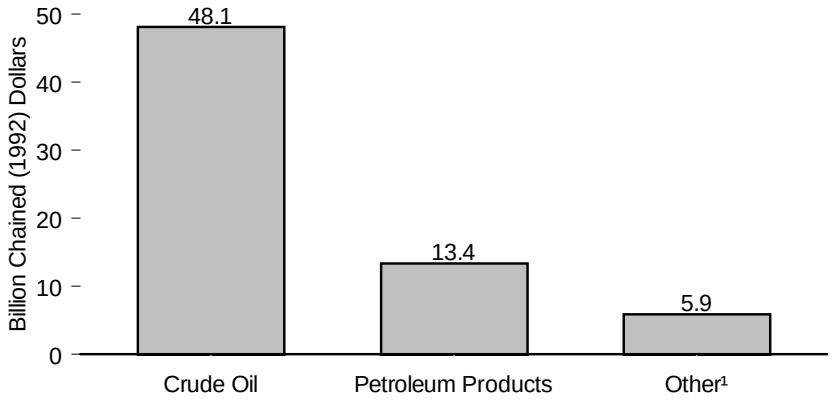
Sources: Energy Information Administration, *State Energy Price and Expenditure Report 1994* (June 1997), Table 5.

Figure 3.5 Value of Fossil Fuel Imports

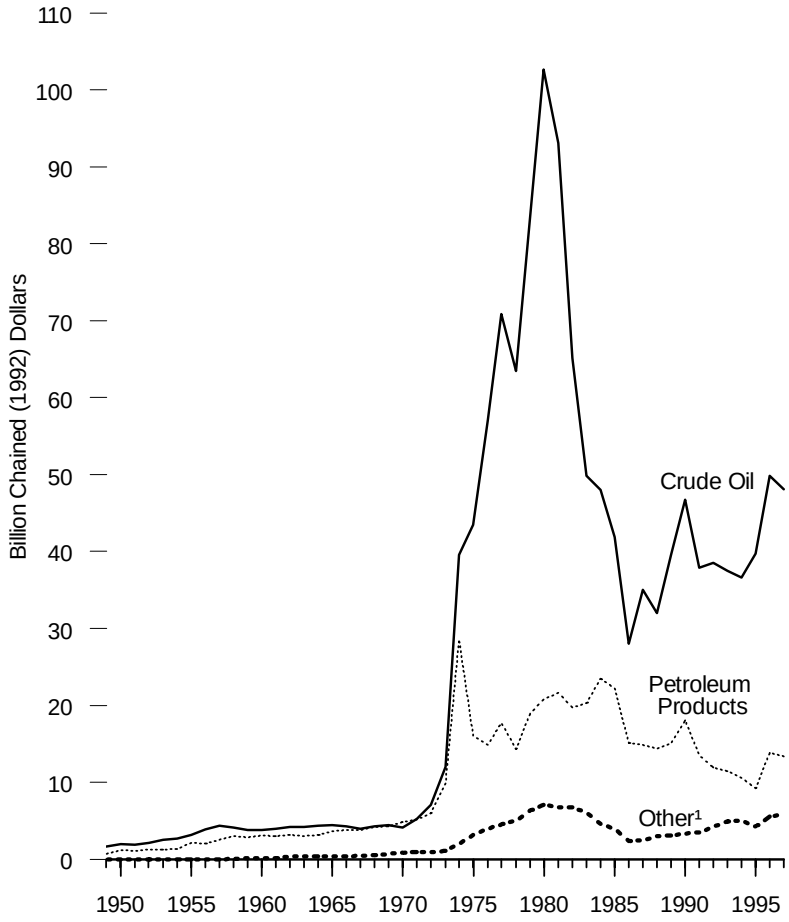
Total, 1949-1997



By Fuel, 1997



By Fuel, 1949-1997



¹ Natural gas, coal, and coal coke.

Notes: • Prices are in chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1. • Because vertical scales differ, graphs should not be compared.

Source: Table 3.5.

Table 3.5 Value of Fossil Fuel Imports, 1949-1997

(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	(s)	R0.01	(s)	R0.02	0.00	0.00	0.30	R1.68	0.14	R0.76	0.45	R2.48
1950	(s)	R0.01	0.01	R0.03	0.00	0.00	0.37	R2.02	0.21	R1.17	0.59	R3.23
1951	(s)	R0.01	(s)	R0.01	0.00	0.00	0.37	R1.91	0.23	R1.16	0.61	R3.09
1952	(s)	R0.01	(s)	R0.02	(s)	(s)	0.42	R2.13	0.25	R1.27	0.68	R3.43
1953	(s)	R0.01	(s)	R0.01	(s)	R0.01	0.51	R2.52	0.25	R1.25	0.77	R3.80
1954	(s)	R0.01	(s)	R0.01	(s)	(s)	0.54	R2.67	0.28	R1.39	0.83	R4.08
1955	(s)	R0.01	(s)	R0.01	(s)	R0.01	0.65	R3.16	0.44	R2.13	1.10	R5.32
1956	(s)	R0.01	(s)	R0.01	(s)	(s)	0.84	R3.90	0.45	R2.08	1.29	R6.01
1957	(s)	R0.01	(s)	R0.01	(s)	R0.01	0.98	R4.42	0.57	R2.56	1.56	R7.01
1958	(s)	R0.01	(s)	R0.01	0.02	R0.10	0.94	R4.14	0.68	R3.02	1.65	R7.27
1959	(s)	0.01	(s)	0.01	0.03	0.11	0.87	R3.79	0.66	R2.88	1.57	R6.81
1960	(s)	0.01	(s)	0.01	0.03	0.12	0.90	3.84	0.73	3.14	1.66	7.12
1961	(s)	0.01	(s)	0.01	0.04	0.19	0.93	R3.97	0.71	R3.02	1.69	R7.20
1962	(s)	0.01	(s)	0.01	0.09	0.36	1.01	R4.25	0.75	R3.17	1.86	R7.79
1963	(s)	0.01	(s)	0.01	0.10	0.41	1.03	R4.25	0.74	R3.06	1.87	R7.74
1964	(s)	0.01	(s)	0.01	0.10	0.41	1.08	4.41	0.78	3.20	1.97	8.03
1965	(s)	0.01	(s)	0.01	0.11	0.42	1.12	4.48	0.92	3.69	2.15	8.61
1966	(s)	0.01	(s)	0.01	0.11	0.41	1.12	4.34	0.99	3.84	2.21	8.61
1967	(s)	0.01	(s)	0.01	0.13	0.49	1.06	4.02	1.02	3.83	2.21	8.35
1968	(s)	0.01	(s)	0.01	0.15	0.53	1.18	R4.29	1.16	R4.22	2.50	R9.05
1969	(s)	(s)	(s)	0.01	0.20	0.67	1.30	R4.49	1.24	R4.29	2.74	R9.47
1970	(s)	(s)	(s)	0.01	0.26	0.84	1.26	R4.13	1.48	R4.86	3.00	R9.85
1971	(s)	0.01	0.01	0.02	0.31	0.97	1.69	R5.26	1.66	R5.16	3.66	R11.41
1972	(s)	(s)	(s)	0.01	0.31	0.94	2.37	R7.09	1.99	R5.96	4.68	R14.01
1973	(s)	(s)	0.04	0.11	0.36	R1.03	4.24	R12.01	3.50	R9.91	8.14	R23.06
1974	0.06	0.15	0.19	0.50	0.53	1.38	15.25	39.62	11.01	28.61	27.05	70.25
1975	0.02	0.05	0.16	0.37	1.15	2.73	18.29	R43.45	6.77	R16.08	26.39	R62.68
1976	0.02	0.04	0.11	0.25	1.66	3.72	25.46	57.08	6.65	14.91	33.90	76.00
1977	0.04	0.08	0.13	0.28	2.00	4.22	33.59	70.87	8.42	17.76	44.18	93.20
1978	0.07	0.15	0.41	0.80	2.06	R4.05	32.30	R63.45	7.30	R14.35	42.15	R82.80
1979	0.05	0.09	0.34	R0.62	3.13	R5.66	46.06	R83.44	10.45	R18.93	60.03	R108.74
1980	0.03	0.05	0.05	0.09	4.21	R6.99	61.90	R102.65	12.54	R20.80	78.74	R130.57
1981	0.03	0.05	0.04	R0.06	4.41	R6.69	61.46	R93.12	14.30	R21.66	80.24	R121.58
1982	0.02	0.03	0.01	0.01	4.69	R6.69	45.72	R65.13	13.86	R19.75	64.31	R91.61
1983	0.04	0.06	(s)	(s)	4.39	R5.99	36.49	R49.85	14.84	R20.27	55.77	R76.18
1984	0.05	0.06	0.05	0.06	3.44	4.53	36.44	48.02	17.87	23.54	57.84	76.21
1985	0.07	0.09	0.04	0.05	3.05	R3.88	32.90	R41.91	17.47	R22.25	53.53	R68.19
1986	0.08	0.10	0.03	0.03	1.82	2.26	22.61	28.05	12.18	15.11	36.72	45.55
1987	0.06	0.07	0.05	0.07	1.93	2.32	29.13	35.05	12.37	14.88	43.54	52.39
1988	0.06	0.07	0.19	0.22	2.38	2.76	27.55	31.99	12.43	14.44	42.62	49.50
1989	0.10	0.11	0.22	0.24	2.51	2.79	35.53	39.61	13.50	15.05	51.85	57.80
1990	0.09	0.10	0.07	0.08	2.97	3.18	43.78	46.78	16.90	18.06	63.83	68.19
1991	0.11	0.12	0.09	0.10	3.24	3.33	36.90	37.93	13.17	13.54	53.51	55.00
1992	0.13	0.13	0.14	0.14	3.96	3.96	38.55	38.55	11.98	11.98	54.77	54.77
1993	0.22	0.21	0.12	0.11	4.77	4.65	38.47	37.49	11.74	11.44	55.31	53.91
1994	0.23	0.22	0.13	0.13	4.90	R4.66	38.48	R36.61	11.14	R10.60	54.89	R52.22
1995	0.25	0.23	0.16	0.15	4.23	R3.92	42.81	R39.72	9.95	R9.23	57.39	R53.24
1996	0.24	0.22	0.11	0.10	R5.79	R5.25	R54.93	R49.85	R15.27	R13.85	R76.34	R69.27
1997P	0.26	0.23	0.12	0.11	6.20	5.52	54.09	48.12	15.03	13.37	75.70	67.35

[1] Includes imports into the Strategic Petroleum Reserve, which began in 1977.
[2] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

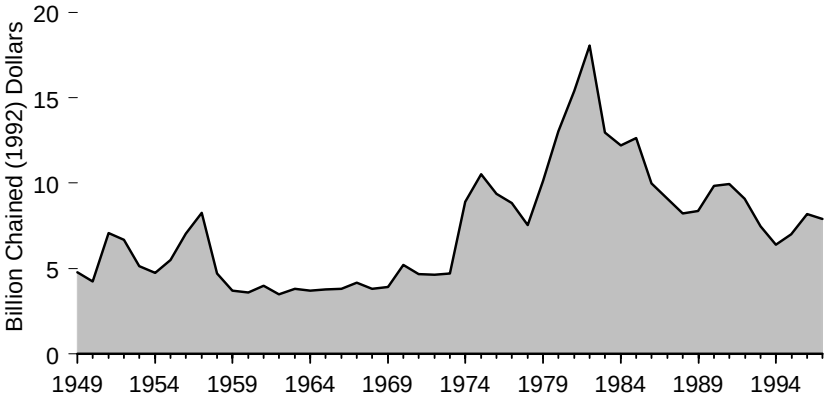
R=Revised data. P=Preliminary data. (s)=Less than $5 million.

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

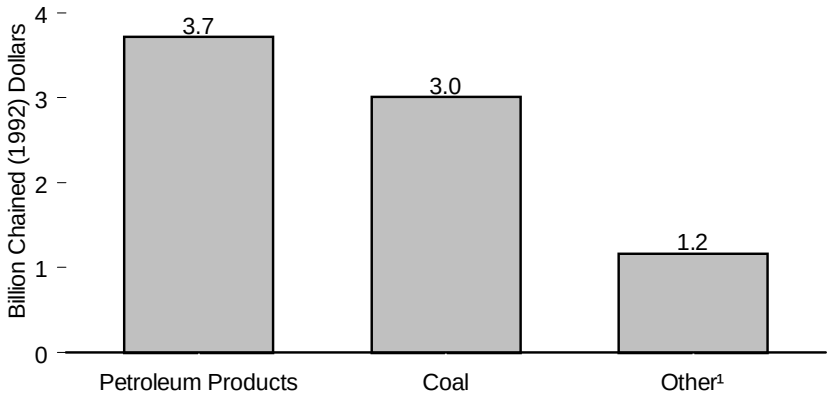
Sources: **Natural Gas:** • 1949-1962—Bureau of the Census, *U.S. Imports of Merchandise for Consumption,* FT110. • 1963—Bureau of the Census, *U.S. Imports of Merchandise for Consumption,* FT125. • 1964-1971—Bureau of the Census, *U.S. Imports for Consumption and General Imports,* FT246. • 1972 and 1973—Federal Power Commission, *Pipeline Imports and Exports of Natural Gas - Imports and Exports of LNG.* • 1974-1977—Federal Power Commission, *United States Imports and Exports of Natural Gas,* annual. • 1978-1981—Energy Information Administration (EIA), *U.S. Imports and Exports of Natural Gas,* annual. • 1982-1996—EIA, *Natural Gas Monthly, August Issue.* • 1997—EIA estimates.
All Other Data: • 1949-1962—Bureau of the Census, *U.S. Imports of Merchandise for Consumption,* FT110. • 1963—Bureau of the Census, *U.S. Imports of Merchandise for Consumption,* FT125. • 1964-1988—Bureau of the Census, *U.S. Imports for Consumption,* FT135. • 1989-1993—Bureau of the Census, *Advanced Report on U.S. Merchandise Trade,* FT900 Advance (94-12). • 1994-1996—Bureau of the Census, *U.S. International Trade in Goods and Services,* FT900 Advance (96-12). • 1996 and 1997—Bureau of the Census, *Foreign Trade Division,* FT900 (CB-97-26), December Issue.

Figure 3.6 Value of Fossil Fuel Exports

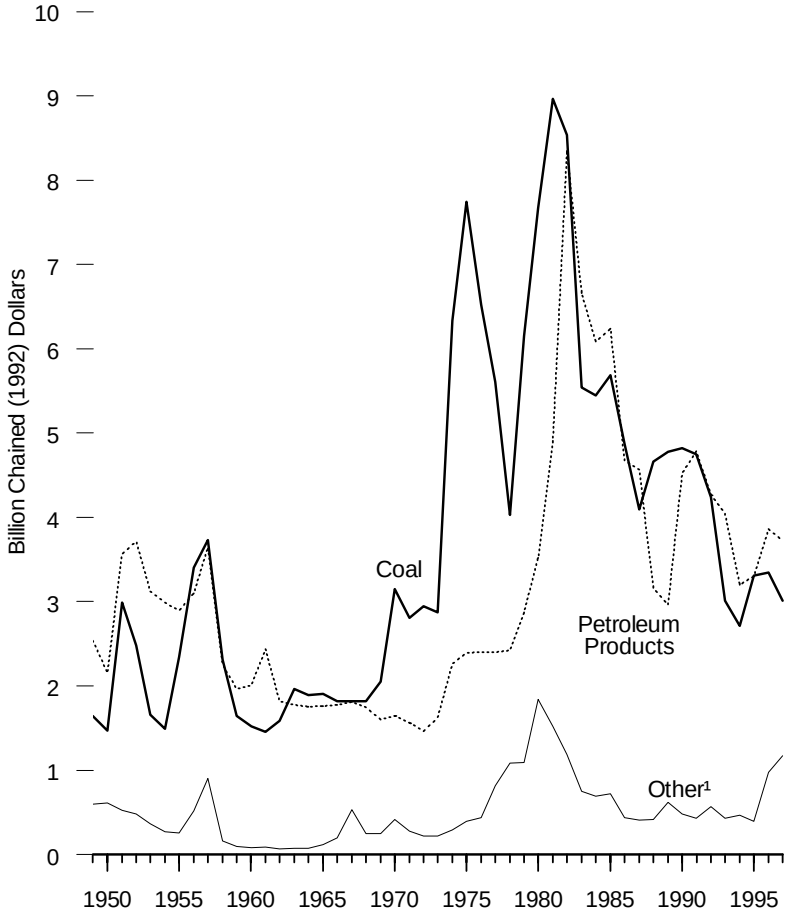
Total, 1949-1997



By Fuel, 1997



By Fuel, 1949-1997



¹ Natural gas, crude oil, and coal coke.

Notes: • Prices are in chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1. Because vertical scales differ, graphs should not be compared.

Source: Table 3.6.

Table 3.6 Value of Fossil Fuel Exports, 1949-1997

(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	[R]1.64	0.01	[R]0.05	(s)	[R]0.01	0.10	[R]0.54	0.46	[R]2.55	0.87	[R]4.79
1950	0.27	[R]1.47	0.01	[R]0.03	(s)	[R]0.02	0.10	[R]0.56	0.39	[R]2.16	0.78	[R]4.24
1951	0.59	[R]2.99	0.02	[R]0.09	(s)	[R]0.02	0.08	[R]0.42	0.70	[R]3.57	1.39	[R]7.08
1952	0.49	[R]2.48	0.01	[R]0.07	(s)	[R]0.02	0.08	[R]0.39	0.74	[R]3.72	1.33	[R]6.68
1953	0.34	[R]1.66	0.01	[R]0.05	(s)	[R]0.02	0.06	[R]0.30	0.63	[R]3.12	1.04	[R]5.14
1954	0.30	[R]1.49	0.01	[R]0.03	(s)	[R]0.02	0.05	[R]0.22	0.61	[R]2.99	0.97	[R]4.75
1955	0.48	[R]2.34	0.01	[R]0.04	0.01	[R]0.03	0.04	[R]0.19	0.60	[R]2.90	1.14	[R]5.50
1956	0.73	[R]3.41	0.01	[R]0.05	0.01	[R]0.04	0.09	[R]0.42	0.67	[R]3.10	1.51	[R]7.02
1957	0.83	[R]3.73	0.01	[R]0.06	0.01	[R]0.06	0.17	[R]0.78	0.81	[R]3.64	1.84	[R]8.27
1958	0.53	[R]2.32	0.01	[R]0.03	0.01	[R]0.06	0.01	[R]0.06	0.51	[R]2.25	1.07	[R]4.73
1959	0.38	[R]1.64	0.01	0.04	0.01	0.03	0.01	0.03	0.45	[R]1.96	0.85	[R]3.70
1960	0.35	1.52	0.01	0.03	(s)	0.02	0.01	0.03	0.47	2.00	0.84	3.60
1961	0.34	1.45	0.01	0.03	(s)	0.02	0.01	0.04	0.57	[R]2.44	0.93	[R]3.98
1962	0.38	1.58	0.01	0.03	(s)	0.02	0.01	0.02	0.43	[R]1.82	0.83	[R]3.47
1963	0.47	1.96	0.01	0.03	(s)	0.02	(s)	0.02	0.43	[R]1.78	0.92	[R]3.81
1964	0.46	1.89	0.01	0.04	(s)	0.02	(s)	0.02	0.43	1.75	0.91	3.72
1965	0.48	1.91	0.02	0.07	0.01	0.03	(s)	0.02	0.44	1.76	0.95	3.78
1966	0.47	1.82	0.02	0.09	0.02	0.07	0.01	0.04	0.46	1.77	0.97	3.79
1967	0.48	1.82	0.02	0.06	0.03	0.12	0.09	0.35	0.48	1.81	1.10	4.16
1968	0.50	[R]1.82	0.02	0.07	0.04	0.14	0.01	0.04	0.48	1.74	1.05	[R]3.81
1969	0.59	2.05	0.04	0.13	0.03	0.09	0.01	0.02	0.46	[R]1.60	1.13	[R]3.90
1970	0.96	[R]3.15	0.08	0.26	0.03	0.10	0.02	0.06	0.50	1.64	1.59	[R]5.21
1971	0.90	[R]2.81	0.04	0.14	0.04	0.12	0.01	0.02	0.50	1.56	1.49	[R]4.65
1972	0.98	[R]2.95	0.03	0.09	0.04	0.12	(s)	0.01	0.49	1.46	1.55	[R]4.63
1973	1.01	[R]2.87	0.03	0.09	0.04	0.12	(s)	0.01	0.57	1.62	1.66	[R]4.71
1974	2.44	6.33	0.04	0.11	0.05	0.14	0.01	0.04	0.87	2.27	3.42	8.89
1975	3.26	[R]7.74	0.07	0.18	0.09	0.22	(s)	(s)	1.01	2.39	4.43	[R]10.53
1976	2.91	6.53	0.07	0.15	0.10	0.23	0.03	0.06	1.07	2.40	4.17	9.36
1977	2.66	5.60	0.07	0.15	0.11	0.23	0.21	0.44	1.14	2.40	4.18	8.82
1978	2.05	[R]4.03	0.05	0.10	0.11	0.22	0.39	[R]0.77	1.23	2.42	3.83	[R]7.53
1979	3.40	[R]6.16	0.08	0.15	0.13	0.23	0.39	0.71	1.58	[R]2.87	5.58	[R]10.12
1980	4.63	[R]7.67	0.13	0.22	0.23	0.38	0.75	1.24	2.12	[R]3.52	7.86	[R]13.03
1981	5.92	[R]8.96	0.07	0.11	0.35	0.53	0.58	[R]0.87	3.24	4.91	10.16	[R]15.39
1982	5.99	[R]8.53	0.06	0.09	0.30	0.43	0.47	0.67	5.86	[R]8.35	12.68	[R]18.07
1983	4.06	[R]5.54	0.05	0.06	0.28	0.38	0.22	0.31	4.88	[R]6.66	9.48	[R]12.95
1984	4.13	5.44	0.07	0.09	0.27	0.35	0.19	0.24	4.62	6.08	9.27	12.22
1985	4.47	[R]5.69	0.08	0.10	0.26	0.34	0.23	0.29	4.90	6.24	9.93	[R]12.65
1986	3.93	4.88	0.07	0.08	0.17	0.21	0.12	0.15	3.77	4.67	8.05	9.99
1987	3.40	4.10	0.05	0.06	0.17	0.20	0.13	0.15	3.80	4.57	7.54	9.07
1988	4.01	4.66	0.08	0.09	0.20	0.23	0.08	0.09	2.72	3.16	7.09	8.24
1989	4.29	4.78	0.08	0.09	0.27	0.30	0.21	0.23	2.65	2.96	7.49	8.35
1990	4.51	4.82	0.05	0.05	0.27	0.28	0.14	0.15	4.23	4.52	9.20	9.82
1991	4.62	4.75	0.05	0.05	0.33	0.34	0.03	0.03	4.65	4.78	9.69	9.96
1992	4.24	4.24	0.04	0.04	0.49	0.49	0.03	0.03	4.27	4.27	9.07	9.07
1993	3.09	3.01	0.06	0.06	0.36	0.35	0.02	0.02	4.15	4.04	7.68	7.48
1994	2.85	[R]2.71	0.04	0.04	0.40	0.39	0.05	0.05	3.36	3.20	6.71	[R]6.38
1995	3.57	3.31	0.05	0.05	0.37	0.34	0.01	0.01	3.56	[R]3.30	7.55	[R]7.00
1996	3.69	[R]3.35	0.06	0.06	[R]0.46	[R]0.41	[R]0.56	[R]0.51	4.25	[R]3.86	[R]9.02	[R]8.18
1997[P]	3.39	3.01	0.05	0.05	0.48	0.43	0.78	0.69	4.18	3.72	8.88	7.90

[1] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

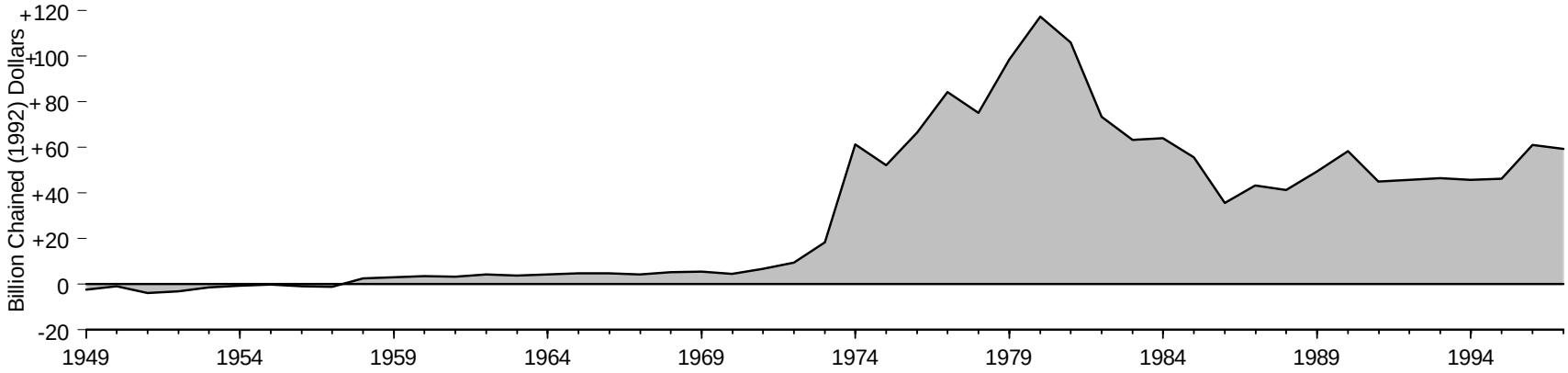
R=Revised data. P=Preliminary data. (s)=Less than $5 million.

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

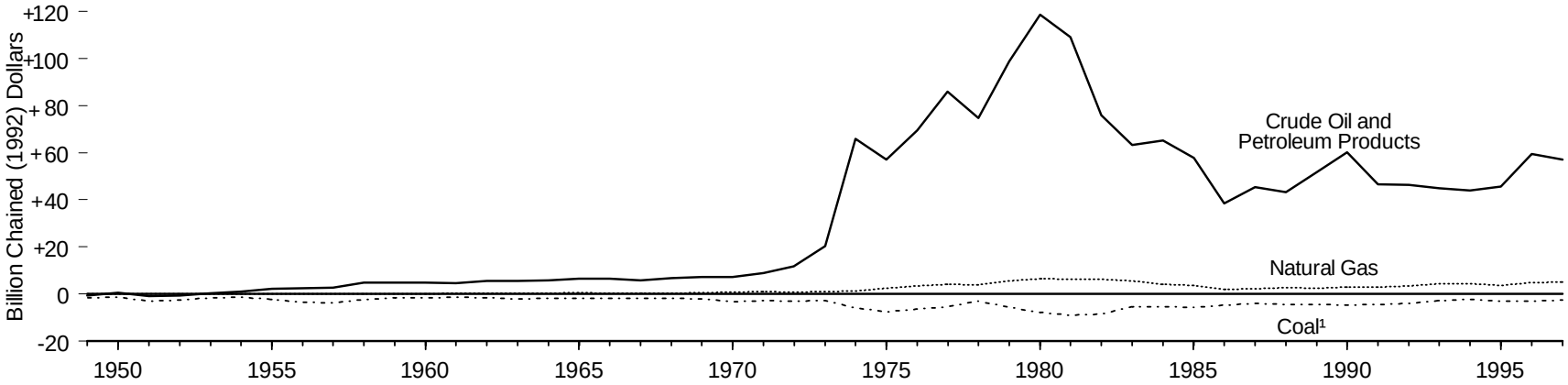
Sources: **Natural Gas:** • 1949-1971—Bureau of the Census, *U.S. Exports,* FT410. • 1972 and 1973—Federal Power Commission, *Pipeline Imports and Exports of Natural Gas - Imports and Exports of LNG.* • 1974-1977—Federal Power Commission, *United States Imports and Exports of Natural Gas,* annual. • 1978-1981—Energy Information Administration (EIA), *U.S. Imports and Exports of Natural Gas,* annual. • 1982-1994—EIA, *Natural Gas Monthly.* • 1995—EIA estimates. **All Other Data:** • 1949-1988—Bureau of the Census, *U.S. Exports,* FT410. • 1989-1993—Bureau of the Census, *Advanced Report on U.S. Merchandise Trade,* FT900 Advance. (94-12).• 1994-1995—Bureau of the Census, *U.S. International Trade in Goods and Services,* FT900 Advance. (96-12). • 1996 and 1997—Bureau of the Census, *Foreign Trade Division,* FT900 (CB-97-26), December Issue.

Figure 3.7 Value of Fossil Fuel Net Imports, 1949-1997

Value of Fossil Fuel Net Imports



Value of Fossil Fuel Net Imports by Fuel



¹ Includes small amounts of coal coke.

Notes: • Negative net imports are net exports. • Prices are in chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

Source: Table 3.7.

Table 3.7 Value of Fossil Fuel Net Imports, 1949-1997

(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	R-1.63	(s)	R-0.02	(s)	R-0.01	0.21	R1.14	-0.32	R-1.79	-0.42	R-2.32
1950	-0.27	R-1.46	(s)	(s)	(s)	R-0.02	0.27	R1.46	-0.18	R-0.98	-0.18	R-1.01
1951	-0.58	R-2.98	-0.02	R-0.08	(s)	R-0.02	0.29	R1.50	-0.47	R-2.41	-0.78	R-3.99
1952	-0.49	R-2.47	-0.01	R-0.05	(s)	R-0.02	0.34	R1.73	-0.49	R-2.45	-0.65	R-3.25
1953	-0.33	R-1.65	-0.01	R-0.04	(s)	R-0.02	0.45	R2.23	-0.38	R-1.87	-0.27	R-1.34
1954	-0.30	R-1.48	(s)	R-0.02	(s)	R-0.02	0.50	R2.45	-0.32	R-1.59	-0.14	R-0.67
1955	-0.48	R-2.33	-0.01	R-0.03	-0.01	R-0.03	0.62	R2.98	-0.16	R-0.76	-0.04	R-0.17
1956	-0.73	R-3.39	-0.01	R-0.05	-0.01	R-0.04	0.75	R3.48	-0.22	R-1.02	-0.22	R-1.02
1957	-0.83	R-3.72	-0.01	R-0.06	-0.01	R-0.04	0.81	R3.63	-0.24	R-1.08	-0.28	R-1.27
1958	-0.52	R-2.30	-0.01	R-0.02	0.01	R0.03	0.92	R4.07	0.17	R0.77	0.58	R2.54
1959	-0.38	R-1.63	-0.01	-0.03	0.02	0.09	0.87	R3.76	0.21	0.92	0.71	R3.11
1960	-0.35	-1.51	-0.01	-0.02	0.02	0.11	0.89	3.81	0.26	1.14	0.82	3.51
1961	-0.34	R-1.45	-0.01	-0.03	0.04	0.17	0.92	R3.94	0.14	R0.59	0.76	R3.22
1962	-0.38	R-1.58	-0.01	-0.02	0.08	R0.35	1.01	R4.23	0.32	R1.35	1.03	R4.32
1963	-0.47	R-1.96	-0.01	-0.03	0.09	0.39	1.02	R4.23	0.31	1.28	0.95	R3.93
1964	-0.46	-1.88	-0.01	-0.04	0.10	0.39	1.08	4.39	0.35	1.44	1.06	4.31
1965	-0.48	-1.90	-0.01	-0.06	0.10	0.39	1.11	4.46	0.48	1.94	1.21	4.83
1966	-0.47	-1.81	-0.02	-0.08	0.09	0.34	1.11	4.30	0.53	2.07	1.24	4.81
1967	-0.48	-1.81	-0.01	-0.06	0.10	0.37	0.97	3.67	0.54	2.03	1.11	4.19
1968	-0.50	-1.81	-0.02	-0.06	0.11	0.39	1.17	R4.25	0.68	2.47	1.45	R5.24
1969	-0.59	R-2.05	-0.04	-0.12	0.17	0.58	1.29	R4.47	0.78	R2.69	1.61	R5.57
1970	-0.96	R-3.15	-0.08	-0.25	0.23	R0.75	1.24	R4.07	0.98	R3.22	1.41	R4.64
1971	-0.90	R-2.80	-0.04	-0.12	0.27	0.85	1.68	R5.24	1.15	R3.60	2.17	R6.76
1972	-0.98	-2.94	-0.03	-0.08	0.28	0.82	2.37	R7.09	1.50	R4.49	3.13	R9.38
1973	-1.01	R-2.87	0.01	0.02	0.32	0.91	4.24	R12.00	2.93	R8.29	6.48	R18.35
1974	-2.38	-6.18	0.15	0.39	0.48	1.24	15.24	39.58	10.14	26.34	23.63	61.37
1975	-3.24	R-7.69	0.08	0.19	1.06	R2.52	18.29	R43.44	5.76	R13.68	21.96	R52.15
1976	-2.89	-6.49	0.04	0.10	1.56	3.50	25.43	57.02	5.58	12.51	29.72	66.64
1977	-2.62	-5.52	0.06	0.12	1.89	3.99	33.38	70.43	7.28	15.36	40.00	84.38
1978	-1.98	R-3.88	0.36	R0.71	1.95	R3.83	31.91	R62.69	6.07	R11.93	38.31	R75.27
1979	-3.35	R-6.06	0.26	0.47	3.00	R5.43	45.66	R82.72	8.87	R16.06	54.44	R98.63
1980	-4.60	R-7.62	-0.08	-0.13	3.98	R6.61	61.15	R101.41	10.42	R17.28	70.88	R117.54
1981	-5.89	R-8.92	-0.03	-0.05	4.06	R6.15	60.88	R92.24	11.06	R16.76	70.09	R106.19
1982	-5.97	R-8.50	-0.05	-0.07	4.39	R6.26	45.25	R64.47	8.00	R11.40	51.63	R73.55
1983	-4.01	R-5.48	-0.04	-0.06	4.11	R5.61	36.27	R49.55	9.96	R13.61	46.28	R63.23
1984	-4.09	-5.38	-0.02	-0.03	3.17	4.18	36.26	47.77	13.25	17.46	48.57	63.99
1985	-4.39	R-5.60	-0.03	-0.04	2.79	3.55	32.68	R41.63	12.57	R16.01	43.60	R55.55
1986	-3.85	-4.78	-0.04	-0.05	1.65	2.05	22.49	27.90	8.42	10.44	28.67	35.57
1987	-3.35	-4.03	0.01	0.01	1.76	2.12	29.00	34.90	8.57	10.31	36.00	43.32
1988	-3.95	-4.59	0.12	0.14	2.18	2.53	27.47	31.90	9.71	11.28	35.53	41.26
1989	-4.19	-4.67	0.14	0.15	2.24	2.49	35.32	39.38	10.85	12.09	44.35	49.45
1990	-4.42	-4.72	0.02	0.02	2.71	2.89	43.65	46.63	12.67	13.54	54.63	58.36
1991	-4.51	-4.63	0.04	0.04	2.90	2.98	36.87	37.89	8.52	8.75	43.82	45.04
1992	-4.11	-4.11	0.10	0.10	3.47	3.47	38.52	38.52	7.72	7.72	45.70	45.70
1993	-2.87	-2.79	0.06	0.05	4.41	4.30	38.45	37.48	7.59	7.40	47.64	46.43
1994	-2.62	R-2.49	0.09	0.09	4.50	R4.28	38.43	R36.57	7.78	R7.40	48.18	R45.84
1995	-3.32	R-3.08	0.11	0.10	3.86	R3.58	42.81	R39.71	6.39	R5.93	49.84	R46.24
1996	-3.45	R-3.13	0.05	0.05	R5.33	R4.84	R54.37	R49.34	R11.01	R9.99	R67.32	R61.09
1997P	-3.13	-2.79	0.07	0.06	5.72	5.09	53.31	47.43	10.85	9.65	66.82	59.45

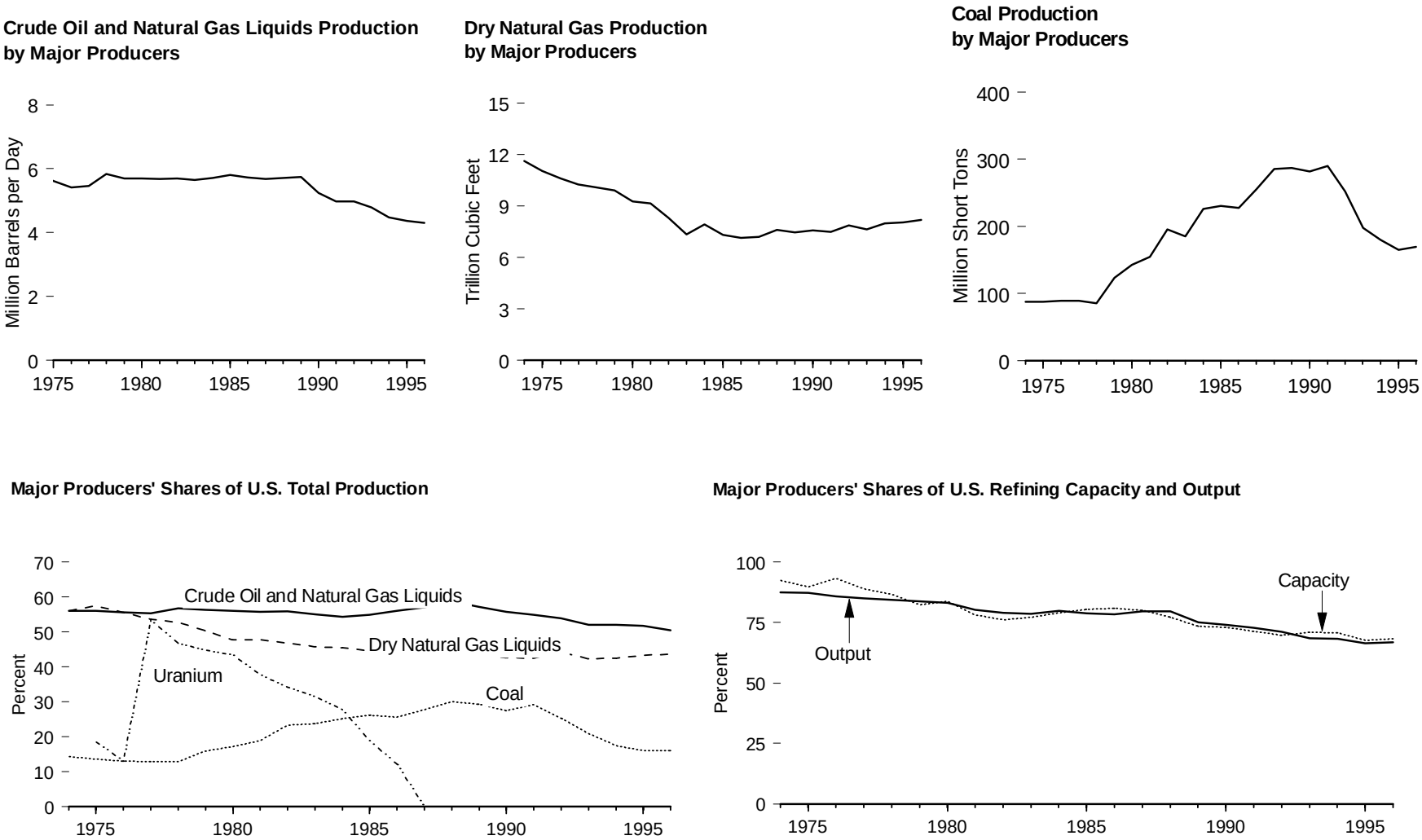
[1] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

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

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

Sources: Tables 3.5 and 3.6.

Figure 3.8 Major Energy Producers' U.S. Production and Refining, 1974-1996



Notes: • See Table 3.12 for information on companies covered. • Because vertical scales differ, graphs should not be compared.

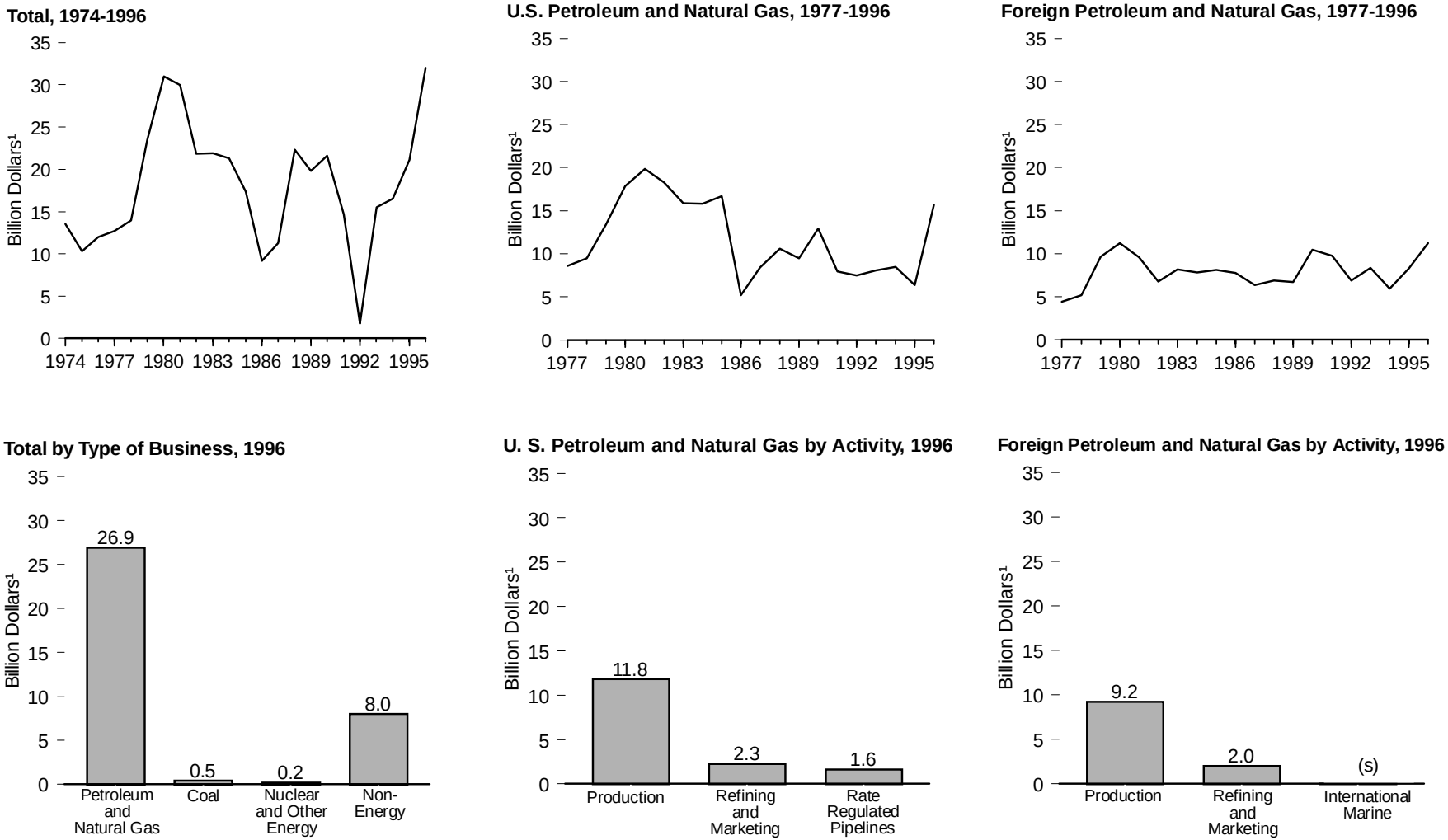
Source: Table 3.8.

Table 3.8 Major Energy Producers' U.S. Production and Refining, 1974-1996

Year	Production				Refining	
	Crude Oil and Natural Gas Liquids (Million Barrels per Day)	Dry Natural Gas (Trillion Cubic Feet)	Coal [1] (Million Short Tons)	Uranium (Million Pounds U_3O_8)	Capacity [2,3] (Million Barrels per Day)	Output [3] (Million Barrels per Day)
1974	R5.9	11.6	87.4	NA	13.3	11.8
1975	R5.6	11.0	88.1	4.3	13.4	12.0
1976	R5.4	10.6	89.0	3.3	14.2	12.6
1977	R5.5	10.3	89.1	R16.0	14.6	13.5
1978	R5.8	10.1	85.5	R17.3	14.8	13.5
1979	R5.7	9.9	123.3	R16.7	14.4	13.2
1980	R5.7	9.3	142.3	19.0	15.1	12.2
1981	R5.7	9.2	154.8	14.5	14.6	11.2
1982	R5.7	8.3	195.2	R9.2	13.6	10.6
1983	R5.6	7.4	185.2	6.6	13.0	10.3
1984	R5.7	7.9	226.0	4.1	12.8	10.9
1985	R5.8	7.3	230.4	2.1	12.6	10.8
1986	R5.7	7.1	227.6	1.6	12.5	11.4
1987	R5.7	7.2	255.3	0.0	12.5	11.7
1988	R5.7	7.6	285.3	0.0	12.3	12.0
1989	R5.2	7.5	286.9	0.0	11.5	11.4
1990	R5.0	7.6	282.0	0.0	11.4	11.3
1991	R5.0	7.5	289.6	0.0	11.2	11.1
1992	R4.8	7.9	251.9	0.0	11.0	11.0
1993	R4.5	7.7	197.3	0.0	10.7	10.8
1994	R4.4	8.0	179.7	0.0	10.6	10.8
1995	R4.3	8.1	165.4	0.0	10.4	R10.6
1996	4.2	8.2	169.4	0.0	10.5	10.9
	Percent of U.S. Total					
1974	56.0	R56.1	14.3	NA	92.5	R87.6
1975	56.1	R57.4	13.5	R18.6	89.8	R87.4
1976	55.7	R55.6	13.0	R13.0	93.4	R85.9
1977	55.3	R53.6	12.8	R53.4	89.0	R85.0
1978	56.8	R52.7	12.8	R46.8	86.7	R84.5
1979	56.3	50.3	15.8	R44.7	82.4	R83.9
1980	56.1	R47.7	17.2	43.5	83.9	R83.1
1981	55.8	R47.8	18.8	37.7	78.2	R80.3
1982	55.9	R46.7	23.3	R34.2	76.2	R79.0
1983	55.1	R45.8	23.7	R31.4	77.2	R78.7
1984	54.3	R45.5	25.2	R27.8	79.1	R79.8
1985	54.9	R44.6	26.1	R18.9	80.6	R78.9
1986	56.0	R44.5	25.6	R12.1	81.0	R78.5
1987	57.0	R43.4	27.8	0.0	80.1	R79.7
1988	58.8	R44.6	30.0	0.0	77.2	R79.7
1989	57.2	R43.2	29.3	0.0	73.4	75.2
1990	55.8	R42.6	27.4	0.0	73.0	R74.0
1991	54.9	42.4	29.1	0.0	71.5	72.9
1992	53.9	R44.2	25.3	0.0	69.8	71.2
1993	52.1	R42.3	20.9	0.0	70.9	R68.5
1994	52.1	42.5	17.4	0.0	70.8	R68.4
1995	51.7	R43.3	16.0	0.0	67.6	66.6
1996	50.5	43.6	15.9	0.0	68.3	66.9

[1] Bituminous coal, subbituminous coal, and lignite.
[2] Operable capacity as of January 1 of the following year.
[3] Includes Puerto Rico and the Virgin Islands.
R=Revised. NA=Not available.
Notes: • Major Energy Producers are the top publicly-owned crude oil producers that form the Financial Reporting System (FRS). See Table 3.12. • FRS Crude Oil and NGL and Natural Gas (Dry Marketed) production are on a net ownership interest basis (see Glossary).
Web Page: http://www.eia.doe.gov/emeu/finance/index.html.
Sources: • 1974–1976—Energy Information Administration (EIA), Form EIA-28, "Financial Reporting System" database, November 1997. • 1977–1995—EIA, *Performance Profiles of Major Energy Producers,* annual report. • 1996—EIA, *Performance Profiles of Major Energy Producers, 1996* (January 1998), Table B2.

Figure 3.9 Major Energy Producers' Net Income



Source: Table 3.9.

¹ Nominal dollars.
(s) = Less than $50 million in absolute value.
Note: See Table 3.12 for information on companies covered.

Table 3.9 Major Energy Producers' Net Income, 1974-1996

(Billion Dollars[1])

	U.S. Petroleum and Natural Gas				Foreign Petroleum and Natural Gas				Type of Business				
Year	Production	Refining and Marketing	Rate Regulated Pipelines	Total [2]	Production	Refining and Marketing	International Marine	Total [2]	Petroleum and Natural Gas	Coal	Nuclear and Other Energy	Non-energy	Total [2]
1974	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13.6
1975	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10.3
1976	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	12.0
1977	6.4	1.5	0.8	8.6	3.6	0.7	0.1	4.4	13.0	0.2	(s)	1.7	12.7
1978	6.7	1.6	1.2	9.5	3.5	1.8	-0.1	5.2	14.7	0.1	-0.1	1.8	13.9
1979	9.4	2.3	1.7	13.4	5.2	4.3	0.1	9.7	23.0	0.3	-0.1	2.8	23.5
1980	13.8	2.5	1.7	17.9	6.9	4.3	0.1	11.2	29.1	0.3	(s)	2.3	31.0
1981	16.8	1.3	1.8	19.9	8.0	1.6	-0.1	9.6	29.5	0.4	-0.3	1.6	30.0
1982	14.1	1.9	2.3	18.3	6.1	0.8	-0.3	6.7	25.0	0.4	-0.3	0.4	21.8
1983	12.2	1.6	2.0	15.9	7.2	1.3	-0.5	8.2	24.0	0.5	(s)	1.8	21.9
1984	13.3	0.1	2.5	15.8	7.5	0.7	-0.4	7.8	23.6	0.6	-0.1	2.9	21.3
1985	12.1	2.3	2.3	16.7	8.0	0.5	-0.4	8.1	24.8	0.4	-0.3	2.5	17.4
1986	0.9	1.6	2.6	5.2	4.7	2.9	0.1	7.7	12.9	0.2	(s)	2.8	9.2
1987	4.7	1.1	2.6	8.4	5.4	1.0	-0.1	6.4	14.8	0.4	(s)	7.1	11.3
1988	3.2	5.4	2.0	10.6	4.3	2.4	0.1	6.9	17.5	0.6	-0.1	10.8	22.3
1989	3.1	4.5	1.9	9.5	4.7	1.8	0.2	6.7	16.2	0.4	-0.1	8.7	19.8
1990	8.7	2.2	2.1	12.9	7.4	2.8	0.2	10.5	23.4	0.3	0.1	4.3	21.6
1991	5.1	0.9	2.0	7.9	5.4	4.1	0.3	9.8	17.7	0.6	0.1	1.6	14.7
1992	5.6	-0.2	2.1	7.5	4.7	2.2	(s)	6.9	14.4	-0.5	0.1	1.2	1.8
1993	4.8	1.7	1.6	8.1	5.2	3.2	(s)	8.4	16.5	0.4	0.1	2.7	15.5
1994	4.8	1.8	1.8	8.5	4.0	2.0	(s)	5.9	14.4	0.2	0.2	6.2	16.5
1995	3.7	0.5	2.2	6.4	5.9	2.4	(s)	8.3	14.7	0.3	0.2	12.6	21.1
1996	11.8	2.3	1.6	15.7	9.2	2.0	(s)	11.2	26.9	0.5	0.2	8.0	32.0

[1] Nominal dollars.

[2] Total is sum of components shown, plus eliminations and nontraceables, which are defined in the glossary.

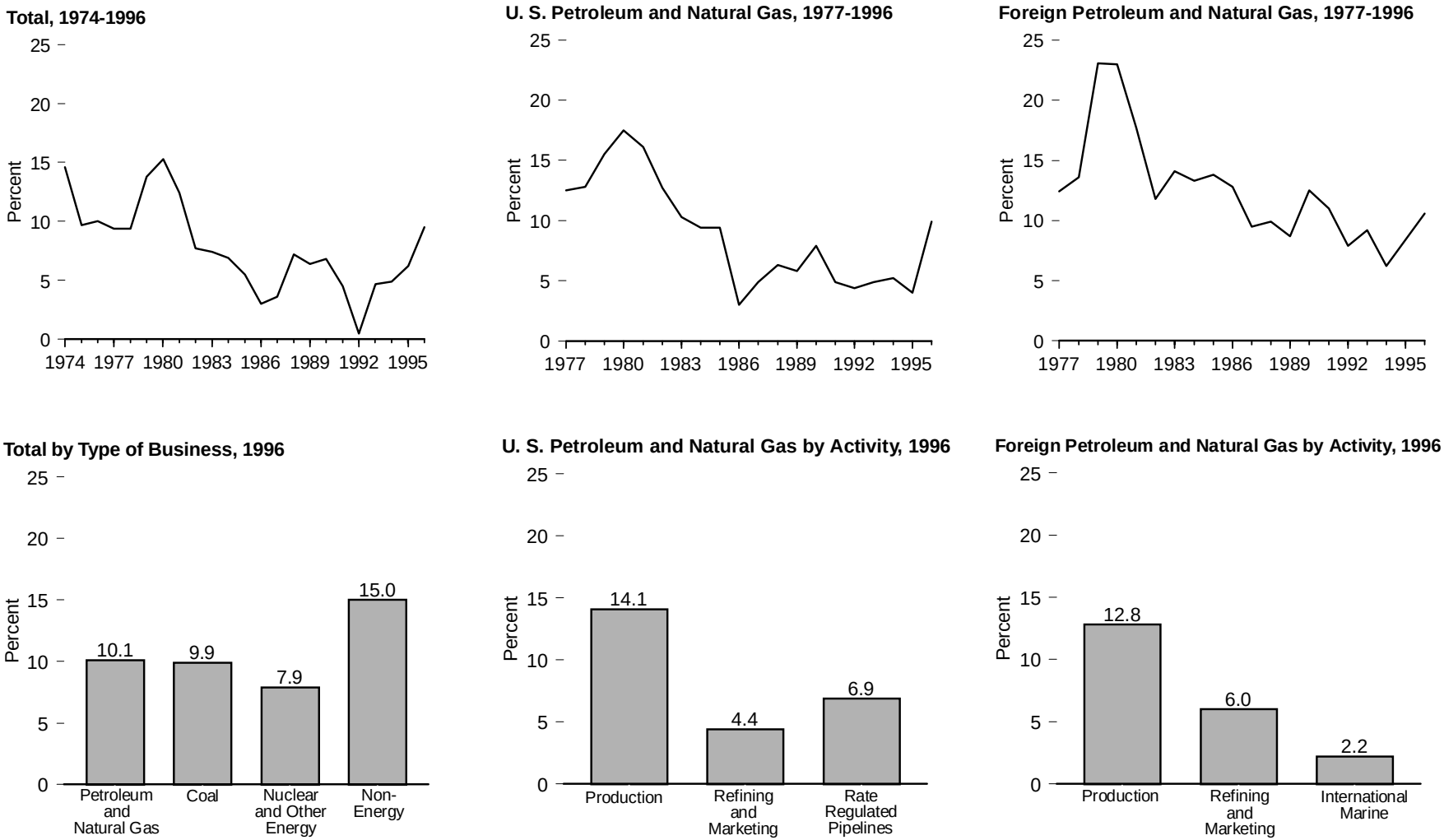
NA=Not available. (s)=Less than $50 million in absolute value.

Note: Major Energy Producers are the top publicly-owned crude oil producers that form the Financial Reporting System (FRS). See Table 3.12.

Web Page: http://www.eia.doe.gov/finance/index.html.

Sources: • 1974–1976—Energy Information Administration (EIA), Form EIA-28, "Financial Reporting System" database, November 1997. • 1977–1995—EIA, *Performance Profiles of Major Energy Producers,* annual report. • 1996—EIA, *Performance Profiles of Major Energy Producers, 1996* (January 1998), Table 2.

Figure 3.10 Major Energy Producers' Return on Investment



Note: See Table 3.12 for information on companies covered.

Source: Table 3.10.

Table 3.10 Major Energy Producers' Return on Investment, 1974-1996

(Percent)

	U.S. Petroleum and Natural Gas				Foreign Petroleum and Natural Gas				Type of Business				
Year	Production	Refining and Marketing	Rate Regulated Pipelines	Total	Production	Refining and Marketing	International Marine	Total	Petroleum and Natural Gas	Coal	Nuclear and Other Energy	Non-energy	Total
1974	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	14.6
1975	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.7
1976	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10.0
1977	17.5	7.2	7.3	12.5	21.8	5.1	2.6	12.4	12.5	8.8	-2.6	7.1	9.4
1978	16.4	7.5	10.9	12.8	18.2	12.7	-1.0	13.6	13.1	4.1	-4.2	6.5	9.4
1979	18.2	9.8	15.1	15.5	23.8	29.1	2.6	23.1	18.0	6.3	-3.7	8.8	13.8
1980	20.9	9.8	15.1	17.5	25.1	26.4	2.4	23.0	19.2	5.6	-0.7	5.9	15.3
1981	20.2	4.4	15.6	16.1	25.5	9.0	-1.1	17.7	16.6	6.1	-6.8	3.5	12.4
1982	14.0	6.0	20.8	12.7	17.4	4.7	-6.3	11.8	12.5	4.4	-5.2	0.6	7.7
1983	11.3	4.8	16.6	10.3	19.6	7.7	-13.2	14.1	11.3	5.0	0.5	2.9	7.4
1984	10.8	0.3	20.8	9.4	18.8	4.5	-14.0	13.3	10.4	6.2	-1.8	4.8	6.9
1985	9.5	6.5	15.0	9.4	20.0	3.3	-19.0	13.8	10.5	4.6	-8.4	4.2	5.5
1986	0.8	4.5	13.2	3.0	11.6	16.3	5.3	12.8	5.5	2.7	-0.8	5.1	3.0
1987	4.1	2.9	12.8	4.9	12.4	4.7	-3.6	9.5	6.2	5.1	0.5	12.2	3.6
1988	2.8	14.7	9.6	6.3	9.2	11.6	6.8	9.9	7.3	6.7	-2.5	20.3	7.2
1989	2.9	11.5	10.2	5.8	8.9	8.0	12.4	8.7	6.7	5.0	-2.3	17.3	6.4
1990	8.5	5.1	11.2	7.9	13.1	11.2	11.7	12.5	9.5	3.3	2.6	7.8	6.8
1991	5.1	2.0	10.7	4.9	9.1	14.6	15.6	11.0	7.0	8.7	2.8	2.9	4.5
1992	5.9	-0.4	8.4	4.4	8.2	7.8	-1.2	7.9	5.6	-9.3	1.8	2.1	0.5
1993	5.3	3.4	6.4	4.9	8.6	10.6	1.2	9.2	6.4	7.6	4.1	4.7	4.7
1994	5.5	3.6	7.6	5.2	6.5	6.1	-2.0	6.2	5.6	4.0	4.8	10.5	4.9
1995	4.4	1.0	9.1	4.0	9.3	7.2	-2.5	8.4	5.7	6.9	6.1	19.4	6.2
1996	14.1	4.4	6.9	9.9	12.8	6.0	2.2	10.6	10.1	9.9	7.9	15.0	9.5

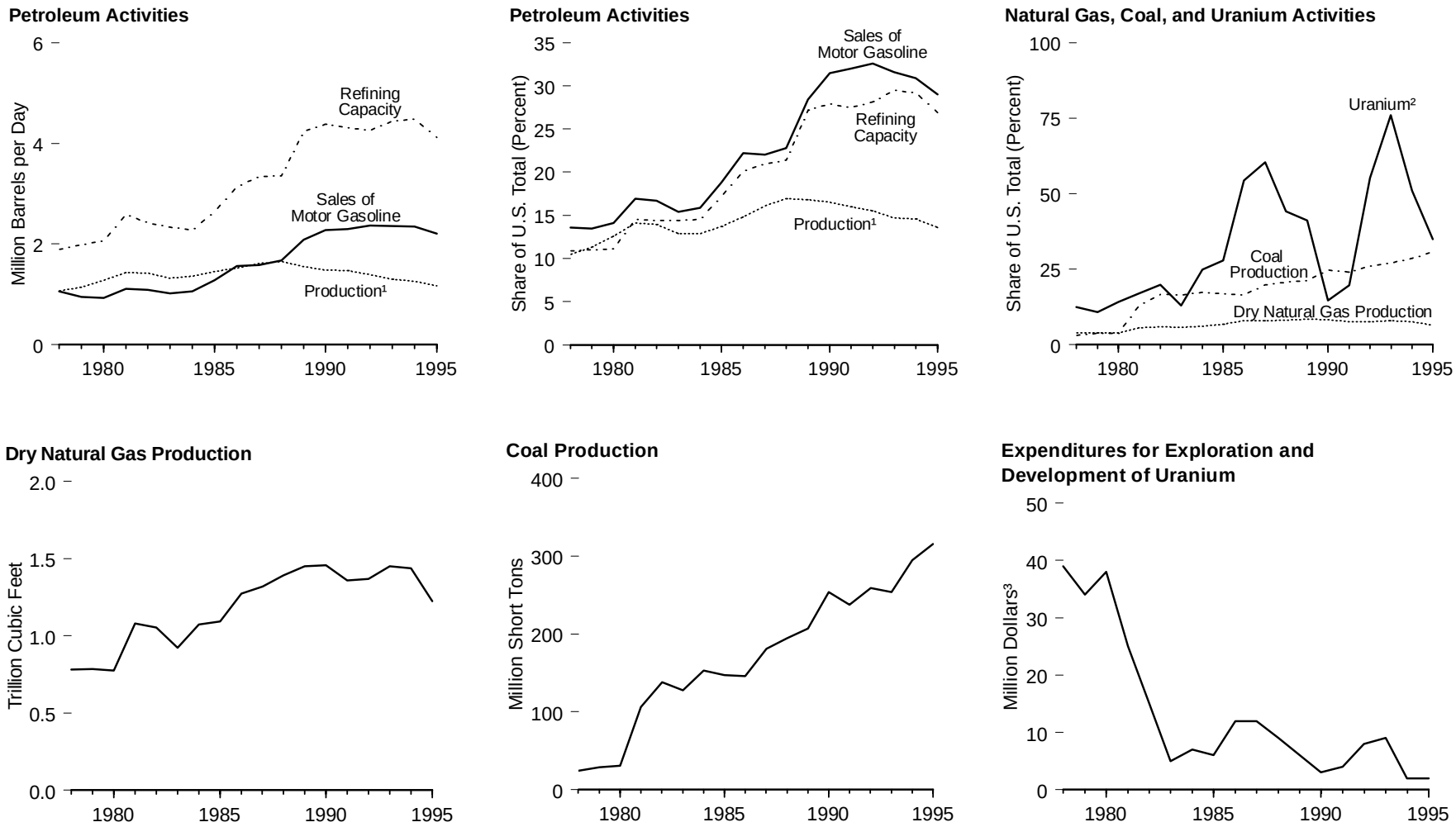
NA=Not available.

Notes: • Major Energy Producers are the top publicly-owned crude oil producers that form the Financial Reporting System (FRS). See Table 3.12. • Return on investment measured as contribution to net income/net investment in place.

Web Page: http://www.eia.doe.gov/emeu/finance/index.html.

Sources: • 1974–1976—Energy Information Administration (EIA), Form EIA-28, "Financial Reporting System" database, October 1996. • 1977–1995—EIA, *Performance Profiles of Major Energy Producers,* annual report. • 1996—EIA, *Performance Profiles of Major Energy Producers, 1996* (January 1998), Table 2.

Figure 3.11 U.S. Energy Activities by Foreign-Affiliated Companies, 1978-1995



¹ Crude oil and natural gas liquids.
² Expenditures for exploration and development of uranium.
³ Nominal dollars.

Note: Because vertical scales differ, graphs should not be compared.
Source: Table 3.11.

Table 3.11 U.S. Energy Activities by Foreign-Affiliated Companies, 1978-1995

Year	Production			Refining Capacity	Sales of Motor Gasoline	Expenditures for Exploration and Development of Uranium
	Crude Oil and Natural Gas Liquids	Dry Natural Gas	Coal			
	Thousand Barrels per Day	Billion Cubic Feet	Million Short Tons	Thousand Barrels per Day		Million Dollars [1]
1978	1,076	783	24	1,895	1,066	39
1979	1,145	786	29	1,984	948	34
1980	1,280	776	31	2,066	926	38
1981	1,438	1,080	106	2,595	1,114	25
1982	1,421	1,055	138	2,423	1,092	15
1983	1,325	924	128	2,337	1,022	5
1984	1,365	1,075	153	2,276	1,066	7
1985	1,455	1,093	147	2,656	1,285	6
1986	1,523	1,276	146	3,133	1,565	12
1987	1,614	1,318	181	3,342	1,586	12
1988	1,659	1,392	195	3,356	1,673	9
1989	1,553	1,452	207	4,243	2,084	6
1990	1,481	1,457	254	4,379	2,282	3
1991	1,469	1,360	238	4,312	2,299	4
1992	1,392	1,368	259	4,256	2,369	8
1993	1,299	1,451	254	4,440	2,362	9
1994	R1,266	R1,439	R295	R4,479	2,346	2
1995	1,172	1,226	316	4,124	2,204	2
	Share of U.S. Total (Percent)					
1978	10.5	3.9	3.1	10.9	13.6	12.5
1979	11.3	4.0	3.8	11.0	13.5	10.8
1980	12.6	4.0	3.8	11.1	14.1	14.1
1981	14.1	5.6	12.9	14.5	16.9	17.0
1982	13.9	5.9	16.6	14.4	16.7	19.8
1983	12.9	5.8	16.5	14.4	15.4	13.0
1984	12.9	6.2	17.3	14.5	15.9	24.9
1985	13.7	6.7	16.8	17.2	18.8	27.9
1986	14.8	8.0	16.5	20.1	22.2	54.3
1987	16.1	8.0	19.8	21.0	22.0	60.4
1988	16.9	8.1	20.6	21.4	22.8	44.2
1989	16.8	8.4	21.2	27.2	28.4	41.2
1990	16.5	8.2	24.7	27.9	31.5	14.6
1991	16.0	7.7	24.0	27.5	32.0	19.7
1992	15.5	7.7	26.0	28.1	32.6	55.2
1993	14.7	8.0	27.0	29.5	31.6	76.0
1994	R14.6	R7.7	R28.6	R29.2	30.9	51.0
1995	13.6	6.5	30.7	26.9	29.0	35.0

[1] Nominal dollars.

Web Page: http://www.eia.doe.gov/emeu/finance/index.html.

Sources: • **1978-1992—**Energy Information Administration (EIA), *Profiles of Foreign Direct Investment in U.S. Energy,* annual report. • **1993—**EIA, *Profiles of Foreign Direct Investment in U.S. Energy 1993* (May 1995), Tables 7, 9, 10, 11, and 12. • **1994—**EIA, *Performance Profiles of Major Energy Producers 1995* (January 1997), Tables 36, 38, 39, 40, and 41. • **1995—**EIA, *Performance Profiles of Major Energy Producers 1996* (January 1998), Tables 36, 38, 39, 40, and 41.

Table 3.12 Companies Reporting to the Financial Reporting System, 1974-1996

Company	1974-1981	1982	1983-84	1985-86	1987	1988	1989-90	1991	1992-93	1994-96
Amerada Hess Corporation	X	X	X	X	X	X	X	X	X	X
American Petrofina Inc.[1]	X	X	X	X	X	X	X			
Amoco Corporation[2]	X	X	X	X	X	X	X	X	X	X
Anadarko Petroleum, Inc.									X	X
Ashland Oil, Inc.	X	X	X	X	X	X	X	X	X	X
Atlantic Richfield Co. (ARCO)	X	X	X	X	X	X	X	X	X	X
BP America, Inc.[3]					X	X	X	X	X	X
Burlington Northern Inc.[4]	X	X	X	X	X					
Burlington Resources Inc.[4]						X	X	X	X	X
Chevron Corporation[5,6]	X	X	X	X	X	X	X	X	X	X
Cities Service[7]	X	X								
Coastal Corporation	X	X	X	X	X	X	X	X	X	X
Conoco[8]	X									
E.I. du Pont de Nemours and Co.[8]		X	X	X	X	X	X	X	X	X
Enron Corporation									X	X
Exxon Corporation	X	X	X	X	X	X	X	X	X	X
Fina, Inc.[1]								X	X	X
Getty Oil[9]	X	X	X							
Gulf Oil[6]	X	X	X							
Kerr-McGee Corporation	X	X	X	X	X	X	X	X	X	X
Marathon[10]	X									
Mobil Corporation[11]	X	X	X	X	X	X	X	X	X	X
Nerco, Inc.[12]									X	
Occidental Petroleum Corporation[7]	X	X	X	X	X	X	X	X	X	X
Oryx Energy Company[13]						X	X	X	X	X
Phillips Petroleum Company	X	X	X	X	X	X	X	X	X	X
Shell Oil Company	X	X	X	X	X	X	X	X	X	X
Standard Oil Co. (Ohio) (Sohio)[3]	X	X	X	X						
Sun Company, Inc.[13]	X	X	X	X	X	X	X	X	X	X
Superior Oil[11]	X	X	X							
Tenneco Inc.[14]	X	X	X	X	X	X				
Texaco Inc.[9]	X	X	X	X	X	X	X	X	X	X
Total Petroleum (North America) Ltd.[15]							X	X		
Union Pacific Corporation	X	X	X	X	X	X	X	X	X	X
Unocal Corporation	X	X	X	X	X	X	X	X	X	X
USX Corporation[10]		X	X	X	X	X	X	X	X	X

[1] American Petrofina, Inc. changed its name to Fina, Inc. effective April 17, 1991.
[2] Formerly Standard Oil Company (Indiana).
[3] In 1987, British Petroleum acquired all shares in Standard Oil Company (Ohio) that it did not already control and renamed its U.S. affiliate British Petroleum America .
[4] Burlington Resources was added to the Financial Reporting System (FRS) and Burlington Northern was dropped for 1988. Data for Burlington Resources cover the full year 1988 even though that company was not created until May of that year.
[5] Formerly Standard Oil Company of California.
[6] Chevron acquired Gulf Oil in 1984 but separate data for Gulf continued to be available for the full 1984 year.
[7] Occidental acquired Cities Service in 1982. Separate financial reports were available for 1982, so each company continued to be treated separately until 1983.
[8] DuPont acquired Conoco in 1981. Separate data for Conoco were available for 1981. DuPont was included in the FRS system in 1982.
[9] Texaco acquired Getty in 1984; however, Getty was treated as a separate FRS company for that year.
[10] U.S. Steel (now USX) acquired Marathon in 1982.
[11] Mobil acquired Superior in 1984 but both companies were treated separately for that year.
[12] RTZ America acquired the common stock of Nerco, Inc., on February 17, 1994. In September 1993, Nerco, Inc., sold Nerco Oil & Gas, Inc., its subsidiary. Nerco's 1993 submission includes operations of Nerco Oil & Gas, Inc., through September 28, 1993.
[13] Sun Company spun off Sun Exploration and Development Company (later renamed Oryx Energy Company) during 1988. Both companies were included in the FRS system for 1988; therefore, some degree of duplication exists for that year.
[14] Tenneco sold its worldwide oil and gas assets and its refining and marketing assets in 1988. Other FRS companies purchased approximately 70 percent of Tenneco's assets.
[15] Effective June 1, 1991, Total's exploration, production, and marketing operations in Canada were spun off to Total Oil & Gas, a new public entity.

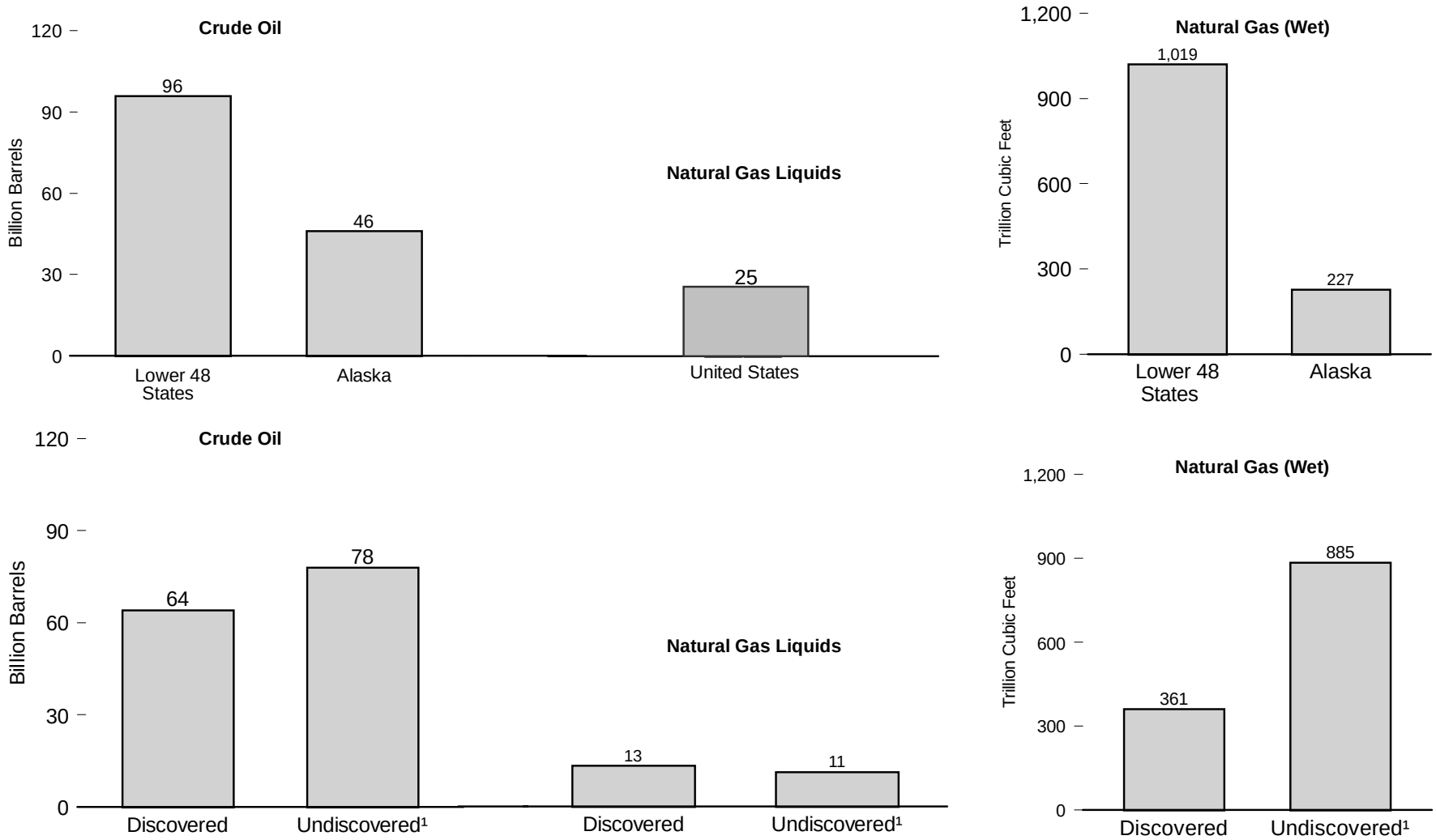
Note: "X" indicates that the company was included in the FRS system for the year indicated.
Web Page: http://www.eia.doe.gov/emeu/finance/index.html.
Source: Energy Information Administration, Form EIA-28, "Financial Reporting System."

4

Energy Resources

Semisubmersible drilling rig in the Gulf of Mexico. Source: U.S. Department of Energy.

Figure 4.1 Petroleum Resource Estimates, January 1, 1994



¹Undiscovered, technically recoverable resources.

Source: Table 4.1.

Table 4.1 Petroleum Resource Estimates, January 1, 1994

Region	Crude Oil [1] (million barrels)			Natural Gas Liquids (million barrels)			Natural Gas (Wet) (billion cubic feet)		
	Alaska	Lower 48 States	United States	Alaska	Lower 48 States	United States	Alaska	Lower 48 States	United States
Discovered									
Reserve Growth (Conventional; Onshore)	[2]13,000	[3]47,000	**60,000**	500	12,900	**13,400**	32,000	290,000	**322,000**
Reserve Growth (Conventional; Federal Offshore)	0	[4] 2,200	**2,200**	NE	NE	**NE**	0	[4] 32,700	**32,700**
Unproved Reserves (Federal Offshore)	400	1,500	**1,900**	NE	NE	**NE**	700	5,500	**6,200**
Undiscovered, Technically Recoverable									
Conventional (Onshore)	8,440	21,810	**30,250**	1,120	6,080	**7,200**	68,410	190,280	**258,690**
Conventional (Federal Offshore)	24,300	21,300	**45,600**	(5)	[6] 1,800	**1,800**	125,900	142,100	**268,000**
Continuous-type (in Sandstone, Shales and Chalks; Onshore)	NE	2,066	**2,066**	NE	2,119	**2,119**	NE	308,080	**308,080**
Continuous-type (in Coal Beds; Onshore)	NA	NA	**NA**	NA	NA	**NA**	NE	49,910	**49,910**
Total	**46,140**	**95,876**	**142,016**	**NA**	**NA**	**24,519**	**227,010**	**1,018,570**	**1,245,580**

[1] Condensate is included with crude oil for Minerals Management Service (MMS) estimates in Federal Offshore regions.

[2] Using U.S. Geological Survey (USGS) definition, 952 million barrels of indicated additional oil reserves were included (Energy Information Administration (EIA), year end 1996).

[3] Using USGS definition, 1,924 million barrels of indicated additional oil reserves were included (EIA, year end 1996)

[4] Reserve growth in the Pacific Federal offshore is not included. It was not estimated by MMS.

[5] Included with Lower 48 States; MMS did not generate separate Lower 48 and Alaska estimates (year end 1986).

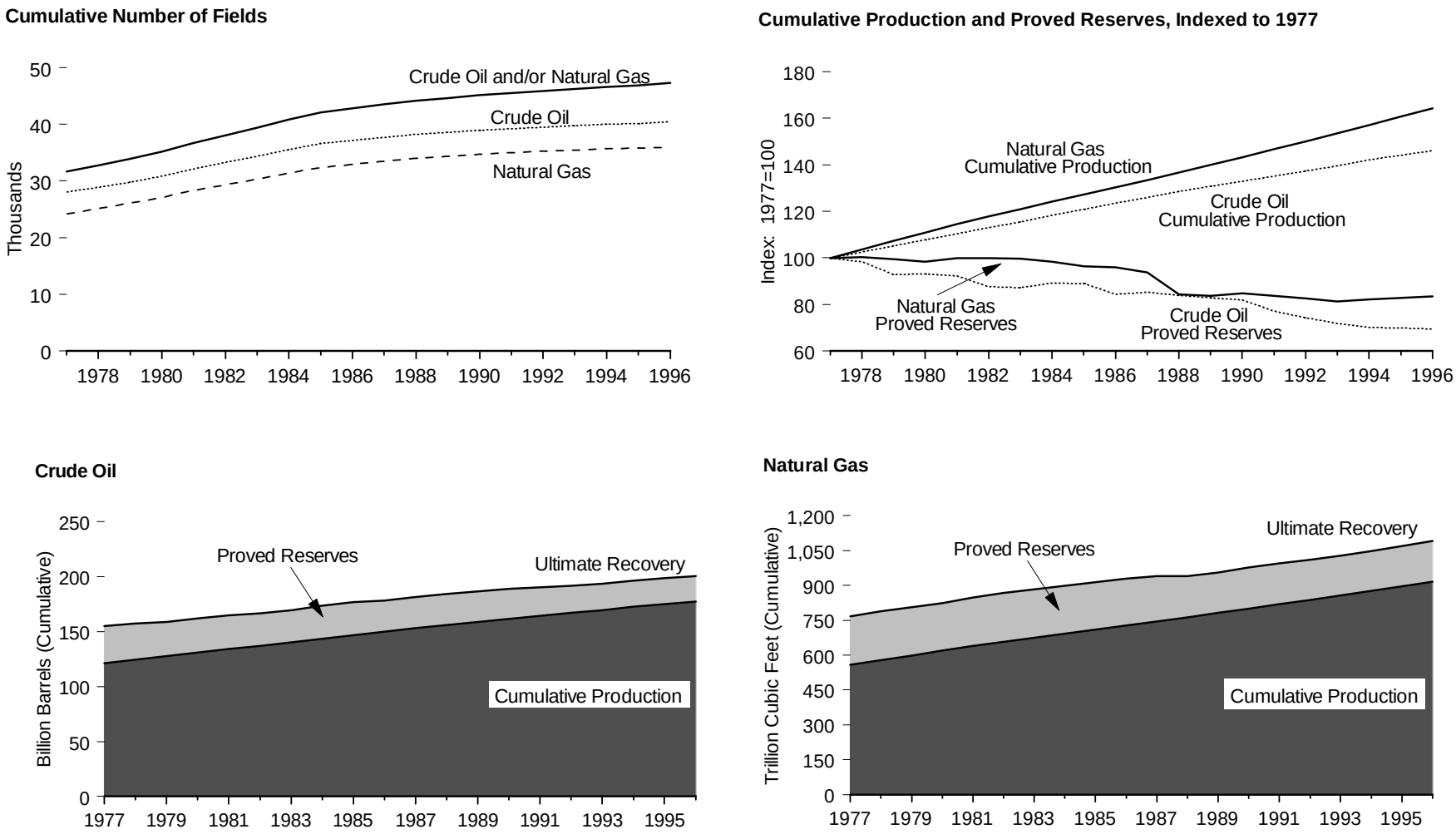
[6] Includes Alaska.

NA=Not available. NE= Not estimated.

Notes: • See Note 1 at end of section. • Onshore indicates estimates for all Onshore plus State Offshore waters (near-shore, shallow-water areas under State jurisdiction). • Federal Offshore denotes MMS estimates for Federal Offshore jurisdictions (the Outer Continental Shelf and deeper water areas seaward of the State Offshore jurisdictional boundary). • The USGS mean estimates are as of year-end 1993 (onshore and State offshore). The MMS mean estimates are as of year-end 1994. Probable and possible reserves are considered by the USGS to be part of reserve growth but are separately estimated by MMS as unproved reserves. USGS did not set a time limit for the duration of reserves growth; MMS set the year 2020 as the time limit in its estimates of reserve growth in existing fields in the Gulf of Mexico. Excluded from these resource estimates are undiscovered oil resources in tar deposits and oil shales, and undiscovered gas resources in geopressured brines and gas hydrates. • Data may not sum to totals due to independent rounding.

Source: **Federal Offshore:** U.S. Department of the Interior, Minerals Management Service. *An Assessment of the Undiscovered Hydrocarbon Potential of the Nation's Outer Continental Shelf (1996),* OCS Report MMS 96-0034. **Onshore:** U.S. Department of the Interior, U.S. Geological Survey (USGS), *1995 National Assessment of United States Oil and Gas Resources,* USGS Circular 1118.

Figure 4.2 Crude Oil and Natural Gas Field Counts, Cumulative Production, Proved Reserves, and Ultimate Recovery, End of Year 1977-1996



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

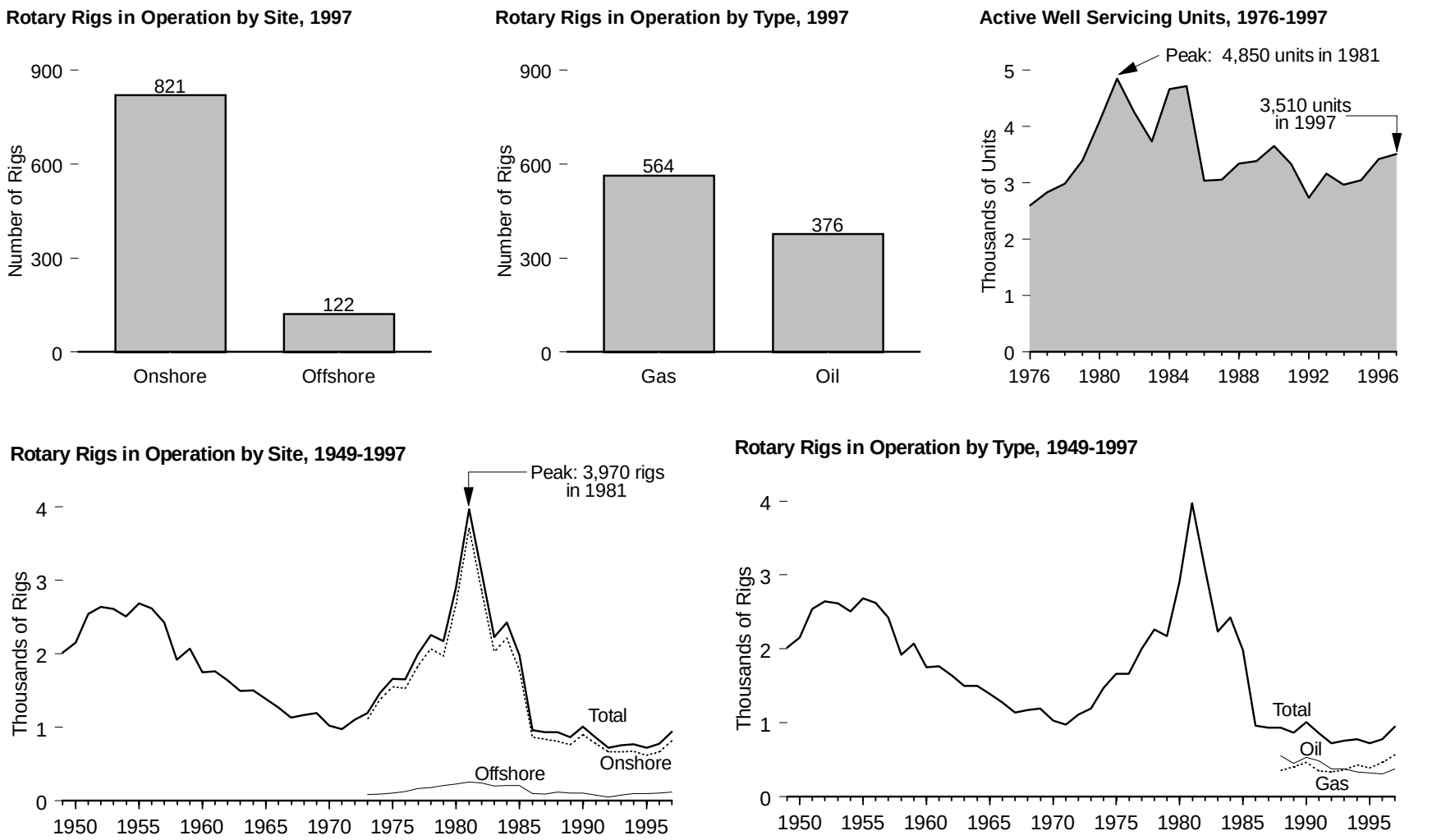
Source: Table 4.2.

Table 4.2 Crude Oil and Natural Gas Field Counts, Cumulative Production, Proved Reserves, and Ultimate Recovery, End of Year 1977-1996

Year	Cumulative Number of Fields with Crude Oil and/or Natural Gas	Cumulative Number of Fields with Crude Oil	Crude Oil [1] (billion barrels)			Cumulative Number of Fields with Natural Gas	Natural Gas [2] (trillion cubic feet)		
			Cumulative Production	Proved Reserves	Ultimate Recovery		Cumulative Production	Proved Reserves	Ultimate Recovery
1977	31,725	28,057	121.4	33.6	155.0	24,266	558.3	209.5	767.8
1978	32,755	28,877	124.6	33.1	157.6	25,126	578.4	210.1	788.5
1979	33,898	29,810	127.7	31.2	158.9	26,094	599.1	208.3	807.4
1980	35,196	30,860	130.8	31.3	162.2	27,129	619.4	206.3	825.6
1981	36,727	32,124	133.9	31.0	165.0	28,331	639.4	209.4	848.9
1982	38,110	33,289	137.1	29.5	166.6	29,374	658.1	209.3	867.4
1983	39,403	34,345	140.3	29.3	169.6	30,349	675.1	209.0	884.1
1984	40,865	35,558	143.5	30.0	173.5	31,449	693.5	206.0	899.5
1985	42,114	36,590	146.8	29.9	176.7	32,419	710.9	202.2	913.1
1986	42,869	37,195	150.0	28.3	178.3	32,963	727.8	201.1	928.9
1987	43,535	37,703	153.0	28.7	181.7	33,469	745.4	196.4	941.8
1988	44,197	38,215	156.0	28.2	184.2	33,996	763.4	177.0	940.4
1989	44,655	38,555	158.8	27.9	186.7	34,367	781.7	175.4	957.1
1990	45,157	38,933	161.5	27.6	189.0	34,757	800.4	177.6	978.0
1991	45,539	39,233	164.2	25.9	190.1	35,022	819.1	175.3	994.4
1992	45,898	39,508	166.8	25.0	191.8	35,283	838.0	173.3	1,011.3
1993	46,220	39,737	169.3	24.1	193.4	35,490	857.2	170.5	1,027.7
1994	46,597	40,001	172.5	23.6	196.2	35,724	877.1	171.9	1,049.1
1995	46,872	40,165	R175.0	23.5	198.5	35,836	896.9	173.5	1,070.4
1996	47,322	40,483	177.3	23.3	200.6	36,052	917.0	175.1	1,092.1

[1] Includes lease condensate.
[2] Wet, after lease separation.
R=Revised.
Web Page: http://www.eia.doe.gov/fuelpetroleum.html.
Sources: **1992:** Energy Information Administration (EIA), Office of Oil and Gas, Oil and Gas Integrated Field File (OGIFF), (July 1995). **1977-1991 and 1993-1996:** • Crude Oil Cumulative Production—EIA, *Petroleum Supply Annual 1996, Volume 1* (June 1997). • Natural Gas Cumulative Production—EIA, *Natural Gas Annual 1996* (September 1997). • Proved Reserves—EIA, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves Annual Report 1996* (December 1997). • Field Counts—EIA, *Oil and Gas Field Code Master List 1997* (February 1998) and OGIFF.

Figure 4.3 Oil and Gas Drilling Activity Measurements



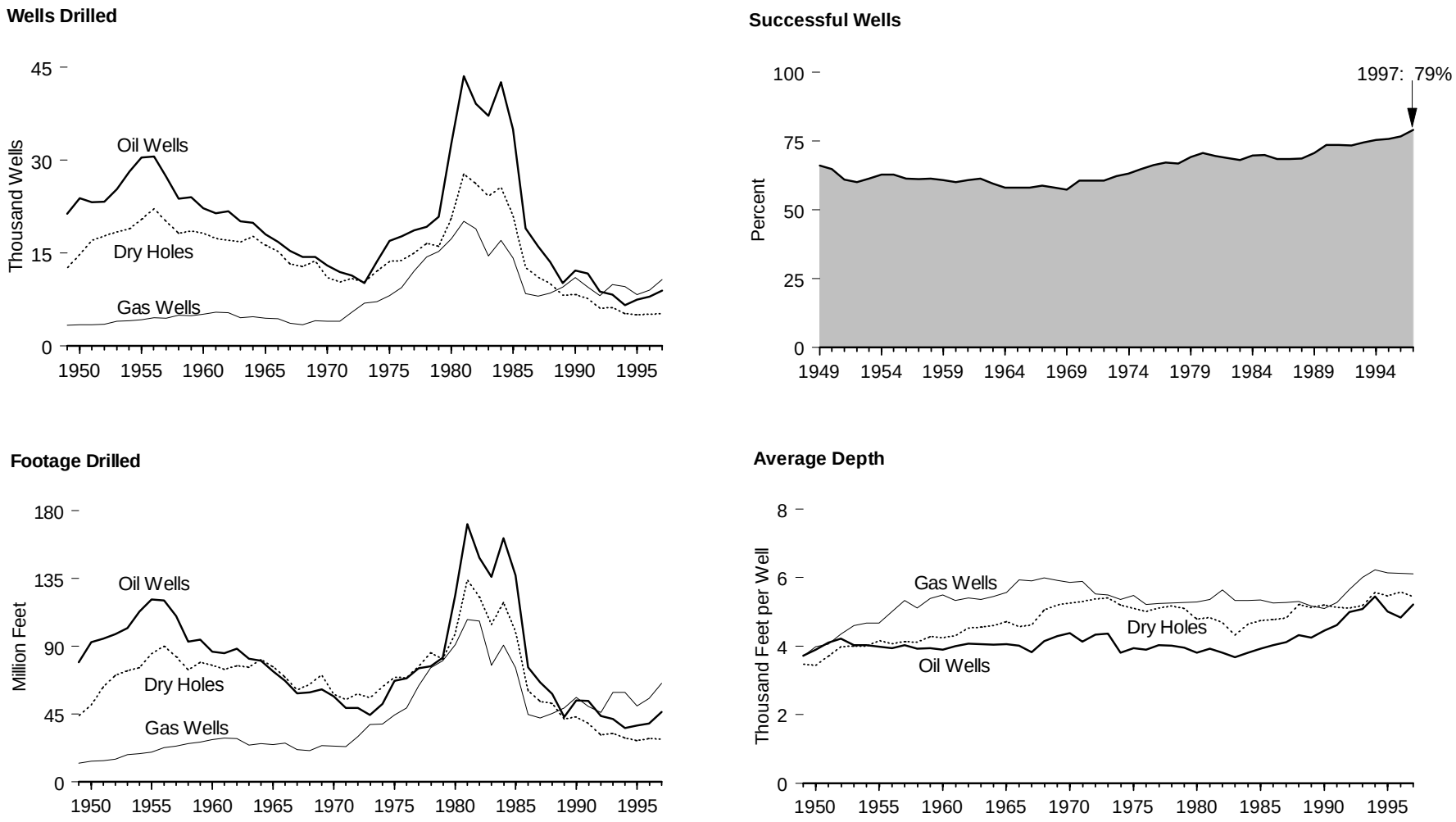
Source: Table 4.3.

Table 4.3 Oil and Gas Drilling Activity Measurements, 1949-1997

Year	Rotary Rigs in Operation [1]					Active Well Servicing Units
	By Site		By Type		Total [2]	
	Offshore	Onshore	Oil	Gas		
1949	NA	NA	NA	NA	2,017	NA
1950	NA	NA	NA	NA	2,154	NA
1951	NA	NA	NA	NA	2,543	NA
1952	NA	NA	NA	NA	2,641	NA
1953	NA	NA	NA	NA	2,613	NA
1954	NA	NA	NA	NA	2,508	NA
1955	NA	NA	NA	NA	2,686	NA
1956	NA	NA	NA	NA	2,620	NA
1957	NA	NA	NA	NA	2,426	NA
1958	NA	NA	NA	NA	1,922	NA
1959	NA	NA	NA	NA	2,071	NA
1960	NA	NA	NA	NA	1,748	NA
1961	NA	NA	NA	NA	1,761	NA
1962	NA	NA	NA	NA	1,641	NA
1963	NA	NA	NA	NA	1,499	NA
1964	NA	NA	NA	NA	1,501	NA
1965	NA	NA	NA	NA	1,388	NA
1966	NA	NA	NA	NA	1,272	NA
1967	NA	NA	NA	NA	1,135	NA
1968	NA	NA	NA	NA	1,169	NA
1969	NA	NA	NA	NA	1,194	NA
1970	NA	NA	NA	NA	1,028	NA
1971	NA	NA	NA	NA	976	NA
1972	NA	NA	NA	NA	1,107	NA
1973	84	1,110	NA	NA	1,194	NA
1974	94	1,378	NA	NA	1,472	NA
1975	106	1,554	NA	NA	1,660	NA
1976	129	1,529	NA	NA	1,658	2,601
1977	167	1,834	NA	NA	2,001	2,828
1978	185	2,074	NA	NA	2,259	2,988
1979	207	1,970	NA	NA	2,177	3,399
1980	231	2,678	NA	NA	2,909	4,089
1981	256	3,714	NA	NA	3,970	4,850
1982	243	2,862	NA	NA	3,105	4,248
1983	199	2,033	NA	NA	2,232	3,732
1984	213	2,215	NA	NA	2,428	4,663
1985	206	1,774	NA	NA	1,980	4,716
1986	99	865	NA	NA	964	3,036
1987	95	841	NA	NA	936	3,060
1988	123	813	554	354	936	3,341
1989	105	764	453	401	869	3,391
1990	108	902	532	464	1,010	3,658
1991	81	779	482	351	860	3,331
1992	52	669	373	331	721	2,732
1993	82	672	373	364	754	3,158
1994	102	673	335	427	775	2,961
1995	101	622	323	385	723	3,043
1996	108	671	306	464	779	3,425
1997	122	821	376	564	943	3,510

[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] Sum of oil, gas, and miscellaneous other rigs, which is not shown.
NA=Not available.
Notes: • Geographic coverage is the 50 States and the District of Columbia. • Totals may not equal sum of components due to independent rounding.
Sources: **Rotary Rigs in Operation:** Baker Hughes, Inc., Houston, Texas, *Rotary Rigs Running—By State.* **Active Well Servicing Units:** Association of Energy Service Companies, Dallas, Texas, *Field Reports.*

Figure 4.4 Oil and Gas Exploratory and Development Wells, 1949-1997



Source: Table 4.4.

Table 4.4 Oil and Gas Exploratory and Development Wells, 1949-1997

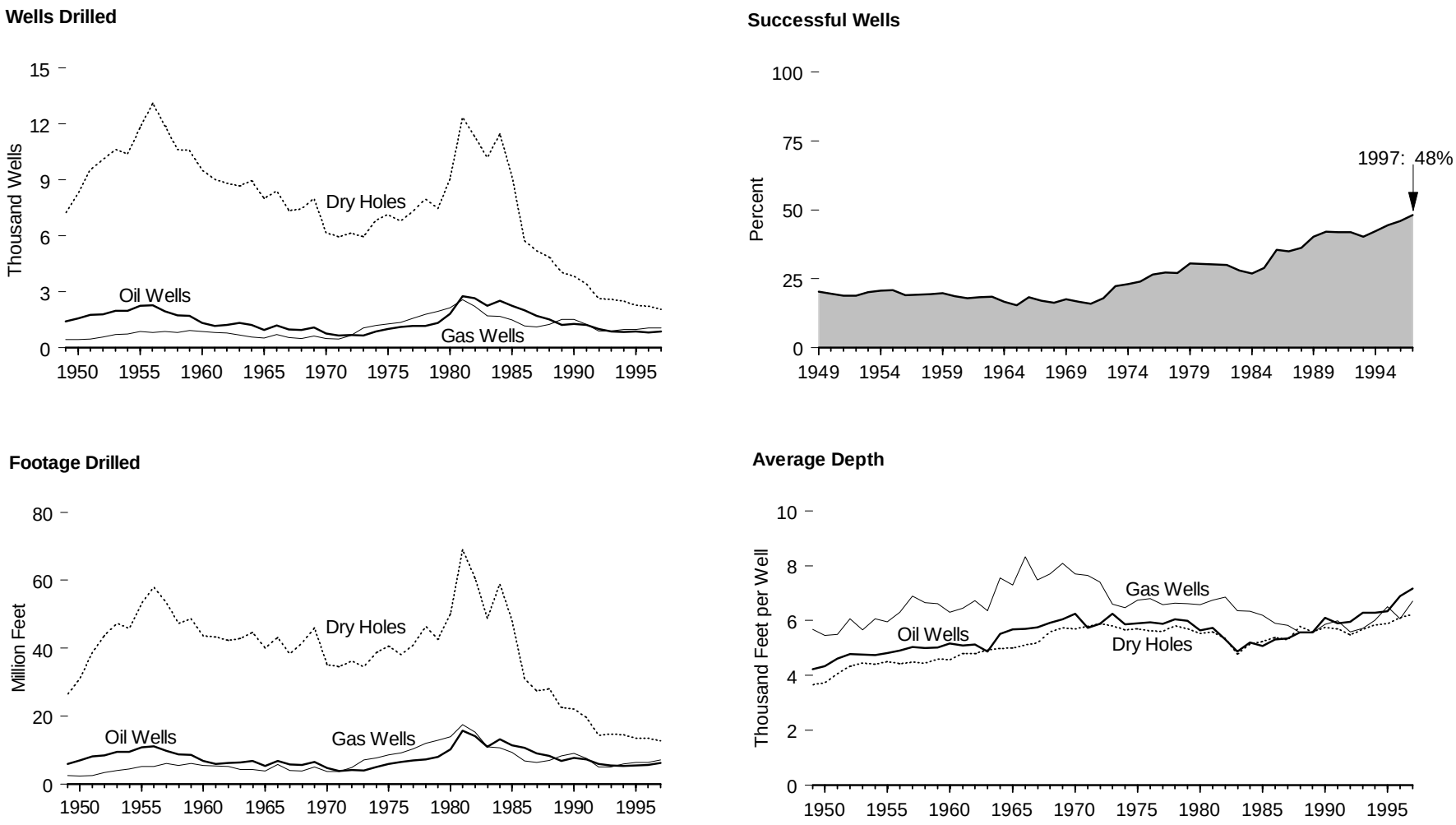
Year	Wells Drilled (thousands)				Successful Wells (percent)	Footage Drilled (million feet)				Average Depth (feet per well)			
	Oil	Gas	Dry Holes	Total		Oil	Gas	Dry Holes	Total	Oil	Gas	Dry Holes	Total
1949	21.35	3.36	12.60	37.31	66.2	79.4	12.4	43.8	135.6	3,720	3,698	3,473	3,635
1950	23.81	3.44	14.80	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	R12.97	4.03	R11.03	R28.03	60.6	R56.9	23.6	58.1	138.6	R4,385	R5,860	R5,265	R4,943
1971	11.90	3.98	R10.31	R26.20	R60.6	49.1	R23.5	R54.7	127.3	R4,126	R5,890	R5,305	R4,858
1972	R11.38	R5.44	R10.89	R27.71	R60.7	R49.3	R30.0	R58.6	R137.8	R4,330	R5,516	R5,377	R4,974
1973	R10.17	R6.93	R10.32	R27.42	R62.4	R44.4	R38.0	R55.8	R138.2	R4,367	R5,487	R5,406	R5,041
1974	13.66	7.17	R12.12	R32.95	R63.2	R52.0	38.5	R63.0	R153.5	R3,807	R5,365	R5,198	R4,657
1975	16.98	R8.13	R13.65	R38.75	R64.8	R67.0	44.5	R69.5	181.0	R3,948	R5,477	R5,091	R4,671
1976	17.70	9.44	13.81	40.94	66.3	R68.9	49.2	R69.1	R187.2	R3,894	R5,212	R5,007	R4,573
1977	18.70	12.12	15.04	45.86	67.2	R75.4	R63.6	R76.8	R215.8	R4,034	R5,250	R5,105	R4,707
1978	R19.18	14.41	16.59	R50.18	66.9	R77.0	R75.8	R85.8	R238.6	R4,014	R5,259	R5,173	R4,754
1979	R20.85	R15.25	16.04	R52.14	R69.2	R82.5	R80.4	R81.6	R244.5	R3,959	R5,270	R5,089	R4,690
1980	R32.59	R17.28	R20.61	R70.49	R70.8	R124.1	R91.3	R98.8	R314.2	R3,809	R5,283	R4,792	R4,458
1981	R43.57	R20.13	R27.78	R91.47	R69.6	R171.1	R107.8	R134.1	R413.1	R3,927	R5,358	R4,830	R4,516
1982	R39.13	R18.95	R26.22	R84.30	R68.9	R148.9	R106.8	R123.0	R378.7	R3,806	R5,638	R4,689	R4,492
1983	R37.10	14.56	R24.16	R75.82	R68.1	R136.2	77.6	R104.4	R318.2	R3,670	R5,333	R4,323	R4,197
1984	R42.54	R17.04	R25.66	R85.23	R69.9	R161.9	R90.7	R119.2	R371.9	R3,807	R5,324	R4,647	R4,363
1985	R34.93	R14.19	R21.03	R70.15	R70.0	R137.2	75.9	R99.9	R313.1	R3,929	R5,349	R4,751	R4,463
1986	R18.98	R8.50	R12.65	R40.13	R68.5	R76.3	R44.7	R60.4	R181.5	R4,023	R5,261	R4,778	R4,523
1987	R16.09	R8.05	R11.09	R35.23	R68.5	R66.3	R42.5	R53.4	R162.1	R4,117	R5,279	R4,815	R4,602
1988	R13.56	R8.55	R10.03	R32.14	R68.8	R58.6	R45.4	R52.3	R156.3	R4,322	R5,305	R5,216	R4,862
1989	R10.18	R9.53	R8.17	R27.88	R70.7	R43.2	R49.2	R41.9	R134.3	R4,245	R5,168	R5,124	R4,818
1990	R12.18	R11.04	R8.30	R31.52	R73.7	R54.2	R56.3	R43.1	R153.6	R4,453	R5,097	R5,193	R4,874
1991	R11.72	R9.48	R7.60	R28.81	R73.6	R54.0	R50.0	R38.9	R143.0	R4,610	R5,279	R5,119	R4,964
1992	R8.76	R8.16	R6.11	R23.03	R73.5	R43.8	R46.1	R31.2	R121.1	R4,992	R5,655	R5,109	R5,258
1993E	R8.25	R9.94	R6.22	R24.42	R74.5	R41.9	R59.6	R32.3	R133.8	R5,080	R6,000	R5,185	R5,481
1994E	R6.59	R9.55	R5.24	R21.38	R75.5	R35.9	R59.5	R29.2	R124.5	R5,443	R6,229	R5,568	R5,824
1995E	R7.50	R8.25	R5.04	R20.79	R75.8	R37.6	R50.6	R27.5	R115.8	R5,018	R6,135	R5,463	R5,569
1996E	R8.00	R9.05	R5.16	R22.21	R76.8	R38.7	R55.4	R28.8	R123.0	R4,839	R6,125	R5,585	R5,535
1997E	8.93	10.73	5.23	24.88	79.0	46.6	65.6	28.5	140.7	5,219	6,114	5,457	5,655

R=Revised. E=Estimated.

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

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

Figure 4.5 Oil and Gas Exploratory Wells, 1949-1997



Source: Table 4.5.

Table 4.5 Oil and Gas Exploratory Wells, 1949-1997

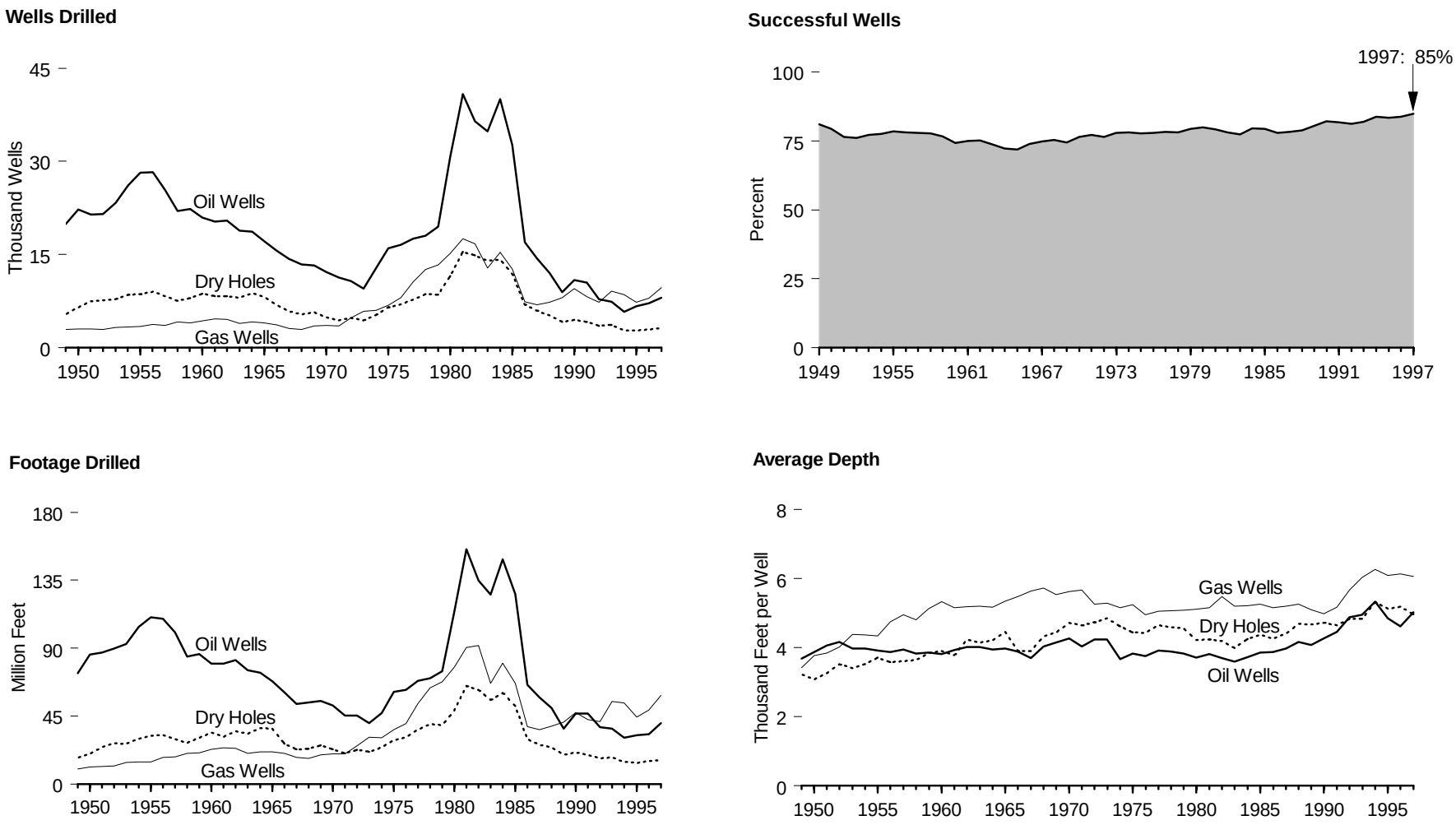
Year	Wells Drilled (thousands)				Successful Wells (percent)	Footage Drilled (million feet)				Average Depth (feet per well)			
	Oil	Gas	Dry Holes	Total		Oil	Gas	Dry Holes	Total	Oil	Gas	Dry Holes	Total
1949	1.41	0.42	7.23	9.06	20.2	6.0	2.4	26.4	34.8	4,232	5,682	3,658	3,842
1950	1.58	0.43	8.29	10.31	19.5	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	R6.16	R7.40	16.7	4.7	3.7	35.1	43.5	R6,247	R7,695	R5,700	R5,885
1971	0.66	0.47	R5.95	R7.08	R16.0	3.8	3.6	R34.5	R41.9	R5,745	R7,649	R5,796	R5,915
1972	0.69	0.66	R6.13	R7.47	17.9	4.0	R4.8	R36.1	R45.0	R5,880	R7,400	R5,882	R6,015
1973	R0.64	R1.07	R5.95	R7.66	22.3	4.0	R7.0	R34.6	R45.6	R6,246	R6,600	R5,811	R5,957
1974	R0.86	R1.19	R6.84	R8.89	23.1	5.1	7.7	R38.7	R51.4	R5,865	R6,463	R5,657	R5,785
1975	0.99	1.26	R7.13	R9.39	R24.0	R5.9	8.5	R40.6	R55.0	R5,908	R6,749	R5,693	R5,858
1976	1.10	R1.35	R6.78	R9.23	R26.6	6.5	9.2	R38.1	R53.8	R5,939	R6,794	R5,617	R5,828
1977	1.18	1.56	R7.29	R10.03	R27.3	6.9	R10.3	R40.9	R58.1	R5,874	R6,581	R5,607	R5,790
1978	R1.18	1.79	R7.97	R10.94	R27.1	7.1	R11.9	R46.3	R65.4	R6,049	R6,643	R5,813	R5,974
1979	1.34	R1.95	7.48	R10.76	R30.5	8.0	R12.9	R42.6	R63.5	R5,988	R6,625	R5,696	R5,900
1980	R1.81	R2.13	R9.05	R12.99	R30.3	R10.2	R14.0	50.1	R74.2	R5,645	R6,571	R5,532	R5,718
1981	R2.75	R2.57	R12.36	R17.68	R30.1	R15.7	R17.4	R69.0	R102.1	R5,730	R6,754	R5,585	R5,778
1982	R2.63	R2.22	R11.32	R16.17	R30.0	R14.0	R15.2	R60.6	R89.8	R5,315	R6,862	R5,351	5,553
1983	R2.23	R1.72	R10.20	R14.15	R27.9	R10.9	R10.9	48.8	R70.6	R4,876	R6,366	R4,784	R4,990
1984	R2.52	R1.68	R11.46	R15.66	R26.8	R13.1	R10.7	R58.9	R82.7	R5,208	R6,348	R5,139	R5,280
1985	R2.24	R1.50	R9.19	R12.92	R28.9	R11.4	R9.3	R48.2	R68.8	R5,080	R6,201	R5,245	R5,327
1986	R2.00	R1.16	R5.73	R8.89	R35.6	R10.6	R6.8	R30.9	R48.3	R5,307	R5,900	R5,394	R5,440
1987	R1.69	R1.10	R5.19	R7.97	R35.0	R9.1	R6.4	R27.5	R42.9	R5,354	R5,827	R5,297	R5,382
1988	R1.50	R1.25	R4.85	R7.60	R36.2	R8.3	R7.0	R28.1	R43.4	R5,564	R5,573	R5,790	R5,710
1989	R1.22	R1.50	R4.03	R6.74	R40.3	R6.8	R8.3	R22.5	R37.6	R5,559	R5,557	R5,596	R5,581
1990	R1.26	R1.53	R3.84	R6.63	R42.1	R7.7	R9.0	R22.1	R38.7	R6,096	R5,873	R5,754	R5,846
1991	R1.22	R1.25	R3.42	R5.89	R41.9	R7.2	R7.5	R19.5	R34.2	R5,903	R5,992	R5,704	R5,806
1992	R1.00	R0.90	R2.62	R4.51	R42.0	R5.9	R5.0	R14.3	R25.3	R5,956	R5,590	R5,484	R5,609
1993E	R0.87	R0.88	R2.59	R4.33	R40.3	R5.4	R5.0	R14.7	R25.2	6,282	R5,718	R5,683	R5,810
1994E	R0.84	R0.99	R2.48	R4.31	R42.4	R5.3	R5.9	R14.5	R25.7	R6,287	R6,007	R5,856	R5,974
1995E	R0.86	R0.98	R2.29	R4.12	R44.5	R5.4	R6.3	R13.4	R25.2	R6,340	R6,503	R5,882	R6,124
1996E	0.82	R1.05	R2.20	R4.08	R45.9	R5.7	R6.4	R13.5	R25.5	R6,889	R6,055	R6,113	R6,255
1997E	0.86	1.05	2.05	3.96	48.1	6.1	7.0	12.8	25.9	7,165	6,698	6,226	6,554

R=Revised. E=Estimated.

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

Sources: • 1949-1960—American Association of Petroleum Geologists, *Statistics on Exploratory Drilling in the United States, 1940 through 1960* (1962), pp. 4-19. • 1961-1965—*Bulletin of the American Association of Petroleum Geologists,* "North American Developments" issue. • 1966-1969—American Petroleum Institute, *Quarterly Review of Drilling Statistics for the United States,* annual summaries and monthly reports. • 1970 forward—Energy Information Administration computations based on well reports submitted to the American Petroleum Institute (1970-1994) and to the Petroleum Information Corporation (1995 forward).

Figure 4.6 Oil and Gas Development Wells, 1949-1997



Source: Table 4.6.

Table 4.6 Oil and Gas Development Wells, 1949-1997

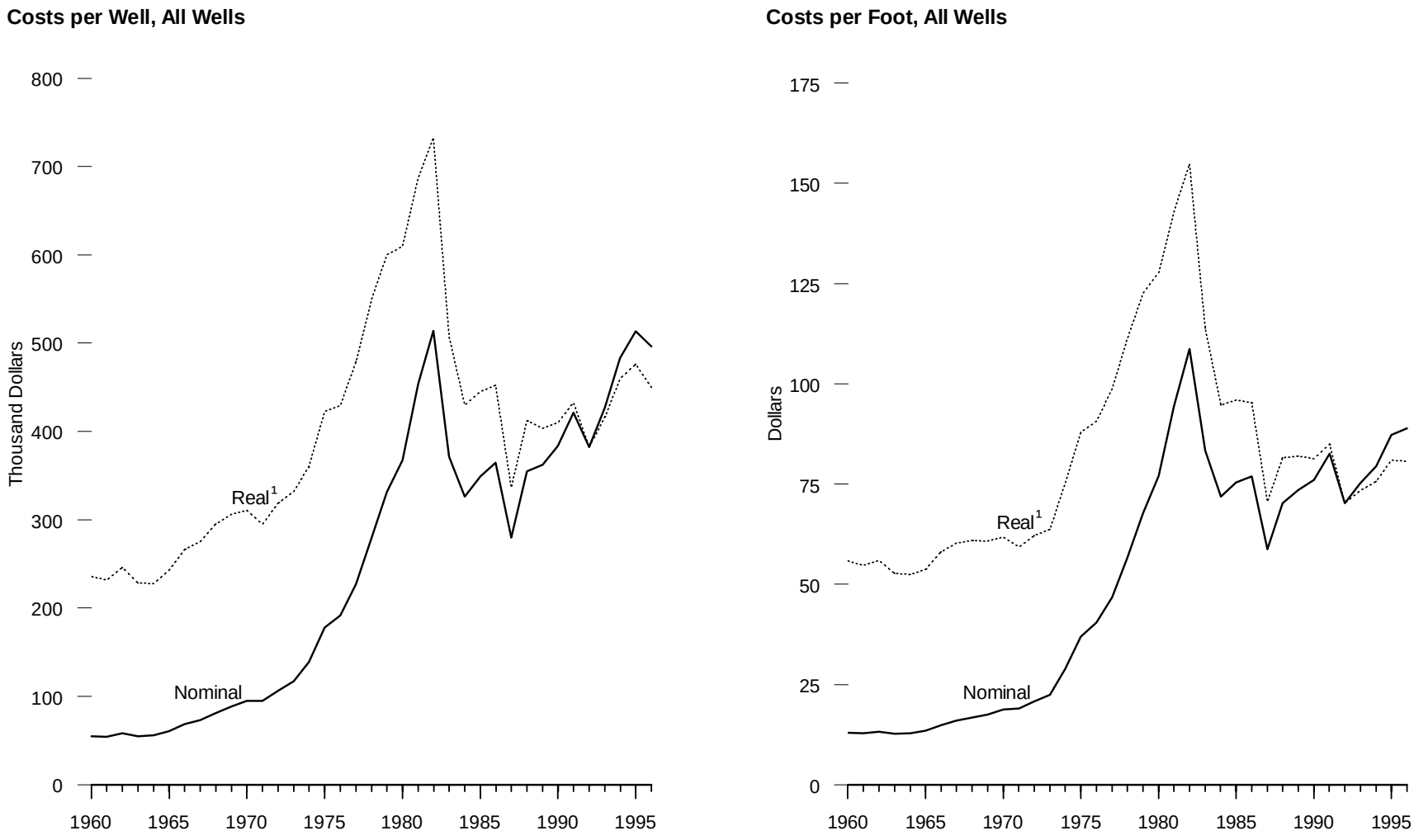
Year	Wells Drilled (thousands)				Successful Wells (percent)	Footage Drilled (million feet)				Average Depth (feet per well)			
	Oil	Gas	Dry Holes	Total		Oil	Gas	Dry Holes	Total	Oil	Gas	Dry Holes	Total
1949	19.95	2.94	5.37	28.25	81.0	73.5	10.0	17.3	100.8	3,684	3,412	3,225	3,568
1950	22.23	3.01	6.51	31.74	79.5	85.8	11.3	20.0	117.2	3,861	3,766	3,077	3,691
1951	21.42	2.98	7.49	31.89	76.5	87.0	11.5	24.4	122.8	4,061	3,837	3,255	3,851
1952	21.51	2.96	7.67	32.14	76.1	89.7	11.9	27.0	128.5	4,167	4,015	3,520	3,999
1953	23.34	3.27	7.82	34.43	77.3	92.7	14.3	26.6	133.6	3,972	4,373	3,401	3,880
1954	26.16	3.31	8.54	38.01	77.5	104.0	14.5	30.0	148.4	3,974	4,365	3,512	3,905
1955	28.20	3.39	8.62	40.21	78.6	110.4	14.7	31.9	157.0	3,915	4,339	3,699	3,904
1956	28.26	3.71	8.99	40.96	78.0	109.2	17.6	32.1	158.9	3,865	4,734	3,574	3,880
1957	25.42	3.61	8.25	37.28	77.9	100.2	17.9	29.7	147.9	3,944	4,950	3,605	3,966
1958	22.03	4.18	7.53	33.74	77.7	84.4	20.1	27.3	131.8	3,831	4,801	3,631	3,907
1959	22.34	4.02	8.01	34.37	76.7	86.1	20.6	30.8	137.4	3,852	5,120	3,844	3,999
1960	20.94	4.28	8.70	33.92	74.4	79.7	22.8	33.8	136.3	3,809	5,321	3,889	4,020
1961	20.28	4.67	8.31	33.26	75.0	79.7	24.0	31.4	135.2	3,931	5,145	3,782	4,064
1962	20.52	4.58	8.26	33.36	75.2	82.2	23.8	35.0	141.0	4,008	5,186	4,239	4,227
1963	18.82	3.91	8.08	30.80	73.8	75.4	20.3	33.5	129.2	4,006	5,198	4,143	4,193
1964	18.69	4.14	8.74	31.57	72.3	73.7	21.4	36.8	131.9	3,947	5,171	4,207	4,179
1965	17.12	3.97	8.22	29.31	71.9	68.0	21.2	36.5	125.7	3,970	5,337	4,446	4,288
1966	15.58	3.68	6.81	26.07	73.9	60.5	20.1	26.6	107.2	3,884	5,474	3,900	4,112
1967	14.34	3.13	5.89	23.36	74.8	53.0	17.6	23.0	93.5	3,692	5,629	3,901	4,004
1968	13.38	2.97	5.37	21.72	75.3	53.9	17.0	23.2	94.0	4,027	5,716	4,311	4,328
1969	13.28	3.47	5.74	22.49	74.5	55.0	19.2	25.4	99.6	4,142	5,531	4,437	4,431
1970	R12.21	3.55	R4.87	R20.63	R76.4	52.1	R19.9	23.0	95.0	R4,269	R5,614	R4,714	R4,606
1971	11.24	3.51	R4.36	R19.11	R77.2	45.3	19.8	20.2	R85.4	R4,031	R5,654	R4,633	R4,466
1972	R10.69	R4.79	R4.76	R20.24	R76.5	45.2	R25.2	R22.5	R92.9	R4,231	R5,258	R4,725	R4,590
1973	R9.53	R5.87	R4.37	R19.76	R77.9	40.4	R31.0	R21.2	R92.6	R4,240	R5,285	R4,853	R4,686
1974	R12.80	R5.98	R5.28	R24.06	R78.1	47.0	R30.7	R24.3	R102.0	R3,668	R5,145	R4,604	R4,240
1975	15.99	R6.86	R6.51	R29.37	77.8	61.2	36.0	28.9	126.0	R3,826	R5,243	R4,431	R4,292
1976	16.60	R8.09	R7.03	R31.71	R77.8	62.4	40.0	31.1	133.4	R3,758	R4,947	R4,419	R4,208
1977	17.52	10.56	R7.74	R35.83	R78.4	68.5	53.3	35.9	R157.7	R3,910	R5,053	R4,633	R4,403
1978	R18.00	12.61	R8.62	R39.23	R78.0	69.9	63.8	R39.5	R173.2	R3,881	R5,062	R4,580	R4,414
1979	R19.51	R13.31	8.56	R41.38	R79.3	74.5	R67.5	R39.0	R181.1	R3,820	R5,072	R4,559	R4,375
1980	R30.78	R15.16	R11.56	R57.50	R79.9	113.9	R77.3	R48.7	R240.0	R3,701	R5,102	R4,213	R4,174
1981	R40.82	R17.55	R15.42	R73.79	R79.1	155.4	R90.5	R65.1	R310.9	R3,806	R5,153	R4,224	R4,214
1982	R36.50	R16.73	R14.90	R68.13	R78.1	134.9	R91.6	R62.4	R288.9	R3,697	R5,476	R4,185	R4,241
1983	R34.87	R12.84	R13.96	R61.67	R77.4	125.3	R66.7	R55.6	R247.6	R3,593	R5,195	R3,986	R4,015
1984	R40.02	R15.36	R14.20	R69.58	R79.6	148.8	R80.0	R60.3	R289.2	R3,719	R5,212	R4,250	R4,157
1985	R32.69	R12.70	R11.84	R57.23	R79.3	125.9	R66.6	R51.7	R244.2	R3,850	R5,249	R4,367	R4,268
1986	R16.97	R7.35	R6.92	R31.25	R77.8	65.7	R37.9	R29.5	R133.2	R3,871	R5,160	R4,268	R4,262
1987	R14.40	R6.95	R5.90	R27.26	R78.3	57.2	R36.1	R25.9	R119.2	R3,971	R5,193	R4,391	R4,374
1988	R12.06	R7.30	R5.18	R24.54	R78.9	50.3	R38.4	R24.2	R112.9	R4,167	R5,259	R4,679	R4,600
1989	R8.97	R8.03	R4.14	R21.14	R80.4	36.5	R40.9	R19.3	R96.7	R4,067	R5,095	R4,665	R4,575
1990	R10.92	R9.51	R4.46	R24.89	R82.1	46.5	R47.3	R21.0	R114.9	R4,263	R4,973	R4,711	R4,614
1991	R10.50	R8.23	R4.18	R22.92	81.7	46.8	R42.6	R19.4	R108.8	R4,459	R5,172	R4,641	R4,748
1992	R7.77	R7.27	R3.49	R18.53	R81.1	37.8	R41.1	R16.9	R95.8	R4,869	R5,663	R4,829	R5,173
1993E	R7.39	R9.06	R3.64	R20.09	R81.9	36.5	R54.6	R17.6	R108.7	R4,939	R6,027	R4,830	R5,410
1994E	R5.75	R8.56	R2.76	R17.07	R83.8	30.6	R53.5	R14.7	R98.8	R5,320	R6,254	R5,310	R5,787
1995E	R6.65	R7.28	R2.75	R16.68	R83.5	32.2	R44.3	R14.1	R90.6	R4,847	R6,086	R5,115	R5,432
1996E	R7.18	R8.00	R2.95	R18.14	R83.7	33.1	R49.1	R15.3	R97.5	R4,604	R6,134	R5,185	R5,374
1997E	8.07	9.68	3.18	20.93	84.8	40.5	58.6	15.7	114.8	5,013	6,051	4,960	5,485

R=Revised. E=Estimated.

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

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

Figure 4.7 Costs of Oil and Gas Wells Drilled, 1960-1996



[1]In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

Source: Table 4.7.

Table 4.7 Costs of Oil and Gas Wells Drilled, 1960-1996

Year	Costs per Well (thousand dollars)					Costs per Foot (dollars)				
	Oil (nominal)	Gas (nominal)	Dry Holes (nominal)	All (nominal)	All (real) [1]	Oil (nominal)	Gas (nominal)	Dry Holes (nominal)	All (nominal)	All (real) [1]
1960	52.2	102.7	44.0	54.9	235.8	13.22	18.57	10.56	13.01	55.84
1961	51.3	94.7	45.2	54.5	R232.0	13.11	17.65	10.56	12.85	R54.68
1962	54.2	97.1	50.8	58.6	R246.4	13.41	18.10	11.20	13.31	R55.92
1963	51.8	92.4	48.2	55.0	R228.3	13.20	17.19	10.58	12.69	R52.66
1964	50.6	104.8	48.5	55.8	227.8	13.12	18.57	10.64	12.86	52.49
1965	56.6	101.9	53.1	60.6	242.6	13.94	18.35	11.21	13.44	53.76
1966	62.2	133.8	56.9	68.4	266.1	15.04	21.75	12.34	14.95	58.17
1967	66.6	141.0	61.5	72.9	275.1	16.61	23.05	12.87	15.97	60.26
1968	79.1	148.5	66.2	81.5	R295.2	18.63	24.05	12.88	16.83	R60.98
1969	86.5	154.3	70.2	88.6	R306.4	19.28	25.58	13.23	17.56	R60.76
1970	86.7	160.7	80.9	94.9	R311.1	19.29	26.75	15.21	18.84	R61.77
1971	78.4	166.6	86.8	94.7	R295.0	18.41	27.70	16.02	19.03	R59.28
1972	93.5	157.8	94.9	106.4	R318.6	20.77	27.78	17.28	20.76	R62.16
1973	103.8	155.3	105.8	117.2	R331.9	22.54	27.46	19.22	22.50	R63.74
1974	110.2	189.2	141.7	138.7	360.3	27.82	34.11	26.76	28.93	75.14
1975	138.6	262.0	177.2	177.8	R422.3	34.17	46.23	33.86	36.99	R87.86
1976	151.1	270.4	190.3	191.6	429.6	37.35	49.78	36.94	40.46	90.72
1977	170.0	313.5	230.2	227.2	479.3	41.16	57.57	43.49	46.81	98.76
1978	208.0	374.2	281.7	280.0	R550.0	49.72	68.37	52.55	56.63	R111.26
1979	243.1	443.1	339.6	331.4	R600.3	58.29	80.66	64.60	67.70	R122.64
1980	272.1	536.4	376.5	367.7	R609.8	66.36	95.16	73.70	77.02	R127.73
1981	336.3	698.6	464.0	453.7	R687.4	80.40	122.17	90.03	94.30	R142.88
1982	347.4	864.3	515.4	514.4	R732.7	86.34	146.20	104.09	108.73	R154.89
1983	283.8	608.1	366.5	371.7	R507.8	72.65	108.37	79.10	83.34	R113.85
1984	262.1	489.8	329.2	326.5	430.1	66.32	88.80	67.18	71.90	94.73
1985	270.4	508.7	372.3	349.4	R445.1	66.78	93.09	73.69	75.35	R95.99
1986	284.9	522.9	389.2	364.6	452.3	68.35	93.02	76.53	76.88	95.38
1987	246.0	380.4	259.1	279.6	336.5	58.35	69.55	51.05	58.71	70.65
1988	279.4	460.3	366.4	354.7	412.0	62.28	84.65	66.96	70.23	81.57
1989	282.3	457.8	355.4	362.2	403.8	64.92	86.86	67.61	73.55	82.00
1990	321.8	471.3	367.5	383.6	409.8	69.17	90.73	67.49	76.07	81.27
1991	346.9	506.6	441.2	421.5	433.1	73.75	93.10	83.05	82.64	84.93
1992	362.3	426.1	357.6	382.6	382.6	69.50	72.83	67.82	70.27	70.27
1993	356.6	521.2	387.7	426.8	416.0	67.52	83.15	72.56	75.30	73.39
1994	409.5	535.1	491.5	483.2	R459.8	70.57	81.90	86.60	79.49	R75.63
1995	415.8	629.7	481.2	513.4	R476.3	78.09	95.97	84.60	87.22	R80.91
1996	341.0	616.0	541.0	496.1	450.2	70.60	98.67	95.74	88.92	80.69

[1] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

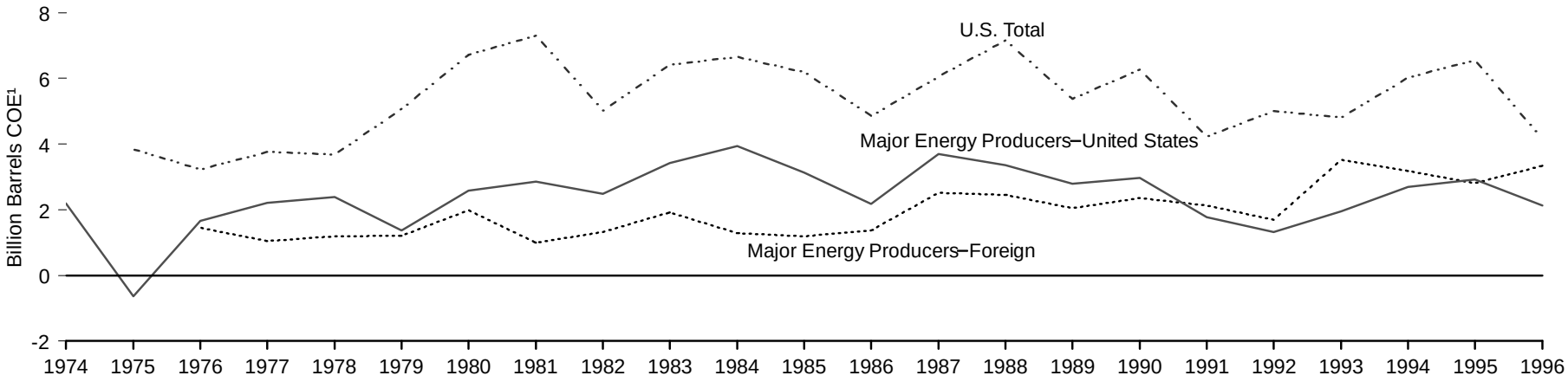
R=Revised.

Notes: • The information reported for 1965 and prior years is not strictly comparable to that in the more recent surveys. • Average cost is the arithmetic mean and includes all costs for drilling and equipping wells and for surface-producing facilities. Wells drilled include exploratory and development wells; excludes service wells, stratigraphic tests, and core tests.

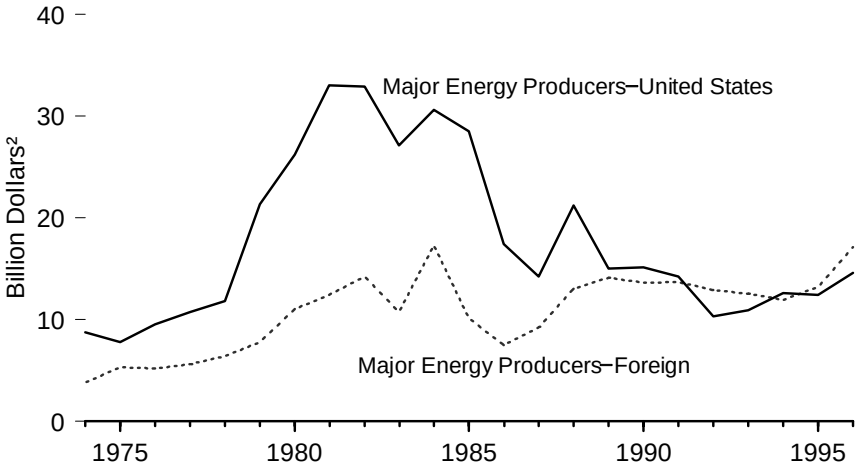
Source: American Petroleum Institute, Independent Petroleum Association of America, Mid-Continent Oil and Gas Association, *1996 Joint Association Survey on Drilling Costs.*

Figure 4.8 Gross Additions to Proved Reserves and Exploration and Development Expenditures by Geographic Area

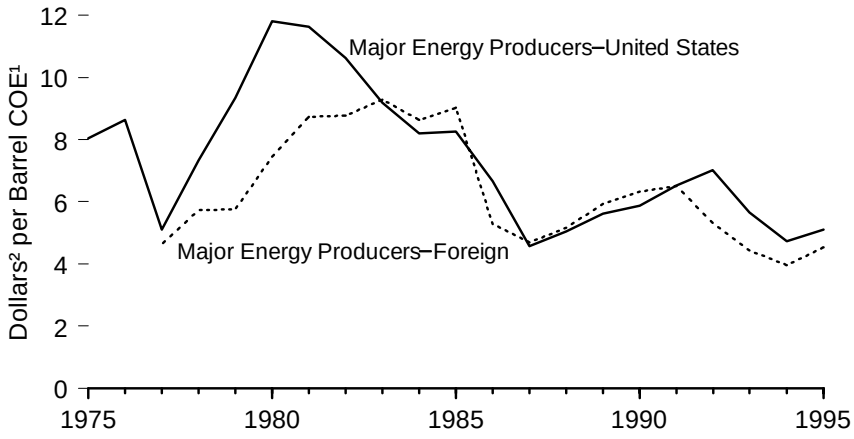
Gross Additions to Proved Reserves of Liquid and Gaseous Hydrocarbons, 1974-1996



Exploration and Development Expenditures, 1974-1996



Expenditures per Barrel of Reserve Additions, 1975-1995
Three-Year Weighted Average



[1] Crude oil equivalent.
[2] Nominal dollars.

Note: See Table 3.12 for information about companies covered.
Source: Table 4.8.

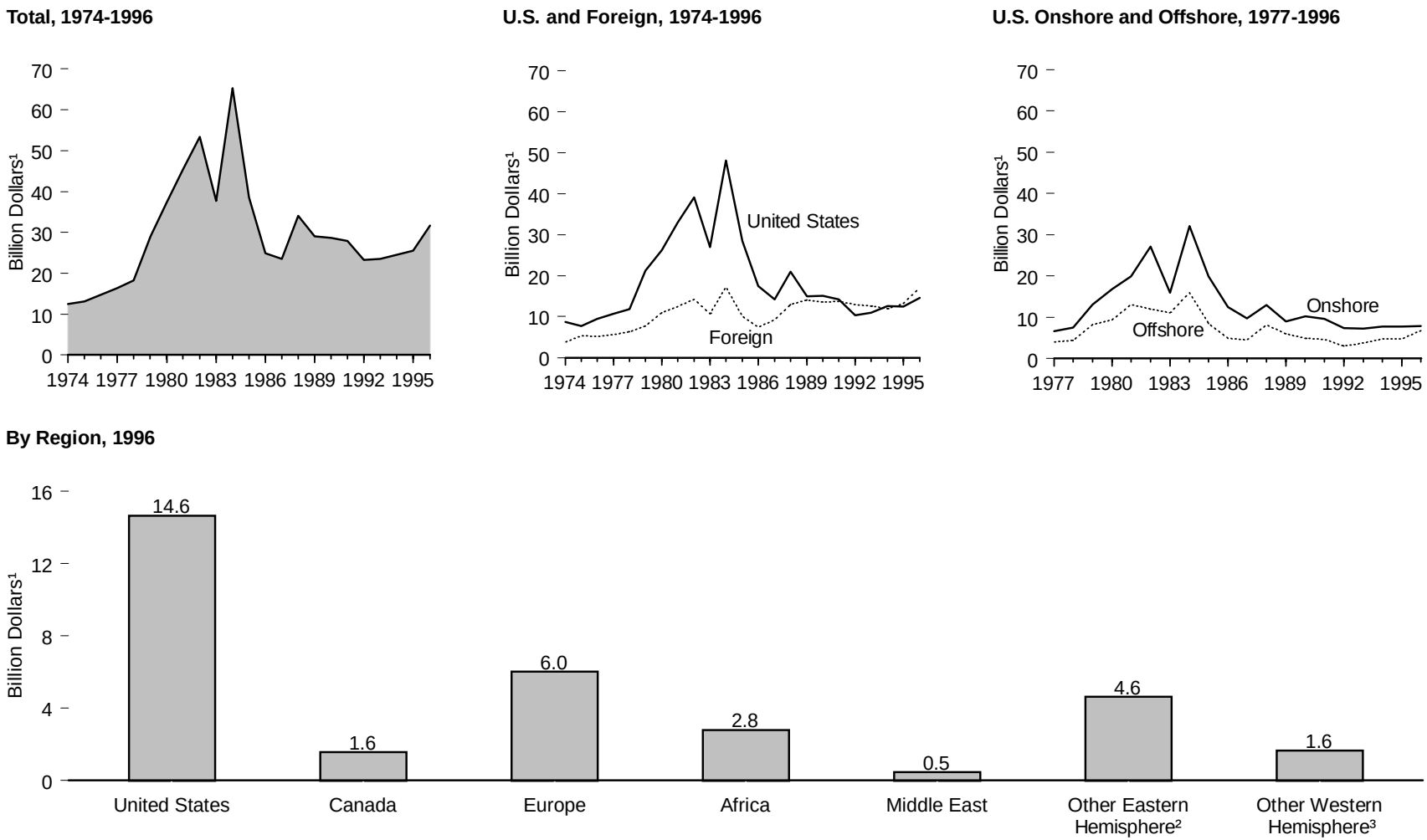
Table 4.8 Gross Additions to Proved Reserves and Exploration and Development Expenditures by Geographic Area, 1974-1996

Year	Gross Additions to Proved Reserves [1] of Liquid and Gaseous Hydrocarbons [2] (million barrels COE [3])			Exploration and Development Expenditures (billion dollars [4])		Expenditures per Barrel of Reserve Additions, Three-Year Weighted Average (dollars [4] per barrel COE [3])	
		Major Energy Producers [5]		Major Energy Producers [5]		Major Energy Producers [5]	
	U.S. Total	United States	Foreign	United States	Foreign	United States	Foreign
1974	NA	2,205	NA	[R]8.7	3.8	NA	NA
1975	3,846	-634	NA	[R]7.8	5.3	8.05	NA
1976	3,224	1,663	1,459	[R]9.5	5.2	8.64	NA
1977	3,765	2,210	1,055	10.7	5.6	5.12	4.64
1978	3,679	2,383	1,191	11.8	6.4	7.34	5.73
1979	5,071	1,378	[6]1,208	21.3	7.8	9.34	[6]5.75
1980	6,723	2,590	1,977	26.2	11.0	11.80	7.45
1981	7,304	2,848	1,006	33.0	12.4	11.63	8.74
1982	5,030	2,482	1,332	32.9	14.2	[7]10.62	[7]8.78
1983	6,412	3,427	1,918	27.1	10.7	9.20	9.28
1984	6,653	3,941	1,298	30.6	17.3	[7]8.21	[7]8.63
1985	6,190	[8]3,129	1,192	28.5	10.1	[8]8.27	9.03
1986	4,866	2,178	[6]1,375	17.4	7.5	6.67	[6]5.28
1987	6,059	[8]3,698	2,516	14.2	9.2	[8]4.58	4.69
1988	7,156	3,359	2,460	21.2	13.0	5.05	5.18
1989	5,385	2,798	2,043	15.0	14.1	5.62	5.94
1990	[R]6,275	2,979	2,355	15.1	13.6	5.87	6.34
1991	4,227	1,772	2,135	14.2	13.7	6.52	6.50
1992	5,006	1,332	1,694	10.3	12.9	7.02	5.32
1993	4,814	1,945	3,526	10.9	12.5	5.66	4.45
1994	6,021	2,703	3,175	12.6	11.9	4.74	3.96
1995	[R]6,558	2,929	2,801	12.4	13.2	[R]5.11	4.53
1996	4,148	2,131	3,345	14.6	17.1	NA	NA

[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 on the basis of annual average conversion factors. See Appendix A.
[4] Nominal dollars.
[5] Major Energy Producers are the top publicly-owned crude oil producers that form the Financial Reporting System (FRS) (see Table 3.12).
[6] Data for 1979 exclude downward revisions of 1,225 million barrels COE due to Iranian policies. Data for 1986 exclude downward revisions due to Libyan sanctions.
[7] Data for 1982 and 1984 are adjusted to exclude purchases of proved reserves associated with mergers among the Financial Reporting System companies.
[8] Data for 1985 and 1987 exclude downward revisions of 1,477 million barrels COE and 2,396 million barrels COE, respectively, of Alaska North Slope natural gas reserves.

R=Revised. NA=Not available.
Web Page: http://www.eia.doe.gov/emeu/finance/index.html.
Sources: **Major Energy Producers:** • 1974-1976—Energy Information Administration (EIA), Form EIA-28, "Financial Reporting System" database, November 1997. • 1977-1995—EIA, *Performance Profiles of Major Energy Producers,* annual report. • 1996—EIA, *Performance Profiles of Major Energy Producers 1996* (January 1998), Tables 13, 17, and B21. **U.S. Total, Exploration and Development Expenditures:** • 1975-1982—Bureau of the Census, *Annual Survey of Oil and Gas.* • 1983-1991—American Petroleum Institute, *Survey on Oil and Gas Expenditures 1992.* **U.S. Total, Gross Additions to Proved Reserves of Liquid and Gaseous Hydrocarbons:** • 1975-1979—American Gas Association, American Petroleum Institute, and Canadian Petroleum Association (published jointly), *Reserves of Crude Oil, Natural Gas Liquids, and Natural Gas in the United States and Canada as of December 31, 1979,* Volume 34, June 1980. • 1980 forward—EIA, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1996 Annual Report* (December 1997).

Figure 4.9 Major Energy Producers' Expenditures for Oil and Gas Exploration and Development by Region



¹ Nominal dollars.

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

³ This region includes areas that are westward of the Greenwich prime meridian to 180° longitude and that are not included in other specific domestic or foreign classifications.

Notes: • See Table 3.12 for information on companies covered. • Because vertical scales differ, graphs should not be compared.

Source: Table 4.9.

Table 4.9 Major Energy Producers' Expenditures for Oil and Gas Exploration and Development by Region, 1974-1996

(Billion Dollars[1])

Year	United States			Foreign							Total
	Onshore	Offshore	Total	Canada	Europe	Africa	Middle East	Other Eastern Hemisphere [2]	Other Western Hemisphere [3]	Total	
1974	NA	NA	8.7	NA	NA	NA	NA	NA	NA	3.8	12.5
1975	NA	NA	7.8	NA	NA	NA	NA	NA	NA	5.3	13.1
1976	NA	NA	9.5	NA	NA	NA	NA	NA	NA	5.2	14.7
1977	6.7	4.0	10.7	1.5	2.5	0.7	0.2	0.3	0.4	5.6	16.3
1978	7.5	4.3	11.8	1.6	2.6	0.8	0.3	0.4	0.6	6.4	18.2
1979	13.0	8.3	21.3	2.3	3.0	0.8	0.2	0.5	0.8	7.8	29.1
1980	16.8	9.4	26.2	3.1	4.3	1.4	0.2	0.8	1.0	11.0	37.2
1981	19.9	13.0	33.0	1.8	5.0	2.1	0.3	1.9	1.3	12.4	45.4
1982	27.2	11.9	39.1	1.9	6.3	2.1	0.4	2.4	1.1	14.2	53.3
1983	16.0	11.1	27.1	1.6	4.3	1.7	0.5	2.0	0.6	10.7	37.7
1984	32.1	16.0	48.1	5.4	5.5	3.4	0.5	2.0	0.5	17.3	65.3
1985	20.0	8.5	28.5	1.9	3.7	1.6	0.9	1.3	0.7	10.1	38.6
1986	12.5	4.9	17.4	1.1	3.2	1.1	0.3	1.2	0.6	7.5	24.9
1987	9.7	4.5	14.3	1.9	3.0	0.8	0.4	2.8	0.5	9.2	23.5
1988	12.9	8.1	21.0	5.4	4.3	0.8	0.4	1.4	0.7	13.0	34.1
1989	9.0	6.0	15.0	6.3	3.5	1.0	0.4	2.3	0.6	14.1	29.1
1990	10.2	4.9	15.1	1.8	6.6	1.4	0.6	2.4	0.7	13.6	28.7
1991	9.6	4.6	14.2	1.7	6.8	1.5	0.5	2.4	0.7	13.7	27.9
1992	7.3	3.0	10.3	1.1	6.8	1.4	0.6	2.4	0.6	12.9	23.2
1993	7.2	3.7	10.9	1.6	5.7	1.5	0.7	2.5	0.6	12.5	23.5
1994	7.8	4.8	12.6	1.8	4.7	1.4	0.4	2.8	0.7	11.9	24.5
1995	7.7	4.7	12.4	1.9	5.6	2.0	0.4	2.4	0.9	13.2	25.6
1996	7.9	6.7	14.6	1.6	6.0	2.8	0.5	4.6	1.6	17.1	31.7

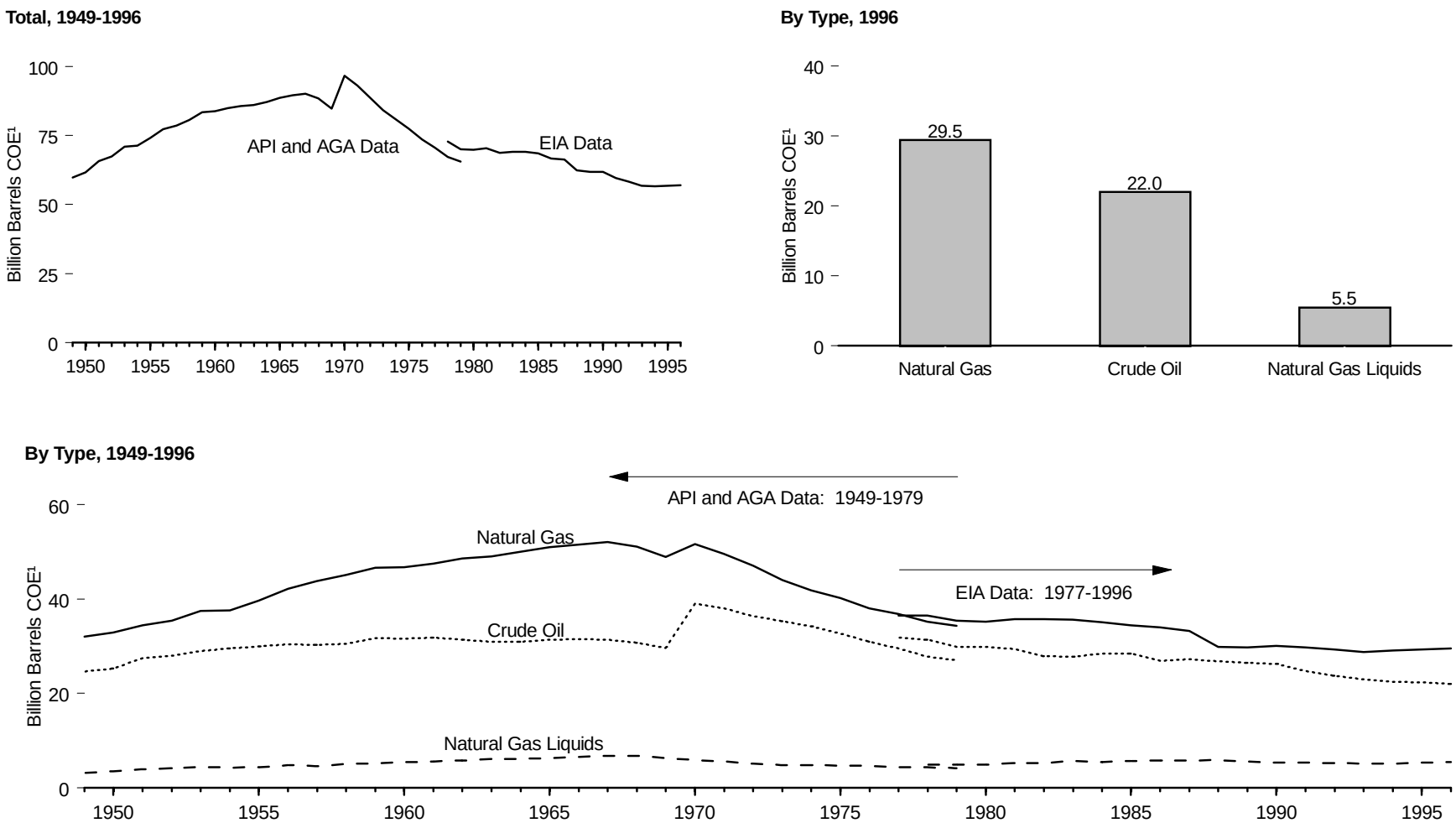
[1] Nominal dollars.
[2] This region includes areas that are eastward of the Greenwich prime meridian to 180 longitude and that are not included in other specified domestic or foreign classifications.
[3] This region includes areas that are westward of the Greenwich prime meridian to 180 longitude and that are not included in other domestic or foreign classifications.
NA=Not available.

Note: • Major Energy Producers are the top publicly-owned crude oil producers that form the Financial Reporting System (FRS). See Table 3.12. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/emeu/finance/index.html.

Sources: • 1974–1976—Energy Information Administration (EIA), Office of Energy Markets and End Use, Financial Reporting System Database, November 1997. • 1977–1995—EIA, *Performance Profiles of Major Energy Producers,* annual report. • 1996—EIA, *Performance Profiles of Major Energy Producers, 1996* (January 1998), Tables B32 and B34.

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



[1] COE=crude oil equivalent.

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

Source: Table 4.10.

Table 4.10 Liquid and Gaseous Hydrocarbon Proved Reserves, End of Year 1949-1996

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 [2]
	American Petroleum Institute and American Gas Association Data					
1949	24.6	179.4	32.0	3.7	3.1	59.7
1950	25.3	184.6	32.9	4.3	3.5	61.7
1951	27.5	192.8	34.4	4.7	3.9	65.7
1952	28.0	198.6	35.4	5.0	4.1	67.5
1953	28.9	210.3	37.5	5.4	4.4	70.9
1954	29.6	210.6	37.6	5.2	4.2	71.3
1955	30.0	222.5	39.7	5.4	4.4	74.1
1956	30.4	236.5	42.2	5.9	4.7	77.3
1957	30.3	245.2	43.8	5.7	4.5	78.6
1958	30.5	252.8	45.1	6.2	5.0	80.6
1959	31.7	261.2	46.6	6.5	5.2	83.5
1960	31.6	262.3	46.8	6.8	5.4	83.8
1961	31.8	266.3	47.5	7.0	5.6	84.8
1962	31.4	272.3	48.6	7.3	5.8	85.7
1963	31.0	276.2	49.1	7.7	6.0	86.1
1964	31.0	281.3	50.0	7.7	6.1	87.1
1965	31.4	286.5	51.0	8.0	6.3	88.6
1966	31.5	289.3	51.5	8.3	6.5	89.5
1967	31.4	292.9	52.1	8.6	6.7	90.2
1968	30.7	287.3	51.1	8.6	6.7	88.5
1969	29.6	275.1	48.9	8.1	6.3	84.8
1970	39.0	290.7	51.7	7.7	5.9	96.6
1971	38.1	278.8	49.6	7.3	5.5	93.2
1972	36.3	266.1	47.1	6.8	5.1	88.5
1973	35.3	250.0	44.0	6.5	4.8	84.1
1974	34.2	237.1	41.9	6.4	4.7	80.8
1975	32.7	228.2	40.2	6.3	4.6	77.5
1976	30.9	216.0	38.0	6.4	4.7	73.6
1977	29.5	208.9	36.8	6.0	4.4	70.6
1978	27.8	200.3	35.2	5.9	4.3	67.3
1979	27.1	194.9	34.3	5.7	4.1	65.5
	Energy Information Administration Data					
1977	31.8	207.4	36.5	NA	NA	NA
1978	31.4	208.0	36.5	6.8	4.9	72.8
1979	29.8	201.0	35.4	6.6	4.8	70.0
1980	29.8	199.0	35.2	6.7	4.9	69.9
1981	29.4	201.7	35.7	7.1	5.2	70.3
1982	27.9	201.5	35.7	7.2	5.2	68.8
1983	27.7	200.2	35.6	7.9	5.7	69.0
1984	28.4	197.5	35.1	7.6	5.5	69.0
1985	28.4	193.4	34.4	7.9	5.6	68.5
1986	26.9	191.6	34.0	8.2	5.7	66.6
1987	27.3	187.2	33.3	8.1	5.8	66.3
1988	26.8	168.0	29.8	8.2	5.8	62.5
1989	26.5	167.1	29.7	7.8	5.5	61.7
1990	26.3	169.3	30.1	7.6	5.4	61.7
1991	24.7	167.1	29.7	7.5	5.3	59.6
1992	23.7	165.0	29.3	7.5	5.2	58.3
1993	23.0	162.4	28.8	7.2	5.1	56.8
1994	22.5	163.8	29.0	7.2	5.1	56.6
1995	22.4	165.1	29.2	7.4	5.3	56.9
1996	22.0	166.5	29.5	7.8	5.5	57.0

[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 (EIA) data do not include gas in underground storage.

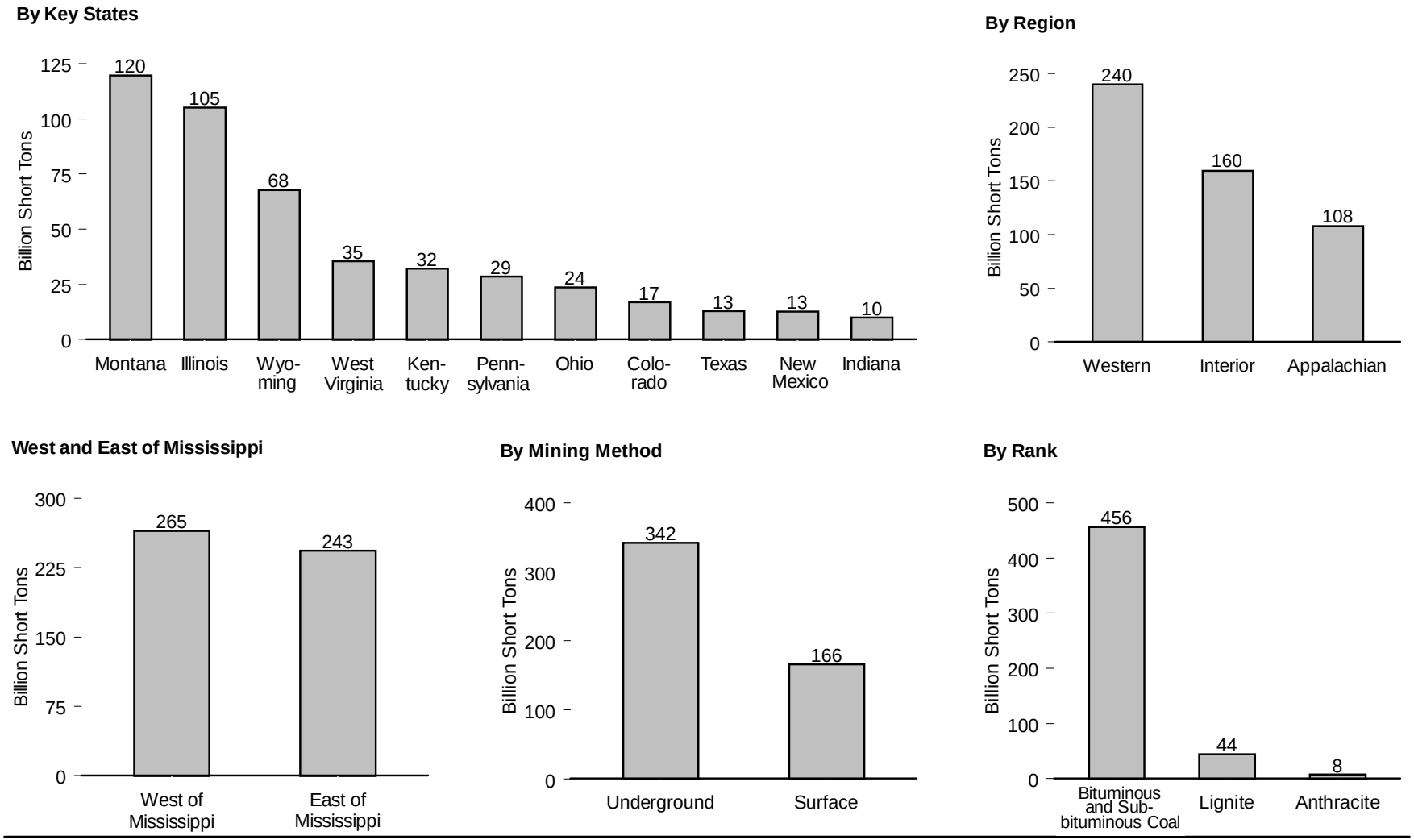
[2] Crude oil equivalent. Natural gas and natural gas liquids are converted to Btu on the basis of annual average conversion factors. See Appendix A.

NA=Not available.

Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

Sources: **API/AGA Data:** American Gas Association, American Petroleum Institute, and Canadian Petroleum Association (published jointly). *Reserves of Crude Oil, Natural Gas Liquids and Natural Gas in the United States and Canada as of December 31, 1979.* Volume 34, June 1980. **EIA Data:** • 1977-1984—EIA, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1988 Annual Report* (October 1989), Table 1. • 1985-forward—EIA, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, Annual Report 1996* (November 1997), Tables 1, 15, and 16.

Figure 4.11 Coal Demonstrated Reserve Base, January 1, 1997



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

Source: Table 4.11.

Table 4.11 Coal Demonstrated Reserve Base, January 1, 1997

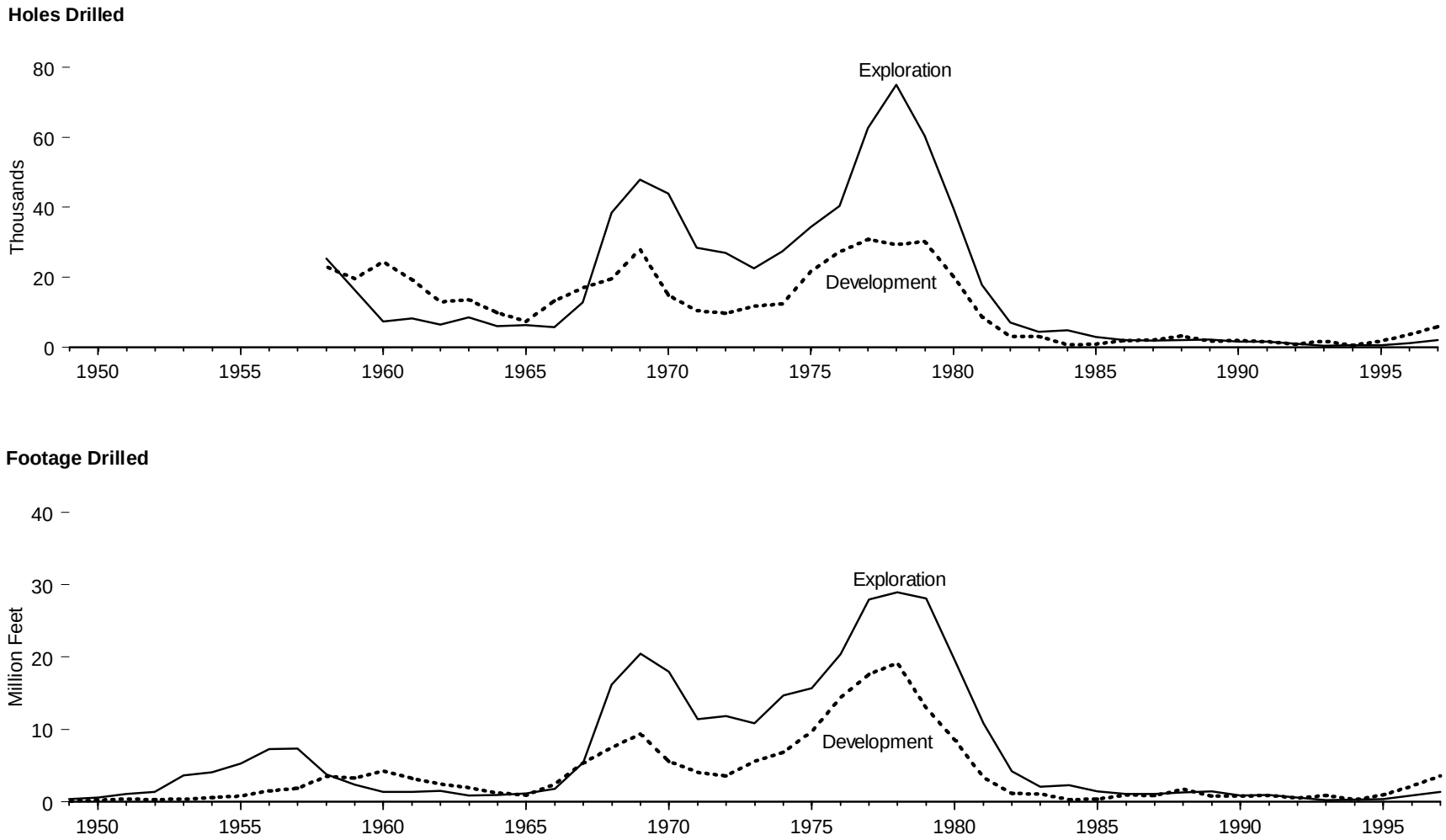
(Billion Short Tons)

Region and State	Anthracite	Bituminous Coal [1]		Lignite	Total		
	Underground and Surface [2]	Underground	Surface	Surface [3]	Underground	Surface	Total
Appalachian	**7.3**	**75.3**	**24.4**	**1.1**	**79.2**	**28.9**	**108.1**
Alabama	0.0	1.3	2.2	1.1	1.3	3.3	4.5
Kentucky, Eastern	0.0	2.2	9.8	0.0	2.2	9.8	12.1
Ohio	0.0	17.8	5.9	0.0	17.8	5.9	23.7
Pennsylvania	7.2	20.4	1.0	0.0	24.2	4.4	28.6
Virginia	0.1	1.4	0.7	0.0	1.5	0.7	2.2
West Virginia	0.0	31.0	4.4	0.0	31.0	4.4	35.4
Other [4]	0.0	1.2	0.4	0.0	1.2	0.4	1.5
Interior	**0.1**	**118.3**	**27.8**	**13.4**	**118.4**	**41.2**	**159.6**
Illinois	0.0	88.5	16.6	0.0	88.5	16.6	105.1
Indiana	0.0	8.9	1.1	0.0	8.9	1.1	9.9
Iowa	0.0	1.7	0.5	0.0	1.7	0.5	2.2
Kentucky, Western	0.0	16.3	3.7	0.0	16.3	3.7	20.0
Missouri	0.0	1.5	4.5	0.0	1.5	4.5	6.0
Oklahoma	0.0	1.2	0.3	0.0	1.2	0.3	1.6
Texas	0.0	0.0	0.0	12.9	0.0	12.9	12.9
Other [5]	0.1	0.3	1.1	0.5	0.4	1.6	2.0
Western	**0.0**	**144.1**	**66.2**	**29.7**	**144.1**	**95.9**	**240.0**
Alaska	0.0	5.4	0.7	0.0	5.4	0.7	6.1
Colorado	0.0	12.0	0.6	4.2	12.0	4.8	16.8
Montana	0.0	71.0	33.0	15.8	71.0	48.7	119.7
New Mexico	0.0	6.2	6.3	0.0	6.2	6.3	12.5
North Dakota	0.0	0.0	0.0	9.4	0.0	9.4	9.4
Utah	0.0	5.6	0.3	0.0	5.6	0.3	5.9
Washington	0.0	1.3	0.0	0.0	1.3	0.1	1.4
Wyoming	0.0	42.5	25.3	0.0	42.5	25.3	67.8
Other [6]	0.0	0.1	0.1	0.4	0.1	0.4	0.5
U.S. Total	**7.5**	**337.7**	**118.3**	**44.2**	**341.8**	**166.0**	**507.7**
States East of the Mississippi River	7.3	189.0	45.8	1.1	192.9	50.2	243.2
States West of the Mississippi River	0.1	148.7	72.6	43.2	148.8	115.7	264.6

[1] Includes subbituminous coal.
[2] Includes 3,385.4 million short tons of surface-minable resources, of which 3,370.0 million tons are in Pennsylvania and 15.5 million tons are in Arkansas.
[3] Lignite resources are not mined underground in the United States.
[4] Georgia, Maryland, North Carolina, and Tennessee.
[5] Arkansas, Kansas, Louisiana, and Michigan.
[6] Arizona, Idaho, Oregon, and South Dakota.

Notes: • Data represent known measured and indicated coal resources meeting minimum seam and depth criteria, in the ground as of January 1, 1997. These coal resources are not totally recoverable. Net recoverability ranges from less than 0 percent to more than 90 percent. Fifty-four percent of the demonstrated reserve base of coal in the United States is estimated to be recoverable. • Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelcoal.html.
Source: Energy Information Administration, U.S. Coal Reserves 1997 update (April 1998).

Figure 4.12 Uranium Exploration and Development Drilling, 1949-1997



Source: Table 4.12.

Table 4.12 Uranium Exploration and Development Drilling, 1949-1997

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	1.97
1988	2.03	1.28	3.18	1.73	5.21	3.01
1989	2.09	1.43	1.75	0.80	3.84	2.23
1990	1.51	0.87	1.91	0.81	3.42	1.68
1991	1.62	0.97	1.57	0.87	3.20	1.84
1992	0.94	0.56	0.83	0.50	1.77	1.06
1993	0.36	0.22	1.67	0.89	2.02	1.11
1994	0.52	0.34	0.48	0.32	1.00	0.66
1995	0.58	0.40	1.73	0.95	2.31	1.35
1996	1.12	0.88	3.58	2.16	4.70	3.05
1997	1.94	1.33	5.86	3.56	7.79	4.88

[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.

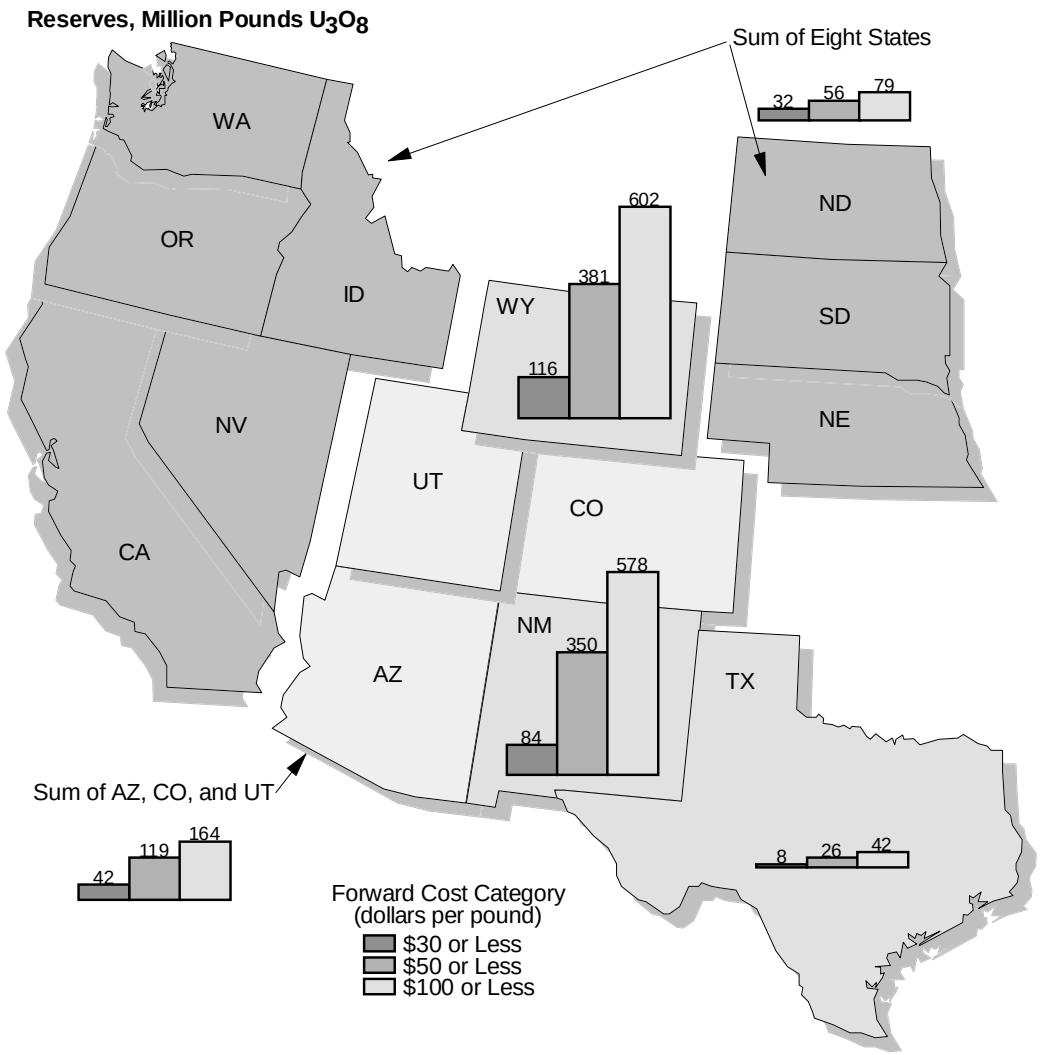
R=Revised. NA=Not available.

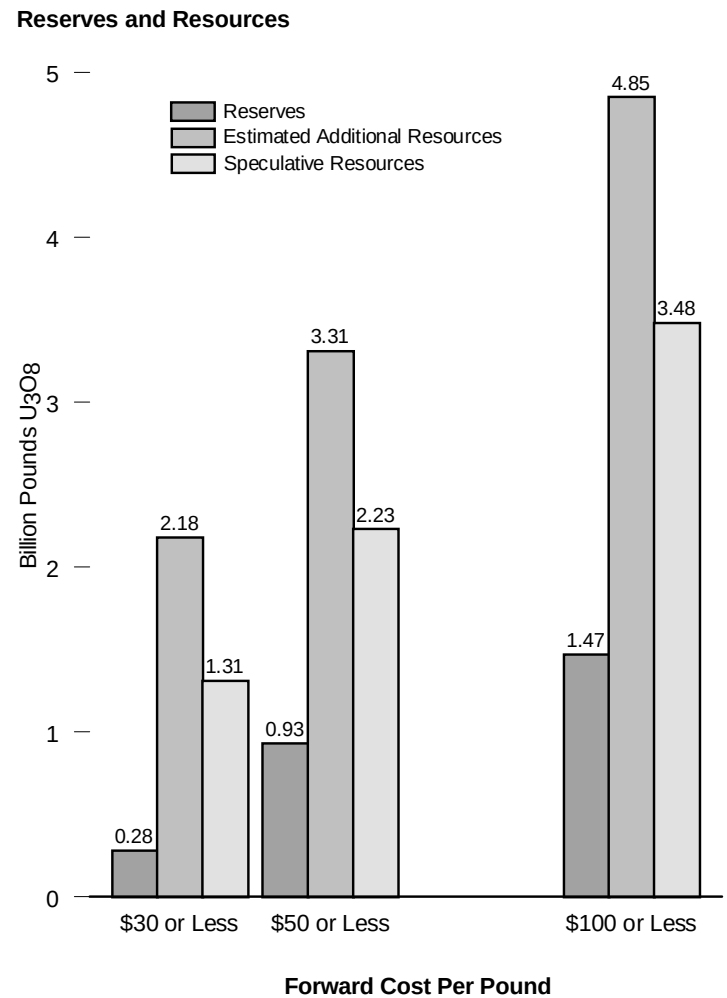
Note: Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelnuclear.html.

Sources: • 1949-1981—U.S. Department of Energy, Grand Junction Office, *Statistical Data of the Uranium Industry,* January 1, 1983, Report No. GJO-100 (1983), Table VIII-5. • 1982-1984—Energy Information Administration (EIA), *Uranium Industry Annual 1993* (September 1994), Table 3. • 1985—EIA, *Uranium Industry Annual 1994* (July 1995), Table 4. • 1986-1987—EIA, *Uranium Industry Annual 1995* (May 1996), Table 1. • 1988 forward—EIA, *Uranium Industry Annual 1997* (April 1998), Table 1.

Figure 4.13 Uranium Reserves and Resources, End of Year 1977





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

Source: Table 4.13.

Table 4.13 Uranium Reserves and Resources, End of Year 1997

(Million Pounds U_3O_8)

Resource Category and State	Forward Cost Category (dollars per pound) [1]		
	$30 or Less	$50 or Less	$100 or Less
Reserves [2]	**281**	**931**	**1,466**
New Mexico	84	350	578
Wyoming	116	381	602
Texas	8	26	42
Arizona, Colorado, Utah	42	119	164
Others [3]	32	56	79
Potential Resources [4]			
Estimated Additional Resources	2,180	3,310	4,850
Speculative Resources	1,310	2,230	3,480

[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. Resource values in forward-cost categories are cumulative; that is, the quantity at each level of forward-cost includes all reserves/resources at the lower cost in that category.

[2] The Energy Information Administration category of uranium reserves is equivalent to the internationally reported category of Reasonably Assured Resources (RAR).

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

[4] Shown are the mean values for the distribution of estimates for each forward-cost category, rounded to the nearest million pounds U_3O_8.

Web Page: http://www.eia.doe.gov/fuelnuclear.html.

Sources: • Forward Costs $30 or Less or $50 or Less—Energy Information Administration (EIA), *Uranium Industry Annual 1997* (April 1998), Tables B1 and B4. • Forward Costs $100 or Less—EIA, Office of Coal, Nuclear, Electric and Alternate Fuels database as of December 31, 1997.

Energy Resources Notes

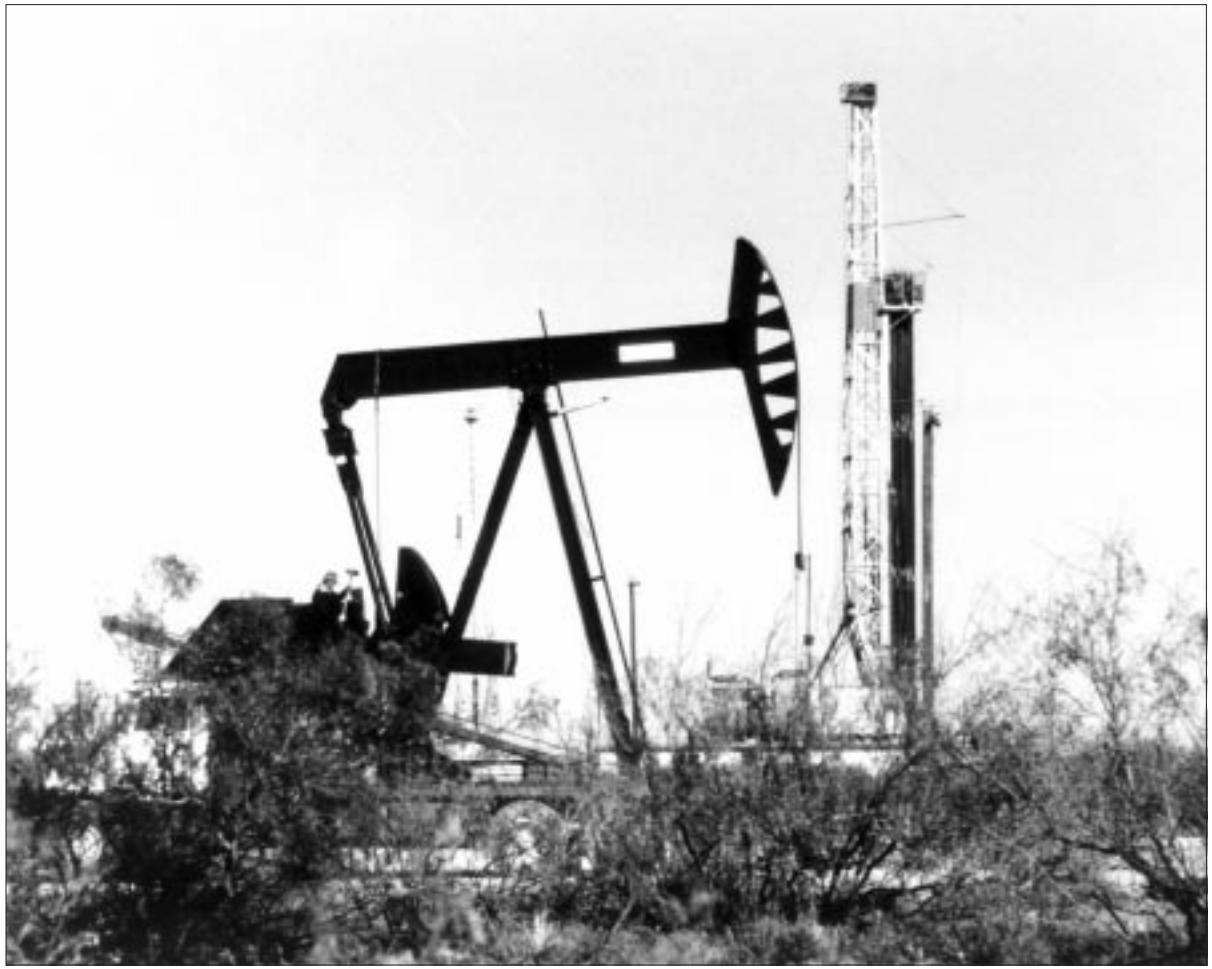
1. These volumes are the sum of the respective mean estimates in United States Geological Survey, *1995 National Assessment of United States Oil and Gas Resources*, Circular 1118 (Washington DC, 1995), pp. 2 and 17-19, for the onshore United States and jurisdiction offshore waters, and in Minerals Management Services, *An Assessment of the Undiscovered Hydrocarbon Potential of the Nation's Outer Continental Shelf*, OCS Report MMS 96-0034 (Washington DC, 1996), pp. 14 and 18, for the Federal jurisdiction offshore.

Conventionally reservoired deposits are discrete subsurface accumulations of crude oil or natural gas usually defined, controlled, or limited by hydrocarbon/water contacts. **Unconventionally reservoired deposits (continuous-type accumulations)** are geographically extensive subsurface accumulations of crude oil or natural gas that generally lack well-defined hydrocarbon/water contacts. Examples include coalbed methane, "tight gas," and auto-sourced oil- and gas-shale reservoirs. **Ultimate recovery appreciation (reserve growth)** is the volume by which the estimate of total recovery from a known oil or gas reservoir or aggregation of such reservoirs is expected to increase during the time between discovery and permanent abandonment.

For purposes of comparison, the Potential Gas Committee, an industry-sponsored group of experts, biennially provides another geologically-based estimate of the Nation's natural gas resources. The latest mean estimate, published in "Potential Supply of Natural Gas in the United States," December 31, 1996, is 1,067 trillion cubic feet. This volume includes undiscovered conventionally reservoired deposits, expected ultimate recovery appreciation, coalbed methane, and tight gas where it is believed to be technically recoverable and marketable at reasonable costs.

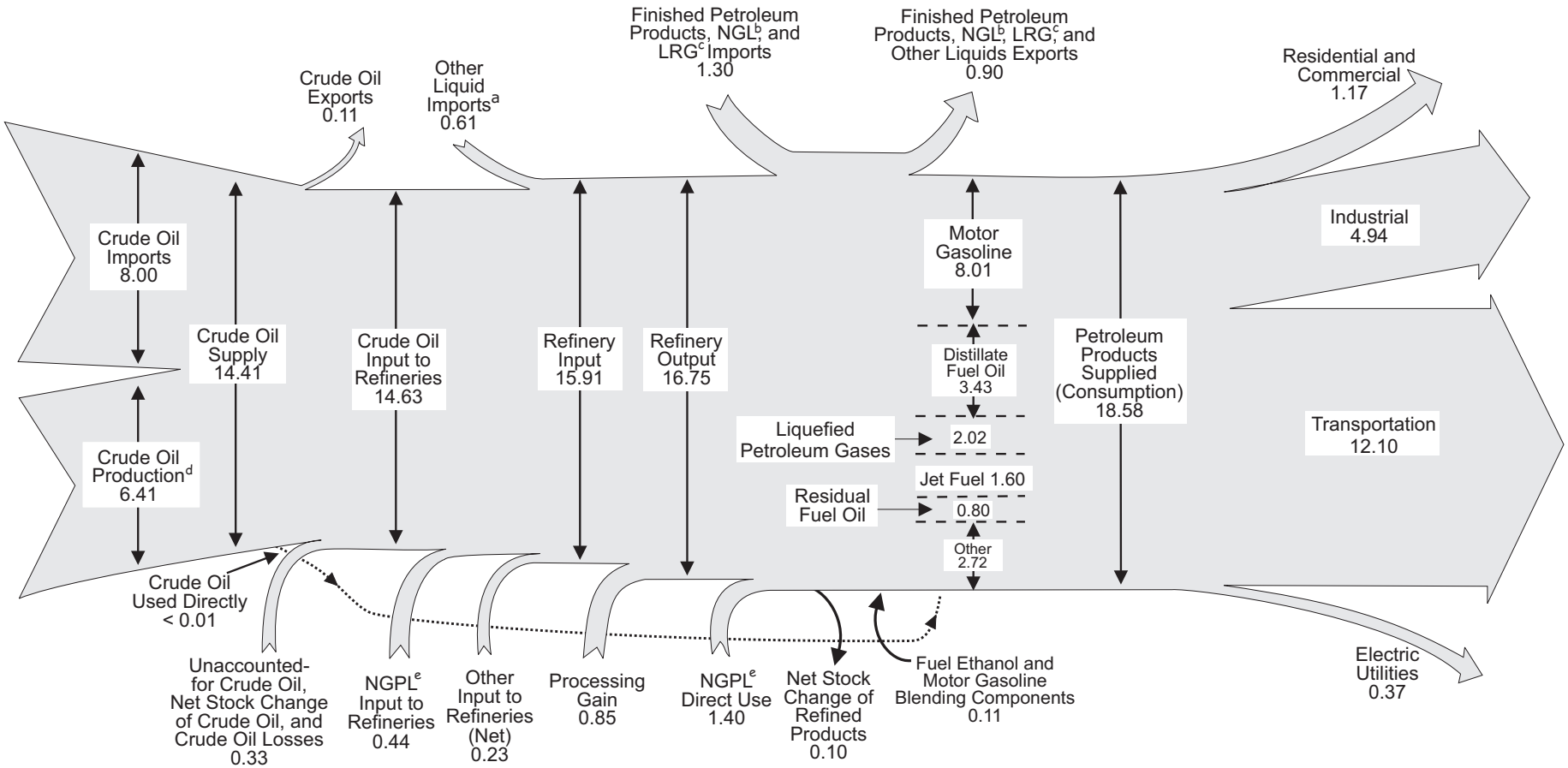
2. For 1970 forward, annual well completions are estimated by EIA based on individual well reports submitted to the American Petroleum Institute (1970-1994) and to Petroleum Information/Dwights LLC (1995 forward). The as-received well completion data for recent years are incomplete due to delays in the reporting of wells drilled. EIA therefore statistically imputes the missing data to provided estimates of total well completions and footage where necessary.

5 Petroleum



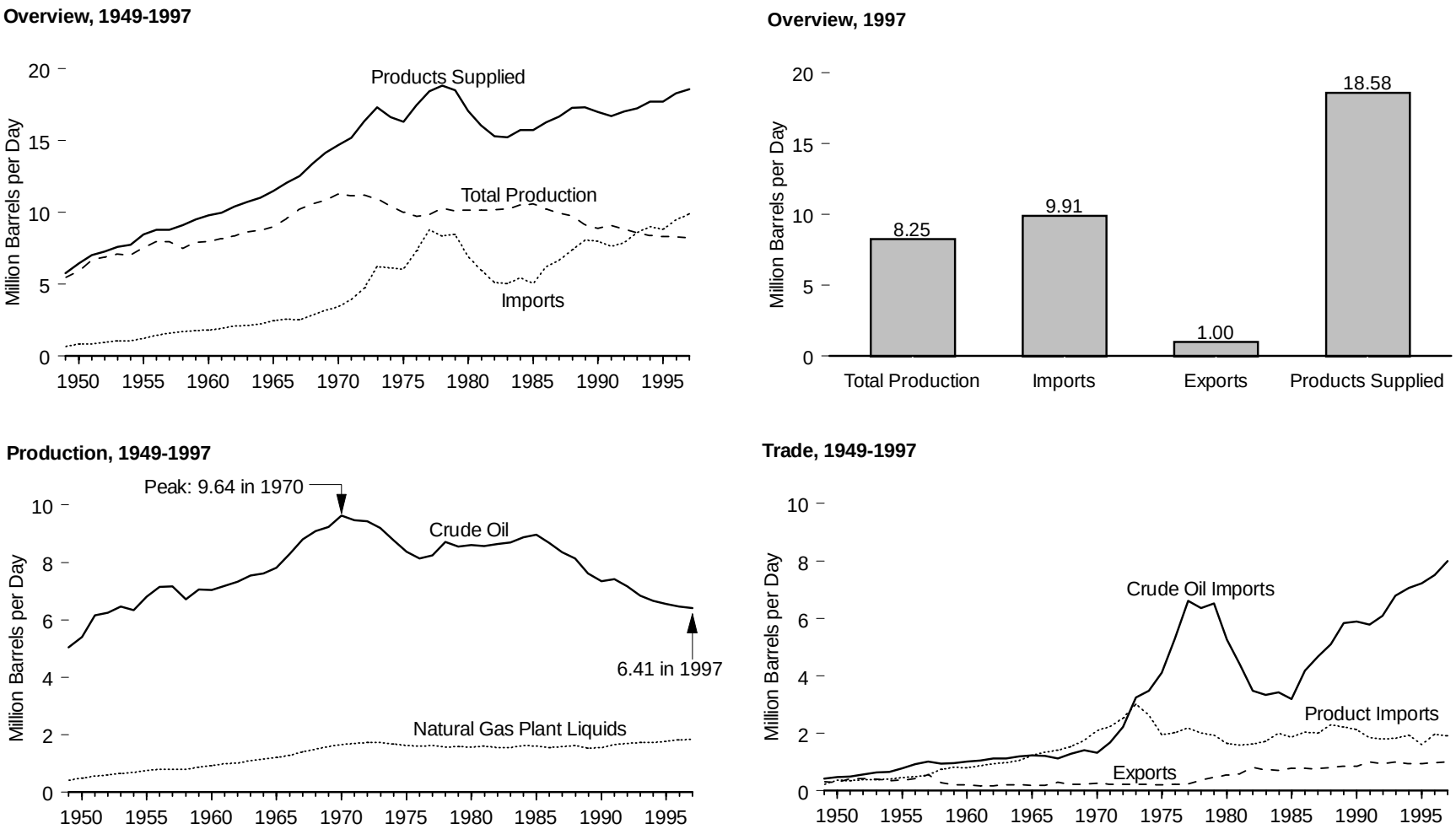
Oil pumping unit and drilling rig, Texas. Source: U.S. Department of Energy.

Diagram 2. Petroleum Flow, 1997
(Million Barrels per Day)



[a] Unfinished oils, motor gasoline and aviation gasoline blending components, and other hydrocarbons, and oxygenates.
[b] Natural gas liquids.
[c] Liquefied refinery gas.
[d] Includes lease condensate.
[e] Natural gas plant liquids.
Notes: • Data are preliminary. • Totals may not equal sum of components due to independent rounding.
Sources: Tables 5.1, 5.5, 5.8, 5.11, 5.12a, and 5.12b, and *Petroleum Supply Monthly*, February 1998, Table 3.

Figure 5.1 Petroleum Overview



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

Source: Table 5.1.

Table 5.1 Petroleum Overview, 1949-1997

(Million Barrels per Day)

Year	Production			Other Domestic Supply [2]	Trade					Crude Oil Losses	Stock Change [6]	Petroleum Products Supplied
	Crude Oil [1]	Natural Gas Plant Liquids	Total Petroleum		Crude Oil Imports [3]	Petroleum Product Imports [4]	Total Imports	Total Exports	Net Imports [5]			
1949	5.05	0.43	5.48	(s)	0.42	0.22	0.65	0.33	0.32	0.04	-0.01	5.76
1950	5.41	0.50	5.91	(s)	0.49	0.36	0.85	0.30	0.55	0.05	-0.06	6.46
1951	6.16	0.56	6.72	0.01	0.49	0.35	0.84	0.42	0.42	0.03	0.10	7.02
1952	6.26	0.61	6.87	0.01	0.57	0.38	0.95	0.43	0.52	0.02	0.11	7.27
1953	6.46	0.65	7.11	0.02	0.65	0.39	1.03	0.40	0.63	0.02	0.14	7.60
1954	6.34	0.69	7.03	0.02	0.66	0.40	1.05	0.36	0.70	0.03	-0.03	7.76
1955	6.81	0.77	7.58	0.04	0.78	0.47	1.25	0.37	0.88	0.04	(s)	8.46
1956	7.15	0.80	7.95	0.04	0.93	0.50	1.44	0.43	1.01	0.05	0.18	8.78
1957	7.17	0.81	7.98	0.04	1.02	0.55	1.57	0.57	1.01	0.05	0.17	8.81
1958	6.71	0.81	7.52	0.06	0.95	0.75	1.70	0.28	1.42	0.03	-0.14	9.12
1959	7.05	0.88	7.93	0.09	0.97	0.81	1.78	0.21	1.57	0.01	0.05	9.53
1960	7.04	0.93	7.96	0.15	1.02	0.80	1.81	0.20	1.61	0.01	-0.08	9.80
1961	7.18	0.99	8.17	0.18	1.05	0.87	1.92	0.17	1.74	0.01	0.11	9.98
1962	7.33	1.02	8.35	0.18	1.13	0.96	2.08	0.17	1.91	0.01	0.03	10.40
1963	7.54	1.10	8.64	0.20	1.13	0.99	2.12	0.21	1.91	0.01	(s)	10.74
1964	7.61	1.15	8.77	0.22	1.20	1.06	2.26	0.20	2.06	0.01	0.01	11.02
1965	7.80	1.21	9.01	0.22	1.24	1.23	2.47	0.19	2.28	0.01	-0.01	11.51
1966	8.30	1.28	9.58	0.25	1.22	1.35	2.57	0.20	2.37	0.01	0.10	12.08
1967	8.81	1.41	10.22	0.29	1.13	1.41	2.54	0.31	2.23	0.01	0.17	12.56
1968	9.10	1.50	10.60	0.35	1.29	1.55	2.84	0.23	2.61	0.01	0.15	13.39
1969	9.24	1.59	10.83	0.34	1.41	1.76	3.17	0.23	2.93	0.01	-0.05	14.14
1970	9.64	1.66	11.30	0.35	1.32	2.10	3.42	0.26	3.16	0.01	0.10	14.70
1971	9.46	1.69	11.16	0.44	1.68	2.25	3.93	0.22	3.70	0.01	0.07	15.21
1972	9.44	1.74	11.18	0.44	2.22	2.53	4.74	0.22	4.52	0.01	-0.23	16.37
1973	9.21	1.74	10.95	0.49	3.24	3.01	6.26	0.23	6.02	0.01	0.14	17.31
1974	8.77	1.69	10.46	0.49	3.48	2.64	6.11	0.22	5.89	0.01	0.18	16.65
1975	8.37	1.63	10.01	0.51	4.10	1.95	6.06	0.21	5.85	0.01	0.03	16.32
1976	8.13	1.60	9.74	0.59	5.29	2.03	7.31	0.22	7.09	0.01	-0.06	17.46
1977	8.24	1.62	9.86	0.57	6.61	2.19	8.81	0.24	8.56	0.02	0.55	18.43
1978	8.71	1.57	10.27	0.49	6.36	2.01	8.36	0.36	8.00	0.02	-0.09	18.85
1979	8.55	1.58	10.14	0.58	6.52	1.94	8.46	0.47	7.99	0.02	0.17	18.51
1980	8.60	1.57	10.17	0.68	5.26	1.65	6.91	0.54	6.36	0.01	0.14	17.06
1981	8.57	1.61	10.18	0.64	4.40	1.60	6.00	0.59	5.40	(s)	0.16	16.06
1982	8.65	1.55	10.20	0.65	3.49	1.63	5.11	0.82	4.30	(s)	-0.15	15.30
1983	8.69	1.56	10.25	0.65	3.33	1.72	5.05	0.74	4.31	(s)	-0.02	15.23
1984	8.88	1.63	10.51	0.78	3.43	2.01	5.44	0.72	4.72	(s)	0.28	15.73
1985	8.97	1.61	10.58	0.76	3.20	1.87	5.07	0.78	4.29	(s)	-0.10	15.73
1986	8.68	1.55	10.23	0.81	4.18	2.05	6.22	0.78	5.44	(s)	0.20	16.28
1987	8.35	1.60	9.94	0.85	4.67	2.00	6.68	0.76	5.91	(s)	0.04	16.67
1988	8.14	1.62	9.76	0.90	5.11	2.30	7.40	0.82	6.59	(s)	-0.03	17.28
1989	7.61	1.55	9.16	0.92	5.84	2.22	8.06	0.86	7.20	(s)	-0.04	17.33
1990	7.36	1.56	8.91	1.02	5.89	2.12	8.02	0.86	7.16	(s)	0.11	16.99
1991	7.42	1.66	9.08	1.00	5.78	1.84	7.63	1.00	6.63	(s)	-0.01	16.71
1992	7.17	1.70	8.87	1.16	6.08	1.80	7.89	0.95	6.94	(s)	-0.07	17.03
1993	6.85	1.74	8.58	1.19	6.79	1.83	8.62	1.00	7.62	(s)	0.15	17.24
1994	6.66	1.73	8.39	1.29	7.06	1.93	9.00	0.94	8.05	(s)	0.02	17.72
1995	6.56	1.76	8.32	1.27	7.23	1.61	8.83	0.95	7.89	(s)	-0.25	17.72
1996	R6.46	1.83	R8.29	R1.36	R7.51	R1.97	R9.48	0.98	R8.50	(s)	R-0.15	R18.31
1997P	6.41	1.84	8.25	1.57	8.00	1.91	9.91	1.00	8.90	0.00	0.14	18.58

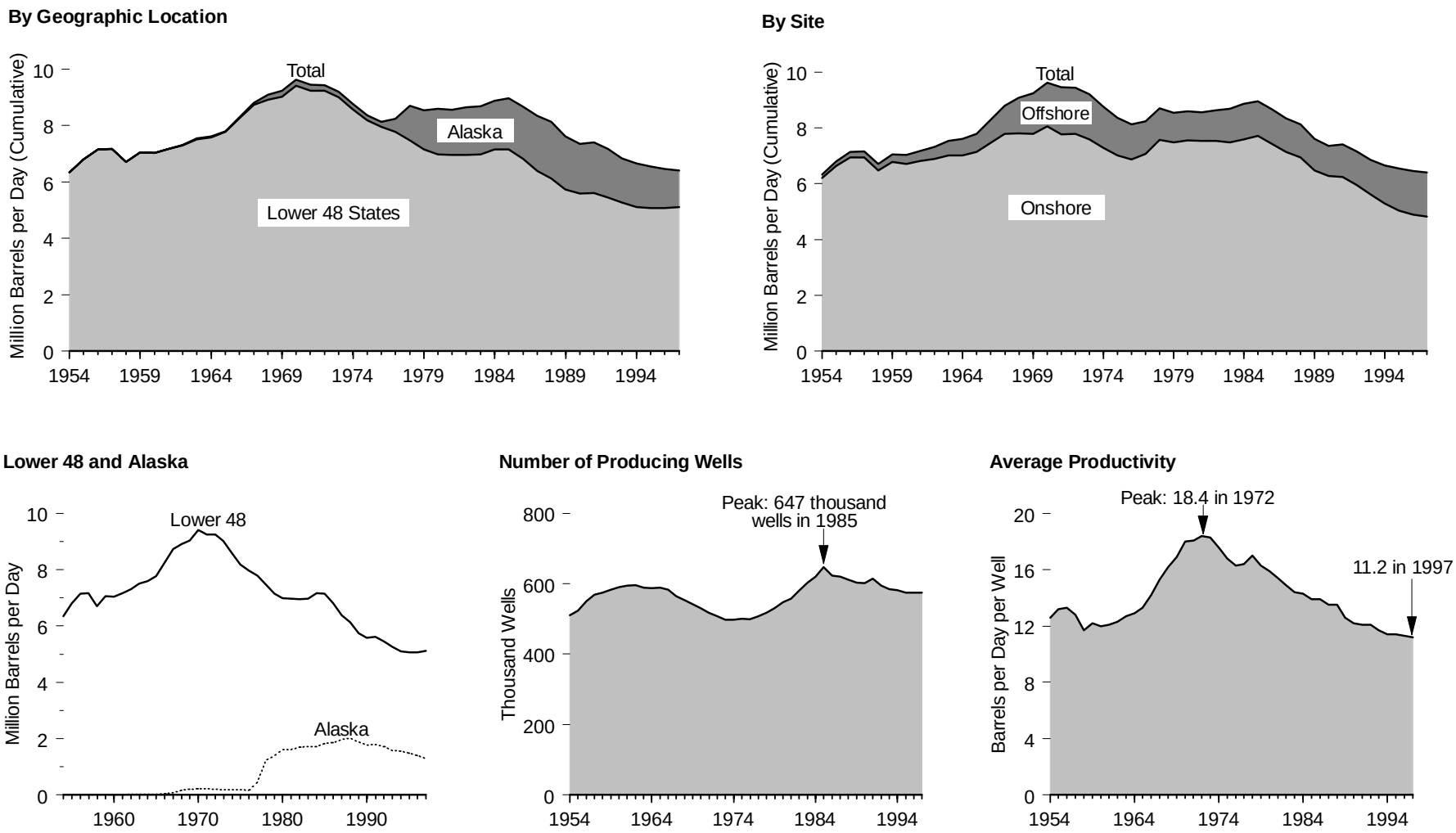
[1] Includes lease condensate.
[2] Includes benzol, other hydrocarbons, oxygenates, gasoline blending components, finished petroleum products, hydrogen, alcohol, processing gains, and unaccounted-for crude oil.
[3] Includes imports for the Strategic Petroleum Reserve, which began in 1977.
[4] For 1981 forward, includes motor gasoline blending components and aviation gasoline blending components.
[5] Net imports = imports minus exports.
[6] A negative value indicates a decrease in stocks; a positive value indicates an increase in stocks.
R=Revised. P=Preliminary. (s)=Less than 0.005 million barrels per day and greater than -0.005 million barrels per day.

Notes: • For the definition of petroleum products supplied, see Notes 1, 2, and 3 at end of section. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

Sources: • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Petroleum Supply Monthly* (February 1998).

Figure 5.2 Crude Oil Production and Oil Well Productivity, 1954-1997



Note: Crude oil includes lease condensate.

Source: Table 5.2.

Table 5.2 Crude Oil Production and Oil Well Productivity, 1954-1997

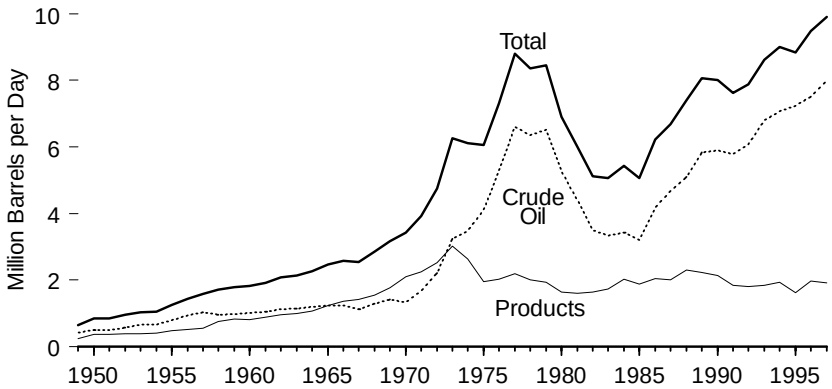
(Thousand Barrels per Day, Except as Noted)

Year	Geographic Location		Site		Type		Total Production	Oil Well Productivity	
	Lower 48	Alaska	Onshore	Offshore	Crude Oil	Lease Condensate		Producing Wells [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	5,618	1,798	6,245	1,172	7,417	([3])	7,417	614	12.1
1992	5,457	1,714	5,953	1,218	7,171	([3])	7,171	594	12.1
1993	5,264	1,582	5,606	1,241	6,847	([3])	6,847	584	11.7
1994	5,103	1,559	5,291	1,370	6,662	([3])	6,662	582	11.4
1995	5,076	1,484	5,035	1,525	6,560	([3])	6,560	574	11.4
1996	[R]5,071	[R]1,393	[R]4,902	[R]1,562	[R]6,465	([3])	[R]6,465	574	11.3
1997[P]	5,115	1,296	4,822	1,589	6,411	([3])	6,411	574	11.2

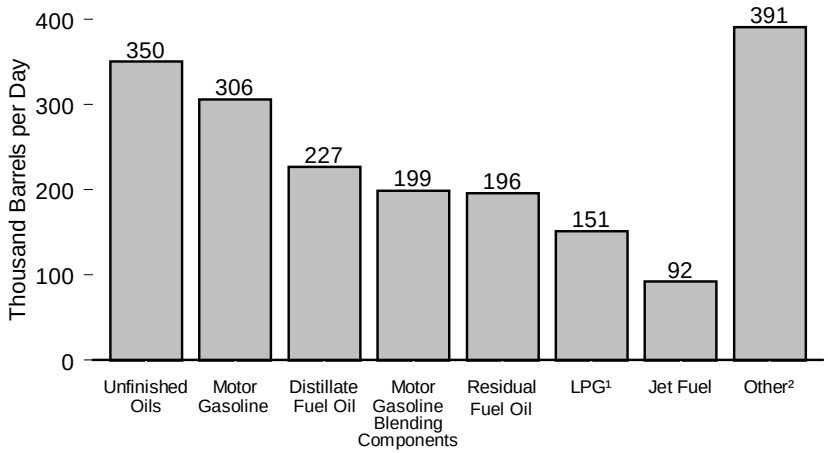
[1] As of December 31.
[2] For 1954-1976, average productivity is based on the average number of producing wells. For 1977 forward, average productivity is based on the number of wells producing at end of year.
[3] Included in crude oil.
R=Revised. P=Preliminary.
Note: Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelpetroleum.html.
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.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Petroleum Supply Monthly* (February 1998). **Oil Well Productivity:** • 1954-1975—Bureau of Mines, *Minerals Yearbook,* "Crude Petroleum and Petroleum Products" chapter. • 1976-1980—EIA, Energy Data Reports, *Petroleum Statement, Annual.* • 1981-1994—Independent Petroleum Association of America, *The Oil Producing Industry in Your State.* • 1995–forward— Gulf Publishing Co., *World Oil,* February issue. **All Other Data:** • 1954-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1976-1980—EIA, Energy Data Reports, *Petroleum Statement, Annual.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Petroleum Supply Monthly* (February 1998).

Figure 5.3 Petroleum Imports by Type

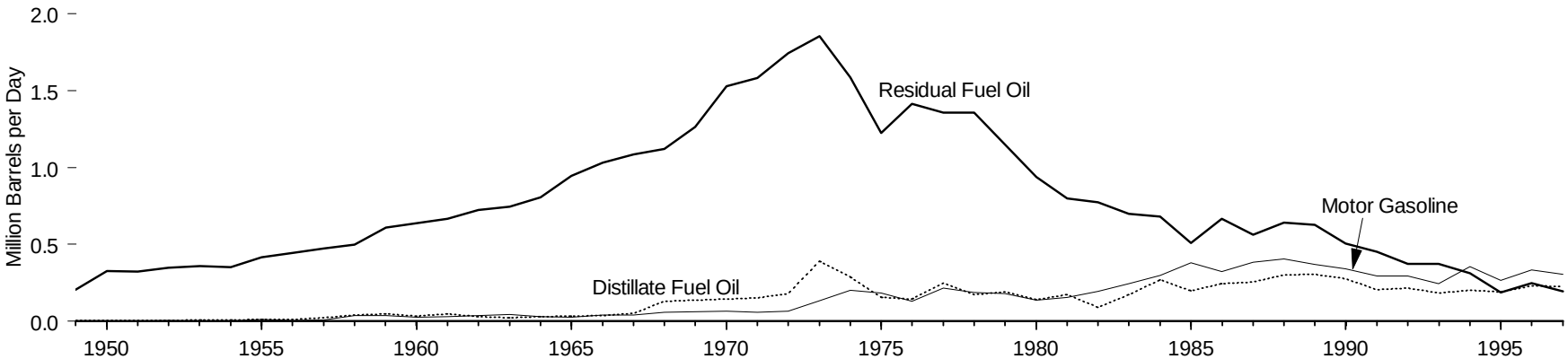
Total, 1949-1997



By Product, 1997



By Selected Product, 1949-1997



[1] Liquefied petroleum gases.

[2] Asphalt and road oil, aviation gasoline and blending components, kerosene, lubricants, pentanes plus, petrochemical feedstocks, petroleum coke, special naphthas, wax, and miscellaneous products.

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

Source: Table 5.3.

Table 5.3 Petroleum Imports by Type, 1949-1997

(Thousand Barrels per Day)

Year	Crude Oil [1]	Petroleum Products											Total Petroleum
		Asphalt and Road Oil	Distillate Fuel Oil	Jet Fuel [2]	Liquefied Petroleum Gases		Motor Gasoline [4]	Motor Gasoline Blending Components	Residual Fuel Oil	Unfinished Oils	Other Products [5]	Total	
					Propane [3]	Total							
1949	421	3	5	(6)	0	0	0	0	206	10	0	224	645
1950	487	5	7	(6)	0	0	(s)	(7)	329	21	R1	363	850
1951	491	7	5	(6)	0	0	1	(7)	326	14	0	354	844
1952	573	7	7	(6)	0	0	5	(7)	351	9	0	380	952
1953	648	7	9	(6)	0	0	1	(7)	360	9	0	386	1,034
1954	656	9	9	(6)	0	0	3	(7)	354	21	(s)	396	1,052
1955	782	9	12	(6)	0	0	13	(7)	417	15	0	466	1,248
1956	934	10	14	21	0	0	5	(7)	445	7	(s)	502	1,436
1957	1,023	18	23	25	0	0	8	(7)	475	3	(s)	552	1,574
1958	953	20	41	57	0	0	38	(7)	499	92	(s)	747	1,700
1959	965	19	48	37	0	0	37	(7)	610	63	(s)	814	1,780
1960	1,015	17	35	34	NA	4	27	(7)	637	45	(s)	799	1,815
1961	1,045	18	48	28	NA	5	29	(7)	666	69	R8	872	1,917
1962	1,126	18	32	30	NA	6	38	(7)	724	89	R18	955	2,082
1963	1,131	17	25	41	NA	7	44	(7)	747	87	R24	992	2,123
1964	1,198	16	32	33	NA	11	29	(7)	808	89	R42	1,060	2,259
1965	1,238	17	36	81	NA	21	28	(7)	946	92	R10	1,229	2,468
1966	1,225	17	38	86	NA	29	43	(7)	1,032	97	R7	1,348	2,573
1967	1,128	18	51	89	11	27	42	(7)	1,085	97	R2	1,409	2,537
1968	1,291	17	132	105	15	32	59	(7)	1,120	80	R4	1,549	2,840
1969	1,409	13	139	125	14	35	62	(7)	1,265	106	R12	1,757	3,166
1970	1,324	17	147	144	26	52	67	(7)	1,528	108	R32	2,095	3,419
1971	1,681	20	153	180	32	70	59	(7)	1,583	124	R56	2,245	3,926
1972	2,216	25	182	194	43	89	68	(7)	1,742	125	R101	2,525	4,741
1973	3,244	23	392	212	71	132	134	(7)	1,853	137	R129	3,012	6,256
1974	3,477	31	289	163	59	123	204	(7)	1,587	121	R117	2,635	6,112
1975	4,105	14	155	133	60	112	184	(7)	1,223	36	R95	1,951	6,056
1976	5,287	11	146	76	68	130	131	(7)	1,413	32	R87	2,026	7,313
1977	6,615	4	250	75	86	161	217	(7)	1,359	31	R95	2,193	8,807
1978	6,356	2	173	86	57	123	190	(7)	1,355	27	R50	2,008	8,363
1979	6,519	4	193	78	88	217	181	(7)	1,151	59	R54	1,937	8,456
1980	5,263	4	142	80	69	216	140	(7)	939	55	R72	1,646	6,909
1981	4,396	4	173	38	70	244	157	24	800	112	R48	1,599	5,996
1982	3,488	5	93	29	63	226	197	42	776	174	R84	1,625	5,113
1983	3,329	7	174	29	44	190	247	47	699	234	R94	1,722	5,051
1984	3,426	18	272	62	67	195	299	83	681	231	R171	2,011	5,437
1985	3,201	35	200	39	67	187	381	67	510	318	R130	1,866	5,067
1986	4,178	29	247	57	110	242	326	72	669	250	R153	2,045	6,224
1987	4,674	36	255	67	88	190	384	60	565	299	R146	2,004	6,678
1988	5,107	31	302	90	106	209	405	57	644	360	R196	2,295	7,402
1989	5,843	31	306	106	111	181	369	66	629	348	R183	2,217	8,061
1990	5,894	32	278	108	115	188	342	62	504	413	R198	2,123	8,018
1991	5,782	28	205	67	91	147	297	36	453	413	R198	1,844	7,627
1992	6,083	27	216	82	85	131	294	41	375	443	R195	1,805	7,888
1993	6,787	32	184	100	103	160	247	27	373	491	R219	1,833	8,620
1994	7,063	37	203	117	124	183	356	20	314	413	R291	1,933	8,996
1995	7,230	36	193	106	102	146	265	48	187	349	R276	1,605	8,835
1996	R7,508	27	R230	R111	119	R166	R336	R166	R248	R367	R319	R1,971	R9,478
1997P	7,996	32	227	92	99	151	306	199	196	350	359	1,912	9,907

[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] Includes propylene.
[4] Prior to 1964, motor gasoline data were for total gasoline, including motor gasoline, aviation gasoline, and special naphthas. After 1980, excludes motor gasoline blending components.
[5] Aviation gasoline, aviation gasoline blending components, kerosene, petrochemical feedstocks, special naphthas, lubricants, wax, petroleum coke, pentanes plus, and miscellaneous products.
[6] Included in motor gasoline.
[7] If applicable, included in motor gasoline.

R=Revised. P=Preliminary. (s)=Less than 500 barrels per day.

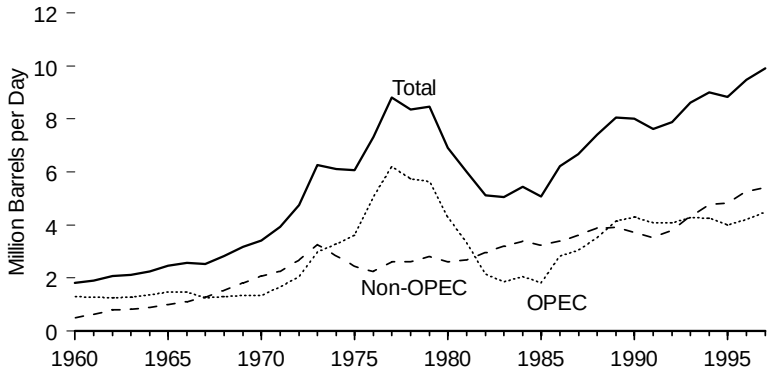
Notes: • Includes imports from U.S. possessions and territories. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

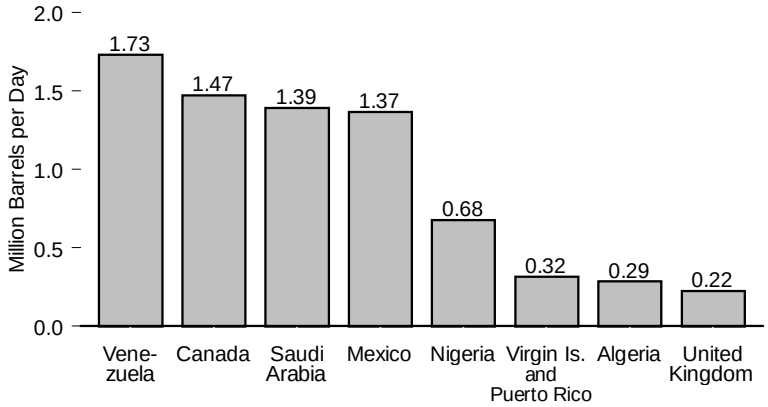
Sources: • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Petroleum Supply Monthly* (February 1998).

Figure 5.4 Petroleum Imports by Country of Origin

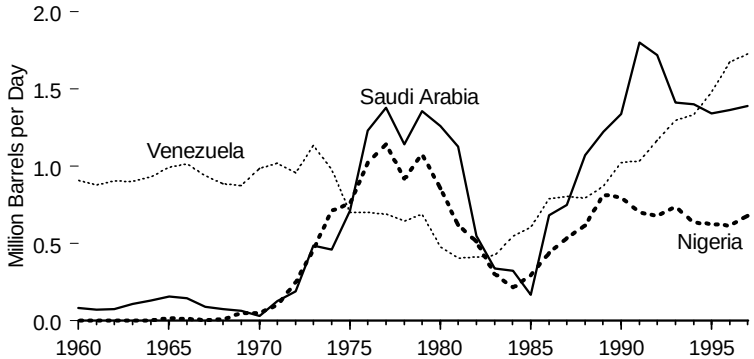
Total, OPEC, and Non-OPEC, 1960-1997



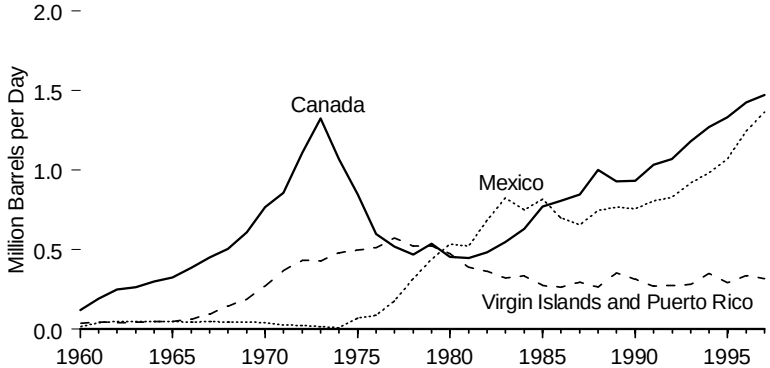
Top Countries, 1997



Selected OPEC Countries, 1960-1997



Selected Non-OPEC Countries, 1960-1997



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

Source: Table 5.4.

Table 5.4 Petroleum Imports by Country of Origin, 1960-1997

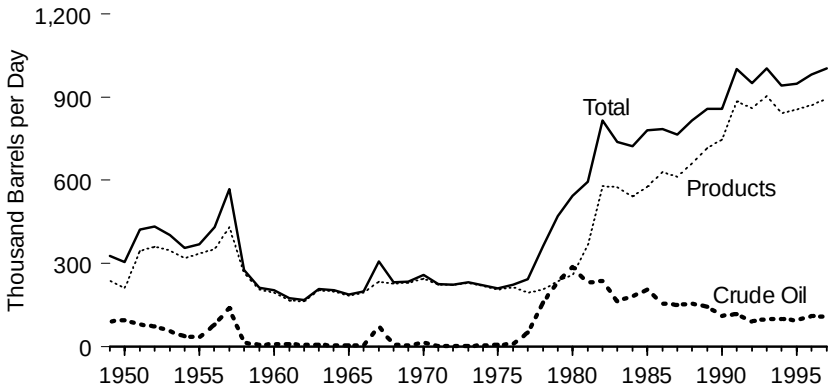
Year	Persian Gulf Nations [2]	Selected OPEC [1] Countries					Selected Non-OPEC Countries					Total Imports	Imports from Persian Gulf Nations as Share of Total Imports	Imports from OPEC as Share of Total Imports
		Algeria	Nigeria	Saudi Arabia	Venezuela	Total OPEC [3]	Canada	Mexico	United Kingdom	Virgin Islands and Puerto Rico	Total Non-OPEC			
	Thousand Barrels per Day												Percent	
1960	NA	NA	0	84	911	1,314	120	16	(s)	36	500	1,815	NA	72.4
1961	NA	NA	0	73	879	1,286	190	40	1	44	631	1,917	NA	67.1
1962	NA	NA	0	74	906	1,265	250	49	2	41	816	2,082	NA	60.8
1963	NA	NA	0	108	900	1,283	265	48	3	44	839	2,123	NA	60.5
1964	NA	NA	0	131	933	1,361	299	47	(s)	47	898	2,259	NA	60.2
1965	NA	NA	15	158	994	1,476	323	48	(s)	47	992	2,468	NA	59.8
1966	NA	NA	11	147	1,018	1,471	384	45	6	61	1,102	2,573	NA	57.2
1967	NA	NA	5	92	938	1,259	450	49	11	96	1,278	2,537	NA	49.6
1968	NA	NA	9	74	886	1,302	506	45	28	145	1,538	2,840	NA	45.9
1969	NA	NA	49	65	875	1,336	608	43	20	189	1,830	3,166	NA	42.2
1970	NA	NA	50	30	989	1,343	766	42	11	271	2,076	3,419	NA	39.3
1971	NA	NA	102	128	1,020	1,673	857	27	10	368	2,253	3,926	NA	42.6
1972	471	92	251	190	959	2,063	1,108	21	9	432	2,678	4,741	9.9	43.5
1973	848	136	459	486	1,135	2,993	1,325	16	15	429	3,263	6,256	13.6	47.8
1974	1,039	190	713	461	979	3,280	1,070	8	8	481	2,832	6,112	17.0	53.7
1975	1,165	282	762	715	702	3,601	846	71	14	496	2,454	6,056	19.2	59.5
1976	1,840	432	1,025	1,230	700	5,066	599	87	31	510	2,247	7,313	25.2	69.3
1977	2,448	559	1,143	1,380	690	6,193	517	179	126	571	2,614	8,807	27.8	70.3
1978	2,219	649	919	1,144	646	5,751	467	318	180	522	2,612	8,363	26.5	68.8
1979	2,069	636	1,080	1,356	690	5,637	538	439	202	523	2,819	8,456	24.5	66.7
1980	1,519	488	857	1,261	481	4,300	455	533	176	476	2,609	6,909	22.0	62.2
1981	1,219	311	620	1,129	406	3,323	447	522	375	389	2,672	5,996	20.3	55.4
1982	696	170	514	552	412	2,146	482	685	456	366	2,968	5,113	13.6	42.0
1983	442	240	302	337	422	1,862	547	826	382	322	3,189	5,051	8.8	36.9
1984	506	323	216	325	548	2,049	630	748	402	336	3,388	5,437	9.3	37.7
1985	R311	187	293	168	605	1,830	770	816	310	275	3,237	5,067	6.1	36.1
1986	912	271	440	685	793	2,837	807	699	350	265	3,387	6,224	14.7	45.6
1987	1,077	295	535	751	804	3,060	848	655	352	294	3,617	6,678	16.1	45.8
1988	R1,541	300	618	1,073	794	3,520	999	747	315	264	3,882	7,402	R20.8	47.6
1989	1,861	269	815	1,224	873	4,140	931	767	215	353	3,921	8,061	23.1	51.4
1990	1,966	280	800	1,339	1,025	4,296	934	755	189	315	3,721	8,018	24.5	53.6
1991	1,845	253	703	1,802	1,035	4,092	1,033	807	138	270	3,535	7,627	24.2	53.7
1992	1,778	196	681	1,720	1,170	4,092	1,069	830	230	275	3,796	7,888	22.5	51.9
1993	1,782	220	740	1,414	1,300	4,273	1,181	919	350	283	4,347	8,620	20.7	49.6
1994	1,728	243	637	1,402	1,334	4,247	1,272	984	458	350	4,749	8,996	19.2	47.2
1995	1,573	234	627	1,344	1,480	4,002	1,332	1,068	383	293	4,833	8,835	17.8	45.3
1996	1,604	256	R617	1,363	R1,676	R4,211	R1,424	R1,244	R308	333	R5,267	R9,478	R16.9	R44.4
1997P	1,737	285	678	1,391	1,729	4,487	1,473	1,366	224	316	5,420	9,907	17.5	45.3

[1] Organization of Petroleum Exporting Countries. See Glossary for current membership.
[2] Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and United Arab Emirates.
[3] Total OPEC imports exclude petroleum imported into the United States indirectly from OPEC countries, primarily from Caribbean and West European refining areas, as petroleum products that were refined from crude oil produced in OPEC countries. Ecuador withdrew from OPEC on December 31, 1992. Beginning in 1993, imports from Ecuador appear under "Non-OPEC." Gabon withdrew from OPEC on December 31, 1994. Beginning in 1995, imports from Gabon appear under "Non-OPEC."
R=Revised. P=Preliminary. (s)=Less than 500 barrels per day. NA=Not available.

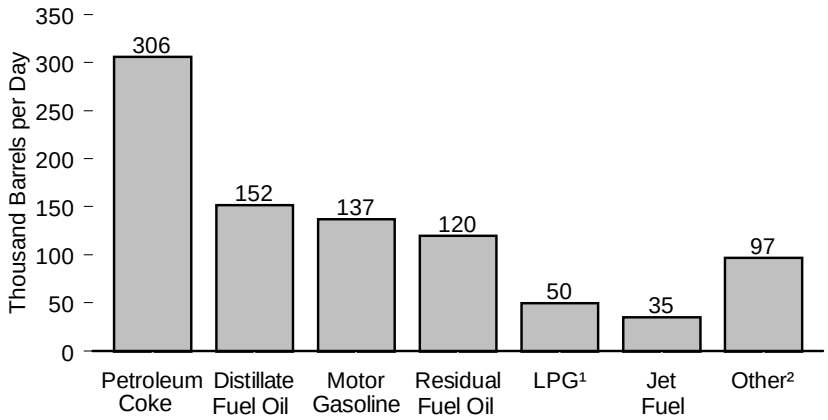
Notes: • Data include imports for the Strategic Petroleum Reserve, which began in 1977. • Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelpetroleum.html.
Sources: • 1960-1975—Bureau of Mines, *Minerals Yearbook,* "Crude Petroleum and Petroleum Products" chapter. • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *P.A.D. Districts Supply/Demand, Annual.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Petroleum Supply Monthly* (February 1998).

Figure 5.5 Petroleum Exports by Type

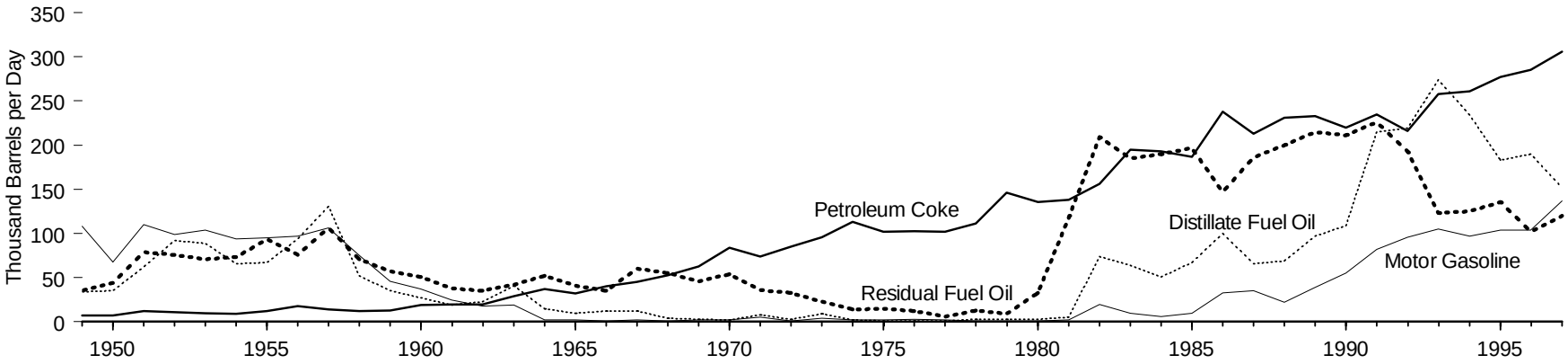
Total, 1949-1997



By Product, 1997



By Selected Products, 1949-1997



[1] Liquefied petroleum gases.
[2] Lubricants, petrochemical feedstocks, special naphthas, and other products.

Note: Because vertical scales differ, graphs should not be compared.
Source: Table 5.5.`

Table 5.5 Petroleum Exports by Type, 1949-1997

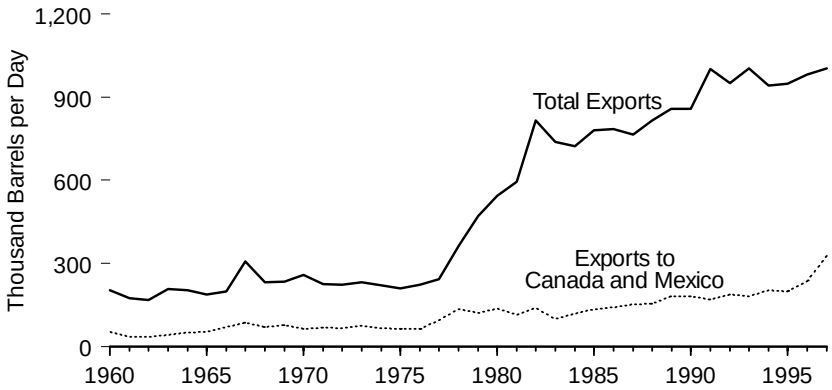
(Thousand Barrels per Day)

Year	Crude Oil	Petroleum Products												Total Petroleum
		Distillate Fuel Oil	Jet Fuel	Liquefied Petroleum Gases		Lubricants	Motor Gasoline [2]	Petroleum Coke	Petrochemical Feedstocks	Residual Fuel Oil	Special Naphthas	Other Products [3]	Total	
				Propane [1]	Total									
1949	91	34	(4)	NA	4	35	108	7	0	35	NA	15	236	327
1950	95	35	(4)	NA	4	39	68	7	0	44	NA	12	210	305
1951	78	62	(4)	NA	6	48	110	12	0	79	NA	27	344	422
1952	73	92	(4)	NA	7	44	99	11	0	76	NA	31	359	432
1953	55	89	1	NA	8	36	104	10	0	71	NA	R28	347	402
1954	37	66	(s)	NA	11	41	94	9	0	73	NA	23	318	355
1955	32	67	(s)	NA	12	39	95	12	0	93	NA	18	336	368
1956	78	94	1	NA	12	38	97	18	0	76	NA	R16	352	430
1957	138	131	(s)	NA	12	38	106	14	0	106	NA	23	430	568
1958	12	52	1	NA	8	36	75	12	0	71	NA	R10	264	276
1959	7	35	1	NA	6	38	46	13	0	57	NA	R8	204	211
1960	8	27	(s)	NA	8	43	37	19	0	51	NA	9	193	202
1961	9	19	(s)	NA	10	47	25	20	0	38	NA	7	165	174
1962	5	23	(s)	NA	11	48	18	20	0	35	NA	8	163	168
1963	5	41	1	NA	13	50	19	29	0	42	NA	R8	203	208
1964	4	15	(s)	NA	15	50	2	37	0	52	5	R23	198	202
1965	3	10	3	NA	21	45	2	32	5	41	4	R20	184	187
1966	4	12	5	NA	22	47	1	40	7	35	6	R19	194	198
1967	73	12	6	5	25	51	2	45	8	60	5	R20	234	307
1968	5	4	6	7	29	49	1	53	8	55	7	R15	226	231
1969	4	3	5	7	35	45	2	63	11	46	6	R13	229	233
1970	14	2	6	6	27	44	2	84	10	54	4	R10	245	259
1971	1	8	4	13	26	43	5	74	14	36	4	R9	223	224
1972	1	3	3	18	31	41	1	85	13	33	4	8	222	222
1973	2	9	4	15	27	35	4	96	19	23	5	8	229	231
1974	3	2	3	14	25	33	2	113	15	14	4	7	218	221
1975	6	1	2	13	26	25	2	102	22	15	3	6	204	209
1976	8	1	2	13	25	26	3	103	30	12	7	6	215	223
1977	50	1	2	10	18	26	2	102	24	6	4	7	193	243
1978	158	3	1	9	20	27	1	111	23	13	2	2	204	362
1979	235	3	1	8	15	23	(s)	146	31	9	5	3	236	471
1980	287	3	1	10	21	23	1	136	29	33	5	4	258	544
1981	228	5	2	18	42	19	2	138	26	118	11	4	367	595
1982	236	74	6	31	65	16	20	156	24	209	5	4	579	815
1983	164	64	6	43	73	16	10	195	20	185	3	3	575	739
1984	181	51	9	30	48	15	6	193	21	190	2	6	541	722
1985	204	67	13	48	62	15	10	187	19	197	1	4	577	781
1986	154	100	18	28	42	23	33	238	22	147	1	8	631	785
1987	151	66	24	24	38	23	35	213	20	186	2	7	613	764
1988	155	69	28	31	49	26	22	231	23	200	7	6	661	815
1989	142	97	27	24	35	19	39	233	26	215	12	15	717	859
1990	109	109	43	28	40	20	55	220	26	211	11	13	748	857
1991	116	215	43	28	41	18	82	235	0	226	15	9	885	1,001
1992	89	219	43	33	49	16	96	216	0	193	14	16	861	950
1993	98	274	R59	26	43	19	105	258	0	123	4	R20	904	1,003
1994	99	234	20	24	38	22	97	261	0	125	20	26	843	942
1995	95	183	26	38	58	25	104	277	0	136	21	25	855	949
1996	110	190	48	28	51	34	104	285	0	102	21	36	871	981
1997P	108	152	35	32	50	31	137	306	0	120	22	44	896	1,003

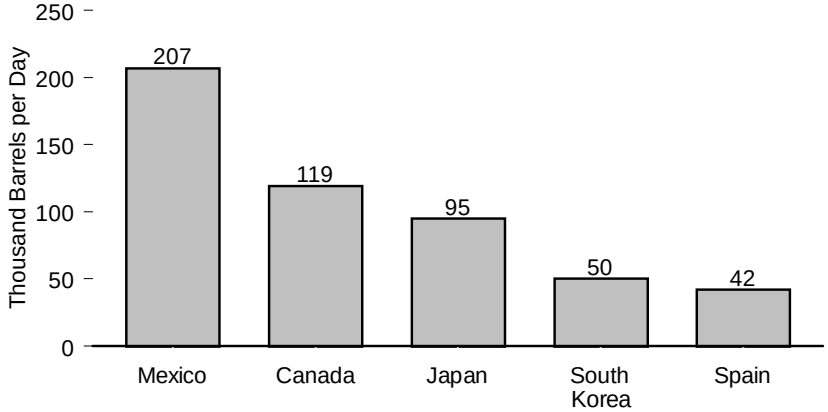
[1] Includes propylene.
[2] Includes aviation gasoline for the years 1949-1963.
[3] Aviation gasoline (for 1964 forward), motor gasoline blending components, kerosene, wax, asphalt, road oil, pentanes plus, and miscellaneous products.
[4] Included in the products from which jet fuel was blended.
R=Revised. P=Preliminary. NA=Not available. (s)=Less than 500 barrels per day.
Notes: • Includes exports to U.S. possessions and territories. • Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelpetroleum.html.
Sources: • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Petroleum Supply Monthly* (February 1998).

Figure 5.6 Petroleum Exports by Country of Destination

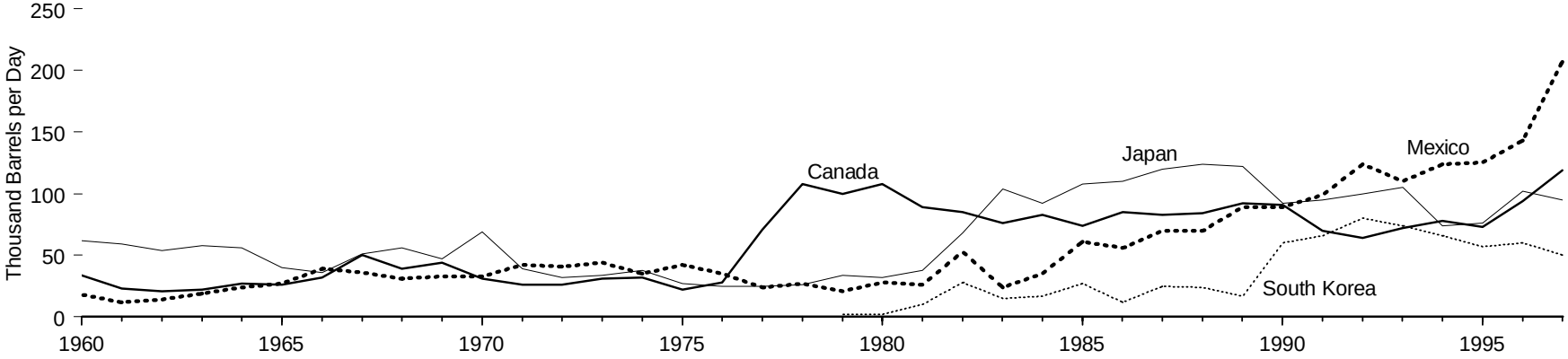
Total Exports and Exports to Canada and Mexico, 1960-1997



By Selected Countries, 1997



By Selected Countries, 1960-1997



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

Source: Table 5.6.

Table 5.6 Petroleum Exports by Country of Destination, 1960-1997

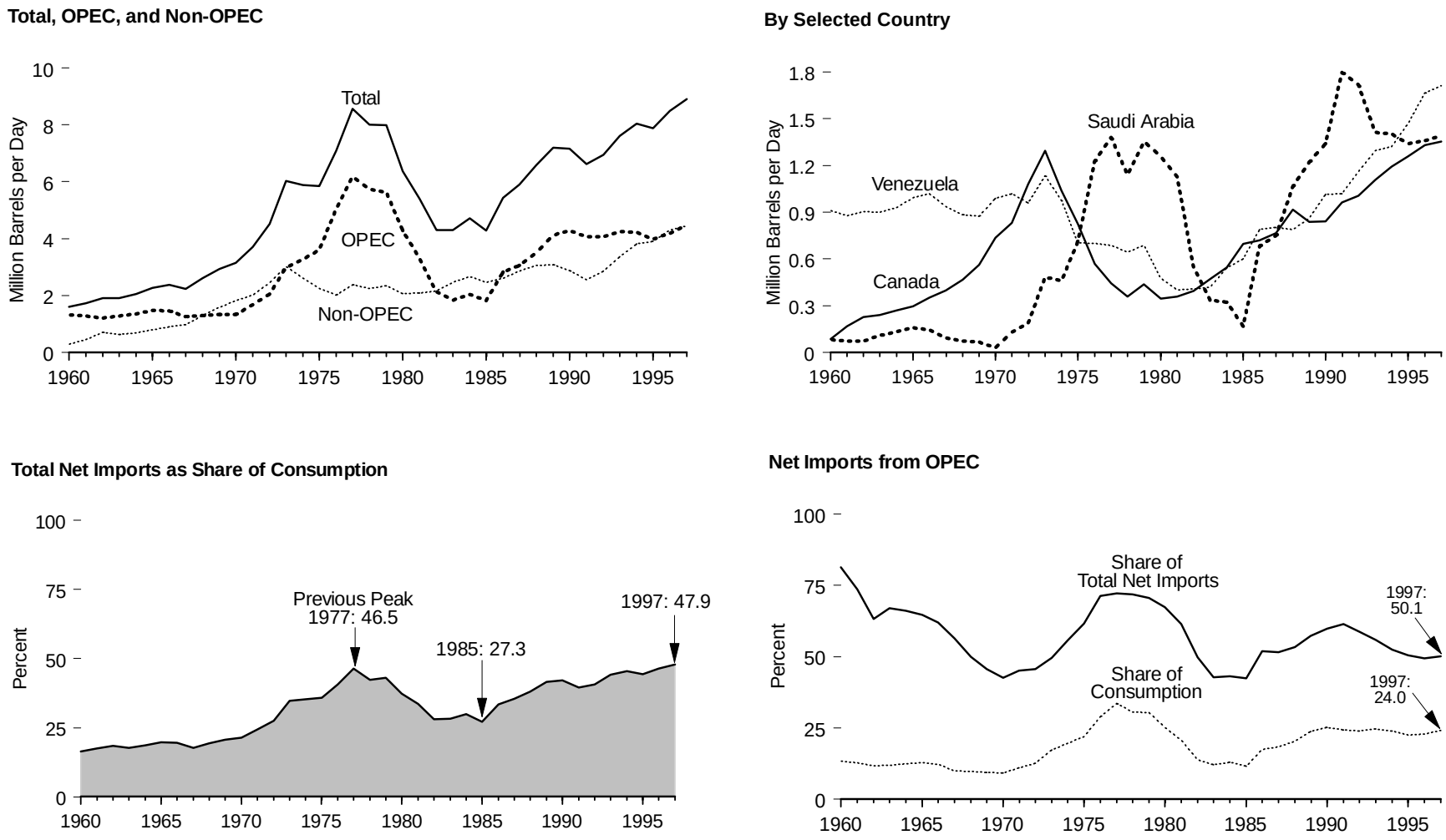
(Thousand Barrels per Day)

Year	Belgium [1]	Brazil	Canada	France	Italy	Japan	Mexico	Nether-lands	South Korea	Spain	United Kingdom	Virgin Islands and Puerto Rico	Other	Total
1960	3	4	34	4	6	62	18	6	NA	NA	12	1	52	202
1961	4	4	23	4	5	59	12	4	NA	NA	10	1	48	174
1962	3	5	21	3	5	54	14	5	NA	NA	8	1	50	168
1963	9	4	22	4	8	58	19	13	NA	NA	11	1	59	208
1964	4	4	27	4	8	56	24	9	NA	NA	10	2	55	202
1965	3	3	26	3	7	40	27	10	NA	NA	12	1	54	187
1966	3	4	32	4	7	36	39	9	NA	NA	12	3	49	198
1967	5	6	50	3	9	51	36	13	NA	NA	62	7	65	307
1968	4	8	39	4	8	56	31	10	NA	NA	14	2	55	231
1969	4	7	44	4	9	47	33	9	NA	NA	13	2	59	233
1970	5	7	31	5	10	69	33	15	NA	NA	12	2	71	259
1971	7	9	26	5	8	39	42	11	NA	NA	9	3	67	224
1972	13	9	26	5	9	32	41	12	NA	4	10	4	59	222
1973	15	8	31	5	9	34	44	13	NA	4	9	3	56	231
1974	13	9	32	4	9	38	35	17	NA	4	6	6	48	221
1975	9	6	22	6	10	27	42	23	NA	4	7	12	40	209
1976	12	7	28	6	10	25	35	22	NA	4	13	22	39	223
1977	16	6	71	9	10	25	24	17	NA	5	9	11	39	243
1978	15	8	108	9	10	26	27	18	NA	5	7	86	42	362
1979	19	7	100	13	15	34	21	28	2	9	7	170	45	471
1980	20	4	108	11	14	32	28	23	2	8	7	220	70	544
1981	12	1	89	15	22	38	26	42	10	18	5	220	97	595
1982	17	8	85	24	32	68	53	85	28	24	14	212	165	815
1983	22	2	76	23	35	104	24	49	15	34	8	144	202	739
1984	21	1	83	18	39	92	35	37	17	29	14	152	182	722
1985	26	3	74	11	30	108	61	44	27	28	14	162	193	781
1986	30	3	85	11	39	110	56	58	12	39	8	113	222	785
1987	17	2	83	12	42	120	70	39	25	31	6	136	179	764
1988	25	3	84	12	29	124	70	26	24	36	9	147	226	815
1989	23	5	92	11	37	122	89	36	17	28	9	141	249	859
1990	20	2	91	17	48	92	89	54	60	33	11	101	240	857
1991	22	13	70	27	55	95	99	72	66	23	13	117	330	1,001
1992	22	20	64	9	38	100	124	52	80	21	12	95	315	950
1993	21	16	72	8	34	105	110	45	74	30	10	108	370	1,003
1994	26	15	78	11	35	74	124	30	66	30	10	104	338	942
1995	21	16	73	11	46	76	125	33	57	38	14	123	317	949
1996	27	29	94	18	32	102	143	43	60	34	9	72	318	981
1997[P]	21	15	119	11	30	95	207	41	50	42	12	18	340	1,003

[1] Including Luxembourg.
P=Preliminary. NA=Not available.
Note: Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

Sources: • 1960-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Petroleum Supply Monthly* (February 1998).

Figure 5.7 Petroleum Net Imports by Country of Origin, 1960-1997



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

Source: Table 5.7.

Table 5.7 Petroleum Net Imports by Country of Origin, 1960-1997

Year	Persian Gulf Nations [2]	Selected OPEC [1] Countries					Selected Non-OPEC Countries					Total Net Imports	Total Net Imports as Share of Consumption [4]	Net Imports from OPEC	
		Algeria	Nigeria	Saudi Arabia	Venezuela	Total OPEC [3]	Canada	Mexico	United Kingdom	Virgin Islands and Puerto Rico	Total Non-OPEC			Share of Total Net Imports [5]	Share of Consumption [6]
	Thousand Barrels per Day												Percent		
1960	NA	NA	0	84	910	1,311	86	-2	-12	34	302	1,613	16.5	81.3	13.4
1961	NA	NA	0	73	878	1,283	167	27	-10	42	460	1,743	17.5	73.6	12.9
1962	NA	NA	0	74	905	1,210	229	35	-6	40	703	1,913	18.4	63.3	11.6
1963	NA	NA	0	108	899	1,282	243	29	-7	43	632	1,915	17.8	67.0	11.9
1964	NA	NA	0	131	932	1,359	272	23	-9	45	698	2,057	18.7	66.1	12.3
1965	NA	NA	15	158	994	1,475	297	21	-11	45	806	2,281	19.8	64.7	12.8
1966	NA	NA	11	147	1,018	1,470	352	6	-6	58	904	2,375	19.7	61.9	12.2
1967	NA	NA	5	92	937	1,258	400	13	-51	89	972	2,230	17.8	56.4	10.0
1968	NA	NA	9	74	886	1,302	468	15	13	143	1,307	2,609	19.5	49.9	9.7
1969	NA	NA	49	65	875	1,336	564	10	7	186	1,598	2,933	20.8	45.5	9.5
1970	NA	NA	50	30	989	1,343	736	9	-1	270	1,817	3,161	21.5	42.5	9.1
1971	NA	NA	102	128	1,019	1,671	831	-14	1	365	2,030	3,701	24.3	45.2	11.0
1972	NA	NA	251	189	959	2,061	1,082	-20	-1	428	2,458	4,519	27.6	45.6	12.6
1973	NA	NA	459	485	1,134	2,991	1,294	-28	6	426	3,034	6,025	34.8	49.6	17.3
1974	NA	NA	713	461	978	3,277	1,038	-27	1	475	2,615	5,892	35.4	55.6	19.7
1975	NA	NA	762	714	702	3,599	824	29	7	484	2,248	5,846	35.8	61.6	22.1
1976	NA	NA	1,025	1,229	699	5,063	571	53	19	488	2,027	7,090	40.6	71.4	29.0
1977	NA	NA	1,143	1,379	689	6,190	446	155	117	560	2,375	8,565	46.5	72.3	33.6
1978	NA	NA	919	1,142	644	5,747	359	291	173	436	2,255	8,002	42.5	71.8	30.5
1979	NA	NA	1,080	1,354	688	5,633	438	418	196	353	2,352	7,985	43.1	70.5	30.4
1980	NA	NA	857	1,259	478	4,293	347	506	169	256	2,071	6,365	37.3	67.5	25.2
1981	1,215	311	620	1,128	403	3,315	358	497	370	169	2,086	5,401	33.6	61.4	20.6
1982	692	170	512	551	409	2,136	397	632	442	154	2,163	4,298	28.1	49.7	14.0
1983	439	240	299	336	420	1,843	471	802	374	178	2,469	4,312	28.3	42.7	12.1
1984	502	323	215	324	544	2,037	547	714	388	184	2,679	4,715	30.0	43.2	13.0
1985	309	187	293	167	602	1,821	696	755	295	114	2,465	4,286	27.3	42.5	11.6
1986	909	271	440	685	788	2,828	721	642	342	152	2,611	5,439	33.4	52.0	17.4
1987	1,074	295	535	751	801	3,055	765	585	346	158	2,859	5,914	35.5	51.7	18.3
1988	1,529	300	618	1,064	790	3,513	916	677	306	117	3,074	6,587	38.1	53.3	20.3
1989	1,858	269	815	1,224	861	4,124	839	678	206	212	3,078	7,202	41.6	57.3	23.8
1990	1,962	280	800	1,339	1,016	4,285	843	666	179	213	2,876	7,161	42.2	59.8	25.2
1991	1,833	253	703	1,796	1,020	4,065	963	707	125	153	2,561	6,626	39.6	61.3	24.3
1992	1,773	196	680	1,720	1,161	4,071	1,005	706	219	180	2,867	6,938	40.7	58.7	23.9
1993	1,774	219	736	1,413	1,296	4,253	1,109	809	340	175	3,365	7,618	44.2	55.8	24.7
1994	1,723	243	637	1,402	1,322	4,233	1,194	860	448	246	3,822	8,054	45.5	52.6	23.9
1995	1,563	234	626	1,343	1,468	3,980	1,260	943	369	170	3,906	7,886	44.5	50.5	22.5
1996	R1,596	256	R616	1,362	R1,667	R4,193	R1,330	R1,101	R299	262	R4,305	R8,498	R46.4	R49.3	22.9
1997P	1,731	285	674	1,390	1,713	4,461	1,353	1,159	211	298	4,443	8,904	47.9	50.1	24.0

[1] Organization of Petroleum Exporting Countries. See Glossary for membership.
[2] Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and United Arab Emirates.
[3] 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] Calculated by dividing total net petroleum imports by total U.S. petroleum products supplied (consumption).
[5] Calculated by dividing net petroleum imports from OPEC countries by total net petroleum imports.
[6] Calculated by dividing net petroleum imports from OPEC countries by total U.S. petroleum product supplied (consumption).

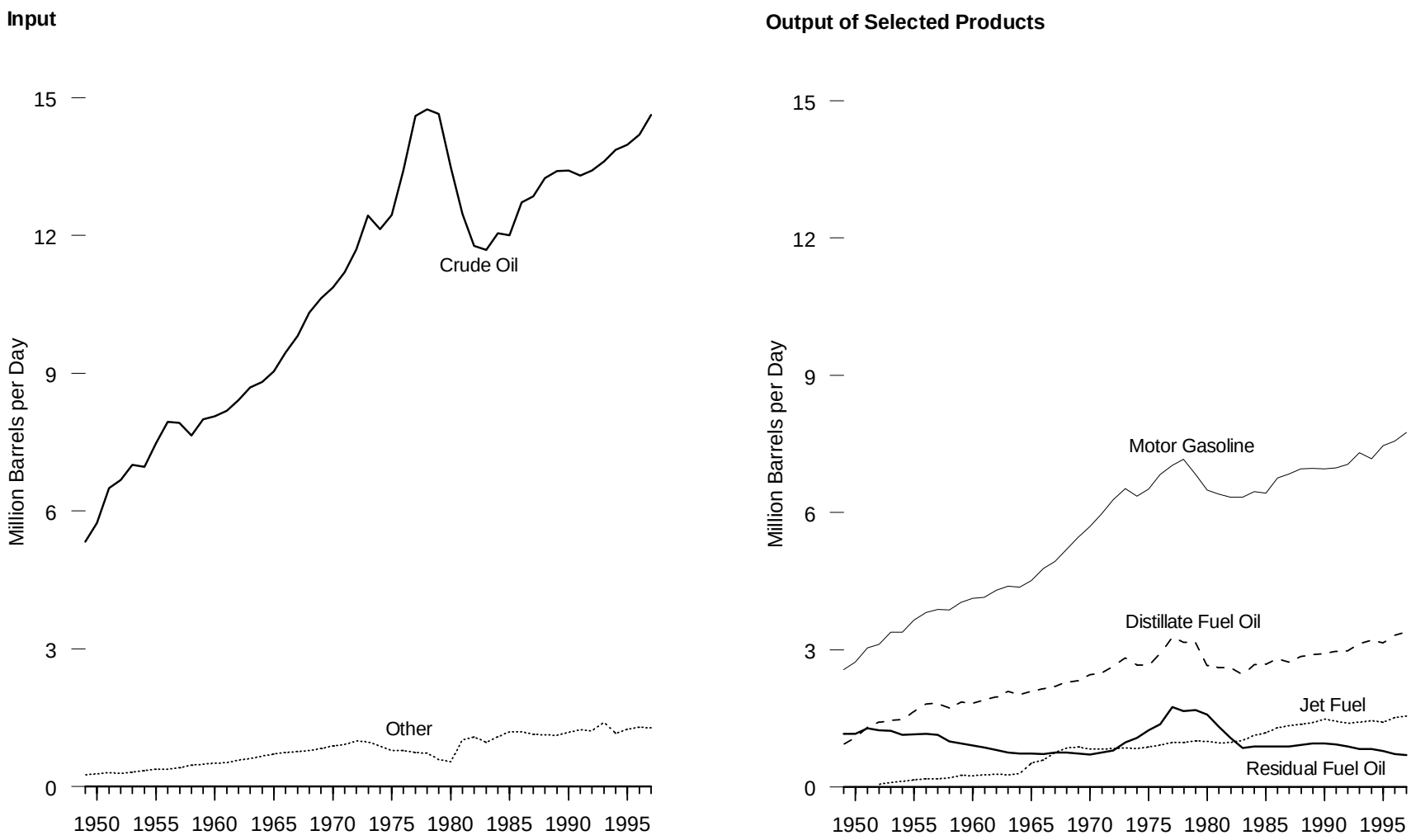
R=Revised. P=Preliminary. NA=Not available.

Notes: • Net imports are imports minus exports; negative numbers indicate that exports exceed imports. • Data include imports for the Strategic Petroleum Reserve, which began in 1977. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

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.* • 1981-1996—EIA, *Petroleum Supply Annual* • 1997—EIA, *Petroleum Supply Monthly* (February 1998).

Figure 5.8 Refinery Input and Output, 1949-1997



Source: Table 5.8.

Table 5.8 Refinery Input and Output, 1949-1997

(Million Barrels per Day)

Year	Input				Output										Processing Gain
	Crude Oil	Natural Gas Plant Liquids	Other Liquids [1]	Total Input	Asphalt and Road Oil	Distillate Fuel Oil	Jet Fuel	Liquefied Petroleum Gases	Motor Gasoline [2]	Petroleum Coke	Residual Fuel Oil	Still Gas	Other Products [3]	Total Output	
1949	5.33	0.23	0.03	5.59	0.16	0.93	(4)	0.06	2.57	0.05	1.16	0.23	R0.42	5.59	(s)
1950	5.74	0.26	0.02	6.02	0.18	1.09	(4)	0.08	2.74	0.05	1.16	0.23	R0.49	6.02	(s)
1951	6.49	0.27	0.03	6.80	0.20	1.30	(4)	0.09	3.04	0.05	1.29	0.26	R0.57	6.80	0.01
1952	6.67	0.28	0.01	6.97	0.21	1.42	0.06	0.08	3.12	0.05	1.24	0.26	R0.54	6.97	0.01
1953	7.00	0.30	(s)	7.31	0.22	1.45	0.10	0.09	3.38	0.06	1.23	0.28	R0.52	7.33	0.02
1954	6.96	0.32	0.02	7.30	0.23	1.49	0.13	0.09	3.38	0.07	1.14	0.28	R0.53	7.32	0.02
1955	7.48	0.34	0.03	7.86	0.25	1.65	0.16	0.12	3.65	0.08	1.15	0.32	R0.52	7.89	0.03
1956	7.94	0.37	0.01	8.32	0.27	1.82	0.18	0.14	3.82	0.08	1.17	0.33	R0.55	8.36	0.04
1957	7.92	0.41	(s)	8.33	0.25	1.83	0.17	0.15	3.88	0.09	1.14	0.34	R0.51	8.37	0.04
1958	7.64	0.37	0.09	8.11	0.26	1.73	0.20	0.16	3.87	0.10	1.00	0.35	R0.51	8.17	0.06
1959	7.99	0.42	0.07	8.48	0.29	1.86	0.25	0.19	4.04	0.11	0.95	0.35	R0.53	8.57	0.09
1960	8.07	0.45	0.06	8.58	0.29	1.82	0.24	0.21	4.13	0.16	0.91	0.35	R0.62	8.73	0.15
1961	8.18	0.46	0.06	8.71	0.29	1.91	0.26	0.22	4.15	0.21	0.86	0.35	R0.64	8.89	0.18
1962	8.41	0.50	0.08	8.99	0.32	1.97	0.28	0.21	4.30	0.22	0.81	0.36	R0.69	9.16	0.18
1963	8.69	0.52	0.09	9.30	0.33	2.09	0.27	0.26	4.39	0.22	0.76	0.38	R0.80	9.50	0.20
1964	8.81	0.58	0.07	9.46	0.33	2.03	0.29	0.29	4.37	0.23	0.73	0.38	R1.03	9.68	0.22
1965	9.04	0.62	0.09	9.75	0.36	2.10	[5]0.52	0.29	4.51	0.24	0.74	0.39	R0.83	9.97	0.22
1966	9.44	0.65	0.09	10.18	0.37	2.15	0.59	0.29	4.77	0.24	0.72	0.40	R0.89	10.43	0.25
1967	9.82	0.67	0.09	10.58	0.37	2.20	0.75	0.31	4.94	0.25	0.76	0.41	R0.89	10.87	0.29
1968	10.31	0.71	0.08	11.10	0.39	2.29	0.86	0.32	5.20	0.26	0.75	0.44	R0.91	11.42	0.32
1969	10.63	0.72	0.11	11.46	0.40	2.32	0.88	0.34	5.47	0.28	0.73	0.47	R0.91	11.79	0.34
1970	10.87	0.76	0.12	11.75	0.43	2.45	0.83	0.35	5.70	0.30	0.71	0.48	R0.88	12.11	0.36
1971	11.20	0.78	0.14	12.12	0.45	2.50	0.83	0.36	5.97	0.30	0.75	0.47	R0.86	12.50	0.38
1972	11.70	0.83	0.17	12.69	0.45	2.63	0.85	0.36	6.28	0.33	0.80	0.51	R0.89	13.08	0.39
1973	12.43	0.82	0.15	13.40	0.48	2.82	0.86	0.37	6.53	0.36	0.97	0.52	R0.94	13.85	0.45
1974	12.13	0.75	0.14	13.02	0.47	2.67	0.84	0.34	6.36	0.34	1.07	0.52	R0.90	13.50	0.48
1975	12.44	0.71	0.07	13.23	0.41	2.65	0.87	0.31	6.52	0.35	1.24	0.52	R0.81	13.68	0.46
1976	13.42	0.73	0.06	14.20	0.39	2.92	0.92	0.34	6.84	0.36	1.38	0.54	R0.99	14.68	0.48
1977	14.60	0.67	0.07	15.35	0.43	3.28	0.97	0.35	7.03	0.37	1.75	0.57	R1.11	15.87	0.52
1978	14.74	0.64	0.09	15.47	0.48	3.17	0.97	0.35	7.17	0.37	1.67	0.60	R1.19	15.97	0.50
1979	14.65	0.51	0.08	15.24	0.47	3.15	1.01	0.34	6.84	0.38	1.69	0.60	R1.30	15.76	0.53
1980	13.48	0.46	0.08	14.02	0.39	2.66	1.00	0.33	6.49	0.37	1.58	0.58	R1.22	14.62	0.60
1981	12.47	0.52	0.49	13.48	0.34	2.61	0.97	0.31	6.40	0.39	1.32	0.57	R1.08	13.99	0.51
1982	11.77	0.52	0.57	12.86	0.33	2.61	0.98	0.27	6.34	0.41	1.07	0.55	R0.84	13.39	0.53
1983	11.69	0.46	0.50	12.65	0.37	2.46	1.02	0.33	6.34	0.42	0.85	0.55	R0.80	13.14	0.49
1984	12.04	0.50	0.58	13.13	0.39	2.68	1.13	0.36	6.45	0.44	0.89	0.56	R0.78	13.68	0.55
1985	12.00	0.51	0.68	13.19	0.40	2.69	1.19	0.39	6.42	0.45	0.88	0.58	R0.74	13.75	0.56
1986	12.72	0.48	0.71	13.91	0.41	2.80	1.29	0.42	6.75	0.51	0.89	0.64	R0.82	14.52	0.62
1987	12.85	0.47	0.67	13.99	0.43	2.73	1.34	0.45	6.84	0.51	0.89	0.64	R0.79	14.63	0.64
1988	13.25	0.51	0.61	14.37	0.44	2.86	1.37	0.50	6.96	0.54	0.93	0.67	R0.76	15.02	0.66
1989	13.40	0.50	0.61	14.51	0.42	2.90	1.40	0.55	6.96	0.54	0.95	0.68	R0.75	15.17	0.66
1990	13.41	0.47	0.71	14.59	0.45	2.92	1.49	0.50	6.96	0.55	0.95	0.67	R0.78	15.27	0.68
1991	13.30	0.47	0.77	14.54	0.43	2.96	1.44	0.54	6.98	0.57	0.93	0.65	R0.76	15.26	0.71
1992	13.41	0.47	0.75	14.63	0.42	2.97	1.40	0.61	7.06	0.60	0.89	0.66	R0.80	15.40	0.77
1993	13.61	0.49	0.92	15.02	0.45	3.13	1.42	0.59	7.30	0.62	0.84	0.65	R0.78	15.79	0.77
1994	13.87	0.47	0.69	15.02	0.45	3.20	1.45	0.61	7.18	0.62	0.83	0.66	R0.79	15.79	0.77
1995	13.97	0.47	0.78	15.22	0.47	3.16	1.42	0.65	7.46	0.63	0.79	0.65	R0.78	15.99	0.77
1996	R14.19	0.45	R0.84	R15.49	0.46	R3.32	1.52	0.66	R7.56	0.66	R0.73	0.65	R0.76	R16.32	R0.84
1997P	14.63	0.44	0.84	15.91	0.48	3.39	1.55	0.69	7.75	0.69	0.71	0.66	0.84	16.75	0.85

[1] Prior to 1981, included unfinished oils (net), hydrogen, and hydrocarbons not included elsewhere; 1981 forward, included unfinished oils (net), motor gasoline blending components (net), aviation gasoline blending components (net), hydrogen, other hydrocarbons, and alcohol. See Note 1 at end of section.

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

[3] Kerosene, petrochemical feedstocks (excluding still gas), lubricants, wax, and miscellaneous products. Since 1964, aviation gasoline and special naphthas have been included.

[4] Included in the products from which jet fuel was blended: in 1952, 71 percent gasoline, 17 percent kerosene, and 12 percent distillate fuel.

[5] Prior to 1965, kerosene-type jet fuel was included in kerosene.

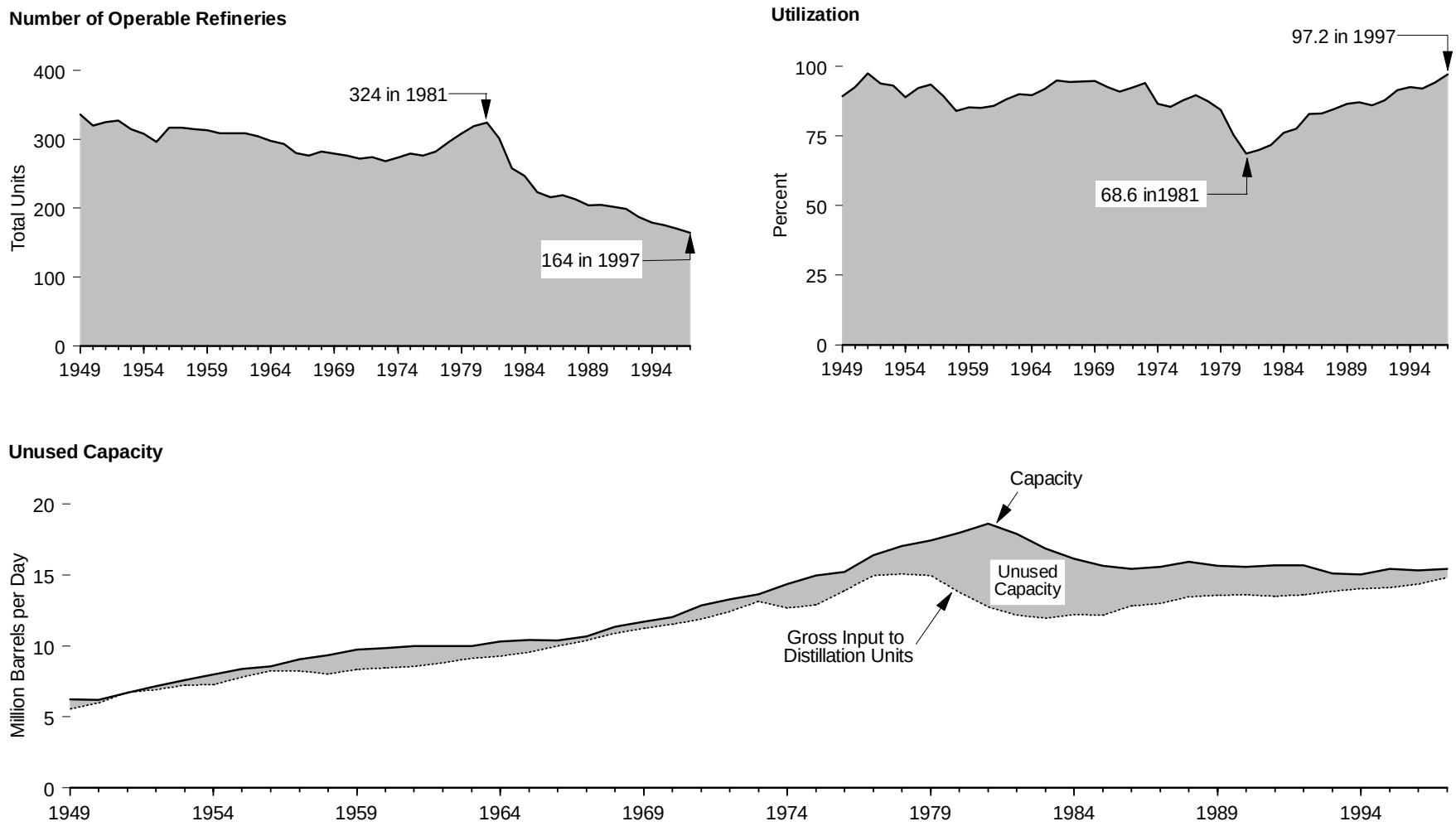
R=Revised. P=Preliminary. (s)=Less than 0.005 million barrels per day.

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

Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

Sources: • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Petroleum Supply Monthly* (February 1998).

Figure 5.9 Refinery Capacity and Utilization, 1949-1997



Source: Table 5.9.

Table 5.9 Refinery Capacity and Utilization, 1949-1997

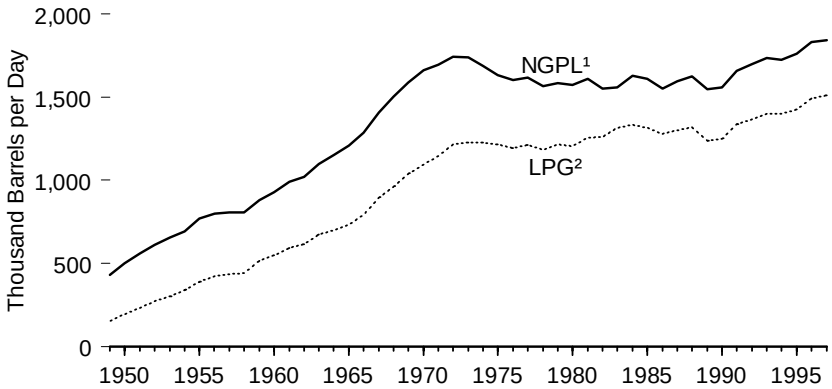
Year	Operable Refineries		Gross Input to Distillation Units [2] (million barrels per day)	Utilization [3] (percent)
	Number [4]	Capacity [1] (million barrels per day)		
1949	336	6.23	5.56	89.2
1950	320	6.22	5.98	92.5
1951	325	6.70	6.76	97.5
1952	327	7.16	6.93	93.8
1953	315	7.62	7.26	93.1
1954	308	7.98	7.27	88.8
1955	296	8.39	7.82	92.2
1956	317	8.58	8.25	93.5
1957	317	9.07	8.22	89.2
1958	315	9.36	8.02	83.9
1959	313	9.76	8.36	85.2
1960	309	9.84	8.44	85.1
1961	309	10.00	8.57	85.7
1962	309	10.01	8.83	88.2
1963	304	10.01	9.14	90.0
1964	298	10.31	9.28	89.6
1965	293	10.42	9.56	91.8
1966	280	10.39	9.99	94.9
1967	276	10.66	10.39	94.4
1968	282	11.35	10.89	94.5
1969	279	11.70	11.25	94.8
1970	276	12.02	11.52	92.6
1971	272	12.86	11.88	90.9
1972	274	13.29	12.43	92.3
1973	268	13.64	13.15	93.9
1974	273	14.36	12.69	86.6
1975	279	14.96	12.90	85.5
1976	276	15.24	13.88	87.8
1977	282	16.40	14.98	89.6
1978	296	17.05	15.07	87.4
1979	308	17.44	14.96	84.4
1980	319	17.99	13.80	75.4
1981	324	18.62	12.75	68.6
1982	301	17.89	12.17	69.9
1983	258	16.86	11.95	71.7
1984	247	16.14	12.22	76.2
1985	223	15.66	12.17	77.6
1986	216	15.46	12.83	82.9
1987	219	15.57	13.00	83.1
1988	213	15.92	13.45	84.7
1989	204	15.65	13.55	86.6
1990	205	15.57	13.61	87.1
1991	202	15.68	13.51	86.0
1992	199	15.70	13.60	87.9
1993	187	15.12	13.85	91.5
1994	179	15.03	14.03	92.6
1995	175	15.43	14.12	92.0
1996	R170	15.33	14.34	R94.1
1997P	164	15.45	14.82	97.2

[1] Capacity in million barrels per calendar day on January 1.
[2] See Note 4 at end of section.
[3] 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.
[4] Prior to 1956, the number of refineries included only those in operation on January 1. For 1957 forward, the number of refineries has included all operable refineries on January 1. See Glossary.
R=Revised. P=Preliminary.
Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

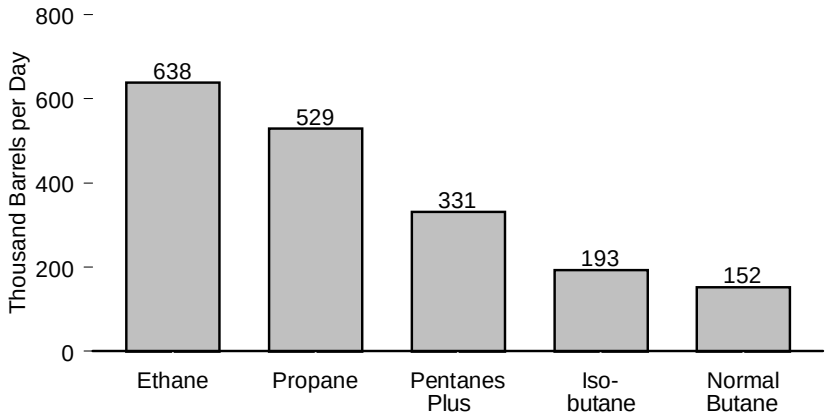
Sources: **Operable Refineries:** • 1949-1961—Bureau of Mines Information Circular, "Petroleum Refineries, Including Cracking Plants in the United States." • 1962-1977—Bureau of Mines, Mineral Industry Surveys, *Petroleum Refineries, Annual.* • 1978-1981—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Refineries in the United States.* • 1982-1997—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.* • 1981-1997—EIA, *Petroleum Supply Annual.* • **Utilization:** • 1949-1980—Calculated. • 1981-1997—EIA, *Petroleum Supply Annual.*

Figure 5.10 Natural Gas Plant Liquids Production

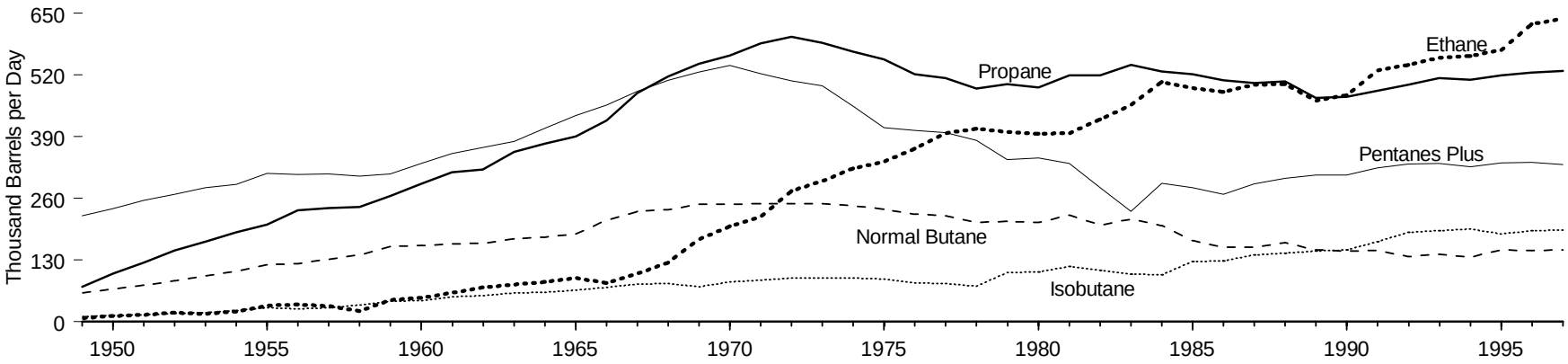
Total, 1949-1997



By Product, 1997



By Selected Product, 1949-1997



[1] Natural gas plant liquids.
[2] Liquefied petroleum gases.

Note: Because vertical scales differ, graphs should not be compared.
Source: Table 5.10.

Table 5.10 Natural Gas Plant Liquids Production, 1949-1997

(Thousand Barrels per Day)

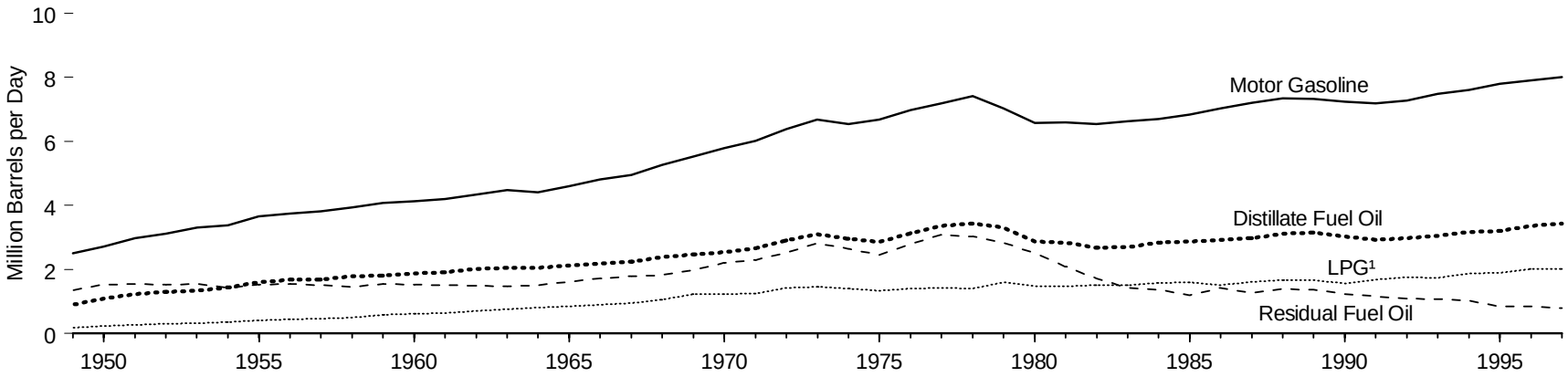
Year	Finished Petroleum Products [1]	Liquefied Petroleum Gases					Pentanes Plus [4]	Total
		Ethane [2]	Isobutane	Normal Butane [3]	Propane [2,3]	Total		
1949	53	8	11	61	74	155	223	430
1950	66	12	13	69	101	195	238	499
1951	73	15	15	77	125	232	256	561
1952	70	19	18	86	150	273	269	611
1953	71	17	19	97	169	301	282	654
1954	61	22	24	106	188	339	290	691
1955	68	34	30	120	205	390	313	771
1956	68	37	27	123	235	422	310	800
1957	63	33	30	132	239	434	311	808
1958	58	23	36	141	242	442	307	808
1959	54	46	43	159	265	514	312	879
1960	47	51	45	161	291	549	333	929
1961	43	61	53	164	315	593	355	991
1962	41	73	55	165	321	614	367	1,021
1963	47	78	61	175	358	672	380	1,098
1964	48	84	62	178	375	699	408	1,154
1965	41	92	67	185	390	734	434	1,210
1966	37	82	73	214	424	792	456	1,284
1967	29	101	80	232	482	895	486	1,409
1968	35	125	81	236	517	960	509	1,504
1969	27	173	74	248	543	1,037	526	1,590
1970	25	201	84	248	561	1,095	540	1,660
1971	25	221	88	249	586	1,144	523	1,693
1972	21	275	92	249	600	1,215	507	1,744
1973	16	296	92	249	587	1,225	497	1,738
1974	7	323	92	244	569	1,227	454	1,688
1975	7	337	90	237	552	1,217	409	1,633
1976	6	365	82	227	521	1,195	403	1,604
1977	5	397	81	223	513	1,214	399	1,618
1978	3	406	75	210	491	1,182	382	1,567
1979	26	400	104	212	500	1,216	342	1,584
1980	23	396	105	210	494	1,205	345	1,573
1981	18	397	117	224	519	1,256	334	1,609
1982	11	426	109	204	519	1,258	282	1,550
1983	12	456	100	217	541	1,314	233	1,559
1984	4	505	99	203	527	1,334	292	1,630
1985	14	493	127	171	521	1,313	282	1,609
1986	4	485	128	157	508	1,277	269	1,551
1987	4	499	141	157	503	1,300	291	1,595
1988	4	501	144	167	506	1,319	302	1,625
1989	([5])	466	149	151	471	1,237	309	1,546
1990	([5])	477	151	149	474	1,250	309	1,559
1991	([5])	530	169	150	487	1,336	324	1,659
1992	([5])	541	189	137	499	1,365	332	1,697
1993	([5])	556	192	142	513	1,402	334	1,736
1994	([5])	559	195	136	510	1,400	326	1,727
1995	([5])	573	185	151	519	1,428	335	1,762
1996	([5])	R627	R192	R150	525	1,494	R336	R1,830
1997P	([5])	638	193	152	529	1,511	331	1,842

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

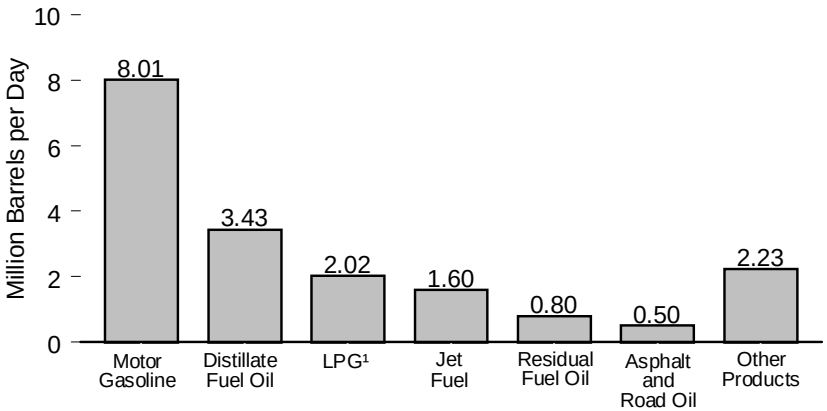
R=Revised. P=Preliminary.
Note: Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelpetroleum.html.
Sources: • 1949-1968—Bureau of Mines, *Minerals Yearbook,* "Crude Petroleum and Petroleum Products" chapter. • 1969-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Petroleum Supply Monthly* (February 1998).

Figure 5.11 Petroleum Products Supplied by Type

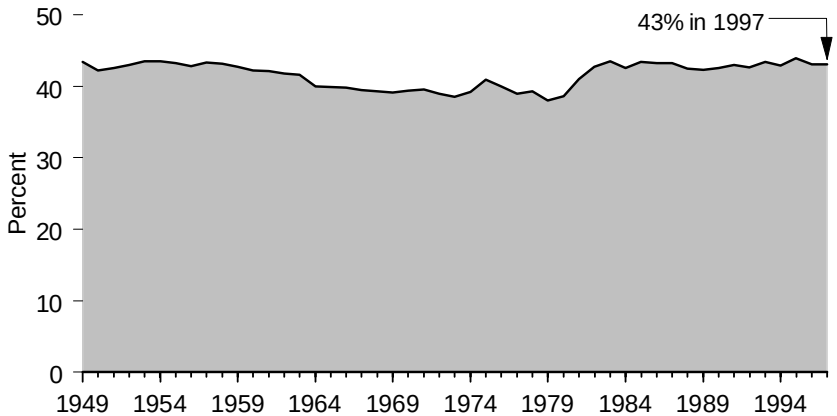
By Selected Product, 1949-1997



By Product, 1997



Motor Gasoline's Share of Total Petroleum Products Supplied, 1949-1997



[1] Liquefied petroleum gases.

Source: Table 5.11.

Table 5.11 Petroleum Products Supplied by Type, 1949-1997

(Million Barrels per Day)

Year	Asphalt and Road Oil	Distillate Fuel Oil	Jet Fuel	Liquefied Petroleum Gases		Motor Gasoline [2]	Residual Fuel Oil	Other Products [3]	Total Products	Percentage Change from Previous Year [4]
				Propane [1]	Total					
1949	0.16	0.90	(5)	NA	0.19	2.50	1.36	R0.65	5.76	—
1950	0.18	1.08	(5)	NA	0.23	2.72	1.52	R0.72	6.46	12.1
1951	0.20	1.23	(5)	NA	0.28	2.99	1.55	R0.78	7.02	8.6
1952	0.21	1.30	0.05	NA	0.30	3.12	1.52	R0.76	7.27	3.9
1953	0.22	1.34	0.09	NA	0.33	3.30	1.54	R0.79	7.60	4.3
1954	0.23	1.44	0.13	NA	0.35	3.37	1.43	R0.80	7.76	2.1
1955	0.25	1.59	0.15	NA	0.40	3.66	1.53	R0.87	8.46	9.0
1956	0.27	1.68	0.20	NA	0.44	3.75	1.54	R0.89	8.78	4.1
1957	0.26	1.69	0.20	NA	0.45	3.82	1.50	R0.88	8.81	0.1
1958	0.28	1.79	0.26	NA	0.49	3.93	1.45	R0.91	9.12	3.5
1959	0.30	1.81	0.29	NA	0.58	4.07	1.54	R0.94	9.53	4.5
1960	0.30	1.87	0.28	NA	0.62	4.13	1.53	R1.06	9.80	3.1
1961	0.31	1.90	0.29	NA	0.64	4.20	1.50	R1.13	9.98	1.5
1962	0.33	2.01	0.31	NA	0.70	4.34	1.50	R1.22	10.40	4.2
1963	0.34	2.05	0.32	NA	0.76	4.47	1.48	R1.34	10.74	3.3
1964	0.35	2.05	0.32	NA	0.81	4.40	1.52	R1.58	11.02	2.9
1965	0.37	2.13	0.60	NA	0.84	4.59	1.61	R1.38	11.51	4.2
1966	0.39	2.18	0.67	NA	0.89	4.81	1.72	R1.43	12.08	5.0
1967	0.38	2.24	0.82	0.62	0.94	4.96	1.79	R1.43	12.56	3.9
1968	0.41	2.39	0.95	0.69	1.05	5.26	1.83	R1.50	13.39	6.9
1969	0.42	2.47	0.99	0.78	1.22	5.53	1.98	R1.54	14.14	5.3
1970	0.45	2.54	0.97	0.78	1.22	5.78	2.20	R1.53	14.70	4.0
1971	0.46	2.66	1.01	0.79	1.25	6.01	2.30	R1.52	15.21	3.5
1972	0.47	2.91	1.05	0.89	1.42	6.38	2.53	R1.62	16.37	7.9
1973	0.52	3.09	1.06	0.87	1.45	6.67	2.82	R1.69	17.31	5.5
1974	0.48	2.95	0.99	0.83	1.41	6.54	2.64	R1.65	16.65	-3.8
1975	0.42	2.85	1.00	0.78	1.33	6.67	2.46	R1.58	16.32	-2.0
1976	0.41	3.13	0.99	0.83	1.40	6.98	2.80	R1.75	17.46	7.3
1977	0.44	3.35	1.04	0.82	1.42	7.18	3.07	R1.94	18.43	5.3
1978	0.48	3.43	1.06	0.78	1.41	7.41	3.02	R2.03	18.85	2.3
1979	0.48	3.31	1.08	0.85	1.59	7.03	2.83	R2.20	18.51	-1.8
1980	0.40	2.87	1.07	0.75	1.47	6.58	2.51	R2.17	17.06	-7.6
1981	0.34	2.83	1.01	0.77	1.47	6.59	2.09	R1.74	16.06	-6.1
1982	0.34	2.67	1.01	0.80	1.50	6.54	1.72	R1.51	15.30	-4.7
1983	0.37	2.69	1.05	0.75	1.51	6.62	1.42	R1.57	15.23	-0.4
1984	0.41	2.84	1.18	0.83	1.57	6.69	1.37	R1.66	15.73	3.5
1985	0.43	2.87	1.22	0.88	1.60	6.83	1.20	R1.58	15.73	-0.3
1986	0.45	2.91	1.31	0.83	1.51	7.03	1.42	R1.65	16.28	3.5
1987	0.47	2.98	1.38	0.92	1.61	7.21	1.26	R1.76	16.67	2.4
1988	0.47	3.12	1.45	0.92	1.66	7.34	1.38	R1.87	17.28	4.0
1989	0.45	3.16	1.49	0.99	1.67	7.33	1.37	R1.86	17.33	0.0
1990	0.48	3.02	1.52	0.92	1.56	7.23	1.23	R1.94	16.99	-1.9
1991	0.44	2.92	1.47	0.98	1.69	7.19	1.16	R1.84	16.71	-1.6
1992	0.45	2.98	1.45	1.03	1.76	7.27	1.09	R2.03	17.03	2.2
1993	0.47	3.04	1.47	1.01	1.73	7.48	1.08	R1.96	17.24	0.9
1994	0.48	3.16	1.53	1.08	1.88	7.60	1.02	R2.04	17.72	2.8
1995	0.49	3.21	1.51	1.10	1.90	7.79	0.85	R1.98	17.72	0.0
1996	0.48	3.37	1.58	1.14	2.01	R7.89	R0.85	R2.13	R18.31	R3.6
1997P	0.50	3.43	1.60	1.16	2.02	8.01	0.80	2.23	18.58	1.2

[1] Includes propylene.
[2] Prior to 1964, motor gasoline data were for total gasoline, including motor gasoline, aviation gasoline, and special naphthas.
[3] Kerosene, petrochemical feedstocks, lubricants, wax, petroleum coke, still gas, pentanes plus, and miscellaneous products. Since 1964, aviation gasoline and special naphthas have been included. Prior to 1965, kerosene-type jet fuel was included in kerosene. For 1981 forward, other products include negative barrels per day of distillate and residual fuel oil reclassified as unfinished oils and other products (from both primary and secondary supply) reclassified as gasoline blending components. Beginning in 1983, product supplied has also included crude oil burned as fuel.
[4] Percent change from previous year calculated from data in thousand barrels per year.
[5] Included in the products from which jet fuel was blended: in 1952, 71 percent gasoline, 17 percent kerosene, and 12 percent distillate fuel.

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

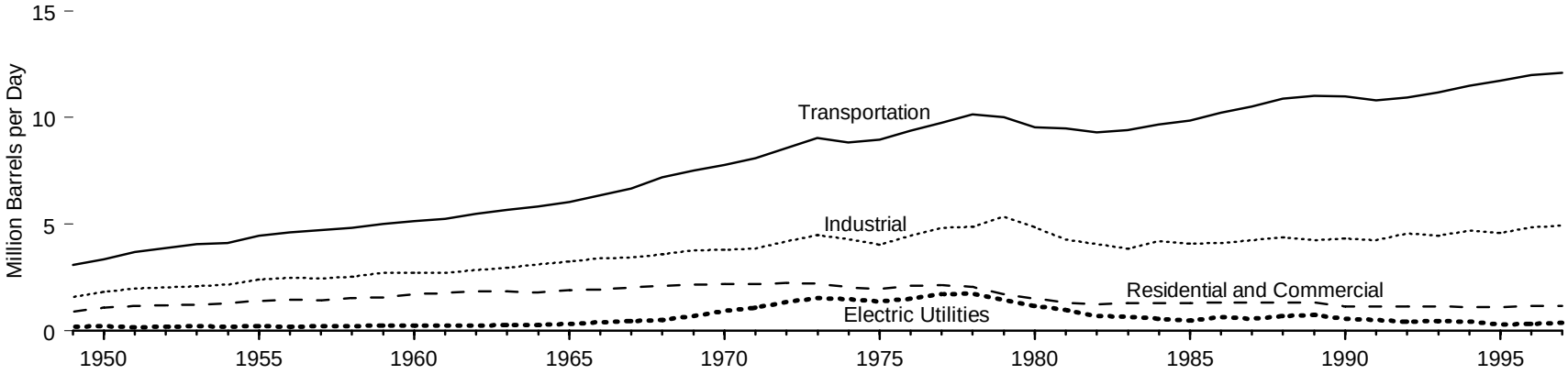
Notes: • For the definition of petroleum products supplied, see Notes 1, 2, and 3 at end of section. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

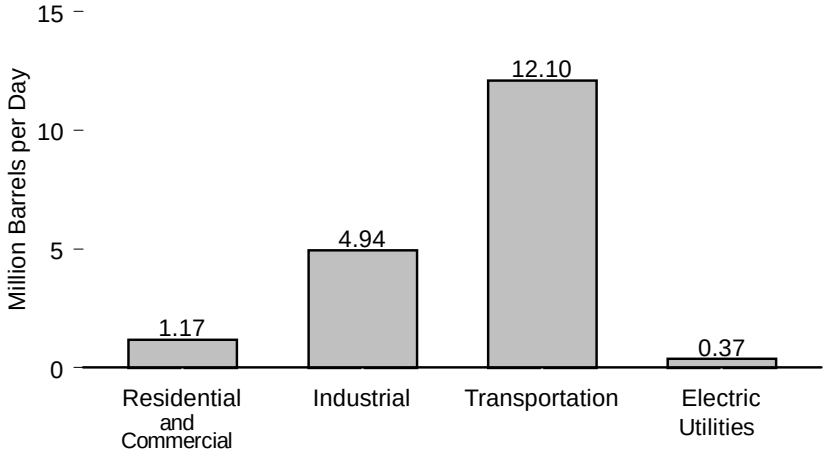
Sources: • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Petroleum Supply Monthly* (February 1998).

Figure 5.12a Petroleum Products Supplied by Sector

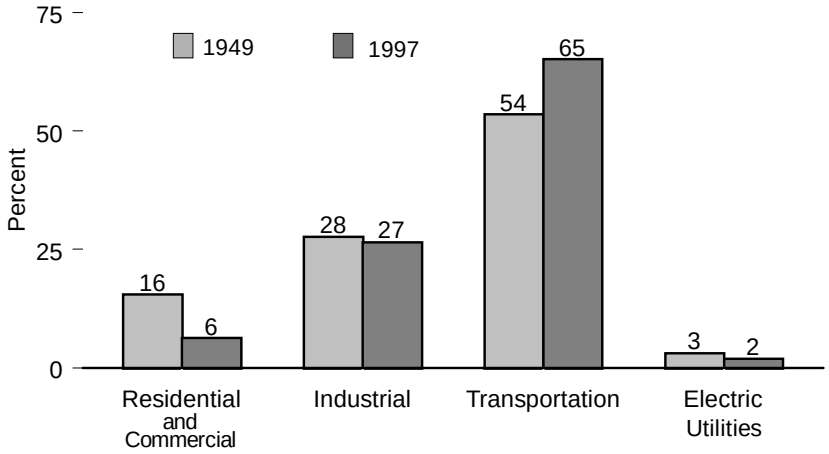
By Sector, 1949-1997



By Sector, 1997



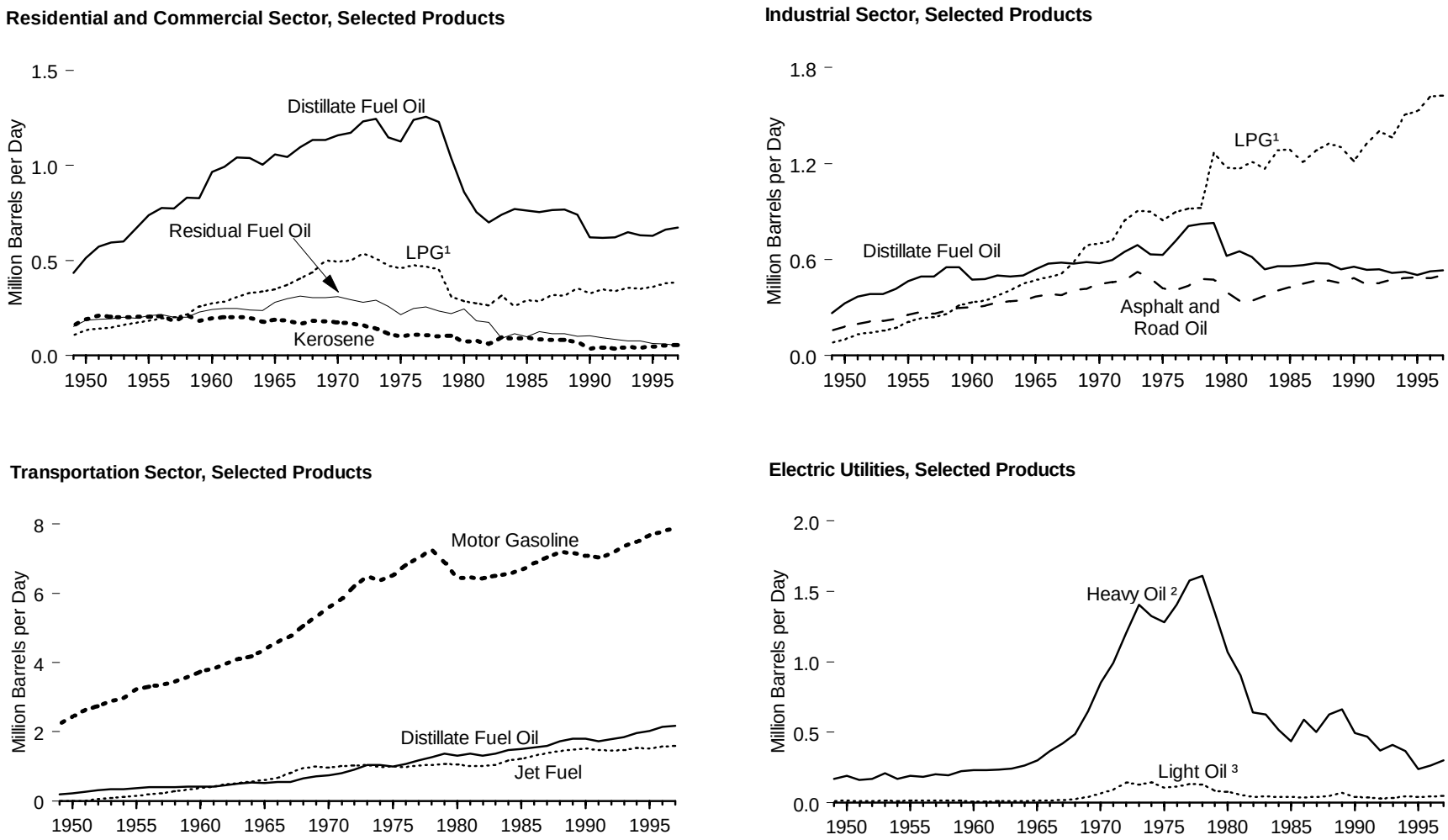
Shares[1] by Sector, 1949 and 1997



[1] Sum of shares may not equal 100 percent due to independent rounding.
Note: See related Figure 5.12b.

Sources: Tables 5.12a and 5.12b.

Figure 5.12b Petroleum Products Supplied by Product by Sector, 1949-1997



[1] Liquefied petroleum gases.

[2] Prior to 1980, based on oil used in steam plants. Since 1980, heavy oil includes fuel oil nos. 4, 5, and 6, and residual fuel oil.

[3] Prior to 1980, based on oil used in internal combustion and gas turbine engine plants. Since 1980, light oil includes fuel nos. 1 and 2, kerosene, and jet fuel.

Notes: • See related Figure 5.12a. • Because vertical scales differ, graphs should not be compared.

Sources: Tables 5.12a and 5.12b.

Table 5.12a Petroleum Products Supplied to the Residential and Commercial Sector and the Industrial Sector, 1949-1997

(Million Barrels per Day)

	Residential and Commercial						Industrial								
Year	Distillate Fuel Oil	Kerosene	Liquefied Petroleum Gases	Motor Gasoline	Residual Fuel Oil	Total	Asphalt and Road Oil	Distillate Fuel Oil	Kerosene	Liquefied Petroleum Gases	Lubricants	Motor Gasoline	Residual Fuel Oil	Other [1]	Total
1949	0.43	0.16	0.11	0.05	0.15	0.90	0.16	0.27	0.12	0.08	0.04	0.12	0.53	0.28	1.60
1950	0.51	0.19	0.13	0.05	0.18	1.07	0.18	0.33	0.13	0.10	0.04	0.13	0.62	0.29	1.82
1951	0.57	0.21	0.14	0.06	0.19	1.17	0.20	0.37	0.13	0.13	0.05	0.14	0.63	0.33	1.98
1952	0.59	0.21	0.15	0.06	0.19	1.20	0.21	0.39	0.13	0.14	0.04	0.15	0.63	0.33	2.02
1953	0.60	0.20	0.16	0.06	0.20	1.22	0.22	0.38	0.12	0.16	0.04	0.16	0.65	0.36	2.08
1954	0.67	0.20	0.17	0.06	0.19	1.30	0.23	0.42	0.12	0.17	0.04	0.16	0.64	0.37	2.16
1955	0.74	0.20	0.18	0.07	0.21	1.40	0.25	0.47	0.12	0.21	0.05	0.17	0.69	0.43	2.39
1956	0.78	0.21	0.20	0.07	0.21	1.46	0.27	0.49	0.11	0.23	0.05	0.18	0.70	0.45	2.49
1957	0.77	0.18	0.20	0.07	0.20	1.43	0.26	0.49	0.10	0.24	0.05	0.18	0.66	0.48	2.46
1958	0.83	0.21	0.21	0.07	0.20	1.53	0.28	0.55	0.08	0.26	0.04	0.19	0.64	0.50	2.54
1959	0.83	0.18	0.26	0.08	0.23	1.57	0.30	0.55	0.08	0.31	0.05	0.19	0.70	0.52	2.71
1960	0.97	0.19	0.27	0.03	0.24	1.71	0.30	0.48	0.08	0.33	0.05	0.20	0.69	0.58	2.71
1961	0.99	0.20	0.28	0.04	0.25	1.76	0.31	0.48	0.06	0.34	0.05	0.19	0.66	0.76	2.72
1962	1.04	0.20	0.31	0.04	0.25	1.84	0.33	0.50	0.07	0.38	0.05	0.19	0.67	0.65	2.84
1963	1.04	0.20	0.33	0.04	0.24	1.84	0.34	0.50	0.07	0.41	0.05	0.18	0.67	0.74	2.96
1964	1.00	0.18	0.34	0.04	0.24	1.79	0.35	0.50	0.08	0.45	0.06	0.18	0.68	0.84	3.12
1965	1.06	0.19	0.35	0.04	0.28	1.91	0.37	0.54	0.08	0.47	0.06	0.18	0.69	0.86	3.25
1966	1.04	0.18	0.37	0.04	0.30	1.94	0.39	0.58	0.09	0.49	0.06	0.17	0.71	0.92	3.40
1967	1.10	0.16	0.41	0.04	0.31	2.02	0.38	0.58	0.11	0.51	0.06	0.16	0.69	0.94	3.43
1968	1.14	0.18	0.44	0.04	0.31	2.10	0.41	0.57	0.10	0.59	0.07	0.16	0.68	1.01	3.58
1969	1.13	0.18	0.50	0.04	0.30	2.16	0.42	0.59	0.10	0.69	0.07	0.15	0.69	1.06	3.76
1970	1.16	0.17	0.49	0.05	0.31	2.18	0.45	0.58	0.09	0.70	0.07	0.15	0.71	1.07	3.81
1971	1.17	0.17	0.50	0.04	0.29	2.18	0.46	0.60	0.08	0.71	0.07	0.14	0.71	1.08	3.84
1972	1.23	0.16	0.54	0.05	0.28	2.25	0.47	0.65	0.08	0.85	0.07	0.13	0.77	1.18	4.19
1973	1.24	0.14	0.51	0.05	0.29	2.23	0.52	0.69	0.08	0.90	0.09	0.13	0.81	1.26	4.48
1974	1.15	0.12	0.47	0.04	0.26	2.04	0.48	0.63	0.06	0.90	0.08	0.12	0.75	1.26	4.30
1975	1.13	0.10	0.46	0.05	0.21	1.95	0.42	0.63	0.06	0.84	0.07	0.12	0.66	1.25	4.04
1976	1.24	0.11	0.48	0.05	0.25	2.12	0.41	0.72	0.06	0.90	0.07	0.11	0.79	1.39	4.45
1977	1.26	0.11	0.47	0.05	0.26	2.14	0.44	0.81	0.07	0.92	0.08	0.10	0.84	1.56	4.82
1978	1.23	0.10	0.45	0.06	0.23	2.07	0.48	0.82	0.08	0.92	0.09	0.09	0.75	1.64	4.87
1979	1.04	0.10	0.31	0.05	0.22	1.73	0.48	0.83	0.09	1.27	0.09	0.08	0.72	1.79	5.34
1980	0.86	0.07	0.28	0.06	0.25	1.52	0.40	0.62	0.09	1.17	0.08	0.08	0.59	1.81	4.84
1981	0.75	0.07	0.28	0.05	0.18	1.33	0.34	0.65	0.05	1.17	0.08	0.08	0.47	1.43	4.27
1982	0.70	0.06	0.26	0.05	0.17	1.24	0.34	0.62	0.07	1.21	0.07	0.07	0.46	1.22	4.06
1983	0.74	0.10	0.31	0.05	0.09	1.29	0.37	0.54	0.03	1.17	0.08	0.06	0.34	1.27	3.85
1984	0.77	0.09	0.26	0.06	0.12	1.29	0.41	0.56	0.03	1.28	0.08	0.08	0.39	1.36	4.19
1985	0.76	0.09	0.29	0.05	0.10	1.30	0.43	0.56	0.02	1.29	0.07	0.11	0.33	1.29	4.10
1986	0.76	0.08	0.29	0.06	0.13	1.31	0.45	0.56	0.02	1.21	0.07	0.11	0.32	1.37	4.11
1987	0.76	0.08	0.32	0.06	0.11	1.33	0.47	0.58	0.01	1.28	0.08	0.11	0.25	1.47	4.25
1988	0.77	0.08	0.31	0.06	0.11	1.34	0.47	0.57	0.01	1.33	0.08	0.10	0.24	1.59	4.39
1989	0.74	0.07	0.35	0.05	0.10	1.32	0.45	0.54	0.01	1.30	0.08	0.10	0.18	1.58	4.26
1990	0.62	0.04	0.32	0.06	0.10	1.14	0.48	0.56	0.01	1.22	0.08	0.10	0.18	1.70	4.32
1991	0.62	0.04	0.35	0.04	0.09	1.14	0.44	0.54	0.01	1.33	0.08	0.10	0.15	1.62	4.25
1992	0.62	0.04	0.34	0.04	0.08	1.12	0.45	0.54	(s)	1.40	0.08	0.10	0.17	1.80	4.55
1993	0.65	0.04	0.36	0.02	0.08	1.14	0.47	0.52	0.01	1.36	0.08	0.09	0.20	1.72	4.45
1994	0.63	0.04	0.35	0.01	0.08	1.11	0.48	0.52	0.01	1.50	0.08	0.10	0.19	1.80	4.69
1995	[R]0.63	0.05	[R]0.36	0.01	[R]0.06	[R]1.11	0.49	[R]0.51	0.01	[R]1.53	0.08	[R]0.11	[R]0.15	1.74	[R]4.60
1996[E]	[R]0.66	0.05	0.38	0.01	[R]0.06	[R]1.17	0.48	[R]0.52	0.01	[R]1.62	0.08	[R]0.11	[R]0.13	[R]1.89	[R]4.84
1997[E]	0.67	0.06	0.38	0.01	0.05	1.17	0.50	0.53	0.01	1.62	0.08	0.11	0.12	1.97	4.94

[1] "Other" is petrochemical feedstocks, special naphthas, waxes, petroleum coke, still gas, natural gasoline, pentanes plus, crude oil, and miscellaneous products.

R=Revised. E=Estimated. (s)=Less than 0.005 million barrels per day.

Notes: • See Table 5.12b for the transportation sector, electric utilities, and overall total. • See Notes 1, 2, and 3 at end of section for comments on the calculation of products supplied. • Totals may not equal sum of components due to independent rounding.

Sources: • 1949-1959—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual,* and Energy Information Administration (EIA) estimates. • 1960-1995—EIA, State Energy Data System 1995. • 1996-forward—EIA, Integrated Modeling Data System output for the *Monthly Energy Review* (March 1998).

Table 5.12b Petroleum Products Supplied to the Transportation Sector, Electric Utilities, and Total, 1949-1997

(Million Barrels per Day)

Year	Transportation								Electric Utilities				Total
	Aviation Gasoline	Distillate Fuel Oil	Jet Fuel	Liquefied Petroleum Gases	Lubricants	Motor Gasoline	Residual Fuel Oil	Total	Heavy Oil [1]	Light Oil [2]	Petroleum Coke	Total	
1949	0.09	0.19	0.00	(s)	0.05	2.24	0.50	3.08	0.17	0.01	0.00	0.18	5.76
1950	0.11	0.23	0.00	(s)	0.06	2.43	0.52	3.36	0.19	0.01	0.00	0.21	6.46
1951	0.15	0.27	0.00	(s)	0.07	2.64	0.56	3.69	0.16	0.01	0.00	0.18	7.02
1952	0.17	0.31	0.05	0.01	0.06	2.75	0.52	3.87	0.17	0.01	0.00	0.18	7.27
1953	0.19	0.34	0.09	0.01	0.07	2.89	0.48	4.07	0.21	0.02	0.00	0.23	7.60
1954	0.18	0.34	0.13	0.01	0.06	2.97	0.43	4.11	0.17	0.01	0.00	0.18	7.76
1955	0.19	0.37	0.15	0.01	0.07	3.22	0.44	4.46	0.19	0.01	0.00	0.21	8.46
1956	0.20	0.40	0.20	0.01	0.07	3.30	0.44	4.62	0.18	0.01	0.00	0.20	8.78
1957	0.20	0.41	0.22	0.01	0.07	3.36	0.44	4.71	0.20	0.02	0.00	0.22	8.81
1958	0.22	0.39	0.27	0.01	0.06	3.45	0.41	4.83	0.20	0.02	0.00	0.21	9.12
1959	0.21	0.41	0.33	0.01	0.07	3.59	0.39	5.01	0.22	0.02	0.00	0.24	9.53
1960	0.16	0.42	0.37	0.01	0.07	3.74	0.37	5.14	0.23	0.01	0.00	0.24	9.80
1961	0.16	0.42	0.42	0.01	0.07	3.82	0.36	5.25	0.23	0.01	0.00	0.24	9.98
1962	0.14	0.45	0.49	0.02	0.07	3.97	0.34	5.48	0.23	0.01	0.00	0.24	10.40
1963	0.14	0.50	0.52	0.02	0.07	4.11	0.33	5.68	0.24	0.01	0.00	0.26	10.74
1964	0.13	0.53	0.56	0.02	0.07	4.19	0.34	5.83	0.26	0.01	0.00	0.28	11.02
1965	0.12	0.51	0.60	0.02	0.07	4.37	0.34	6.04	0.30	0.01	0.00	0.32	11.51
1966	0.11	0.55	0.67	0.03	0.07	4.60	0.34	6.36	0.37	0.02	0.00	0.39	12.08
1967	0.09	0.54	0.82	0.03	0.06	4.76	0.36	6.66	0.42	0.02	0.00	0.44	12.56
1968	0.08	0.65	0.95	0.03	0.07	5.06	0.35	7.20	0.49	0.03	0.00	0.52	13.39
1969	0.07	0.70	0.99	0.03	0.07	5.33	0.33	7.52	0.65	0.04	0.00	0.69	14.14
1970	0.05	0.74	0.97	0.03	0.07	5.59	0.33	7.78	0.85	0.07	0.01	0.93	14.70
1971	0.05	0.80	1.01	0.04	0.07	5.83	0.31	8.09	0.99	0.09	0.01	1.09	15.21
1972	0.05	0.91	1.02	0.04	0.07	6.20	0.28	8.57	1.20	0.15	0.01	1.36	16.37
1973	0.05	1.05	1.04	0.04	0.07	6.50	0.32	9.05	1.41	0.13	0.01	1.54	17.31
1974	0.04	1.04	0.98	0.03	0.07	6.37	0.30	8.84	1.32	0.15	0.01	1.48	16.65
1975	0.04	1.00	0.99	0.03	0.07	6.51	0.31	8.95	1.28	0.11	(s)	1.39	16.32
1976	0.04	1.07	0.98	0.03	0.08	6.82	0.36	9.37	1.40	0.11	(s)	1.52	17.46
1977	0.04	1.17	1.02	0.04	0.08	7.02	0.40	9.76	1.57	0.13	(s)	1.71	18.43
1978	0.04	1.26	1.04	0.04	0.08	7.26	0.43	10.16	1.61	0.13	0.01	1.75	18.85
1979	0.04	1.37	1.07	0.02	0.09	6.90	0.54	10.01	1.35	0.08	(s)	1.44	18.51
1980	0.03	1.31	1.06	0.01	0.08	6.44	0.61	9.55	1.07	0.08	(s)	1.15	17.06
1981	0.03	1.36	1.01	0.02	0.07	6.46	0.53	9.49	0.90	0.06	(s)	0.96	16.06
1982	0.03	1.31	1.01	0.02	0.07	6.42	0.44	9.31	0.64	0.04	(s)	0.69	15.30
1983	0.03	1.37	1.05	0.03	0.07	6.51	0.36	9.41	0.63	0.05	(s)	0.68	15.23
1984	0.02	1.47	1.18	0.03	0.08	6.55	0.35	9.68	0.52	0.04	(s)	0.56	15.73
1985	0.03	1.51	1.22	0.02	0.07	6.67	0.34	9.85	0.44	0.04	(s)	0.48	15.73
1986	0.03	1.55	1.31	0.02	0.07	6.87	0.38	10.23	0.59	0.04	(s)	0.64	16.28
1987	0.02	1.59	1.38	0.02	0.08	7.04	0.39	10.53	0.50	0.04	(s)	0.55	16.67
1988	0.03	1.73	1.45	0.02	0.08	7.18	0.40	10.87	0.63	0.05	0.01	0.68	17.28
1989	0.03	1.81	1.49	0.02	0.08	7.17	0.43	11.01	0.66	0.07	0.01	0.74	17.33
1990	0.02	1.80	1.52	0.02	0.08	7.08	0.45	10.97	0.50	0.04	0.01	0.55	16.99
1991	0.02	1.73	1.47	0.02	0.07	7.04	0.45	10.80	0.47	0.04	0.01	0.52	16.71
1992	0.02	1.79	1.45	0.01	0.07	7.13	0.47	10.95	0.37	0.03	0.01	0.42	17.03
1993	0.02	1.84	1.47	0.01	0.07	7.37	0.40	11.18	0.41	0.04	0.02	0.46	17.24
1994	0.02	1.96	1.53	0.02	0.08	7.49	0.39	11.49	0.37	0.04	0.01	0.43	17.72
1995	0.02	R2.03	1.51	R0.01	0.08	7.67	R0.40	R11.73	0.24	0.04	0.01	0.29	17.72
1996E	0.02	R2.13	1.58	R0.01	0.07	R7.77	R0.39	R11.98	0.26	0.05	0.01	0.32	R18.31
1997E	0.02	2.18	1.60	0.01	0.08	7.89	0.33	12.10	0.30	0.05	0.02	0.37	18.58

[1] Prior to 1980, based on oil used in steam plants. Since 1980, heavy oil has included fuel oil nos. 4, 5, and 6, and residual fuel oils.

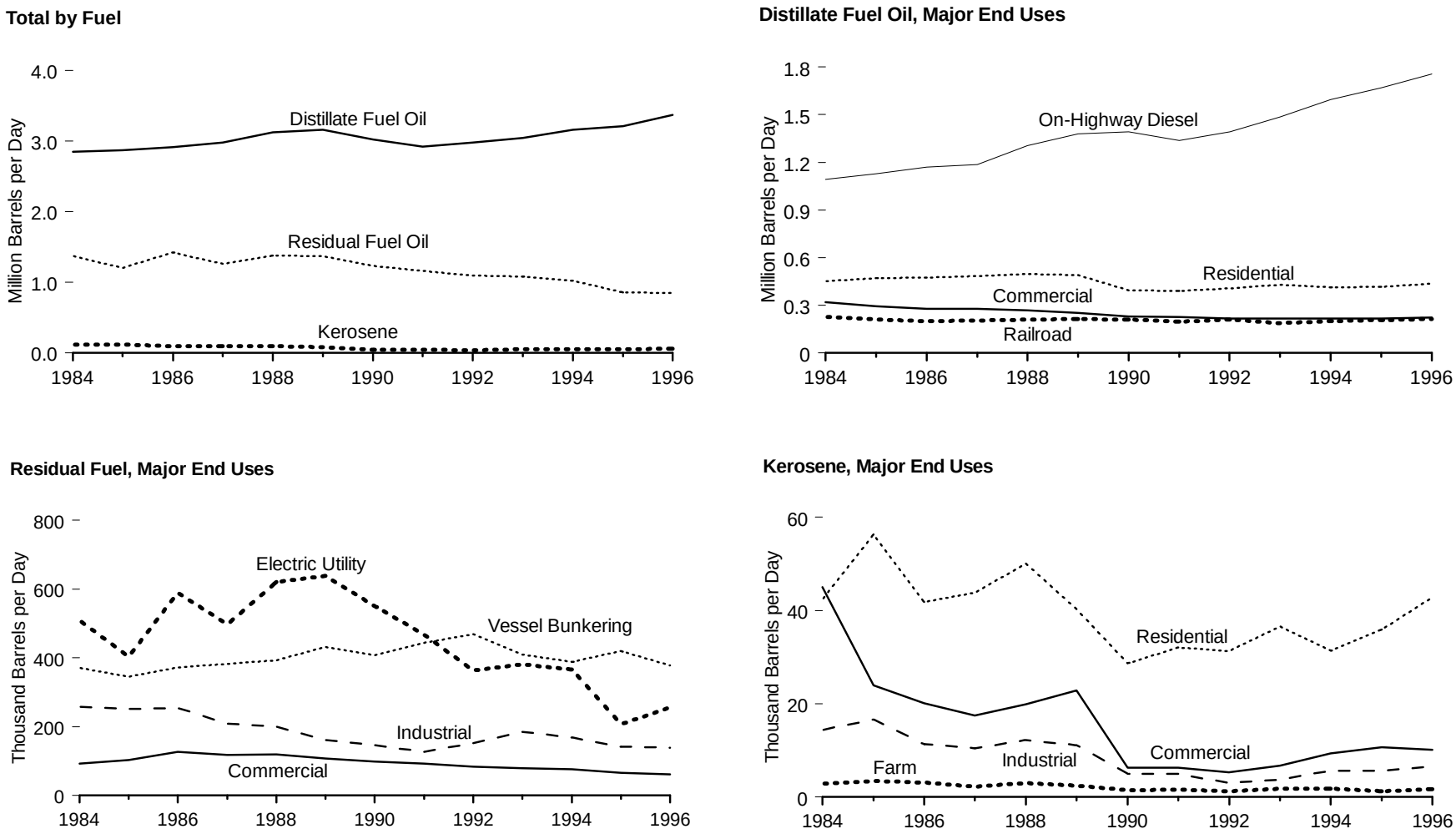
[2] Prior to 1980, based on oil used in internal combustion and gas turbine engine plants. Since 1980, light oil has included fuel oil nos. 1 and 2, kerosene, and jet fuel.

R=Revised. E=Estimated. (s)=Less than 0.005 million barrels per day.

Notes: • See Table 5.12a for the residential and commercial sector and the industrial sector. • See Notes 1, 2, and 3 at end of section for comments on the calculation of products supplied. • Totals may not equal sum of components due to independent rounding.

Sources: • 1949-1959—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual,* and Energy Information Administration (EIA) estimates. • 1960-1995—EIA, State Energy Data System 1995. • 1996-forward—EIA, Integrated Modeling Data System output for the *Monthly Energy Review* (March 1998).

Figure 5.13 Fuel Oil and Kerosene Adjusted Sales, 1984-1996



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

Source: Table 5.13.

Table 5.13 Fuel Oil and Kerosene Adjusted Sales, 1984-1996

(Thousand Barrels per Day)

Year	Residential	Commercial	Industrial	Oil Company	Farm	Electric Utility	Railroad	Vessel Bunkering	On-Highway Diesel	Military	Off-Highway Diesel	All Other	Total
							Distillate Fuel Oil						
1984	450	319	153	59	193	45	225	110	1,093	45	109	44	2,845
1985	471	294	169	57	216	34	209	124	1,127	50	105	12	2,868
1986	476	280	175	49	220	40	202	133	1,169	50	111	9	2,914
1987	484	279	190	58	211	42	205	145	1,185	58	113	5	2,976
1988	498	269	170	57	223	52	212	150	1,304	64	119	4	3,122
1989	489	252	167	55	209	70	213	154	1,378	61	107	2	3,157
1990	393	228	160	63	215	48	209	143	1,393	51	116	(s)	3,021
1991	391	226	152	59	214	39	197	141	1,336	54	110	(s)	2,921
1992	406	218	144	51	228	30	209	146	1,391	42	113	(s)	2,979
1993	429	218	128	50	211	38	190	133	1,485	31	127	(s)	3,041
1994	413	218	136	46	209	49	200	132	1,594	34	130	(s)	3,162
1995	416	216	132	36	211	39	208	129	1,668	24	126	—	3,207
1996	438	224	137	41	218	45	213	142	1,759	24	135	—	3,374
							Residual Fuel Oil						
1984	—	92	258	76	—	509	([1])	370	—	14	—	50	1,369
1985	—	103	252	71	—	403	([1])	346	—	13	—	15	1,202
1986	—	126	254	51	—	590	([1])	371	—	[E]12	—	15	1,418
1987	—	118	208	42	—	498	([1])	383	—	12	—	3	1,264
1988	—	119	200	34	—	621	([1])	392	—	9	—	4	1,378
1989	—	108	160	22	—	639	([1])	432	—	7	—	2	1,370
1990	—	98	145	21	—	550	([1])	408	—	5	—	2	1,229
1991	—	93	126	20	—	468	NA	443	—	8	—	1	1,158
1992	—	84	152	19	—	363	NA	468	—	7	—	1	1,094
1993	—	79	184	21	—	381	NA	409	—	6	—	(s)	1,080
1994	—	76	168	17	—	366	NA	388	—	4	—	(s)	1,021
1995	—	66	141	15	—	206	NA	420	—	4	—	(s)	852
1996	—	62	139	11	—	256	NA	379	—	4	—	1	851
							Kerosene						
1984	42	45	14	—	3	—	—	—	—	—	—	11	115
1985	56	24	17	—	3	—	—	—	—	—	—	14	114
1986	42	20	11	—	3	—	—	—	—	—	—	22	98
1987	44	17	10	—	2	—	—	—	—	—	—	21	95
1988	50	20	12	—	3	—	—	—	—	—	—	11	96
1989	40	23	11	—	2	—	—	—	—	—	—	8	84
1990	29	6	5	—	1	—	—	—	—	—	—	1	43
1991	32	6	5	—	2	—	—	—	—	—	—	1	46
1992	31	5	3	—	1	—	—	—	—	—	—	(s)	41
1993	37	7	4	—	2	—	—	—	—	—	—	1	50
1994	31	9	6	—	2	—	—	—	—	—	—	1	49
1995	36	11	6	—	1	—	—	—	—	—	—	(s)	54
1996	43	10	7	—	2	—	—	—	—	—	—	(s)	62

[1] Included in "All Other."

E = Annual estimate based on eleven months of data. NA=Not available. — = Not applicable. (s)=Less than 0.5 thousand barrels per day.

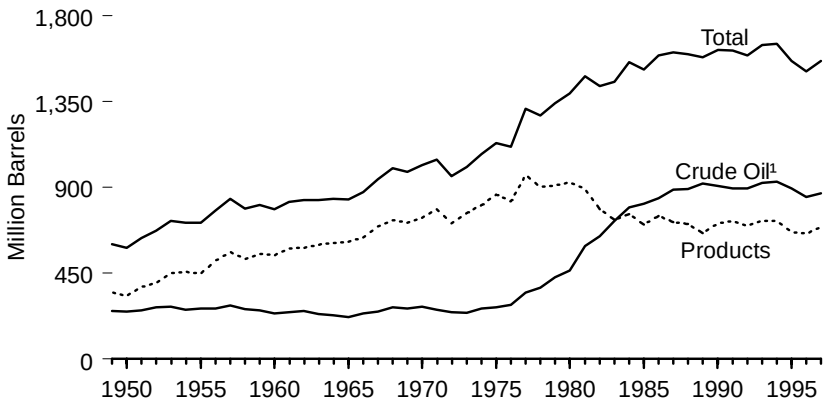
Notes: • Distillate fuel oil and kerosene data are sales data that were adjusted at the Petroleum Administration for Defense district level to equal Energy Information Administration (EIA) volume estimates of products supplied in the U.S. marketplace. The residual fuel data are sales data adjusted at the national level to equal the EIA volume estimate of residual fuel oil products supplied. Additional information is available in EIA's report *Fuel Oil and Kerosene Sales 1994* (October 1995). • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

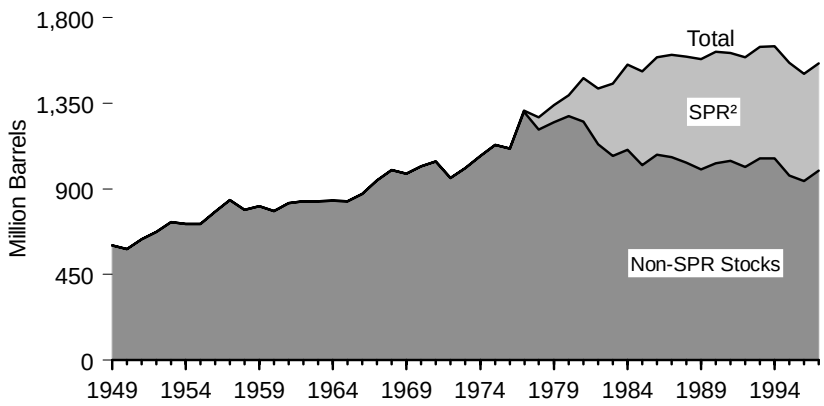
Sources: **Distillate Fuel Oil and Kerosene:** • 1984—EIA, *Petroleum Marketing Annual 1988* (October 1989), Tables 13 and 15. • 1985—EIA, *Fuel Oil and Kerosene Sales 1989* (January 1991), Tables 13 and 15. • 1986—EIA, *Fuel Oil and Kerosene Sales 1990* (October 1991), Tables 13 and 15. • 1987—EIA, *Fuel Oil and Kerosene Sales 1991* (November 1992), Tables 13 and 15. • 1988—EIA, *Fuel Oil and Kerosene Sales 1992* (October 1993), Tables 13 and 15. • 1989—EIA, *Fuel Oil and Kerosene Sales 1993* (September 1994), Tables 13 and 15. • 1990—EIA, *Fuel Oil and Kerosene Sales 1994* (September 1995), Tables 13 and 15. • 1991 forward—EIA, *Fuel Oil and Kerosene Sales 1996* (September 1997), Tables 13 and 15. **Residual Fuel Oil:** • 1984—EIA, *Petroleum Marketing Annual 1988,* (October 1989) Table 14. • 1985—EIA, *Fuel Oil and Kerosene Sales 1989* (January 1991), Table 14. • 1986—EIA, *Fuel Oil and Kerosene Sales 1990* (October 1991), Table 14. • 1987—EIA, *Fuel Oil and Kerosene Sales 1991* (November 1992), Table 14. • 1988—EIA, *Fuel Oil and Kerosene Sales 1992* (October 1993), Table 14. • 1989—EIA, *Fuel Oil and Kerosene Sales 1993* (September 1994), Table 14. • 1990—EIA, *Fuel Oil and Kerosene Sales 1994* (September 1995), Table 14. • 1991 forward—EIA, *Fuel Oil and Kerosene Sales 1996* (August 1997), Table 14.

Figure 5.14 Petroleum Primary Stocks by Type, End of Year

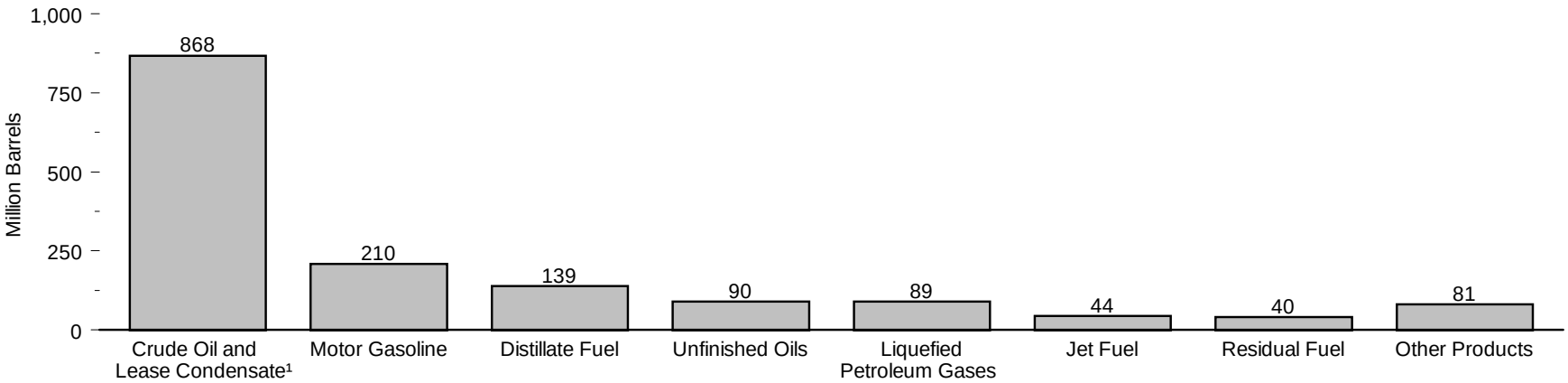
Total, Products, and Crude Oil,[1] 1949-1997



SPR,[2] Non-SPR, and Total Stocks, 1949-1997



By Type, 1997



[1] Includes crude oil stored in the Strategic Petroleum Reserve (SPR).
[2] See Figure 5.15 for additional Strategic Petroleum Reserve information.

Note: Because vertical scales differ, graphs should not be compared.
Sources: Tables 5.14 and 5.15.

Table 5.14 Petroleum Primary Stocks by Type, End of Year 1949-1997

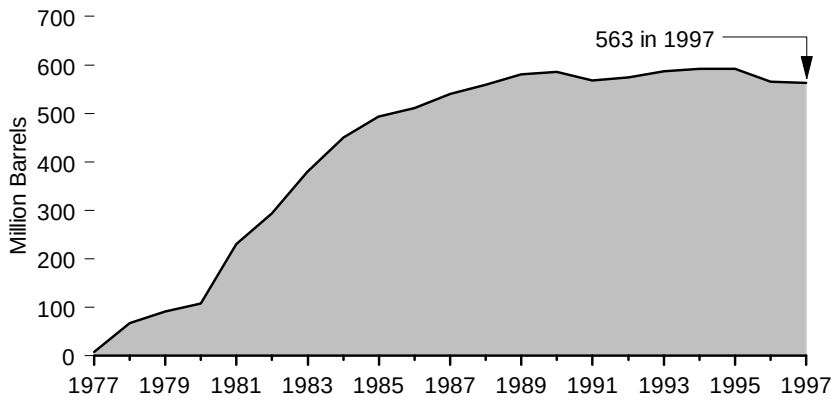
(Million Barrels)

Year	Crude Oil and Lease Condensate			Petroleum Products										Total Petroleum
	Strategic Petroleum Reserve	Other Primary	Total	Distillate Fuel Oil		Jet Fuel	Liquefied Petroleum Gases		Motor Gasoline [3]	Residual Fuel Oil	Unfinished Oils	Other Products [4]	Total Products	
				Low Sulfur [1]	Total		Propane [2]	Total						
1949	0	253	253	NA	75	(5)	(6)	1	110	60	66	37	350	603
1950	0	248	248	NA	72	(5)	(6)	2	116	41	70	34	334	583
1951	0	256	256	NA	87	(5)	(6)	2	135	43	67	45	378	634
1952	0	272	272	NA	99	2	(6)	3	135	49	62	53	402	674
1953	0	274	274	NA	112	3	(6)	4	158	49	69	56	451	726
1954	0	258	258	NA	108	3	(6)	7	155	52	74	57	457	715
1955	0	266	266	NA	111	3	(6)	7	165	39	68	55	449	715
1956	0	266	266	NA	134	5	(6)	14	187	44	67	63	514	780
1957	0	282	282	NA	149	5	(6)	14	197	60	69	66	560	841
1958	0	263	263	NA	125	6	(6)	16	187	60	70	63	526	789
1959	0	257	257	NA	151	8	(6)	19	188	54	67	66	552	809
1960	0	240	240	NA	138	7	(6)	23	195	45	62	76	545	785
1961	0	245	245	NA	152	8	(6)	31	184	45	79	81	580	825
1962	0	252	252	NA	144	10	(6)	25	189	50	82	83	582	834
1963	0	237	237	NA	157	9	(6)	28	191	48	82	85	598	836
1964	0	230	230	NA	156	19	(6)	30	186	40	87	92	609	839
1965	0	220	220	NA	155	19	(6)	30	175	56	89	92	616	836
1966	0	238	238	NA	154	19	(6)	35	186	61	89	91	636	874
1967	0	249	249	NA	160	22	(6)	64	200	66	90	93	695	944
1968	0	272	272	NA	173	24	(6)	76	204	67	93	89	727	1,000
1969	0	265	265	NA	172	28	(6)	60	211	58	98	88	715	980
1970	0	276	276	NA	195	28	(6)	67	209	54	99	89	741	1,018
1971	0	260	260	NA	191	28	(6)	95	219	60	101	92	784	1,044
1972	0	246	246	NA	154	25	(6)	86	213	55	95	84	713	959
1973	0	242	242	NA	196	29	R65	99	209	53	99	80	766	1,008
1974	0	265	265	NA	200	29	R69	113	218	60	106	82	809	1,074
1975	0	271	271	NA	209	30	R82	125	235	74	106	82	862	1,133
1976	0	285	285	NA	186	32	R74	116	231	72	110	78	826	1,112
1977	7	340	348	NA	250	35	R81	136	258	90	113	82	964	1,312
1978	67	309	376	NA	216	34	R87	132	238	90	109	82	901	1,278
1979	91	339	430	NA	229	39	R64	111	237	96	118	82	911	1,341
1980	108	358	466	NA	205	42	R65	120	261	92	124	82	926	1,392
1981	230	363	594	NA	192	41	R76	135	253	78	111	80	890	1,484
1982	294	350	644	NA	179	37	R54	94	235	66	105	70	786	1,430
1983	379	344	723	NA	140	39	R48	101	222	49	108	72	731	1,454
1984	451	345	796	NA	161	42	58	101	243	53	94	67	760	1,556
1985	493	321	814	NA	144	40	39	74	223	50	107	67	705	1,519
1986	512	331	843	NA	155	50	63	103	233	47	94	68	750	1,593
1987	541	349	890	NA	134	50	48	97	226	47	93	70	718	1,607
1988	560	330	890	NA	124	44	50	97	228	45	100	70	707	1,597
1989	580	341	921	NA	106	41	32	80	213	44	106	70	660	1,581
1990	586	323	908	NA	132	52	49	98	220	49	99	63	712	1,621
1991	569	325	893	NA	144	49	48	92	219	50	98	72	724	1,617
1992	575	318	893	NA	141	43	39	89	216	43	95	73	699	1,592
1993	587	335	922	64	141	40	51	106	226	44	88	78	725	1,647
1994	592	337	929	73	145	47	46	99	215	42	91	84	724	1,653
1995	592	303	895	67	130	40	43	93	202	37	86	79	668	1,563
1996	566	R284	850	R68	127	40	43	86	R195	46	88	R76	R658	R1,507
1997P	563	305	868	69	139	44	44	89	210	40	90	81	694	1,562

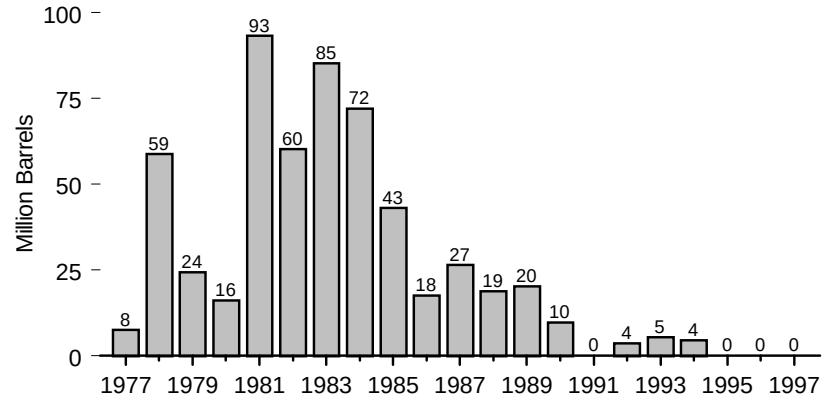
[1] Sulfur content of 0.05 percent or less by weight.
[2] Includes propylene.
[3] Prior to 1964, motor gasoline data were for total gasoline,which included motor gasoline, aviation gasoline, and special naphthas. For 1981 forward, includes motor gasoline blending components.
[4] Kerosene, petrochemical feedstocks, lubricants, wax, petroleum coke, asphalt, road oil, pentanes plus, and miscellaneous products. Since 1964, aviation gasoline and special naphthas have been included. For 1981 forward, includes aviation gasoline blending components, hydrogen, other hydrocarbons, and alcohol.
[5] Included in the products from which jet fuel was blended: in 1952, 71 percent gasoline, 17 percent kerosene, and 12 percent distillate fuel.
[6] Included in liquefied petroleum gases total.
R=Revised. P=Preliminary. NA=Not available.
Note: Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelpetroleum.html.
Sources: • 1949-1975—Bureau of Mines, Mineral Industry Surveys, *Petroleum Statement, Annual.* • 1976-1980—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Statement, Annual.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Petroleum Supply Monthly* (February 1998).

Figure 5.15 Strategic Petroleum Reserve, 1977-1997

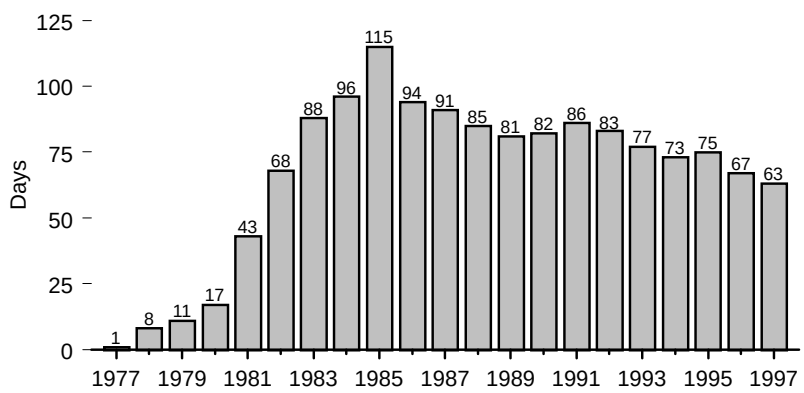
End-of-Year Stocks in SPR



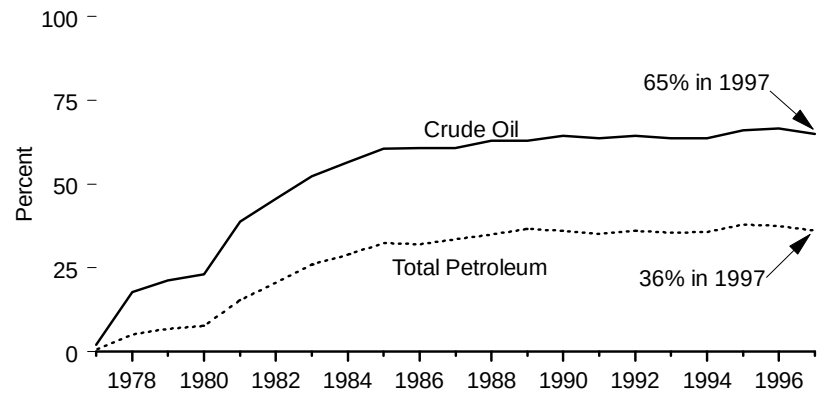
Crude Oil Imports for SPR



SPR Storage as Days of Net Imports[1]



SPR as Share of Domestic Stocks



[1] Derived by dividing end-of-year Strategic Petroleum Reserve stocks by average daily net imports of all petroleum.

Notes: • SPR=Strategic Petroleum Reserve.

• Because vertical scales differ, graphs should not be compared.

Source: Table 5.15.

Table 5.15 Strategic Petroleum Reserve, 1977-1997

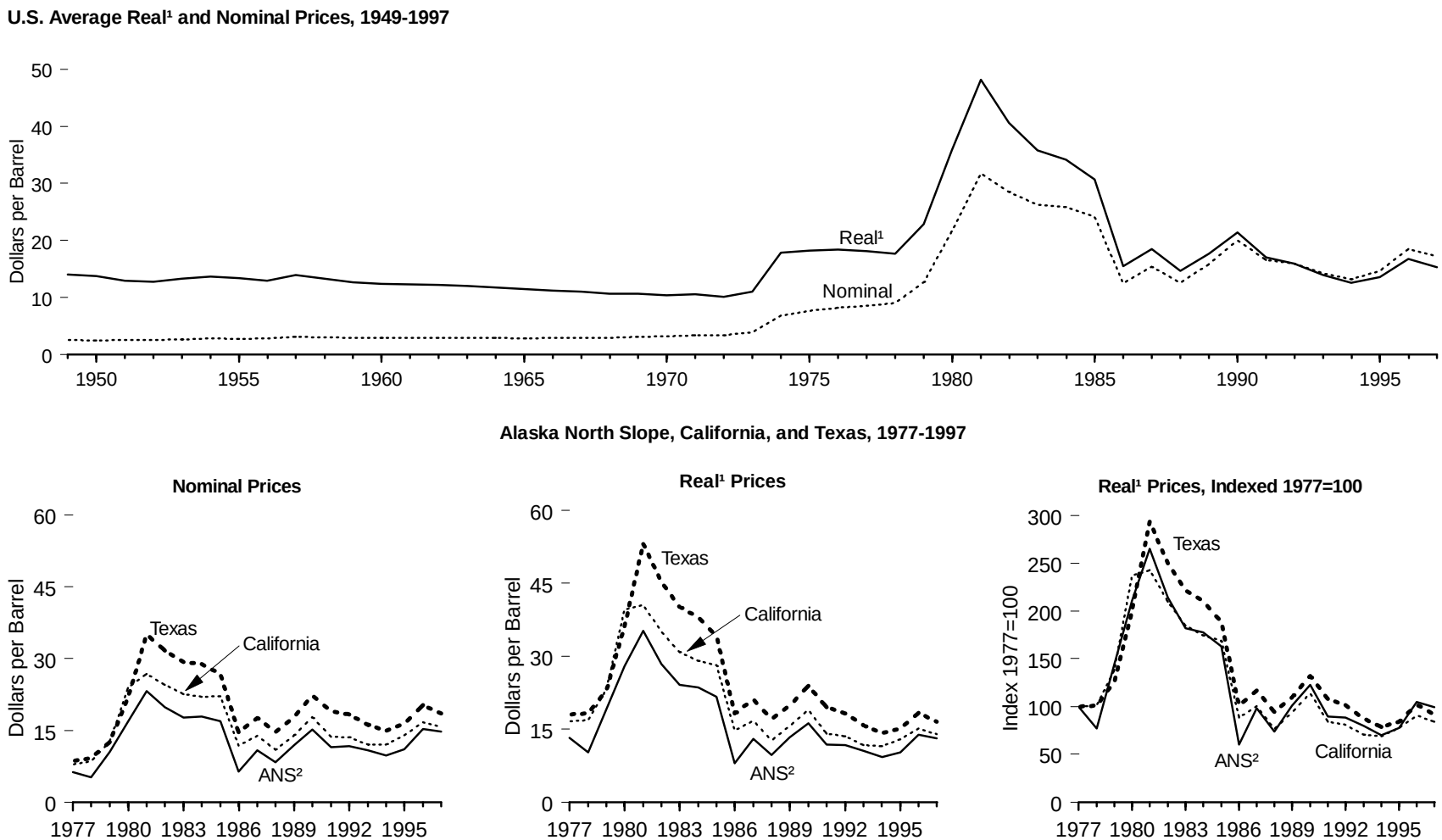
(Million Barrels, Except as Noted)

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	0.00	7.46	2.1	0.6	1
1978	58.80	0.00	0.00	66.86	17.8	5.2	8
1979	24.43	(s)	0.00	91.19	21.2	6.8	11
1980	16.07	1.30	0.00	107.80	23.1	7.7	17
1981	93.30	28.79	0.00	230.34	38.8	15.5	43
1982	60.19	3.79	0.00	293.83	45.7	20.5	68
1983	85.29	0.42	0.00	379.09	52.4	26.1	88
1984	72.04	0.05	0.00	450.51	56.6	28.9	96
1985	43.12	0.17	0.00	493.32	60.6	32.5	115
1986	17.56	1.21	0.00	511.57	60.7	32.1	94
1987	26.52	2.69	0.00	540.65	60.8	33.6	91
1988	18.76	0.01	0.00	559.52	62.9	35.0	85
1989	20.35	0.00	0.00	579.86	62.9	36.7	81
1990	9.77	0.00	3.91	585.69	64.5	36.1	82
1991	0.00	0.00	17.22	568.51	63.7	35.2	86
1992	3.59	2.60	0.00	574.72	64.4	36.1	83
1993	5.37	6.96	0.00	587.08	63.6	35.6	77
1994	4.49	0.11	0.00	591.67	63.7	35.8	73
1995	0.00	0.00	0.00	591.64	66.1	37.9	75
1996	0.00	0.00	25.82	565.82	[R]66.6	37.5	[R]67
1997	0.00	0.00	2.33	563.43	64.9	36.1	63

[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.

R=Revised. (s)=Less than 0.005 million barrels.
Web Page: http://www.eia.doe.gov/fuelpetroleum.html.
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.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Petroleum Supply Monthly* (February 1998).

Figure 5.16 Crude Oil Domestic First Purchase Prices



[1] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

[2] Alaska North Slope.

Note: Because vertical scales differ, graphs should not be compared.
Source: Table 5.16.

Table 5.16 Crude Oil Domestic First Purchase Prices, 1949-1997

(Dollars per Barrel)

Year	Alaska North Slope		California		Texas		U.S. Average	
	Nominal	Real [1]	Nominal	Real [1]	Nominal	Real [1]	Nominal	Real [1]
1949	—	—	—	—	—	—	2.54	[R]14.03
1950	—	—	—	—	—	—	2.51	[R]13.72
1951	—	—	—	—	—	—	2.53	[R]12.91
1952	—	—	—	—	—	—	2.53	[R]12.71
1953	—	—	—	—	—	—	2.68	[R]13.27
1954	—	—	—	—	—	—	2.78	[R]13.63
1955	—	—	—	—	—	—	2.77	[R]13.38
1956	—	—	—	—	—	—	2.79	[R]12.98
1957	—	—	—	—	—	—	3.09	[R]13.92
1958	—	—	—	—	—	—	3.01	[R]13.26
1959	—	—	—	—	—	—	2.90	[R]12.61
1960	—	—	—	—	—	—	2.88	12.36
1961	—	—	—	—	—	—	2.89	[R]12.30
1962	—	—	—	—	—	—	2.90	[R]12.18
1963	—	—	—	—	—	—	2.89	[R]11.99
1964	—	—	—	—	—	—	2.88	11.76
1965	—	—	—	—	—	—	2.86	11.44
1966	—	—	—	—	—	—	2.88	11.21
1967	—	—	—	—	—	—	2.92	11.02
1968	—	—	—	—	—	—	2.94	[R]10.65
1969	—	—	—	—	—	—	3.09	[R]10.69
1970	—	—	—	—	—	—	3.18	[R]10.43
1971	—	—	—	—	—	—	3.39	[R]10.56
1972	—	—	—	—	—	—	3.39	[R]10.15
1973	—	—	—	—	—	—	3.89	[R]11.02
1974	—	—	—	—	—	—	6.87	17.84
1975	—	—	—	—	—	—	7.67	[R]18.22
1976	—	—	—	—	—	—	8.19	18.36
1977	[2]6.29	[2]13.27	7.92	16.71	8.58	18.10	8.57	18.08
1978	5.21	[R]10.24	8.58	[R]16.86	9.29	[R]18.25	9.00	[R]17.68
1979	10.57	[R]19.15	12.78	[R]23.15	12.65	[R]22.92	12.64	[R]22.90
1980	16.87	[R]27.98	23.87	[R]39.59	21.84	[R]36.22	21.59	[R]35.80
1981	23.23	[R]35.20	26.80	[R]40.61	35.06	[R]53.12	31.77	[R]48.14
1982	19.92	[R]28.38	24.58	[R]35.01	31.77	[R]45.26	28.52	[R]40.63
1983	17.69	[R]24.17	22.61	[R]30.89	29.35	[R]40.10	26.19	[R]35.78
1984	17.91	23.60	22.09	29.10	28.87	38.04	25.88	34.10
1985	16.98	[R]21.63	22.14	[R]28.20	26.80	[R]34.14	24.09	[R]30.69
1986	6.45	8.00	11.90	14.76	14.73	18.28	12.51	15.52
1987	10.83	13.03	13.92	16.75	17.55	21.12	15.40	18.53
1988	8.43	9.79	10.97	12.74	14.71	17.08	12.58	14.61
1989	12.00	13.38	14.06	15.67	17.81	19.86	15.86	17.68
1990	15.23	16.27	17.81	19.03	22.37	23.90	20.03	21.40
1991	11.57	11.89	13.72	14.10	19.04	19.57	16.54	17.00
1992	11.73	11.73	13.55	13.55	18.32	18.32	15.99	15.99
1993	10.84	10.57	12.11	11.80	16.19	15.78	14.25	13.89
1994	9.77	[R]9.30	12.12	[R]11.53	14.98	[R]14.25	13.19	[R]12.55
1995	11.12	[R]10.32	14.00	[R]12.99	16.38	[R]15.19	14.62	[R]13.56
1996	15.32	[R]13.90	[R]16.72	[R]15.17	20.31	[R]18.43	18.46	[R]16.75
1997[P]	14.84	13.20	15.78	14.04	18.64	16.58	17.24	15.34

[1] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

[2] Average for July through December only.

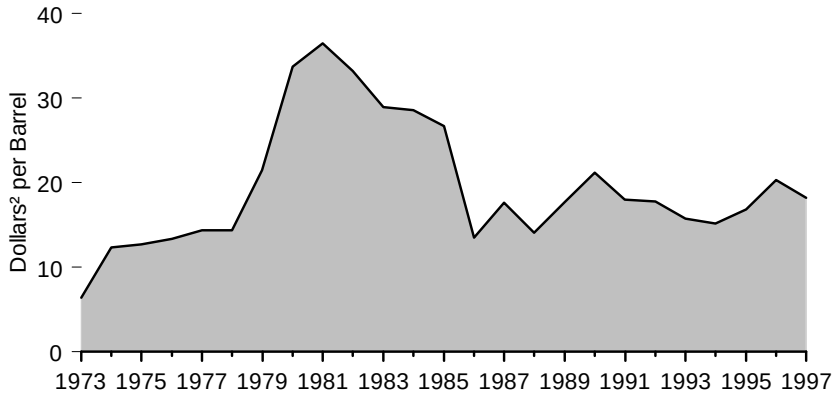
R=Revised. P=Preliminary. — = Not applicable.

Note: For the definition of crude oil domestic first purchase prices, see Note 5 at end of section.

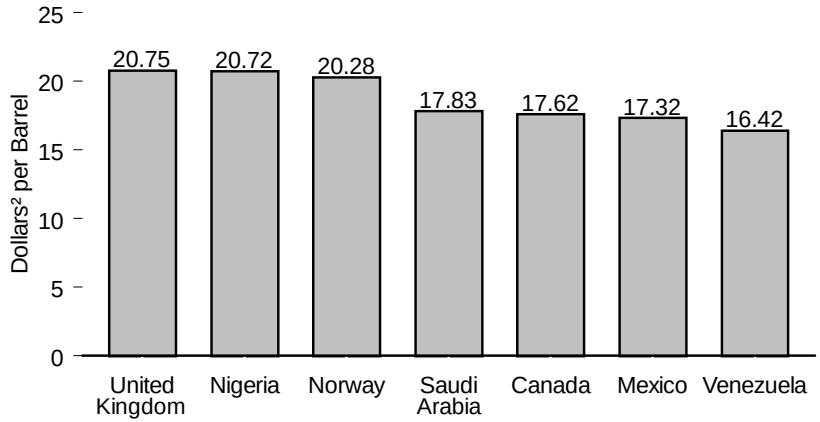
Sources: • 1949-1973—Bureau of Mines, *Minerals Yearbook,* "Crude Petroleum and Petroleum Products" chapter. • 1974 through January 1976—Federal Energy Administration (FEA), Form FEA-90, "Crude Petroleum Production Monthly Report." • February 1976 through September 1979—FEA, Form FEA-P-124, "Domestic Crude Oil Purchaser's Monthly Report." • October 1979 through 1982—Economic Regulatory Administration, Form ERA-182, "Domestic Crude Oil First Purchase Report." • 1983 forward—Energy Information Administration, Form EIA-182, "Domestic Crude Oil First Purchase Report."

Figure 5.17 Landed Costs of Crude Oil Imports From Selected Countries

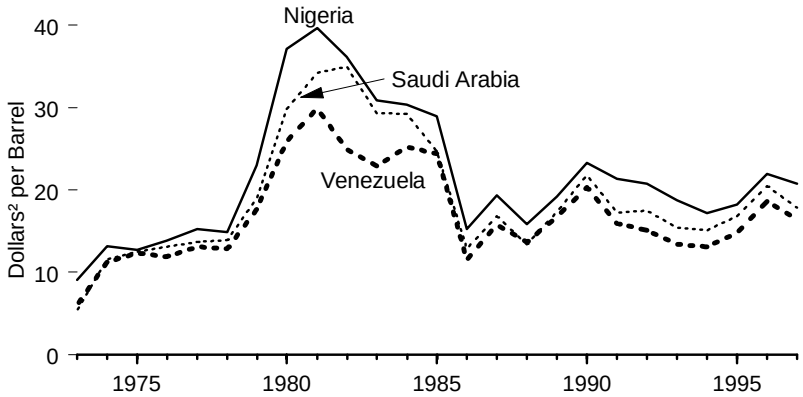
Total, 1973[1]-1997



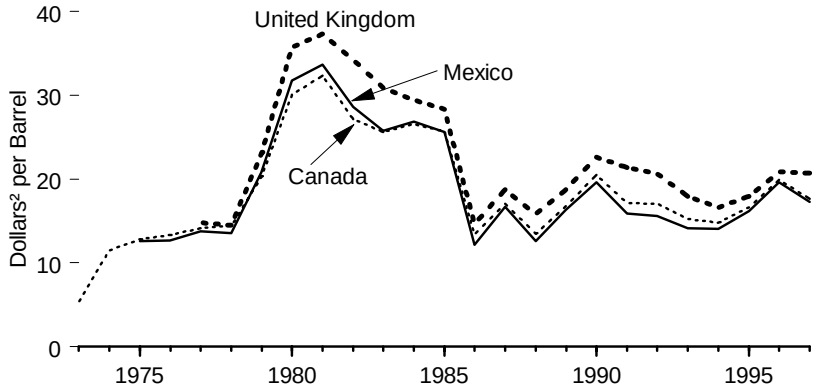
By Selected Country, 1997



By Selected OPEC Country, 1973[1]-1997



By Selected Non-OPEC Country, 1973[1]-1997



[1] Based on October, November, and December data only.
[2] Nominal dollars.

Note: Because vertical scales differ, graphs should not be compared.
Source: Table 5.17.

Table 5.17 Landed Costs of Crude Oil Imports From Selected Countries, 1973-1997

(Dollars[1] per Barrel)

Year	Persian Gulf Nations	Selected OPEC [2] Countries					Selected Non-OPEC Countries							Total
		Kuwait	Nigeria	Saudi Arabia	Venezuela	Total OPEC [3]	Angola	Canada	Colombia	Mexico	Norway	United Kingdom	Total Non-OPEC	
1973[4]	5.91	W	9.08	5.37	5.99	6.85	W	5.33	W	NA	NA	NA	R5.64	6.41
1974	12.21	W	13.16	11.63	11.25	12.49	12.48	11.48	W	W	NA	NA	R11.81	12.32
1975	12.64	W	12.70	12.50	12.36	12.70	11.81	12.84	([5])	12.61	12.80	NA	R12.70	12.70
1976	13.03	W	13.81	13.06	11.89	13.32	12.71	13.36	([5])	12.64	13.74	W	R13.35	13.32
1977	13.85	W	15.29	13.69	13.11	14.35	14.04	14.13	([5])	13.82	14.93	14.83	R14.42	14.36
1978	14.01	W	14.88	13.94	12.84	14.34	14.07	14.41	([5])	13.56	14.68	14.53	R14.38	14.35
1979	20.42	W	22.97	18.95	17.65	21.29	21.06	20.22	([5])	20.77	22.55	22.97	R22.10	21.45
1980	30.59	W	37.15	29.80	25.92	33.56	34.76	30.11	W	31.77	36.82	35.68	R33.99	33.67
1981	34.61	NA	39.66	34.20	29.91	36.60	36.84	32.32	([5])	33.70	38.70	37.29	36.14	36.47
1982	34.94	NA	36.16	34.99	24.93	34.81	33.08	27.15	([5])	28.63	34.70	34.25	31.47	33.18
1983	29.37	NA	30.85	29.27	22.94	29.84	29.31	25.63	([5])	25.78	30.72	30.87	28.08	28.93
1984	29.07	W	30.36	29.20	25.19	29.06	28.49	26.56	([5])	26.85	30.05	29.45	28.14	28.54
1985	25.50	NA	28.96	24.72	24.43	26.86	27.39	25.71	([5])	25.63	28.32	28.36	26.53	26.67
1986	12.92	11.70	15.29	12.84	11.52	13.46	14.09	13.43	12.85	12.17	15.98	14.63	13.52	13.49
1987	17.47	18.14	19.32	16.81	15.76	17.64	18.20	17.04	18.43	16.69	19.10	18.78	17.66	17.65
1988	13.51	12.84	15.88	13.37	13.66	14.18	14.48	13.50	14.47	12.58	15.43	15.82	13.96	14.08
1989	17.37	16.90	19.19	17.34	16.78	17.78	18.36	16.81	18.10	16.35	19.06	18.74	17.54	17.68
1990	20.55	17.01	23.33	21.82	20.31	21.23	21.51	20.48	22.34	19.64	21.11	22.65	20.98	21.13
1991	17.34	18.48	21.39	17.22	15.92	18.08	19.90	17.16	19.55	15.89	21.44	21.37	17.93	18.02
1992	17.58	16.99	20.78	17.48	15.13	17.81	19.36	17.04	18.46	15.60	20.90	20.63	17.67	17.75
1993	15.26	14.23	18.73	15.40	13.39	15.68	17.40	15.27	16.54	14.11	18.99	17.92	15.78	15.72
1994	15.00	14.49	17.21	15.11	13.12	15.08	16.36	14.83	15.80	14.09	17.09	16.64	15.29	15.18
1995	16.78	16.47	18.25	16.84	14.81	16.61	17.66	16.65	17.45	16.19	18.06	17.91	16.95	16.78
1996	R20.44	R20.32	R21.95	R20.49	R18.59	R20.14	R21.86	R19.94	22.02	R19.64	R21.34	R20.88	R20.46	R20.31
1997P	17.70	17.17	20.72	17.83	16.42	17.88	20.36	17.62	19.70	17.32	20.28	20.75	18.47	18.19

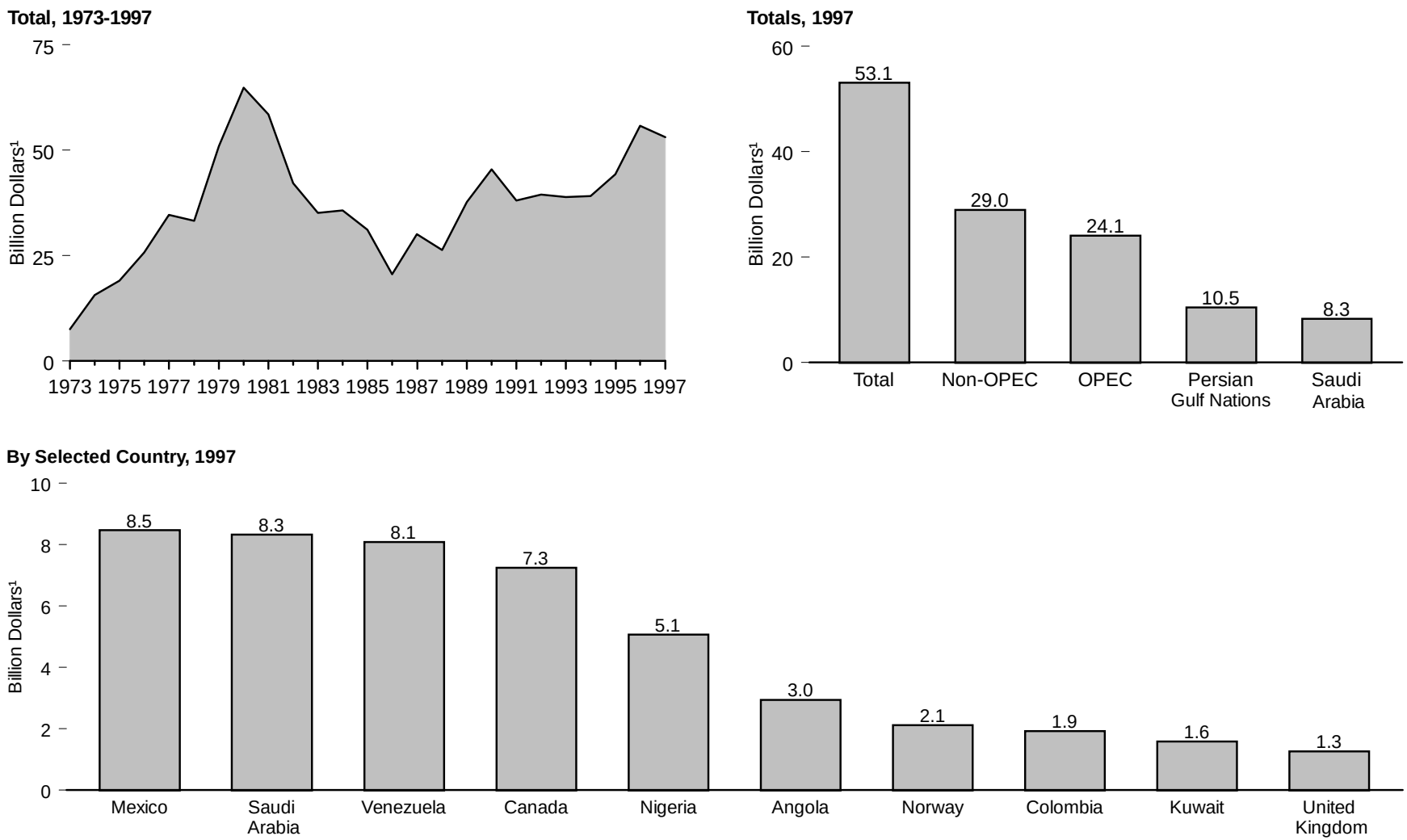
[1] Nominal dollars.
[2] Organization of Petroleum Exporting Countries (OPEC). See Glossary for current membership.
[3] Ecuador, which withdrew from OPEC on December 31, 1992, is included through 1992. In June 1996, OPEC retroactively ended Gabon's membership in OPEC effective December 31, 1994. However, data for Gabon are still included here for 1995. 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] Based on October, November, and December data only.
[5] No data reported.
R=Revised. P=Preliminary. NA=Not available. W=Value withheld to avoid disclosure of individual company data.

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

Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

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, "Monthly Foreign Crude Oil Transaction Report." • July 1984 forward—EIA, Form EIA-856, "Monthly Foreign Crude Oil Acquisition Report."

Figure 5.18 Value of Crude Oil Imports



[1]Nominal Dollars.

Notes: • OPEC = Organization of Petroleum Exporting Countries. • Because vertical scales differ, graphs should not be compared.

Source: Table 5.18.

Table 5.18 Value of Crude Oil Imports From Selected Countries, 1973-1997

(Billion Dollars[1])

Year	Persian Gulf Nations	Selected OPEC [2] Countries					Selected Non-OPEC Countries							Total [4]
		Kuwait	Nigeria	Saudi Arabia	Venezuela	Total OPEC [3]	Angola	Canada	Colombia	Mexico	Norway	United Kingdom	Total Non-OPEC	
1973	1.7	W	1.5	0.9	0.8	5.2	W	1.9	W	W	NA	NA	2.4	7.6
1974	4.4	W	3.3	1.9	1.3	11.6	0.2	3.3	NA	W	W	NA	4.1	15.6
1975	5.2	W	3.5	3.2	1.8	14.9	0.3	2.8	NA	0.3	0.1	W	4.1	19.0
1976	8.7	W	5.1	5.8	1.0	22.2	(s)	1.8	W	0.4	0.2	W	3.6	25.8
1977	12.2	W	6.3	6.9	1.2	29.6	0.1	1.4	NA	0.9	0.3	0.5	5.1	34.7
1978	11.3	W	4.9	5.8	0.8	27.1	(s)	1.3	NA	1.6	0.6	0.9	6.2	33.3
1979	15.3	W	9.0	9.3	1.9	39.7	0.3	2.0	NA	3.3	0.6	1.7	11.3	51.0
1980	16.9	W	11.4	13.6	1.5	47.5	0.5	2.2	NA	5.9	1.9	2.3	17.4	64.9
1981	15.1	NA	8.8	13.9	1.6	39.0	0.6	1.9	NA	5.8	1.6	5.0	19.5	58.5
1982	8.4	W	6.7	6.8	1.4	22.0	0.5	2.1	NA	6.7	1.3	5.5	20.2	42.2
1983	4.3	W	3.4	3.4	1.4	16.1	0.8	2.6	NA	7.2	0.7	4.1	19.1	35.2
1984	4.8	W	2.3	3.3	2.3	16.1	0.9	3.3	NA	6.5	1.2	4.1	19.7	35.8
1985	2.3	W	3.0	1.2	2.7	12.9	1.0	4.4	NA	6.7	0.3	2.9	18.3	31.2
1986	3.8	0.1	2.4	2.9	1.8	10.4	0.5	2.8	0.3	2.8	0.3	1.7	10.2	20.6
1987	6.0	0.5	3.7	3.9	2.8	15.5	1.2	3.8	0.8	3.7	0.5	2.1	14.7	30.1
1988	6.7	0.4	3.5	4.4	2.2	14.0	1.1	3.4	0.6	3.1	0.3	1.5	12.3	26.3
1989	11.0	1.0	5.6	7.1	3.0	21.9	1.9	3.9	0.9	4.3	0.9	1.1	15.8	37.7
1990	13.5	0.5	6.7	9.5	4.9	27.2	1.9	4.8	1.1	4.9	0.7	1.3	18.2	45.5
1991	11.0	(s)	5.3	10.7	3.9	22.3	1.8	4.7	0.9	4.4	0.6	0.8	15.7	38.0
1992	10.5	0.2	5.1	10.2	4.6	22.2	2.4	5.0	0.7	4.5	0.9	1.5	17.3	39.5
1993	9.1	1.8	4.9	7.2	4.9	20.7	2.1	5.0	0.9	4.4	0.9	2.0	18.3	38.9
1994	8.8	1.6	3.9	7.2	5.0	19.7	1.9	5.3	0.8	4.8	1.2	2.4	19.4	39.1
1995	9.1	1.3	4.1	7.7	6.2	21.6	2.3	6.3	1.3	6.1	1.7	2.2	22.6	44.3
1996	11.1	1.8	4.8	9.4	8.9	25.3	2.8	7.8	1.8	8.7	2.3	1.6	30.5	55.8
1997[P]	10.5	1.6	5.1	8.3	8.1	24.1	3.0	7.3	1.9	8.5	2.1	1.3	29.0	53.1

[1] Nominal dollars.
[2] Organization of Petroleum Exporting Countries. See Glossary for current membership.
[3] Ecuador, which withdrew from OPEC on December 31, 1992, is included through 1992. In June 1996, OPEC retroactively ended Gabon's membership in OPEC effective December 31, 1994. However, data for Gabon are still included here for 1995. 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] Data shown here represent landed value; they differ from data in Table 3.7, which are data from U.S. Customs that represent crude oil value at the port of loading.

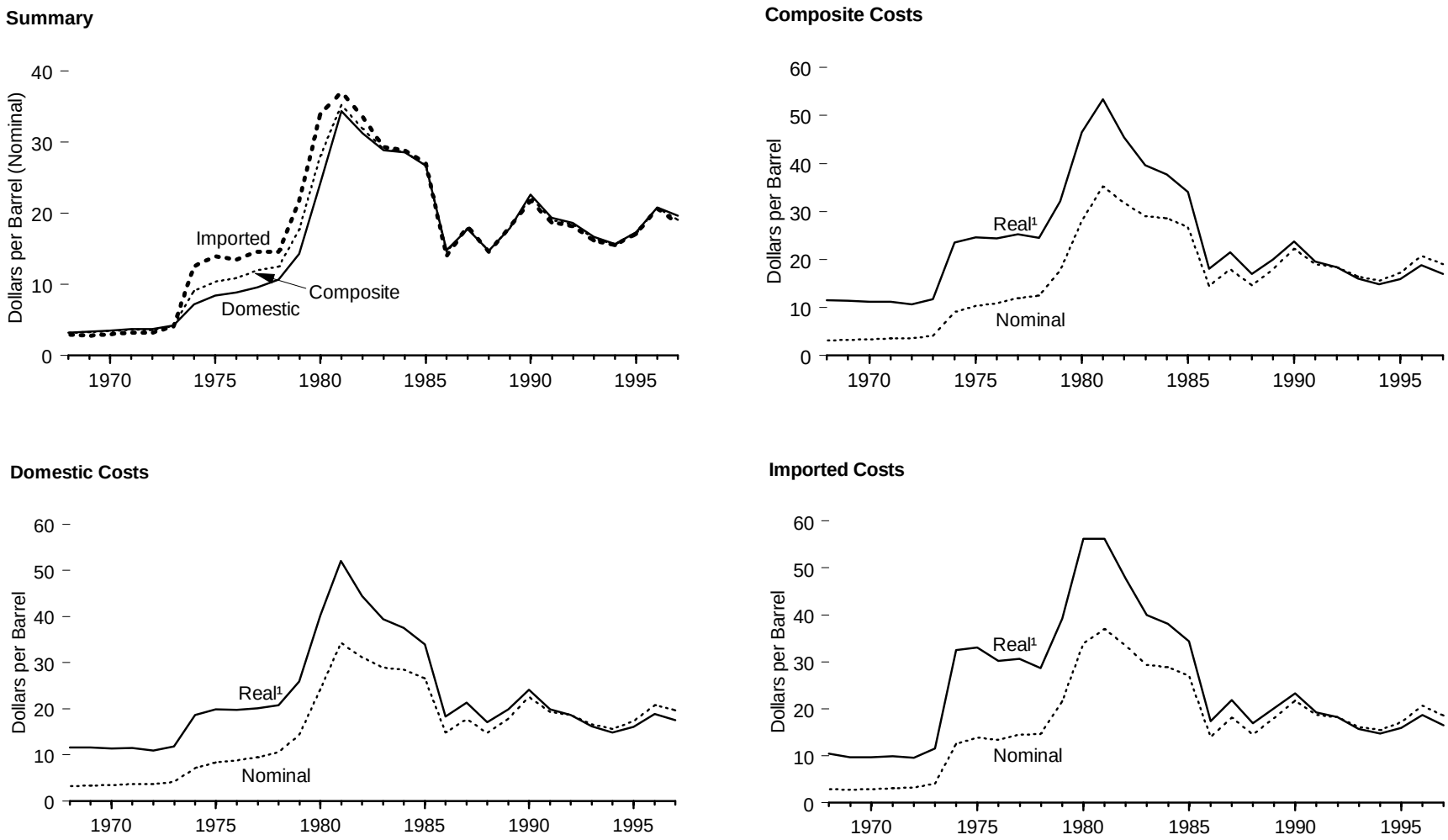
P=Preliminary. NA=Not available. W=Value withheld to avoid disclosure of individual company data. (s)=Less than $0.05 billion.

Note: Because the volumes associated with the landed costs are not the same as those used in the calculation of this table, the value of imports do not sum. The values were calculated independently.

Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

Sources: Calculated by using prices on Table 5.17 and volume data as follows: • 1973-1975—U.S. Department of the Interior, Bureau of Mines, *Petroleum Statement, Annual.* • 1976-1980—Energy Information Administration (EIA), *Petroleum Statement, Annual.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Petroleum Supply Monthly* (March 1998).

Figure 5.19 Crude Oil Refiner Acquisition Costs, 1968-1997



¹ In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

Note: Because vertical scales differ, graphs should not be compared.
Source: Table 5.19.

Table 5.19 Crude Oil Refiner Acquisition Costs, 1968-1997

(Dollars per Barrel)

Year	Domestic		Imported		Composite	
	Nominal	Real [1]	Nominal	Real [1]	Nominal	Real [1]
1968	3.21	[R]11.63	2.90	[R]10.51	3.17	[R]11.49
1969	3.37	[R]11.66	2.80	[R]9.69	3.29	[R]11.38
1970	3.46	[R]11.34	2.96	[R]9.70	3.40	[R]11.15
1971	3.68	[R]11.46	3.17	[R]9.88	3.60	[R]11.21
1972	3.67	[R]10.99	3.22	[R]9.64	3.58	[R]10.72
1973	4.17	[R]11.81	4.08	[R]11.56	4.15	[R]11.76
1974	7.18	18.65	12.52	32.52	9.07	23.56
1975	8.39	[R]19.93	13.93	[R]33.09	10.38	[R]24.66
1976	8.84	19.82	13.48	30.22	10.89	24.42
1977	9.55	20.15	14.53	30.65	11.96	25.23
1978	10.61	[R]20.84	14.57	[R]28.62	12.46	[R]24.48
1979	14.27	[R]25.85	21.67	[R]39.26	17.72	[R]32.10
1980	24.23	[R]40.18	33.89	[R]56.20	28.07	[R]46.55
1981	34.33	[R]52.02	37.05	[R]56.14	35.24	[R]53.39
1982	31.22	[R]44.47	33.55	[R]47.79	31.87	[R]45.40
1983	28.87	[R]39.44	29.30	[R]40.03	28.99	[R]39.60
1984	28.53	37.59	28.88	38.05	28.63	37.72
1985	26.66	[R]33.96	26.99	[R]34.38	26.75	[R]34.08
1986	14.82	18.39	14.00	17.37	14.55	18.05
1987	17.76	21.37	18.13	21.82	17.90	21.54
1988	14.74	17.12	14.56	16.91	14.67	17.04
1989	17.87	19.92	18.08	20.16	17.97	20.03
1990	22.59	24.13	21.76	23.25	22.22	23.74
1991	19.33	19.87	18.70	19.22	19.06	19.59
1992	18.63	18.63	18.20	18.20	18.43	18.43
1993	16.67	16.25	16.14	15.73	16.41	15.99
1994	15.67	[R]14.91	15.51	[R]14.76	15.59	[R]14.83
1995	17.33	[R]16.08	17.14	[R]15.90	17.23	[R]15.98
1996	[R]20.77	[R]18.85	[R]20.64	18.73	[R]20.71	[R]18.79
1997[P]	19.67	17.50	18.58	16.53	19.08	16.98

[1] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

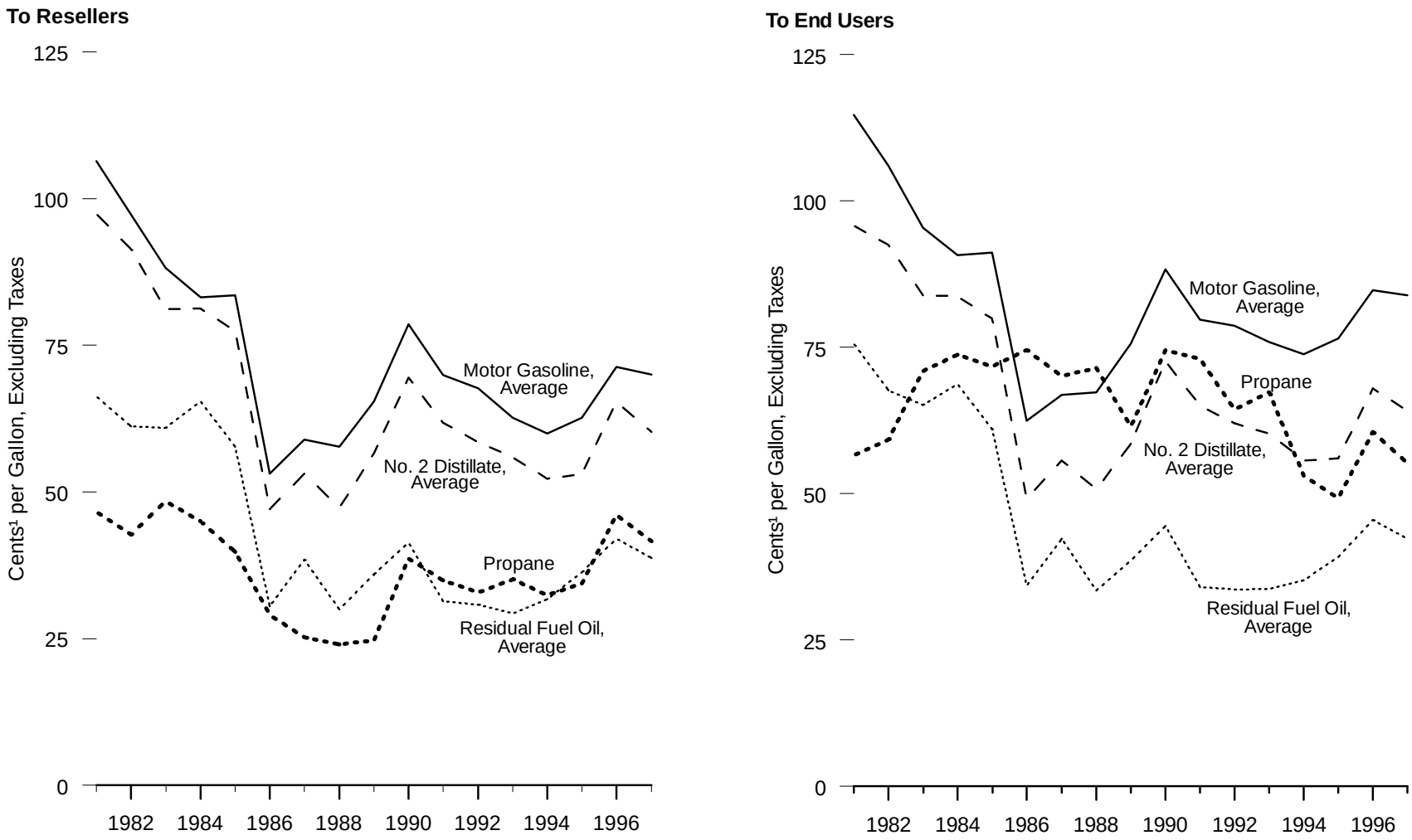
R=Revised. P=Preliminary.

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.

Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

Sources: • 1968-1973—Estimated. See Note 6 at end of section. • 1974 through January 1976—Federal Energy Administration (FEA), Form FEA-96, "Monthly Cost Allocation Report." • February 1976 through September 1977—FEA, Form FEA-P110-M-1, "Refiners' Monthly Cost Allocation Report." • October 1977 through June 1978—Energy Information Administration (EIA), Form FEA-P110-M-1, "Refiners' Monthly Cost Allocation Report." • July 1978 through December 1980—EIA, Form ERA-49, "Domestic Crude Oil Entitlements Program Refiners Monthly Report." • 1981 forward—EIA, Form EIA-14, "Refiners' Monthly Cost Report."

Figure 5.20 Refiner Sales Prices of Selected Petroleum Products, 1981-1997



[1] Nominal value.

Source: Table 5.20.

Table 5.20 Refiner Sales Prices and Refiner Margins for Selected Petroleum Products, 1981-1997

(Cents[1] per Gallon, Excluding Taxes)

Product	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997 P
Sales Prices to Resellers: [2]																	
Aviation Gasoline	125.0	122.8	117.8	116.5	113.0	91.2	85.9	85.0	95.0	106.3	100.1	99.1	96.5	93.3	97.5	105.5	106.6
Motor Gasoline	106.4	97.3	88.2	83.2	83.5	53.1	58.9	57.7	65.4	78.6	69.9	67.7	62.6	59.9	62.6	71.3	70.0
Leaded Regular	NA	NA	85.0	79.5	79.3	50.1	56.5	54.8	63.1	75.4	65.7	69.3	NA	NA	NA	NA	NA
Unleaded Regular	NA	NA	89.5	84.2	84.3	52.2	56.9	54.8	61.8	75.8	67.2	64.5	59.3	56.6	59.3	68.5	67.3
Unleaded Midgrade	NA	NA	NA	NA	NA	NA	NA	NA	68.6	81.4	73.3	70.8	66.0	63.8	67.0	76.0	74.9
Premium	NA	NA	96.4	91.6	92.2	61.0	67.1	67.2	74.9	87.4	79.2	77.4	72.2	69.5	72.2	80.3	79.2
Kerosene	106.6	101.8	89.2	91.6	87.4	60.6	59.2	54.9	66.9	83.9	72.2	63.2	60.4	61.8	58.0	R71.4	65.1
Jet Fuel, Kerosene-Type	101.2	95.3	85.4	83.0	79.4	49.5	53.8	49.5	58.3	77.3	65.0	60.5	57.7	53.4	53.9	64.6	61.2
No. 1 Distillate	107.1	103.8	89.6	89.2	86.3	57.9	59.9	54.9	66.8	83.8	73.0	65.2	64.6	61.5	62.5	75.1	72.1
No. 2 Distillate	97.4	91.4	81.2	81.3	77.4	47.0	53.1	47.3	56.6	69.5	61.8	58.5	55.9	52.2	53.0	R65.3	60.2
No. 2 Fuel Oil	97.6	91.4	81.5	82.1	77.6	48.6	52.7	47.3	56.5	69.7	62.2	57.9	54.4	50.6	51.1	63.9	58.9
No. 2 Diesel Fuel	97.2	91.4	80.8	80.3	77.2	45.2	53.4	47.3	56.7	69.4	61.5	59.1	57.0	52.9	53.8	65.9	60.6
No. 4 Fuel [3]	78.3	73.7	72.6	70.7	67.2	40.9	46.2	42.5	48.0	59.0	55.6	49.5	48.8	46.2	46.3	60.3	55.1
Residual Fuel Oil	66.3	61.2	60.9	65.4	57.7	30.5	38.5	30.0	36.0	41.3	31.4	30.8	29.3	31.7	36.3	R42.0	38.7
1% or Less Sulfur Content	74.8	69.5	64.3	68.5	61.0	32.8	41.2	33.3	40.7	47.2	36.4	35.1	33.7	34.5	38.3	R45.6	41.5
Greater than 1% Sulfur Content	62.2	57.2	59.1	63.9	56.0	28.9	36.2	27.1	33.1	37.2	29.2	28.6	25.6	28.7	33.8	R38.9	36.7
Propane (Consumer Grade)	46.6	42.7	48.4	45.0	39.8	29.0	25.2	24.0	24.7	38.6	34.9	32.8	35.1	32.4	34.4	46.1	41.6
Sales Prices to End Users: [2]																	
Aviation Gasoline	130.3	131.2	125.5	123.4	120.1	101.1	90.7	89.1	99.5	112.0	104.7	102.7	99.0	95.7	100.5	R111.6	113.8
Motor Gasoline	114.7	106.0	95.4	90.7	91.2	62.4	66.9	67.3	75.6	88.3	79.7	78.7	75.9	73.8	76.5	84.7	83.9
Leaded Regular	NA	NA	90.6	84.8	84.2	57.3	61.8	61.9	71.0	83.1	71.5	78.5	NA	NA	NA	NA	NA
Unleaded Regular	NA	NA	97.0	91.5	91.7	61.6	65.0	64.1	71.4	84.9	76.1	74.3	71.2	68.9	71.7	80.6	79.8
Unleaded Midgrade	NA	NA	NA	NA	NA	NA	NA	NA	79.2	92.1	84.3	82.7	80.5	78.5	80.8	89.6	89.5
Premium	NA	NA	105.7	101.5	102.3	73.7	78.4	78.8	86.7	98.5	90.7	91.4	88.9	86.5	89.0	97.2	97.3
Kerosene	112.3	108.9	96.1	103.6	103.0	79.0	77.0	73.8	70.9	92.3	83.8	78.8	75.4	66.0	58.9	R74.0	74.4
Jet Fuel, Kerosene-Type	102.4	96.3	87.8	84.2	79.6	52.9	54.3	51.3	59.2	76.6	65.2	61.0	58.0	53.4	54.0	65.1	61.2
No. 1 Distillate	103.9	102.3	96.2	92.7	88.0	62.0	60.4	56.4	66.1	81.9	74.0	66.6	66.6	64.0	62.0	72.6	68.5
No. 2 Distillate	95.8	92.5	83.9	83.7	79.9	49.1	55.6	50.7	58.5	72.6	65.0	62.0	60.2	55.6	56.0	68.0	64.1
No. 2 Fuel Oil	91.4	90.5	91.6	91.6	84.9	56.0	58.1	54.4	58.7	73.4	66.5	62.7	60.2	57.2	56.2	R67.3	63.6
No. 2 Diesel Fuel	99.5	94.2	82.6	82.3	78.9	47.8	55.1	50.0	58.5	72.5	64.8	61.9	60.2	55.4	56.0	68.1	64.2
No. 4 Fuel [3]	79.7	75.0	76.6	79.6	77.3	48.9	51.3	46.1	51.2	62.2	58.0	52.6	50.1	50.1	50.5	60.3	56.5
Residual Fuel Oil	75.6	67.6	65.1	68.7	61.0	34.3	42.3	33.4	38.5	44.4	34.0	33.6	33.7	35.2	39.2	R45.5	42.3
1% or Less Sulfur Content	82.9	74.7	69.5	72.0	64.4	37.2	44.7	37.2	43.6	50.5	40.2	38.9	39.7	40.1	43.6	R52.6	48.8
Greater than 1% Sulfur Content	67.3	61.1	61.1	65.9	58.2	31.7	39.6	30.0	34.4	40.0	30.6	31.2	30.3	33.0	37.7	R43.3	40.4
Propane (Consumer Grade)	56.5	59.2	70.9	73.7	71.7	74.5	70.1	71.4	61.5	74.5	73.0	64.3	67.3	53.0	49.2	R60.5	55.2
Refiner Margins [4]																	
Motor Gasoline	22.5	21.4	19.2	15.1	19.8	18.4	16.3	22.8	22.6	25.7	24.5	23.8	23.5	22.8	21.6	R22.0	24.6
Jet Fuel, Kerosene-Type	17.3	19.4	16.4	14.9	15.8	14.9	11.2	14.6	15.5	24.4	19.6	16.5	18.6	16.3	12.9	R15.3	15.8
No. 2 Distillate	13.5	15.5	12.2	13.1	13.8	12.4	10.4	12.4	13.8	16.6	16.4	14.6	16.8	15.1	12.0	R16.0	14.8
Residual Fuel Oil	-17.6	-14.7	-8.1	-2.8	-6.0	-4.1	-4.1	-5.0	-6.8	-11.6	-14.0	-13.2	-9.8	-5.4	-4.8	R-7.2	-6.7
Composite [5]	19.4	19.4	16.0	13.7	17.0	15.8	13.8	18.7	18.8	22.1	20.7	19.8	19.0	19.8	18.1	R19.4	20.9

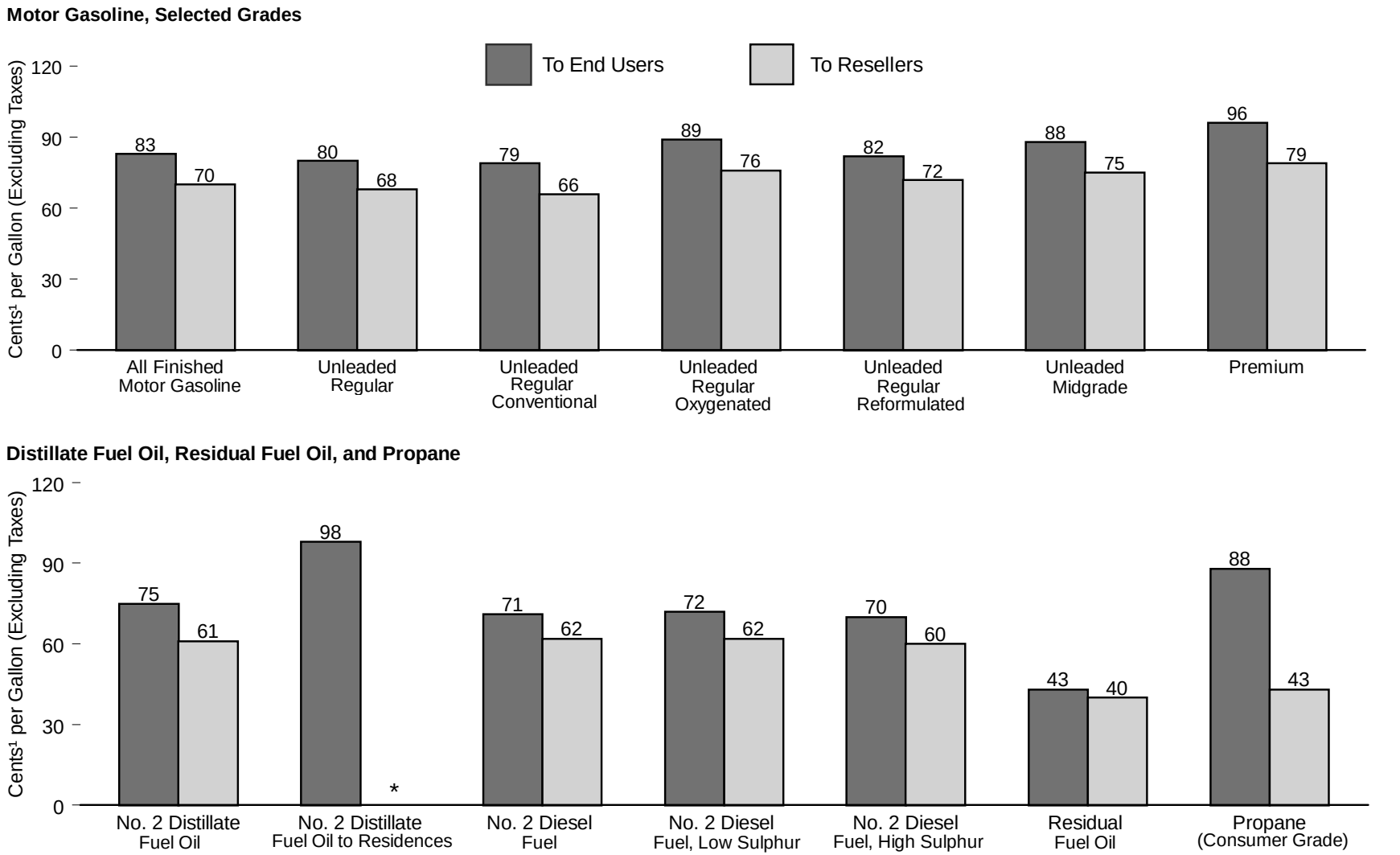
[1] Nominal value.
[2] Sales for resale, that is, wholesale sales, are those made to purchasers who are other than ultimate consumers. Sales to end users are those made directly to the ultimate consumer, including bulk customers, such as agriculture, industry, and utilities, as well as residential and 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 of crude oil 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.

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

Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

Sources: • 1983-1996—EIA, *Petroleum Marketing Annual.* • 1997—EIA, *Petroleum Marketing Monthly* (March 1998).

Figure 5.21 All Sellers Sales Prices for Selected Petroleum Products, 1997



[1] Nominal value.
* Not applicable.

Note: Data are preliminary.
Source: Table 5.21.

Table 5.21 All Sellers Sales Prices for Selected Petroleum Products, 1983-1997

(Cents[1] per Gallon, Excluding Taxes)

Product	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997 P
Sales Prices to Resellers [2]															
Motor Gasoline	NA	83.8	84.1	53.8	59.2	58.0	65.8	78.9	70.8	68.0	62.8	60.2	63.0	71.5	70.3
Unleaded Regular	NA	84.9	84.9	52.9	57.2	55.1	62.3	76.2	68.2	64.9	59.7	57.1	59.9	68.9	67.8
Conventional	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	56.5	58.3	67.2	65.9
Oxygenated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	62.7	66.2	74.5	76.2
Reformulated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	63.2	64.6	73.3	72.4
Unleaded Midgrade	NA	NA	NA	NA	NA	NA	69.1	82.3	74.4	71.3	66.4	64.1	67.3	76.0	75.1
Conventional	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	63.3	65.1	73.7	72.2
Oxygenated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	68.9	71.1	78.9	79.7
Reformulated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	72.2	71.9	80.2	80.0
Premium	NA	92.4	92.8	61.7	67.4	67.5	75.2	87.7	80.0	77.6	72.2	69.6	72.4	80.4	79.4
Conventional	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	68.6	69.5	77.7	76.4
Oxygenated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	75.7	78.7	85.1	86.8
Reformulated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	76.9	77.9	85.1	84.5
No. 2 Distillate	81.8	81.9	78.1	48.0	53.5	48.2	57.2	70.6	62.7	59.1	56.6	52.9	53.6	66.0	61.1
No. 2 Diesel Fuel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	53.8	54.6	66.7	61.6
Low Sulfur	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	54.2	55.1	67.3	61.9
High Sulfur	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	51.9	52.4	63.9	60.2
Residual Fuel Oil	60.9	65.8	58.2	31.5	39.9	31.5	37.8	43.4	33.0	32.6	30.1	32.2	36.6	42.7	39.6
1% or Less Sulfur Content	64.3	68.5	60.6	33.6	42.0	34.1	41.5	48.1	37.9	36.8	34.1	35.0	38.3	46.1	42.5
Greater than 1% Sulfur Content	59.1	64.1	56.1	29.5	38.1	28.2	34.0	38.8	29.7	30.0	27.2	29.8	34.4	39.7	37.6
Propane (Consumer Grade)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	33.6	35.4	47.1	42.6
Sales Prices to End Users [2]															
Motor Gasoline	NA	91.6	91.9	63.7	67.7	68.0	76.8	89.9	81.1	78.7	75.3	72.9	76.1	84.3	83.1
Unleaded Regular	NA	92.7	92.8	63.0	66.3	65.5	73.2	87.0	78.0	75.0	71.4	69.0	72.1	80.9	79.7
Conventional	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	68.5	71.4	80.1	78.5
Oxygenated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	73.7	77.3	86.1	89.0
Reformulated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	74.3	74.1	83.3	82.1
Unleaded Midgrade	NA	NA	NA	NA	NA	NA	NA	NA	NA	82.4	79.2	77.0	80.2	88.5	88.0
Conventional	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	76.6	79.3	87.4	86.6
Oxygenated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	82.1	83.8	92.9	96.7
Reformulated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	85.1	82.9	91.6	91.3
Premium	NA	101.2	101.6	73.6	78.0	78.6	87.4	99.6	91.9	90.6	87.5	85.2	88.3	96.2	95.5
Conventional	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	84.6	87.1	95.0	94.0
Oxygenated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	90.8	93.8	101.9	105.8
Reformulated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	93.7	91.4	99.1	98.6
No. 2 Distillate	93.3	92.6	89.0	61.4	64.3	61.2	69.5	84.1	76.0	72.6	71.0	67.5	67.3	79.3	75.3
No. 2 Distillate to Residences [3]	107.8	109.1	105.3	83.6	80.3	81.3	90.0	106.3	101.9	93.4	91.1	88.4	86.7	98.9	98.4
No. 2 Diesel Fuel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	62.8	63.6	75.7	71.4
Low Sulfur	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	64.2	64.5	76.7	71.9
High Sulfur	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	59.8	61.4	73.2	69.8
Residual Fuel Oil	65.1	69.6	62.3	35.8	42.6	33.9	39.3	45.5	34.7	34.6	34.1	35.8	39.7	46.4	42.9
1% or Less Sulfur Content	69.5	72.9	66.0	38.9	44.9	37.3	43.6	51.2	40.0	39.4	39.3	40.3	43.3	52.9	47.2
Greater than 1% Sulfur Content	61.1	66.4	58.9	32.8	39.9	30.6	35.1	40.5	31.1	31.9	31.2	32.7	37.6	43.0	40.7
Propane (Consumer Grade)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	77.6	76.6	88.6	88.4

[1] Nominal value.

[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] See Note 7 at end of section for historical data.

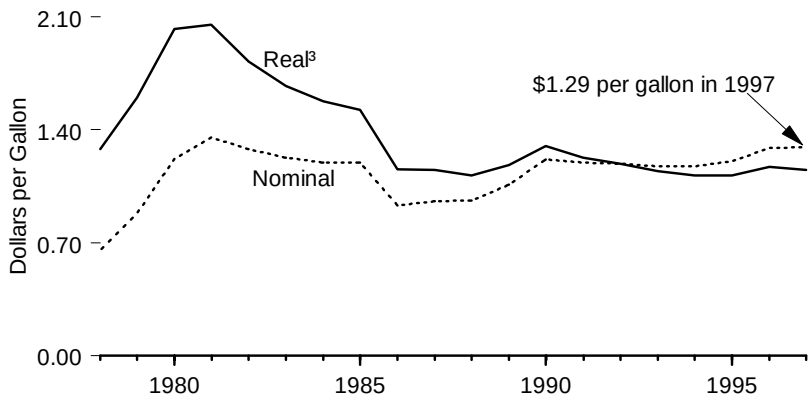
P=Preliminary. NA=Not available.

Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

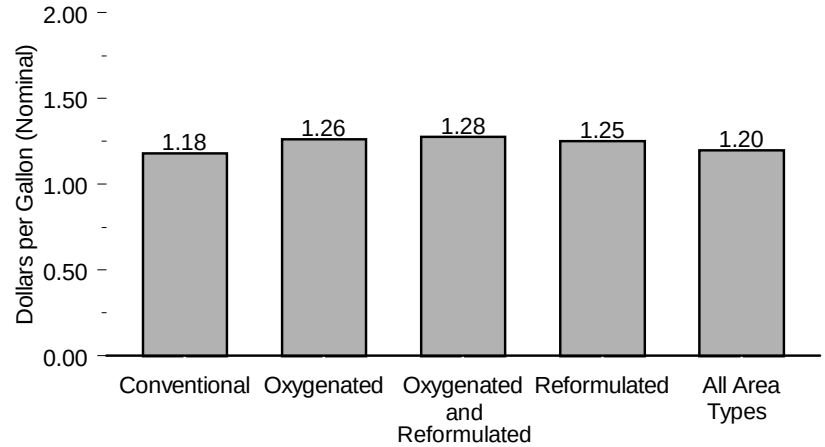
Sources: • 1983-1996—Energy Information Administration (EIA), *Petroleum Marketing Annual.* • 1997—EIA, *Petroleum Marketing Monthly* (March 1998).

Figure 5.22 Retail Motor Gasoline Prices

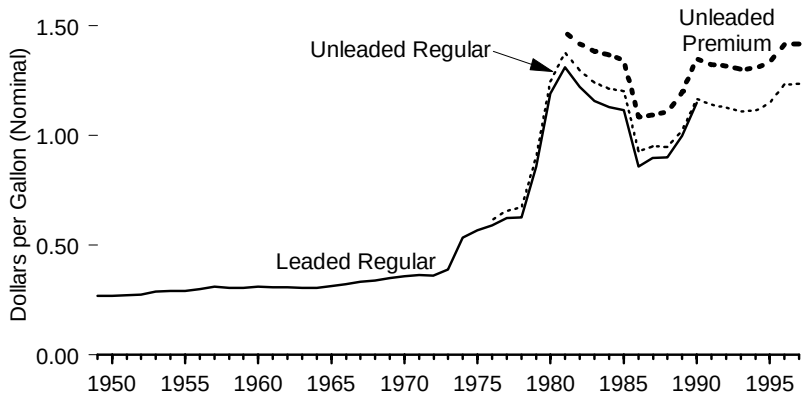
Motor Gasoline, All Types, 1978-1997



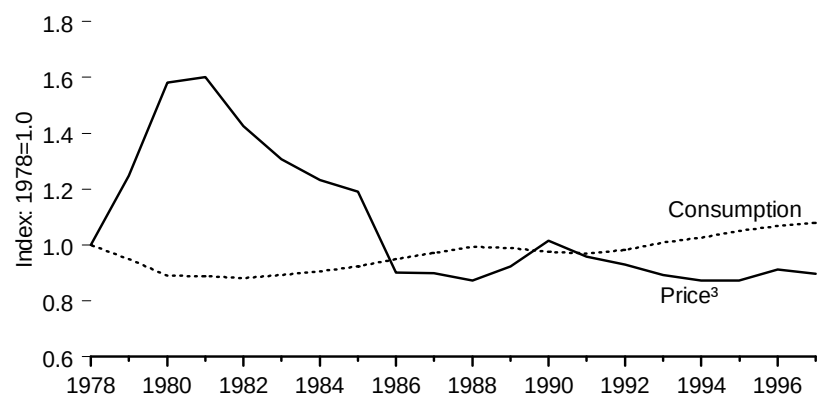
Regular Motor Gasoline by Area Type,[1] 1997



Motor Gasoline by Type, 1949-1997



Motor Gasoline[2] Price and Consumption, Indexed to 1978, 1978-1997



[1] Area refers to the areas of the country in which specific types of motor gasoline are sold as designated by the Environmental Protection Agency. Only self-service prices are included.

[2] All types.

[3] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

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

Sources: Tables 5.11 and 5.22.

Table 5.22 Retail Motor Gasoline and On-Highway Diesel Fuel Prices, 1949-1997

(Cents per Gallon)

	Motor Gasoline by Grade								Regular Motor Gasoline by Area Type [3,4]					
	Leaded Regular [1]		Unleaded Regular		Unleaded Premium		All Types							On-Highway Diesel Fuel
Year	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]	Nominal	Real [2]	Conventional	Oxygenated	Oxygenated and Reformulated	Reformulated	All Area Types	
1949	26.8	R148.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1950	26.8	R146.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1951	27.2	R138.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1952	27.4	R137.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1953	28.7	R142.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1954	29.0	R142.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1955	29.1	R140.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1956	29.9	R139.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1957	31.0	R139.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1958	30.4	R133.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1959	30.5	R132.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1960	31.1	133.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1961	30.8	R131.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1962	30.6	R128.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1963	30.4	R126.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1964	30.4	124.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1965	31.2	124.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1966	32.1	124.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1967	33.2	125.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1968	33.7	R122.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1969	34.8	R120.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1970	35.7	R117.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1971	36.4	R113.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1972	36.1	R108.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1973	38.8	R109.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1974	53.2	138.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1975	56.7	R134.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1976	59.0	132.3	61.4	137.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1977	62.2	131.2	65.6	138.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1978	62.6	R123.0	67.0	R131.6	NA	NA	65.2	R128.1	NA	NA	NA	NA	NA	NA
1979	85.7	R155.3	90.3	R163.6	NA	NA	88.2	R159.8	NA	NA	NA	NA	NA	NA
1980	119.1	R197.5	124.5	R206.5	NA	NA	122.1	R202.5	NA	NA	NA	NA	NA	NA
1981	131.1	R198.6	137.8	R208.8	147.0	R222.7	135.3	R205.0	NA	NA	NA	NA	NA	NA
1982	122.2	R174.1	129.6	R184.6	141.5	R201.6	128.1	R182.5	NA	NA	NA	NA	NA	NA
1983	115.7	R158.1	124.1	R169.5	138.3	R188.9	122.5	R167.3	NA	NA	NA	NA	NA	NA
1984	112.9	148.7	121.2	159.7	136.6	180.0	119.8	157.8	NA	NA	NA	NA	NA	NA
1985	111.5	R142.0	120.2	R153.1	134.0	R170.7	119.6	R152.4	NA	NA	NA	NA	NA	NA
1986	85.7	106.3	92.7	115.0	108.5	134.6	93.1	115.5	NA	NA	NA	NA	NA	NA
1987	89.7	107.9	94.8	114.1	109.3	131.5	95.7	115.2	NA	NA	NA	NA	NA	NA
1988	89.9	104.4	94.6	109.9	110.7	128.6	96.3	111.8	NA	NA	NA	NA	NA	NA
1989	99.8	111.3	102.1	113.8	119.7	133.4	106.0	118.2	NA	NA	NA	NA	NA	NA
1990	114.9	122.8	116.4	124.4	134.9	144.1	121.7	130.0	NA	NA	NA	NA	NA	NA
1991	NA	NA	114.0	117.2	132.1	135.8	119.6	122.9	110.0	NA	NA	NA	110.0	NA
1992	NA	NA	112.7	112.7	131.6	131.6	119.0	119.0	108.7	NA	NA	NA	108.7	NA
1993	NA	NA	110.8	108.0	130.2	126.9	117.3	114.3	104.8	113.8	NA	NA	106.7	NA
1994	NA	NA	111.2	R105.8	130.5	R124.2	117.4	R111.7	105.5	113.5	NA	NA	107.5	NA
1995	NA	NA	114.7	R106.4	133.6	R123.9	120.5	R111.8	109.0	116.0	118.2	115.9	111.1	110.9
1996	NA	NA	123.1	R111.7	141.3	R128.2	128.8	R116.9	117.8	127.1	126.5	123.9	119.9	123.5
1997	NA	NA	123.4	109.8	141.6	126.0	129.1	114.9	117.9	126.2	127.5	125.0	119.9	119.8

[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] In chained (1992) cents, calculated by using gross domestic product implicit price deflators. See Table 3.1.

[3] Area refers to the areas of the country in which specific types of motor gasoline are sold as designated by the Environmental Protection Agency. Only self-service prices are included.

[4] Nominal cents.

R=Revised. NA=Not available.

Web Page: http://www.eia.doe.gov/fuelpetroleum.html.

Sources: **Motor Gasoline by Grade:** • 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.* **Motor Gasoline by Area Type:** EIA, Form EIA-878, "Motor Gasoline Price Survey." **On-Highway Diesel:** EIA, Form EIA-888, "On-Highway Diesel Fuel Price Survey."

Petroleum Notes

1. Accurate calculation of the quantity of petroleum products supplied to the domestic market is complicated by the recycling of products at the refinery, the renaming of products involved in a transfer, and the receipt of products from outside the primary supply system. Beginning in 1981, a single adjustment (always a negative quantity) is made to total product supplied to correct this accounting problem. The calculation of this adjustment, called "reclassified," involves only unfinished oils and gasoline blending components. It is the sum of their net changes in primary stocks (net withdrawals is a plus quantity net additions is a minus quantity) plus imports minus net input to refineries.

2. Total petroleum products supplied is the sum of the products supplied for each petroleum product, crude oil, unfinished oils, and gasoline blending components. For each of these, except crude oil, product supplied is calculated by adding refinery production, natural gas plant liquids production, new supply of other liquids, imports, and stock withdrawals, and subtracting stock additions, refinery inputs, and exports. Crude oil product supplied is the sum of crude oil burned on leases and at pipeline pump stations as reported on Form EIA-813. Prior to 1983, crude oil burned on leases and at pipeline pump stations was reported as either distillate or residual fuel oil and was included as product supplied for these products. Petroleum product supplied is an approximation of petroleum consumption and is synonymous with the term "Petroleum Consumption" in Section 1. Sector data for petroleum products used in more than one sector are derived from surveys of sales to ultimate consumers by refiners, marketers, distributors, and dealers and from receipts at electric utilities.

3. Beginning in January 1981, several Energy Information Administration survey forms and calculation methodologies were changed to reflect new developments in refinery and blending plant practices and to improve data integrity. Those changes affect production and product supplied statistics for motor gasoline, distillate fuel oil, and residual fuel oil, and stocks of motor gasoline. On the basis of those changes, motor gasoline production during the last half of 1980 would have averaged 289,000 barrels per day higher than that which was published on the old basis. Distillate and residual fuel oil production and product supplied for all of 1980 would have averaged, respectively, 105,000 and 54,000 barrels per day higher than the numbers that were published.

4. The methods of deriving Gross Input to Distillation Units (GIDU) in this report are as follows: 1949-1966, GIDU is estimated by summing annual crude oil runs to stills, net unfinished oil reruns at refineries, and shipments of natural gasoline and plant condensate from natural gas processing plants to refineries. 1967-1973, GIDU is estimated by summing annual crude oil runs to stills, net unfinished oil reruns, and refinery input of natural gasoline and plant condensate. 1974-1980, GIDU is published annual data. 1981 forward, GIDU is the sum of reported monthly data.

5. The Crude Oil Domestic First Purchase Prices were derived as follows: 1949-1973, weighted average Domestic First Purchase values as reported by State agencies and calculated by the Bureau of Mines; 1974 and 1975, weighted averages of a sample survey of major first purchasers' purchases; 1976 forward, weighted averages of all first purchasers' purchases.

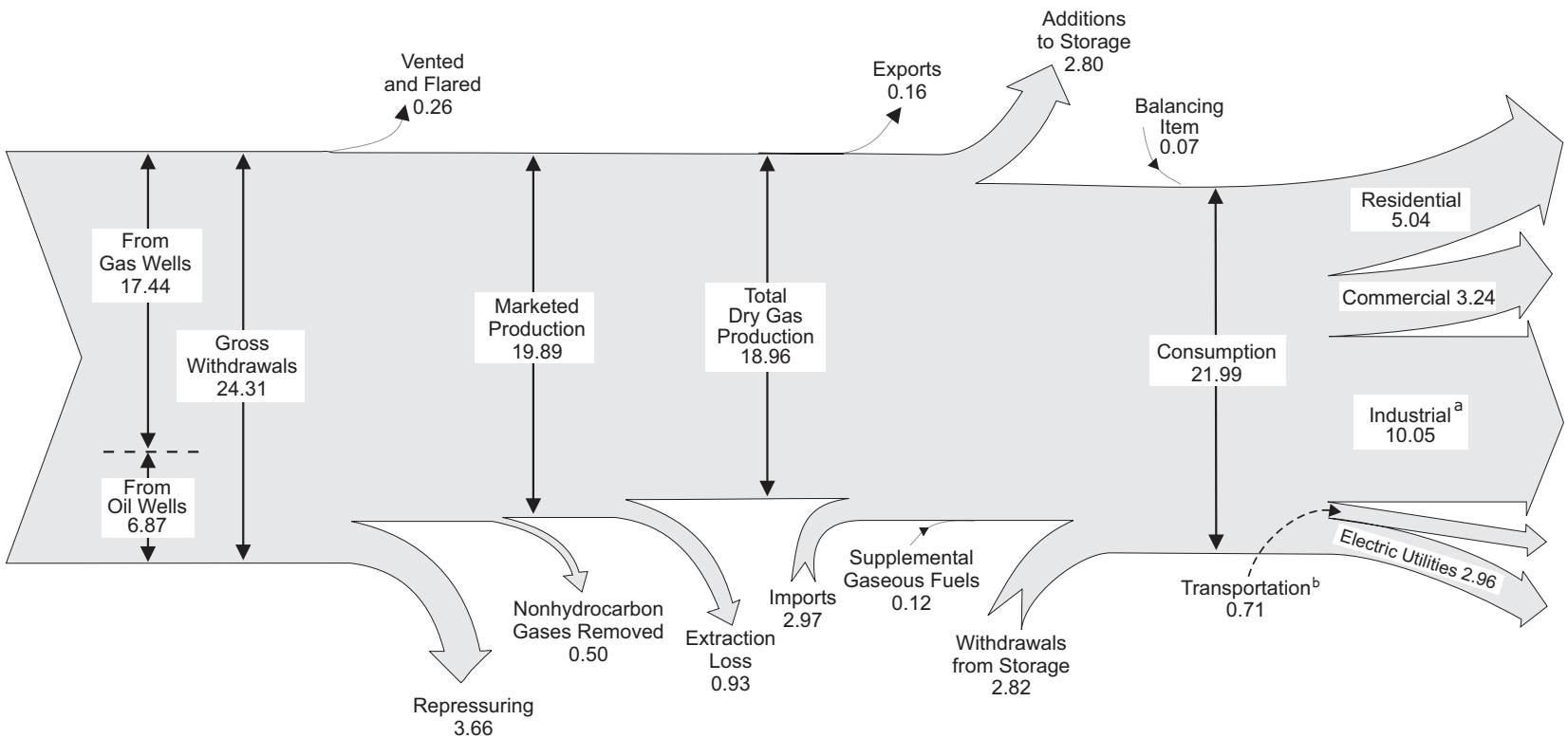
6. The Refiner Acquisition Cost of Crude Oil was estimated for 1968-1973. The cost of domestic crude oil was derived by adding estimated transportation costs to the reported average domestic first purchase value. The cost of imported crude oils was derived by adding an estimated ocean transport cost based on the published "Average Freight Rate Assessment" to the average "Free Alongside Ship" value published by the U.S. Bureau of the Census. The composite cost was derived by weighting domestic costs and imported costs on the basis of quantities produced and imported.

7. Residential heating oil prices for 1956 through 1982 were formerly published in the *Annual Energy Review*. These data are now being provided here: 15.2, 16.0, 15.1, 15.3, 15.0, 15.6, 15.6, 16.0, 16.1, 16.0, 16.4, 16.9, 17.4, 17.8, 18.5, 19.6, 19.7, 22.8, 36.0, 37.7, 40.6, 46.0, 49.0, 70.4, 97.4, 119.4, 116.0. The sources of these data are: 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—Energy Information Adminsitration (EIA), Form EIA-9, "No. 2 Heating Oil Supply/Price Monitoring Report." 1978-forward—EIA, *Petroleum Marketing Monthly*, Table 18.

6 Natural Gas

Natural gas pipeline, El Paso County, Texas. Source: U.S. Department of Energy.

Diagram 3. Natural Gas Flow, 1997
(Trillion Cubic Feet)

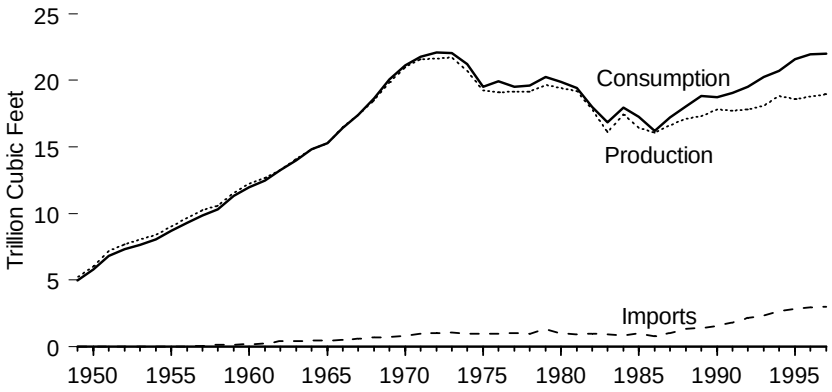


[a] Includes lease and plant fuel.
[b] Natural gas consumed in the operation of pipelines, primarily in compressors, and a small quantity used as vehicle fuel.

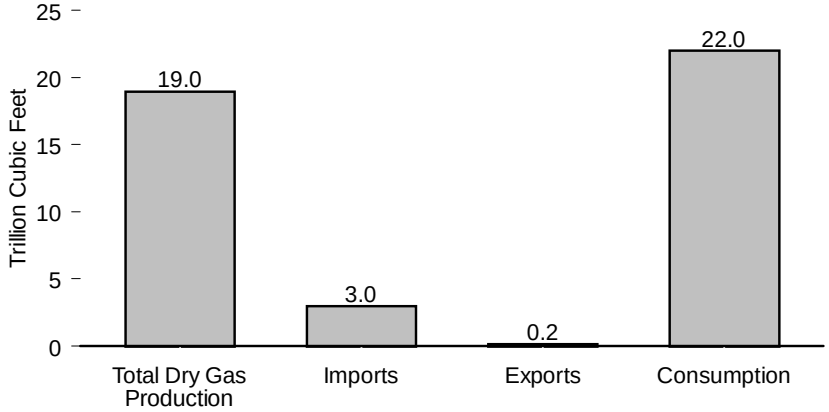
Notes: • Data are preliminary. • Totals may not equal sum of components due to independent rounding.
Sources: Tables 6.1, 6.2, and 6.6.

Figure 6.1 Natural Gas Overview

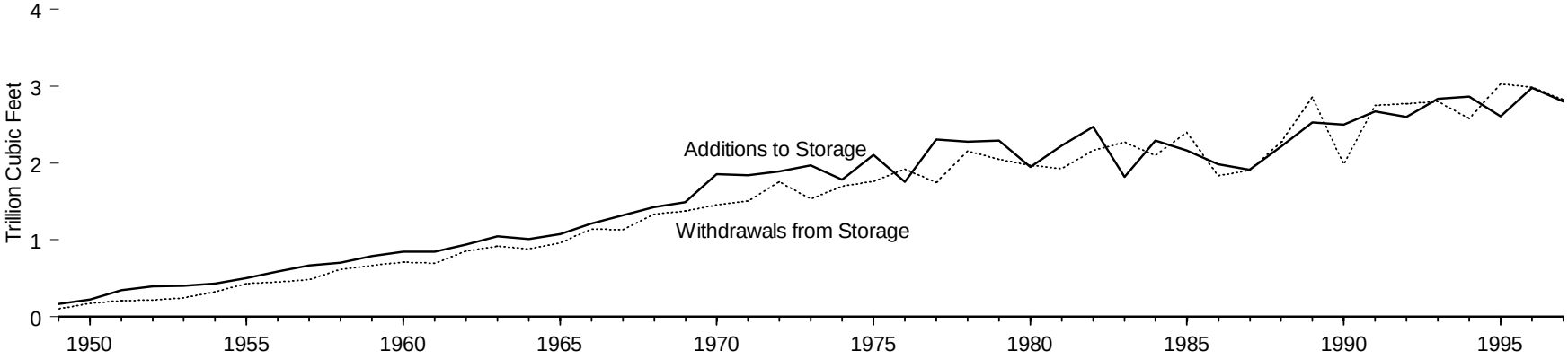
Overview, 1949-1997



Overview, 1997



Storage Additions and Withdrawals,[1] 1949-1997



[1] Beginning with 1980, includes liquefied natural gas stored in above-ground tanks.
Note: Because vertical scales differ, graphs should not be compared.

Source: Table 6.1.

Table 6.1 Natural Gas Overview, 1949-1997

(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	0.00	0.02	0.11	0.17	-0.14	4.97
1950	6.02	NA	0.00	0.03	0.18	0.23	-0.18	5.77
1951	7.16	NA	0.00	0.02	0.21	0.35	-0.19	6.81
1952	7.69	NA	0.01	0.03	0.22	0.40	-0.20	7.29
1953	8.06	NA	0.01	0.03	0.25	0.40	-0.24	7.64
1954	8.39	NA	0.01	0.03	0.33	0.43	-0.22	8.05
1955	9.03	NA	0.01	0.03	0.44	0.51	-0.25	8.69
1956	9.66	NA	0.01	0.04	0.45	0.59	-0.21	9.29
1957	10.25	NA	0.04	0.04	0.48	0.67	-0.21	9.85
1958	10.57	NA	0.14	0.04	0.62	0.70	-0.28	10.30
1959	11.55	NA	0.13	0.02	0.67	0.79	-0.22	11.32
1960	12.23	NA	0.16	0.01	0.71	0.84	-0.27	11.97
1961	12.66	NA	0.22	0.01	0.70	0.84	-0.23	12.49
1962	13.25	NA	0.40	0.02	0.85	0.94	-0.29	13.27
1963	14.08	NA	0.41	0.02	0.92	1.05	-0.36	13.97
1964	14.82	NA	0.44	0.02	0.89	1.01	-0.30	14.81
1965	15.29	NA	0.46	0.03	0.96	1.08	-0.32	15.28
1966	16.47	NA	0.48	0.02	1.14	1.21	-0.40	16.45
1967	17.39	NA	0.56	0.08	1.13	1.32	-0.30	17.39
1968	18.49	NA	0.65	0.09	1.33	1.43	-0.33	18.63
1969	19.83	NA	0.73	0.05	1.38	1.50	-0.33	20.06
1970	21.01	NA	0.82	0.07	1.46	1.86	-0.23	21.14
1971	21.61	NA	0.93	0.08	1.51	1.84	-0.34	21.79
1972	21.62	NA	1.02	0.08	1.76	1.89	-0.33	22.10
1973	21.73	NA	1.03	0.08	1.53	1.97	-0.20	22.05
1974	20.71	NA	0.96	0.08	1.70	1.78	-0.29	21.22
1975	19.24	NA	0.95	0.07	1.76	2.10	-0.24	19.54
1976	19.10	NA	0.96	0.06	1.92	1.76	-0.22	19.95
1977	19.16	NA	1.01	0.06	1.75	2.31	-0.04	19.52
1978	19.12	NA	0.97	0.05	2.16	2.28	-0.29	19.63
1979	19.66	NA	1.25	0.06	2.05	2.30	-0.37	20.24
1980	19.40	0.15	0.98	0.05	1.97	1.95	-0.64	19.88
1981	19.18	0.18	0.90	0.06	1.93	2.23	-0.50	19.40
1982	17.82	0.14	0.93	0.05	2.16	2.47	-0.54	18.00
1983	16.09	0.13	0.92	0.05	2.27	1.82	-0.70	16.83
1984	17.47	0.11	0.84	0.05	2.10	2.30	-0.22	17.95
1985	16.45	0.13	0.95	0.06	2.40	2.16	-0.43	17.28
1986	16.06	0.11	0.75	0.06	1.84	1.98	-0.49	16.22
1987	16.62	0.10	0.99	0.05	1.91	1.91	-0.44	17.21
1988	17.10	0.10	1.29	0.07	2.27	2.21	-0.45	18.03
1989	17.31	0.11	1.38	0.11	2.85	2.53	-0.22	18.80
1990	17.81	0.12	1.53	0.09	1.99	2.50	-0.15	18.72
1991	17.70	0.11	1.77	0.13	2.75	2.67	-0.50	19.04
1992	17.84	0.12	2.14	0.22	2.77	2.60	-0.51	19.54
1993	18.10	0.12	2.35	0.14	2.80	2.83	-0.11	20.28
1994	18.82	0.11	2.62	0.16	2.58	2.86	-0.40	20.71
1995	18.60	0.11	2.84	0.15	3.02	2.61	-0.23	21.58
1996	[R]18.79	[R]0.11	[R]2.94	0.15	[R]2.98	[R]2.98	[R]0.28	[R]21.97
1997[P]	18.96	0.12	2.97	0.16	2.82	2.80	0.07	21.99

[1] Beginning with 1980, includes liquefied natural gas stored in above-ground tanks.
[2] Quantities lost and imbalances in data due to differences among data sources. Since 1980, excludes intransit shipments that cross the U.S.-Canada border (i.e., natural gas delivered to its destination via the other country).

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

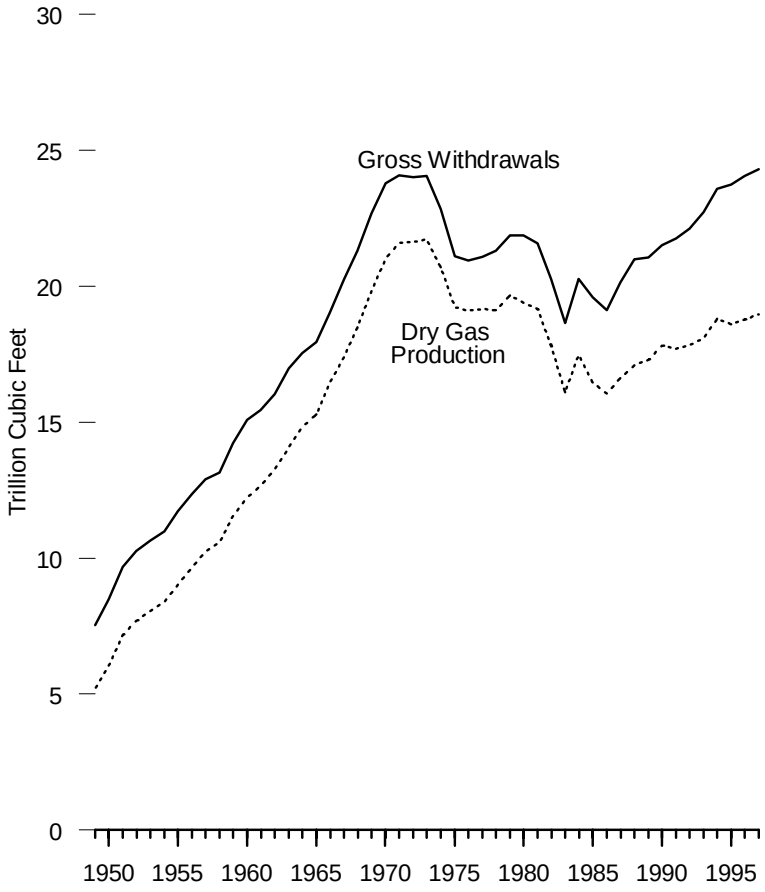
Notes: • Beginning with 1965, all volumes are shown on a pressure base of 14.73 p.s.i.a. at 60° F. For prior years, the pressure base was 14.65 p.s.i.a. at 60° F. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelnatgas.html.

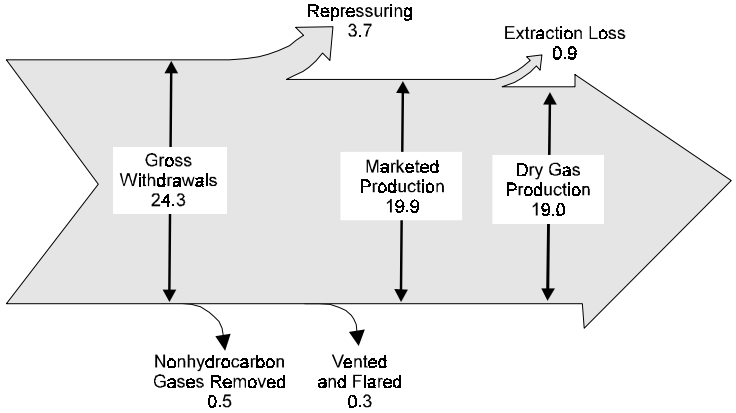
Sources: **Supplemental Gaseous Fuels:** • 1980-1991—EIA, *Natural Gas Annual,* various issues. • 1992 forward—EIA, *Natural Gas Monthly* (February 1998), Table 2. **All Other Data:** • 1949-1991—EIA, *Natural Gas Annual 1996* (September 1997), Table 100. • 1992 forward—EIA, *Natural Gas Monthly* (February 1998), Table 2.

Figure 6.2 Natural Gas Production

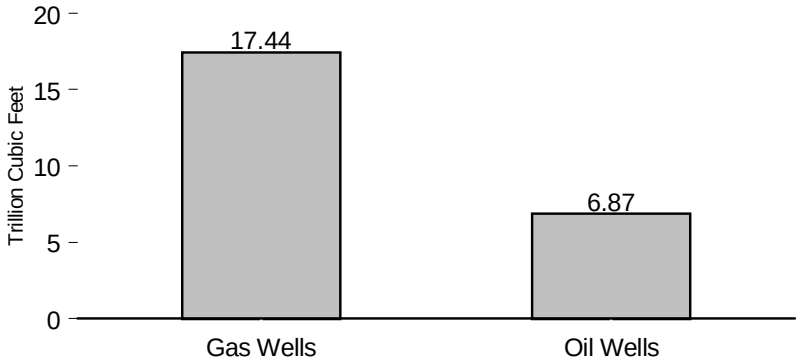
Gross Withdrawals and Dry Gas Production, 1949-1997



Production Flow, 1997
(Trillion Cubic Feet)



Gross Withdrawals by Well Type, 1997



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

Source: Table 6.2.

Table 6.2 Natural Gas Production, 1949-1997

(Trillion Cubic Feet)

Year	Gross Withdrawals			Repressuring	Nonhydrocarbon 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	16.02	5.73	21.75	2.77	0.28	0.17	18.53	0.83	17.70
1992	16.16	5.97	22.13	2.97	0.28	0.17	18.71	0.87	17.84
1993	16.69	6.03	22.73	3.10	0.41	0.23	18.98	0.89	18.10
1994	17.35	6.23	23.58	3.23	0.41	0.23	19.71	0.89	18.82
1995	17.28	6.46	23.74	3.57	0.39	0.28	19.51	0.91	18.60
1996	R17.68	R6.37	R24.05	R3.51	R0.52	R0.27	R19.75	R0.96	R18.79
1997	E17.44	E6.87	P24.31	P3.66	P0.50	P0.26	P19.89	P0.93	P18.96

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

R=Revised. P=Preliminary. E=Estimate. NA=Not available.

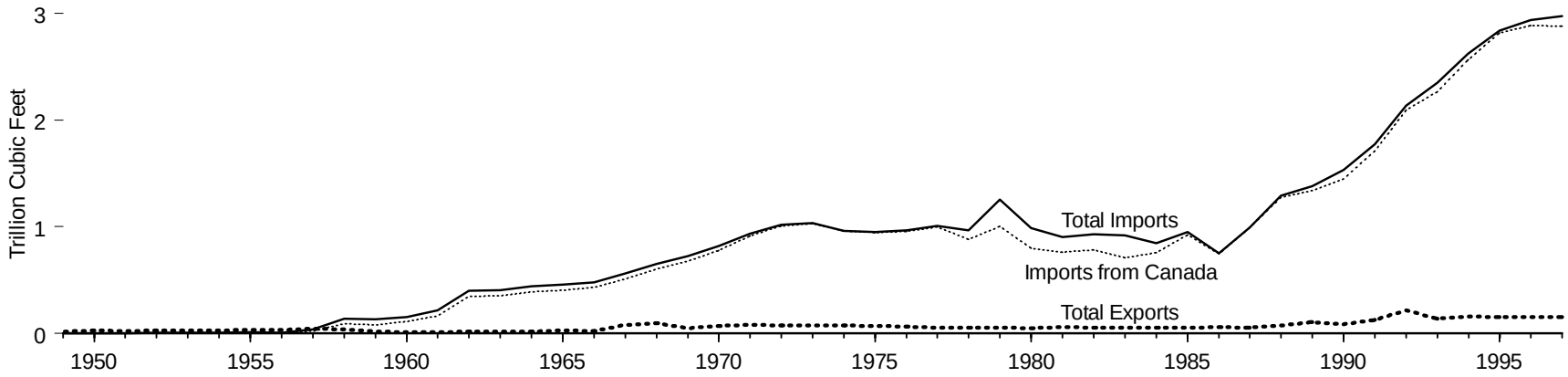
Notes: • Beginning with 1965 data, all volumes are shown on a pressure base of 14.73 p.s.i.a. at 60° F. For prior years, the pressure base was 14.65 p.s.i.a. at 60° F. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelnatgas.html.

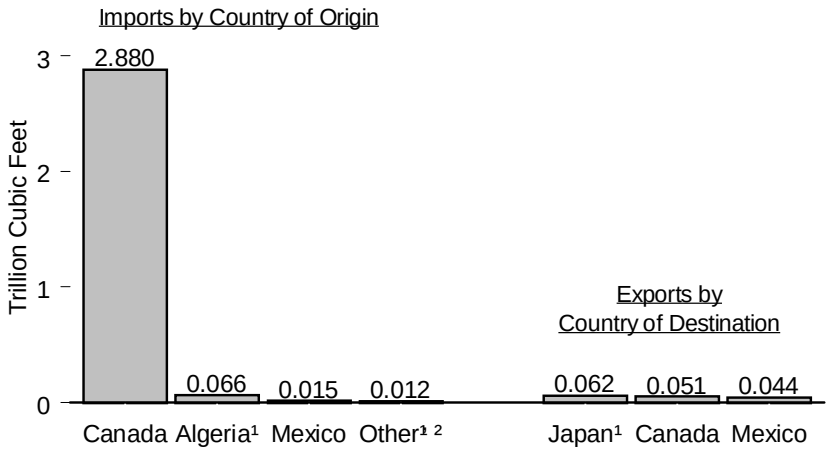
Sources: **From Gas Wells and From Oil Wells:** • 1949-1966—Bureau of Mines, *Minerals Yearbook,* "Natural Gas" chapter. • 1967-1988—Energy Information Administration (EIA), *Natural Gas Annual 1992, Volume 2* (November 1993), Table 5. • 1989-1996—EIA, *Natural Gas Annual 1996* (September 1997), Table 3. • 1997—EIA, estimated data. **All Other Data:** • 1949-1990—EIA, *Natural Gas Annual 1996* (September 1997), Table 99. • 1991 forward—EIA, *Natural Gas Monthly* (February 1998), Table 1.

Figure 6.3 Natural Gas Imports, Exports, and Net Imports

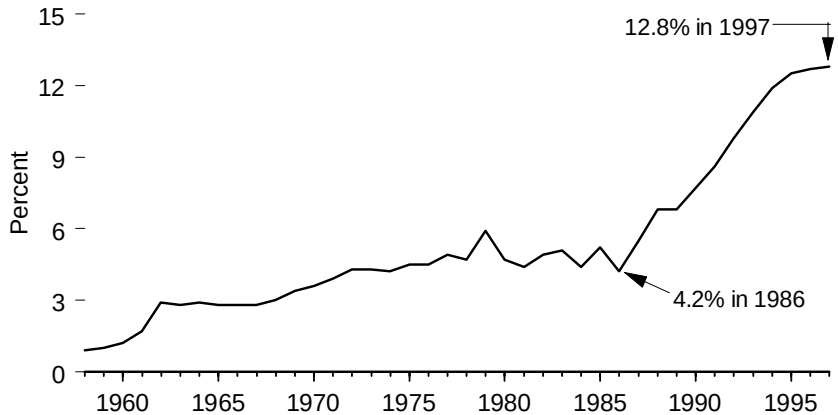
Trade Overview, 1949-1997



Trade, 1997



Net Imports as Share of Consumption, 1958-1997



¹ Imports from Algeria and Other and exports to Japan are liquefied natural gases.
² Australia and United Arab Emirates.

Source: Table 6.3.

Table 6.3 Natural Gas Imports, Exports, and Net Imports, 1949-1997

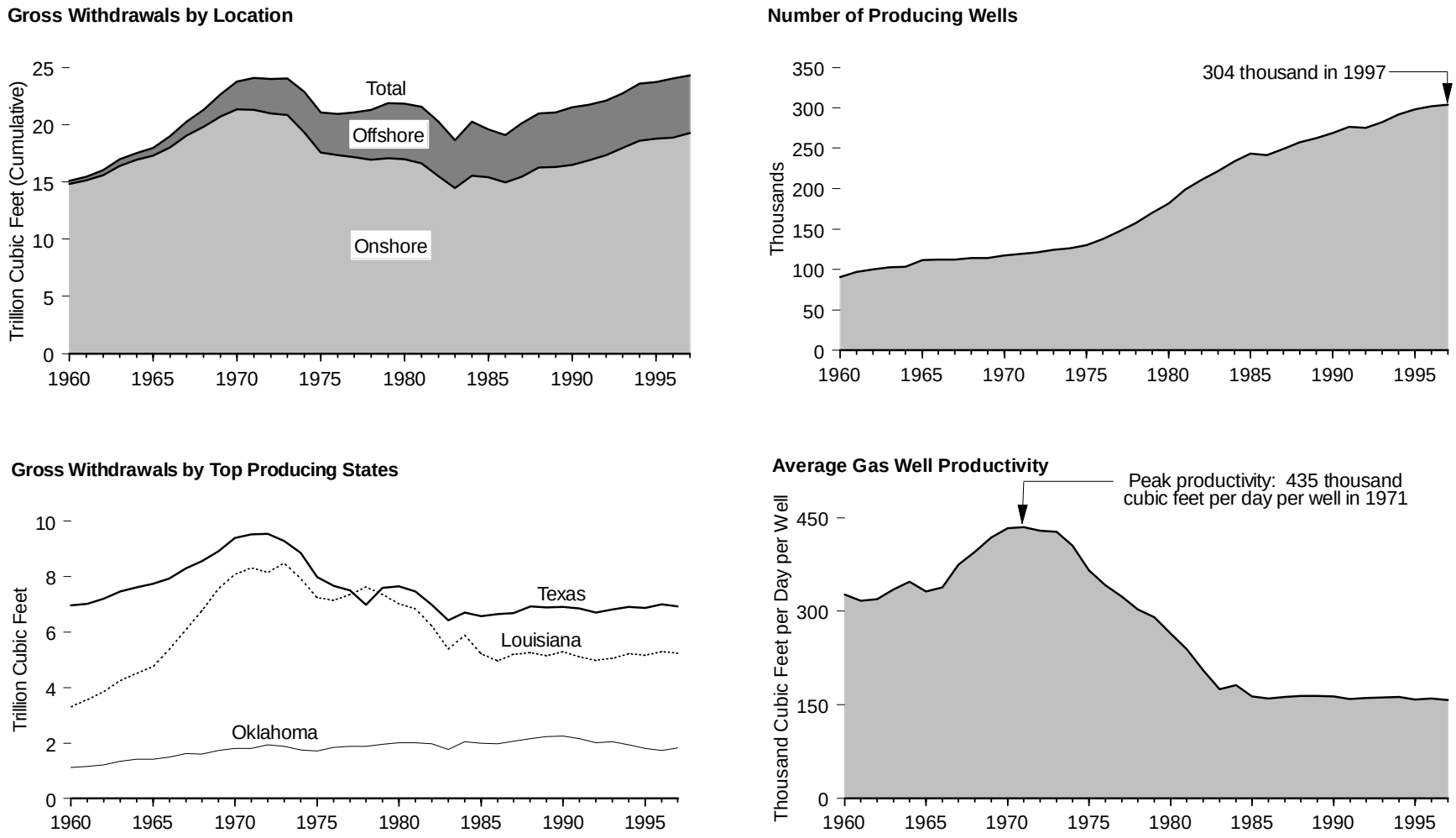
(Billion Cubic Feet, Except as Noted)

	Imports by Country of Origin							Exports by Country of Destination				Net Imports [1]	
Year	Algeria [2]	Australia [2]	Canada	Indonesia [2]	Mexico	United Arab Emirates [2]	Total	Canada	Japan [2]	Mexico	Total	Total	Percent of U.S. Consumption
1949	0	0	0	0	0	0	0	(s)	0	20	20	-20	([3])
1950	0	0	0	0	0	0	0	3	0	23	26	-26	([3])
1951	0	0	0	0	0	0	0	4	0	21	24	-24	([3])
1952	0	0	8	0	(s)	0	8	6	0	22	27	-20	([3])
1953	0	0	9	0	0	0	9	6	0	22	28	-19	([3])
1954	0	0	7	0	0	0	7	6	0	23	29	-22	([3])
1955	0	0	11	0	(s)	0	11	11	0	20	31	-20	([3])
1956	0	0	10	0	(s)	0	10	17	0	19	36	-26	([3])
1957	0	0	21	0	17	0	38	31	0	11	42	-4	([3])
1958	0	0	90	0	46	0	136	32	0	7	39	97	0.9
1959	0	0	83	0	51	0	134	12	0	7	18	116	1.0
1960	0	0	109	0	47	0	156	6	0	6	11	144	1.2
1961	0	0	167	0	52	0	219	6	0	5	11	208	1.7
1962	0	0	350	0	51	0	402	6	0	10	16	386	2.9
1963	0	0	356	0	50	0	406	7	0	10	17	389	2.8
1964	0	0	391	0	53	0	443	10	0	10	20	424	2.9
1965	0	0	405	0	52	0	456	18	0	8	26	430	2.8
1966	0	0	430	0	50	0	480	20	0	4	25	455	2.8
1967	0	0	513	0	51	0	564	70	0	11	82	483	2.8
1968	0	0	604	0	47	0	652	82	0	12	94	558	3.0
1969	0	0	680	0	47	0	727	35	3	13	51	676	3.4
1970	1	0	779	0	41	0	821	11	44	15	70	751	3.6
1971	1	0	912	0	21	0	935	14	50	16	80	854	3.9
1972	2	0	1,009	0	8	0	1,019	16	48	15	78	941	4.3
1973	3	0	1,028	0	2	0	1,033	15	48	14	77	956	4.3
1974	0	0	959	0	(s)	0	959	13	50	13	77	882	4.2
1975	5	0	948	0	0	0	953	10	53	9	73	880	4.5
1976	10	0	954	0	0	0	964	8	50	7	65	899	4.5
1977	11	0	997	0	2	0	1,011	(s)	52	4	56	955	4.9
1978	84	0	881	0	0	0	966	(s)	48	4	53	913	4.7
1979	253	0	1,001	0	0	0	1,253	(s)	51	4	56	1,198	5.9
1980	86	0	797	0	102	0	985	(s)	45	4	49	936	4.7
1981	37	0	762	0	105	0	904	(s)	56	3	59	845	4.4
1982	55	0	783	0	95	0	933	(s)	50	2	52	882	4.9
1983	131	0	712	0	75	0	918	(s)	53	2	55	864	5.1
1984	36	0	755	0	52	0	843	(s)	53	2	55	788	4.4
1985	24	0	926	0	0	0	950	(s)	53	2	55	894	5.2
1986	0	0	749	2	0	0	750	9	50	2	61	689	4.2
1987	0	0	993	0	0	0	993	3	49	2	54	939	5.5
1988	17	0	1,276	0	0	0	1,294	20	52	2	74	1,220	6.8
1989	42	0	1,339	0	0	0	1,382	38	51	17	107	1,275	6.8
1990	84	0	1,448	0	0	0	1,532	17	53	16	[R]86	[R]1,447	7.7
1991	64	0	1,710	0	0	0	1,773	15	54	60	129	1,644	8.6
1992	43	0	2,094	0	0	0	2,138	68	53	96	216	1,921	9.8
1993	82	0	2,267	0	2	0	2,350	45	56	40	140	2,210	10.9
1994	51	0	2,566	0	7	0	2,624	53	63	47	162	2,462	11.9
1995	18	0	2,816	0	7	0	2,841	28	65	61	154	2,687	12.5
1996	35	0	[R]2,883	0	14	5	[R]2,937	[R]52	68	[R]34	[R]153	[R]2,784	[R]12.7
1997[P]	66	10	2,880	0	15	2	2,972	51	62	44	157	2,815	12.8

[1] Net imports = imports minus exports.
[2] Imports from Algeria, Australia, Indonesia, and United Arab Emirates, and exports to Japan are liquefied natural gas.
[3] Not meaningful because there were net exports during this year.
R=Revised. P=Preliminary. (s)=Less than 0.5 billion cubic feet.
Note: Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelnatgas.html.
Sources: **Total Imports and Total Exports:** calculated. **All Other Data:** 1949-1954—Energy Information Administration (EIA), Office of Oil and Gas, Reserves and Natural Gas Division, unpublished data. • 1955-1971—EIA, Federal Power Commission, by telephone • 1972-1990—EIA, Form FPC-14, "Annual Report for Importers and Exporters of Natural Gas." • 1991 Forward—EIA, *Natural Gas Monthly* (February 1998), Tables 5, 6, and unpublished revisions.

Figure 6.4 Natural Gas Gross Withdrawals by State and Location and Gas Well Productivity, 1960-1997



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

Source: Table 6.4.

Table 6.4 Natural Gas Gross Withdrawals by State and Location and Gas Well Productivity, 1960-1997

(Trillion Cubic Feet, Except as Noted)

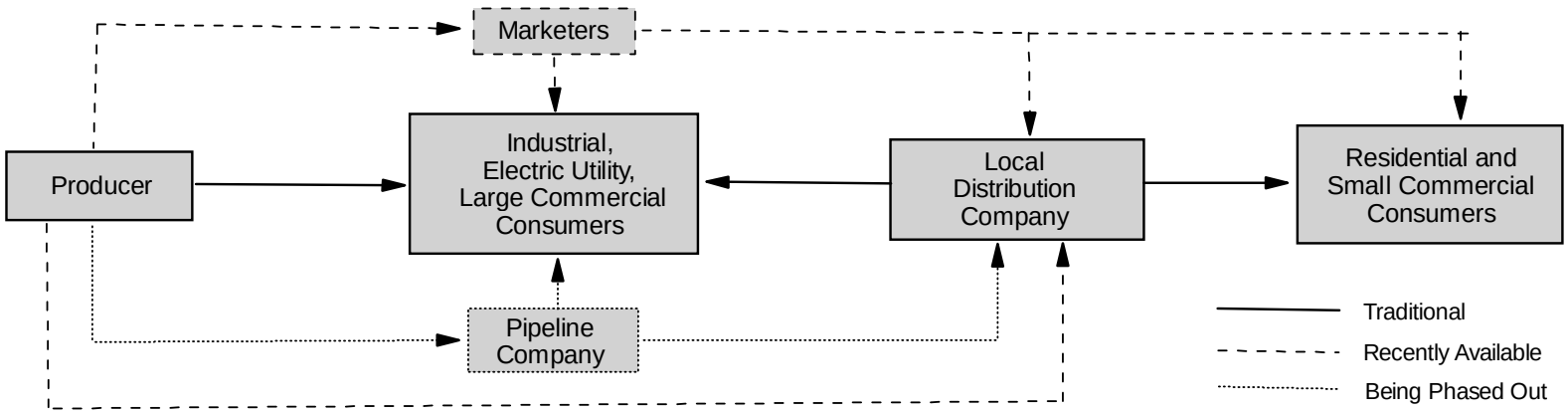
	State				Location			Gas Well [1] Productivity		
Year	Texas	Louisiana	Oklahoma	Other	Onshore [2]	Offshore [3]	Gross Withdrawals from Oil and Gas Wells	Gross Withdrawals from Gas Wells	Thousands of Producing Wells [4]	Average Productivity (thousand cubic feet per day)
1960	6.96	3.31	1.13	3.68	14.81	0.27	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	269	163.4
1991	6.85	5.10	2.15	7.65	16.90	4.85	21.75	16.02	276	158.8
1992	6.71	4.98	2.02	8.43	17.36	4.77	22.13	16.16	275	160.8
1993	6.82	5.05	2.05	8.81	17.96	4.77	22.73	16.69	282	162.1
1994	6.91	5.23	1.93	9.51	18.58	5.00	23.58	17.35	292	162.9
1995	6.87	5.16	1.81	9.90	18.80	4.94	23.74	17.28	299	158.6
1996	R7.01	R5.30	R1.73	R10.01	R18.88	R5.18	R24.05	R17.68	R302	R160.5
1997	E6.93	E5.23	E1.83	E10.32	E19.27	E5.04	P24.31	E17.44	P304	E157.3

[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 each year.
R=Revised. P=Preliminary. E=Estimate.
Web Page: http://www.eia.doe.gov/fuelnatgas.html.

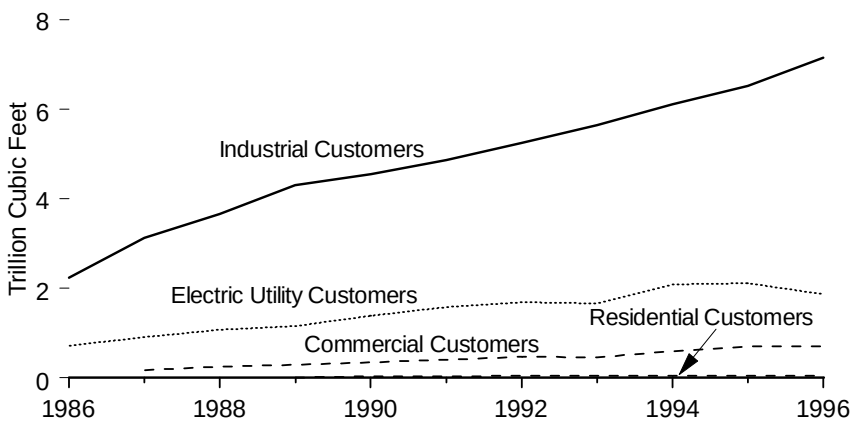
Sources: **Offshore** (Outer Continental Shelf): • 1960-1981—U.S. Geological Survey. • 1982-1985—The United States Minerals Management Service, *Mineral Revenues - The 1989 Report on Receipts from Federal and Indian Leases,* and predecessor annual reports. • 1986—Energy Information Administration (EIA), *Natural Gas Annual 1990, Volume 1* (December 1991), Table 4. • 1987—EIA, *Natural Gas Annual 1991* (October 1992), Table 4. • 1988—EIA, *Natural Gas Annual 1992, Volume 1* (November 1993), Table 4. • 1989-1991—EIA, *Natural Gas Annual 1994* (November 1995), Table 4. • 1992-1996—EIA, *Natural Gas Annual 1996* (September 1997), Table 4. • 1997—EIA, estimated data. **Gross Withdrawals from Oil and Gas Wells:** • 1960-1990—EIA, *Natural Gas Annual 1996* (September 1997), Table 99. • 1991 forward—EIA, *Natural Gas Monthly* (February 1998), Table 1. **Producing Wells:** • 1960-1966—Bureau of Mines, *Natural Gas Production and Consumption.* • 1967-1991—EIA, *Natural Gas Annual* (various issues). • 1992-1996—EIA, *Natural Gas Annual 1996* (September 1997), Table 1. • 1997—Gulf Publishing Company, *World Oil* (February 1998). **All Other Data:** • 1960-1966—Bureau of Mines, *Natural Gas Production and Consumption.* • 1967-1992—EIA, *Natural Gas Annual 1992, Volume 2* (November 1993), Tables 5 and 6. • 1992-1996—EIA, *Natural Gas Annual 1996* (September 1997), Table 3. • 1997—EIA, estimated data.

Figure 6.5 Natural Gas Delivered for the Account of Others

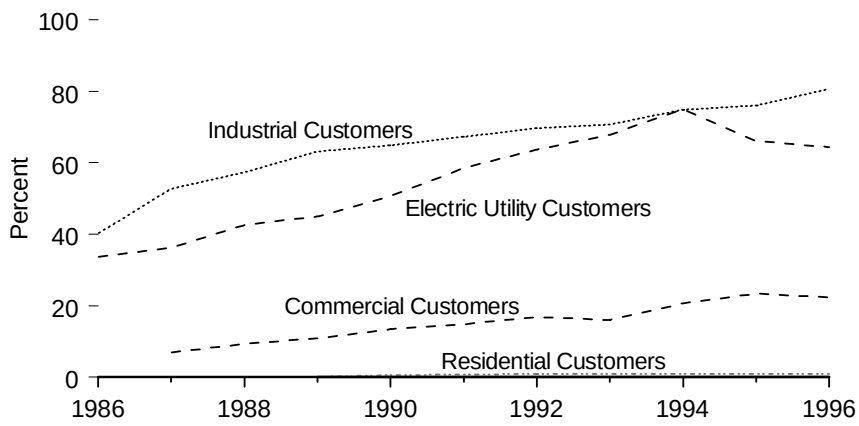
Transaction Paths for Natural Gas Purchases



Natural Gas Delivered for the Account of Others, 1986-1996



Account of Others Share of Total Deliveries to Sector, 1986-1996



Source: Table 6.5.

Table 6.5 Natural Gas Delivered for the Account of Others, 1986-1996

Year	Residential Customers			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 [2]	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	Billion Cubic Feet		Percent
1986	NA	4,314	NA	NA	2,318	NA	2,240	5,579	40.2	721	2,602	33.6
1987	NA	4,315	NA	167	2,430	6.9	3,129	5,953	52.6	914	2,844	36.3
1988	NA	4,630	NA	247	2,670	9.3	3,663	6,383	57.4	1,076	2,636	42.5
1989	3	4,781	0.1	296	2,718	10.9	4,298	6,816	63.1	1,152	2,787	45.0
1990	31	4,391	0.7	353	2,623	13.4	4,545	7,018	64.8	1,390	2,787	50.7
1991	36	4,556	0.8	406	2,729	14.9	4,864	7,231	67.3	1,580	2,789	58.5
1992	41	4,690	0.9	471	2,803	16.8	5,249	7,527	69.7	1,697	2,766	63.7
1993	44	4,956	0.9	460	2,863	16.1	5,645	7,981	70.7	1,658	2,682	67.8
1994	42	4,848	0.9	599	2,897	20.7	6,113	8,167	74.8	2,092	2,987	75.0
1995	45	4,850	0.9	706	3,034	23.3	6,517	8,580	76.0	2,110	3,197	66.0
1996	49	5,241	0.9	707	3,161	22.4	7,152	8,870	80.6	1,871	2,732	64.4

[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.

[2] Small quantities of natural gas delivered for use as vehicle fuel are included, beginning in 1990.

NA=Not available.

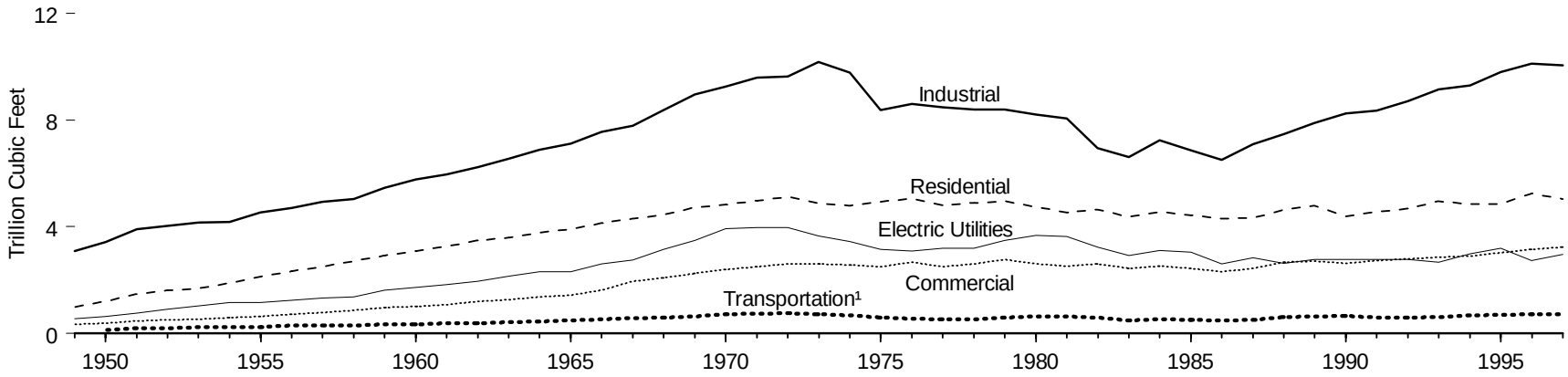
Note: • Percentages are based on data prior to rounding. • Deliveries for the account of others are deliveries to customers by transporters that do not own the natural gas but provide transportation services. These quantities may include gas covered by long-term contracts and quantities involved in short-term or spot market sales.

Web Page: http://www.eia.doe.gov/fuelnatgas.html.

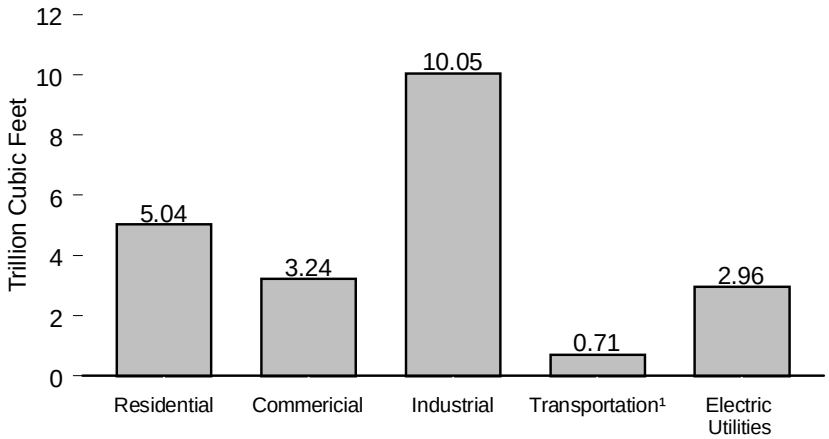
Sources: **Electric Utilities Total Deliveries:** EIA, Form EIA-759, "Monthly Power Plant Report." **All Other Data:** • 1986—EIA, *Natural Gas Annual 1990, Volume 1* (December 1991), Table 1. • 1987—EIA, *Natural Gas Annual 1991* (October 1992), Table 1. • 1988-1991—EIA, *Natural Gas Annual 1992, Volume 1* (November 1993), Table 1. • 1992 forward—EIA, *Natural Gas Annual 1996* (September 1997), Table 1.

Figure 6.6 Natural Gas Consumption by Sector

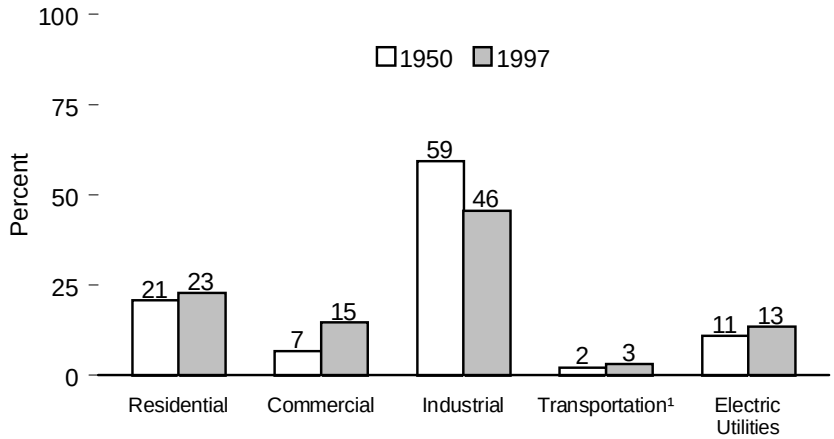
By Sector, 1949-1997



By Sector, 1997



Shares² by Sector, 1950 and 1997



¹ Pipeline fuel and vehicle fuel; for 1997, vehicle fuel data were not available.

² Shares are based on data prior to rounding for publication and may not sum exactly to 100 percent.

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

Source: Table 6.6.

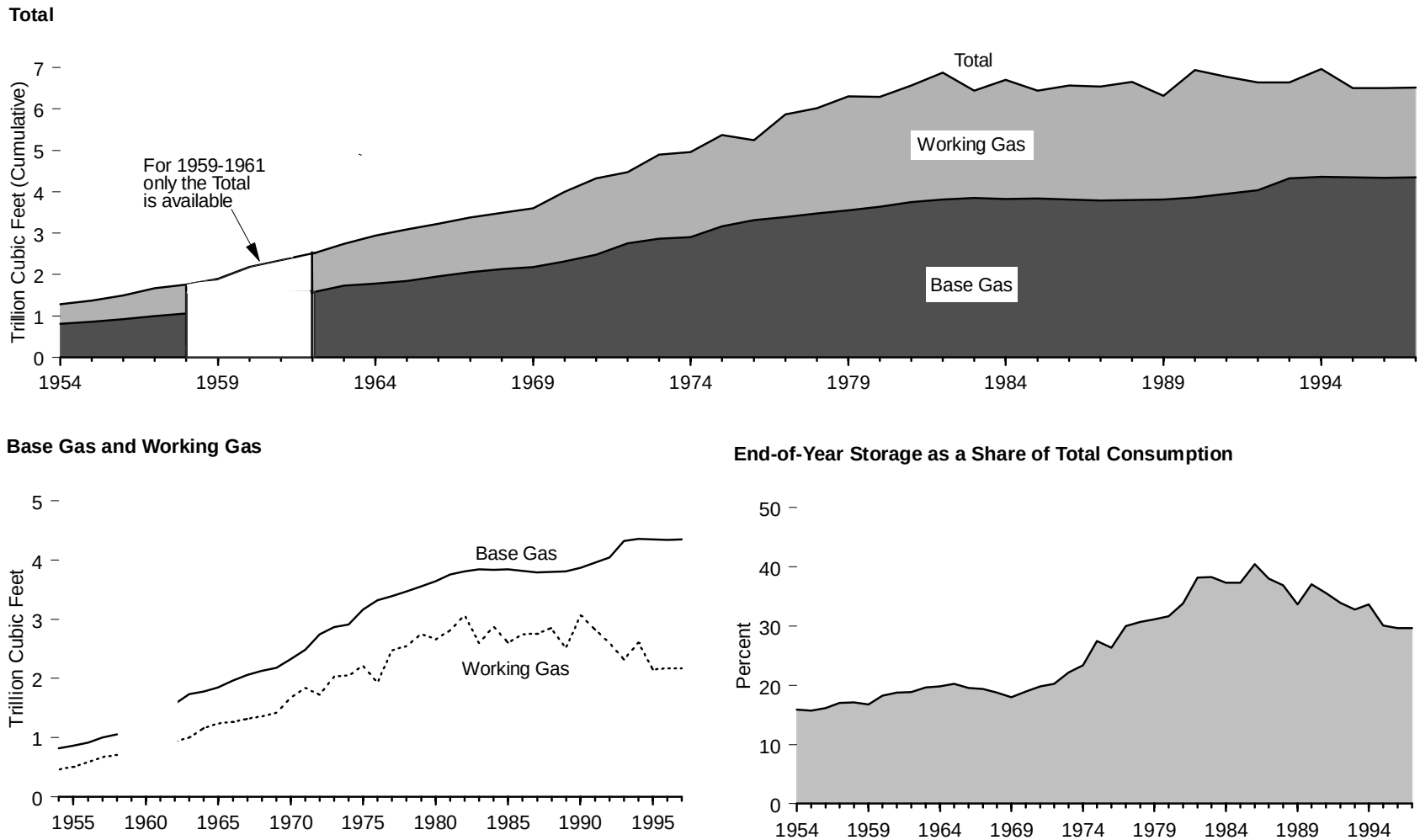
Table 6.6 Natural Gas Consumption by Sector, 1949-1997

(Trillion Cubic Feet)

Year	Residential	Commercial [1]	Industrial			Transportation			Electric Utilities	Total
			Lease and Plant Fuel	Other	Total	Pipeline Fuel [2]	Vehicle Fuel	Total		
1949	0.99	0.35	0.84	2.25	3.08	NA	NA	NA	0.55	4.97
1950	1.20	0.39	0.93	2.50	3.43	0.13	NA	0.13	0.63	5.77
1951	1.47	0.46	1.15	2.77	3.91	0.19	NA	0.19	0.76	6.81
1952	1.62	0.52	1.16	2.87	4.04	0.21	NA	0.21	0.91	7.29
1953	1.69	0.53	1.13	3.03	4.16	0.23	NA	0.23	1.03	7.64
1954	1.89	0.58	1.10	3.07	4.17	0.23	NA	0.23	1.17	8.05
1955	2.12	0.63	1.13	3.41	4.54	0.25	NA	0.25	1.15	8.69
1956	2.33	0.72	1.00	3.71	4.71	0.30	NA	0.30	1.24	9.29
1957	2.50	0.78	1.05	3.89	4.93	0.30	NA	0.30	1.34	9.85
1958	2.71	0.87	1.15	3.89	5.03	0.31	NA	0.31	1.37	10.30
1959	2.91	0.98	1.24	4.22	5.46	0.35	NA	0.35	1.63	11.32
1960	3.10	1.02	1.24	4.53	5.77	0.35	NA	0.35	1.72	11.97
1961	3.25	1.08	1.29	4.67	5.96	0.38	NA	0.38	1.83	12.49
1962	3.48	1.21	1.37	4.86	6.23	0.38	NA	0.38	1.97	13.27
1963	3.59	1.27	1.41	5.13	6.55	0.42	NA	0.42	2.14	13.97
1964	3.79	1.37	1.37	5.52	6.89	0.44	NA	0.44	2.32	14.81
1965	3.90	1.44	1.16	5.96	7.11	0.50	NA	0.50	2.32	15.28
1966	4.14	1.62	1.03	6.51	7.55	0.54	NA	0.54	2.61	16.45
1967	4.31	1.96	1.14	6.65	7.79	0.58	NA	0.58	2.75	17.39
1968	4.45	2.08	1.24	7.13	8.37	0.59	NA	0.59	3.15	18.63
1969	4.73	2.25	1.35	7.61	8.96	0.63	NA	0.63	3.49	20.06
1970	4.84	2.40	1.40	7.85	9.25	0.72	NA	0.72	3.93	21.14
1971	4.97	2.51	1.41	8.18	9.59	0.74	NA	0.74	3.98	21.79
1972	5.13	2.61	1.46	8.17	9.62	0.77	NA	0.77	3.98	22.10
1973	4.88	2.60	1.50	8.69	10.18	0.73	NA	0.73	3.66	22.05
1974	4.79	2.56	1.48	8.29	9.77	0.67	NA	0.67	3.44	21.22
1975	4.92	2.51	1.40	6.97	8.36	0.58	NA	0.58	3.16	19.54
1976	5.05	2.67	1.63	6.96	8.60	0.55	NA	0.55	3.08	19.95
1977	4.82	2.50	1.66	6.82	8.47	0.53	NA	0.53	3.19	19.52
1978	4.90	2.60	1.65	6.76	8.40	0.53	NA	0.53	3.19	19.63
1979	4.97	2.79	1.50	6.90	8.40	0.60	NA	0.60	3.49	20.24
1980	4.75	2.61	1.03	7.17	8.20	0.63	NA	0.63	3.68	19.88
1981	4.55	2.52	0.93	7.13	8.06	0.64	NA	0.64	3.64	19.40
1982	4.63	2.61	1.11	5.83	6.94	0.60	NA	0.60	3.23	18.00
1983	4.38	2.43	0.98	5.64	6.62	0.49	NA	0.49	2.91	16.83
1984	4.56	2.52	1.08	6.15	7.23	0.53	NA	0.53	3.11	17.95
1985	4.43	2.43	0.97	5.90	6.87	0.50	NA	0.50	3.04	17.28
1986	4.31	2.32	0.92	5.58	6.50	0.49	NA	0.49	2.60	16.22
1987	4.31	2.43	1.15	5.95	7.10	0.52	NA	0.52	2.84	17.21
1988	4.63	2.67	1.10	6.38	7.48	0.61	NA	0.61	2.64	18.03
1989	4.78	2.72	1.07	6.82	7.89	0.63	NA	0.63	2.79	18.80
1990	4.39	2.62	1.24	7.02	8.25	0.66	(s)	0.66	2.79	18.72
1991	4.56	2.73	1.13	7.23	8.36	0.60	(s)	0.60	2.79	19.04
1992	4.69	2.80	1.17	7.53	8.70	0.59	(s)	0.59	2.77	19.54
1993	4.96	2.86	1.17	7.98	9.15	0.62	(s)	0.63	2.68	20.28
1994	4.85	2.90	1.12	8.17	9.29	0.69	(s)	0.69	2.99	20.71
1995	4.85	3.03	1.22	8.58	9.80	0.70	(s)	0.70	3.20	21.58
1996	[R]5.24	[R]3.16	1.25	[R]8.87	[R]10.12	0.71	(s)	0.71	[R]2.73	[R]21.97
1997[P]	5.04	3.24	1.25	8.80	10.05	0.71	NA	0.71	2.96	21.99

[1] Includes deliveries to municipalities and public authorities for institutional heating and other purposes.
[2] Natural gas consumed in the operation of pipelines, primarily in compressors.
R=Revised. P=Preliminary. NA=Not available. (s)=Less than 5 billion cubic feet.
Notes: • For the definition of natural gas consumption, see Note at end of section. • Beginning with 1965, all volumes are shown on a pressure base of 14.73 p.s.i.a. at 60° F. For prior years, the pressure base was 14.65 p.s.i.a. at 60° F. • Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelnatgas.html.
Sources: **Electric Utilities:** Table 8.8. **All Other Data:** • 1949-1990—Energy Information Administration (EIA), *Natural Gas Annual 1996* (September 1997), Table 101. • 1991 forward—EIA, *Natural Gas Monthly* (February 1998), Table 3.

Figure 6.7 Natural Gas in Underground Storage, End of Year 1954-1997



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

Sources: Tables 6.6 and 6.7.

Table 6.7 Natural Gas in Underground Storage, End of Year 1954-1997

(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	3,068	6,936
1991	3,954	2,824	6,778
1992	4,044	2,597	6,641
1993	4,327	2,322	6,649
1994	4,360	2,606	6,966
1995	4,349	2,153	6,503
1996	[R]4,341	[R]2,173	[R]6,513
1997	4,350	2,170	6,520

[1] Includes native gas.

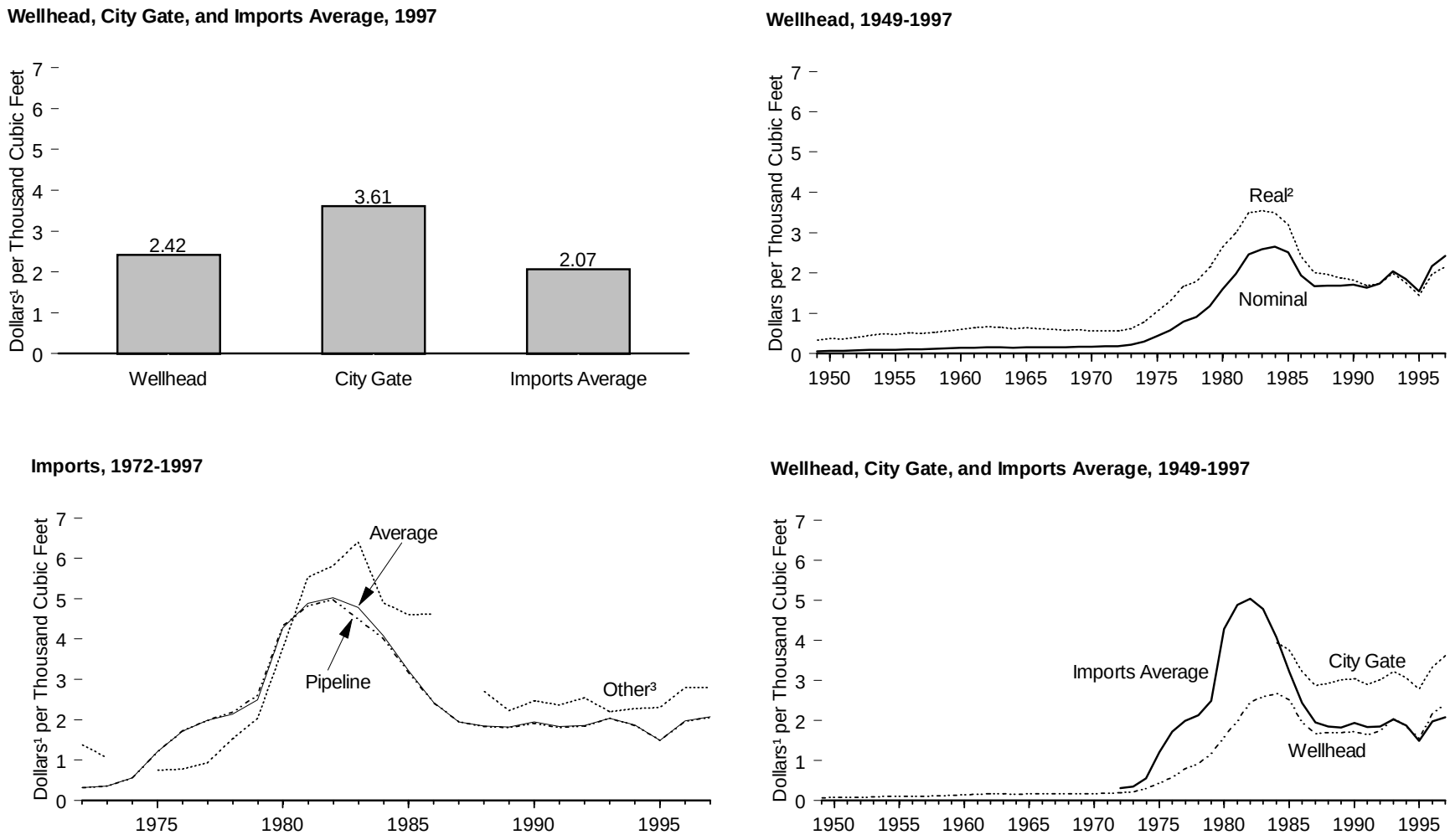
R=Revised. NA=Not available.

Notes: • Beginning with 1965, all volumes are shown on a pressure base of 14.73 p.s.i.a. at 60 degrees F. For prior years, the pressure base was 14.65 p.s.i.a. at 60 degrees F. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelnatgas.html.

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

Figure 6.8 Natural Gas Wellhead, City Gate, and Imports Prices



[1] Nominal Dollars.

[2] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators.

[3] There was no price in 1974 or 1987 because all imports were by pipeline in those years.

Source: Table 6.8.

Table 6.8 Natural Gas Wellhead, City Gate, and Imports Prices, 1949-1997

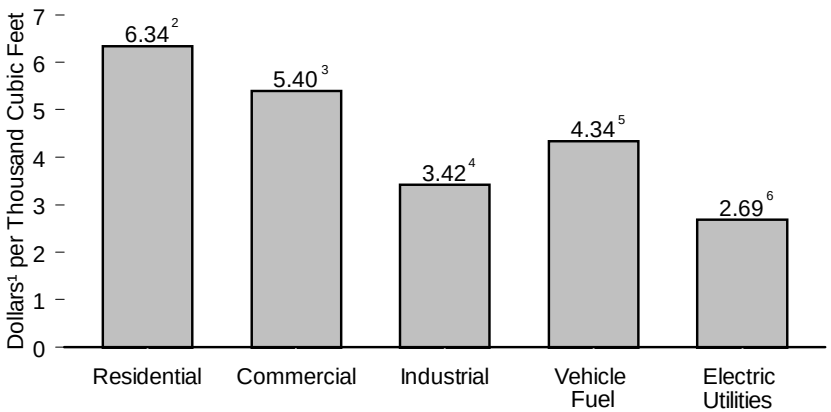
(Dollars per Thousand Cubic Feet)

Year	Wellhead [1]		City Gate		Imports		
	Nominal	Real [2]	Nominal	Real [2]	Pipeline (Nominal)	Other [3] (Nominal)	Average (Nominal)
1949	0.06	R0.33	NA	NA	NA	NA	NA
1950	0.07	R0.38	NA	NA	NA	NA	NA
1951	0.07	R0.36	NA	NA	NA	NA	NA
1952	0.08	R0.40	NA	NA	NA	NA	NA
1953	0.09	R0.45	NA	NA	NA	NA	NA
1954	0.10	R0.49	NA	NA	NA	NA	NA
1955	0.10	R0.48	NA	NA	NA	NA	NA
1956	0.11	R0.51	NA	NA	NA	NA	NA
1957	0.11	R0.50	NA	NA	NA	NA	NA
1958	0.12	R0.53	NA	NA	NA	NA	NA
1959	0.13	0.57	NA	NA	NA	NA	NA
1960	0.14	0.60	NA	NA	NA	NA	NA
1961	0.15	0.64	NA	NA	NA	NA	NA
1962	0.16	0.67	NA	NA	NA	NA	NA
1963	0.16	0.66	NA	NA	NA	NA	NA
1964	0.15	0.61	NA	NA	NA	NA	NA
1965	0.16	0.64	NA	NA	NA	NA	NA
1966	0.16	0.62	NA	NA	NA	NA	NA
1967	0.16	0.60	NA	NA	NA	NA	NA
1968	0.16	0.58	NA	NA	NA	NA	NA
1969	0.17	0.59	NA	NA	NA	NA	NA
1970	0.17	0.56	NA	NA	NA	NA	NA
1971	0.18	0.56	NA	NA	NA	NA	NA
1972	0.19	0.57	NA	NA	0.31	1.38	0.31
1973	0.22	0.62	NA	NA	0.35	1.05	0.35
1974	0.30	0.78	NA	NA	0.55	([4])	0.55
1975	0.44	R1.05	NA	NA	1.21	0.74	1.21
1976	0.58	1.30	NA	NA	1.73	0.77	1.72
1977	0.79	1.67	NA	NA	1.99	0.92	1.98
1978	0.91	R1.79	NA	NA	2.19	1.53	2.13
1979	1.18	R2.14	NA	NA	2.61	2.03	2.49
1980	1.59	R2.64	NA	NA	4.32	3.77	4.28
1981	1.98	3.00	NA	NA	4.83	5.54	4.88
1982	2.46	R3.50	NA	NA	4.97	5.82	5.03
1983	2.59	3.54	NA	NA	4.49	6.41	4.78
1984	2.66	3.50	3.95	5.20	4.01	4.90	4.08
1985	2.51	3.20	3.75	4.78	3.17	4.60	3.21
1986	1.94	2.41	3.22	4.00	2.42	4.62	2.43
1987	1.67	2.01	2.87	3.45	1.95	0.00	1.95
1988	1.69	1.96	2.92	3.39	1.83	2.71	1.84
1989	1.69	1.88	3.01	3.36	1.81	2.22	1.82
1990	1.71	1.83	3.03	3.24	1.91	2.47	1.94
1991	1.64	1.69	2.90	2.98	1.81	2.36	1.83
1992	1.74	1.74	3.01	3.01	1.84	2.54	1.85
1993	2.04	1.99	3.21	3.13	2.03	2.20	2.03
1994	1.85	1.76	3.07	2.92	1.86	2.28	1.87
1995	1.55	1.44	2.78	2.58	1.49	2.30	1.49
1996	R2.17	R1.97	3.34	3.03	1.96	R2.80	R1.97
1997	E2.42	E2.15	3.61	3.21	E2.06	E2.80	E2.07

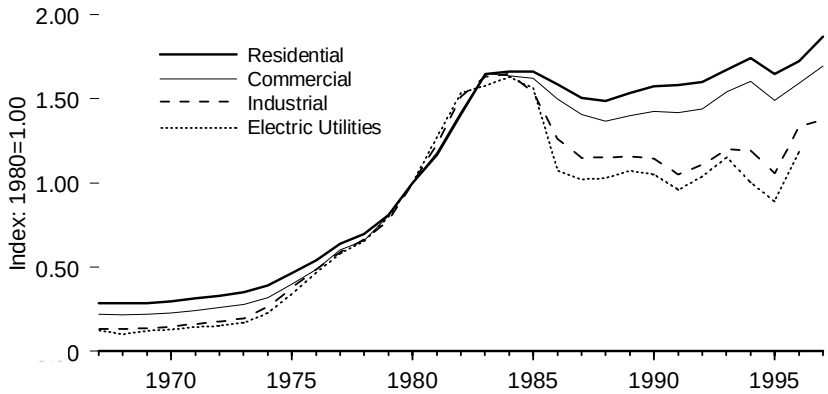
[1] See Glossary for definition of Natural Gas Wellhead Price.
[2] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Appendix Table 3.1.
[3] Primarily liquefied natural gas from Algeria.
[4] Not applicable. All imports were by pipeline.
R=Revised. E=Estimated. NA=Not available.
Web Page: http://www.eia.doe.gov/fuelnatgas.html.
Sources: **Wellhead:** • 1949-1990—Energy Information Administration (EIA), *Natural Gas Annual 1996* (September 1997), Table 99. • 1991 forward—EIA, *Natural Gas Monthly* (March 1998), Table 4. **City Gate:** • 1984-1990—EIA, *Natural Gas Annual,* various issues. • 1991 forward—EIA, *Natural Gas Monthly* (March 1998), Table 4. **Imports:** • 1972 and 1973—Federal Power Commission (FPC), *Pipeline Imports and Exports of Natural Gas - Imports and Exports of LNG.* • 1974-1976—FPC, *United States Imports and Exports of Natural Gas,* annual. • 1977-1988—EIA, *Natural Gas Monthly* (August 1994), Table FE7. • 1989-1991—EIA, *Natural Gas Annual* (1993), Table 10. 1992-1996—EIA, *Natural Gas Monthly* (March 1998), Table 5. • 1997—EIA estimates.

Figure 6.9 Natural Gas Prices by Sector

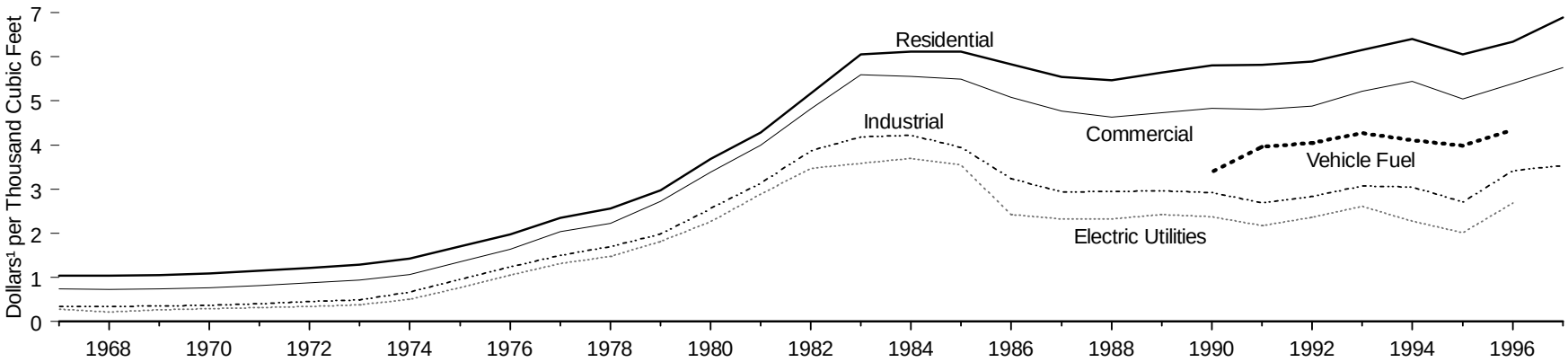
Prices, 1996



Prices, Indexed, 1967-1997



Prices, 1967-1997



[1] Nominal dollars.
[2] Based on 100 percent of volume delivered.
[3] Based on 77.6 percent of volume delivered.
[4] Based on 20.2 percent of volume delivered.
[5] Based on 94.0 percent of volume delivered.
[6] Based on all steam-electric utility plants with a combined capacity of 50 megawatts or greater.

Source: Table 6.9.

Table 6.9 Natural Gas Prices by Sector, 1967-1997

(Price: Dollars[1] per Thousand Cubic Feet; Share of Total Volume Delivered: Percentage)

	Residential	Commercial [2]		Industrial		Vehicle Fuel [3]		Electric Utilities
Year	Price [4]	Price	Share of Total Volume Delivered	Price	Share of Total Volume Delivered	Price	Share of Total Volume Delivered	Price [5]
1967	1.04	0.74	NA	0.34	NA	NA	NA	0.28
1968	1.04	0.73	NA	0.34	NA	NA	NA	0.22
1969	1.05	0.74	NA	0.35	NA	NA	NA	0.27
1970	1.09	0.77	NA	0.37	NA	NA	NA	0.29
1971	1.15	0.82	NA	0.41	NA	NA	NA	0.32
1972	1.21	0.88	NA	0.45	NA	NA	NA	0.34
1973	1.29	0.94	NA	0.50	NA	NA	NA	0.38
1974	1.43	1.07	NA	0.67	NA	NA	NA	0.51
1975	1.71	1.35	NA	0.96	NA	NA	NA	0.77
1976	1.98	1.64	NA	1.24	NA	NA	NA	1.06
1977	2.35	2.04	NA	1.50	NA	NA	NA	1.32
1978	2.56	2.23	NA	1.70	NA	NA	NA	1.48
1979	2.98	2.73	NA	1.99	NA	NA	NA	1.81
1980	3.68	3.39	NA	2.56	NA	NA	NA	2.27
1981	4.29	4.00	NA	3.14	NA	NA	NA	2.89
1982	5.17	4.82	NA	3.87	85.1	NA	NA	3.48
1983	6.06	5.59	NA	4.18	80.7	NA	NA	3.58
1984	6.12	5.55	NA	4.22	74.7	NA	NA	3.70
1985	6.12	5.50	NA	3.95	68.8	NA	NA	3.55
1986	5.83	5.08	NA	3.23	59.8	NA	NA	2.43
1987	5.54	4.77	93.1	2.94	47.4	NA	NA	2.32
1988	5.47	4.63	90.7	2.95	42.6	NA	NA	2.33
1989	5.64	4.74	89.1	2.96	36.9	NA	NA	2.43
1990	5.80	4.83	86.6	2.93	35.2	3.39	NA	2.38
1991	5.82	4.81	85.1	2.69	32.7	3.96	NA	2.18
1992	5.89	4.88	83.2	2.84	30.3	4.05	NA	2.36
1993	6.16	5.22	83.9	3.07	29.7	4.27	87.8	2.61
1994	6.41	5.44	79.3	3.05	25.5	[R]4.11	86.9	2.28
1995	6.06	5.05	76.7	2.71	24.5	3.98	86.6	2.02
1996	[R]6.34	[R]5.40	[R]77.6	[R]3.42	[R]20.2	[R]4.34	[R]94.0	[R]2.69
1997[P]	6.89	5.75	65.0	3.53	15.3	NA	NA	NA

[1] Nominal dollars.
[2] Includes deliveries to municipalities and public authorities for institutional heating and other purposes.
[3] Much of the natural gas delivered for vehicle fuel represents deliveries to fueling stations that are used primarily or exclusively by respondents' fleet vehicles. Thus, the prices are often those associated with the operation of fleet vehicles.
[4] Based on 100 percent of volume delivered.
[5] Based on all steam-electric utility plants with a combined capacity of 50 megawatts or greater.
R=Revised. P=Preliminary. NA=Not available.
Notes: • Natural gas includes supplemental gaseous fuels. • Residential, commercial, and industrial price data represent prices of natural gas sold and delivered by local distribution companies to residential, commercial, and industrial consumers, respectively. The data do not reflect prices of natural gas transported for the account of others. • The average for each end-use sector is calculated by dividing the total value of the gas consumed by each sector by the total quantity consumed. See Note at end of section.
Web Page: http://www.eia.doe.gov/fuelnatgas.html.
Sources: **Vehicle Fuel:** 1990-1996—EIA, *Natural Gas Annual 1996 (September 1997), Table 102.* **All Other Data:** • 1967-1990—EIA, *Natural Gas Annual 1996* (September 1997), Table 102. • 1991 forward—EIA, *Natural Gas Monthly* (March 1998), Table 4.

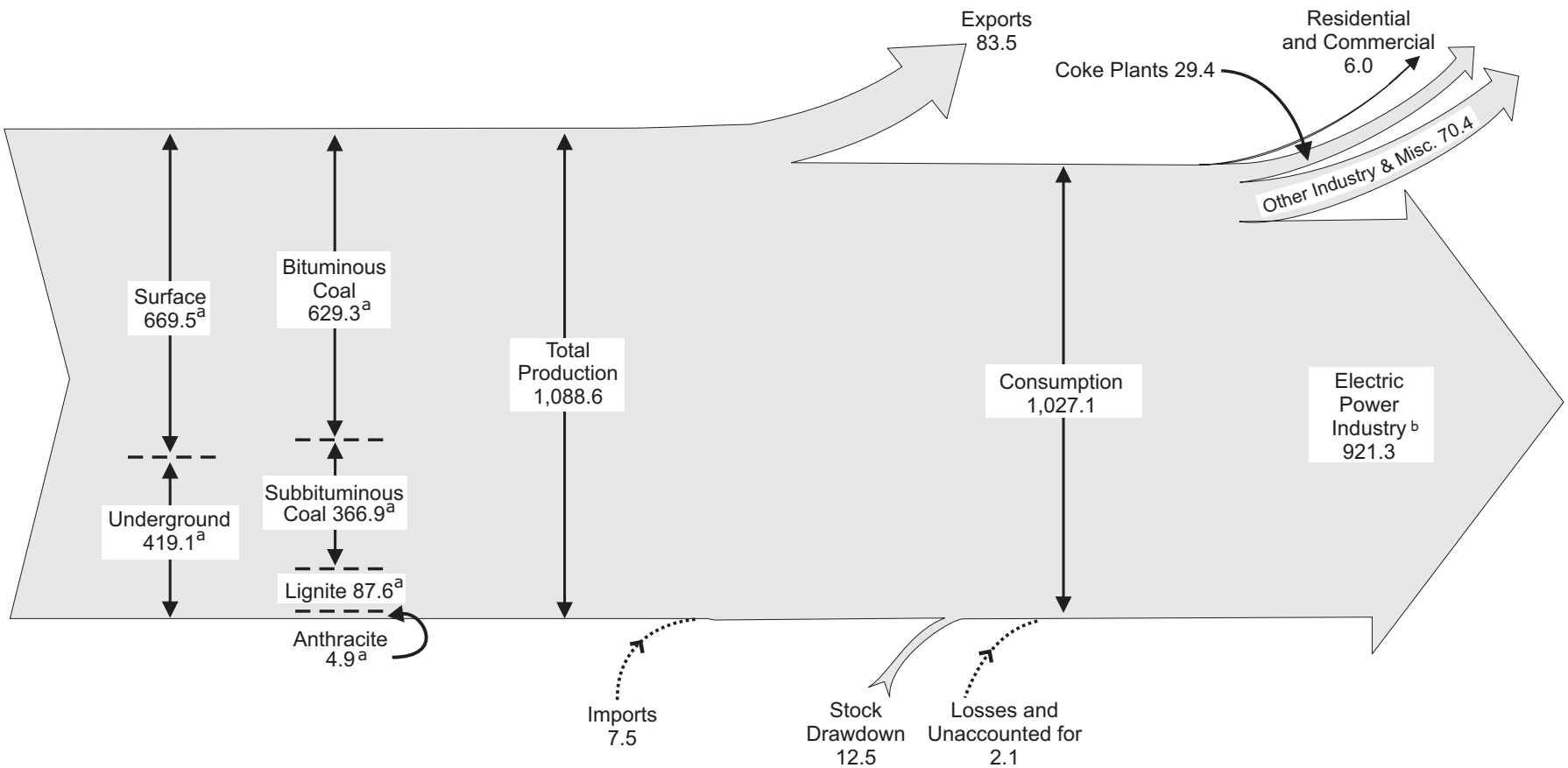
Natural Gas Note

Natural gas consumption statistics are compiled from surveys of natural gas production, transmission, and distribution companies and electric utility companies. Consumption by sector from these surveys is compiled on a national and individual State basis and then balanced with national and individual State supply data. Included in the data are the following: Commercial Sector-consumption by nonmanufacturing establishments, by municipalities for institutional heating and lighting, and those engaged in agriculture, forestry, and fishing; Electric Utility Sector-consumption by electric utilities for the generation of electric power; Industrial Sector-consumption by establishments engaged primarily in processing unfinished materials into another form of product (includes mining, petroleum refining, manufacturing, and natural gas industry use for lease and plant fuel); Residential Sector-consumption by private households for space heating, cooking, and other household uses; Transportation Sector-natural gas transmission (pipeline) fuel.

7 Coal

Coal yard, Curtis Bay, Maryland. Source: U.S. Department of Energy.

Diagram 4. Coal Flow, 1997
(Million Short Tons)

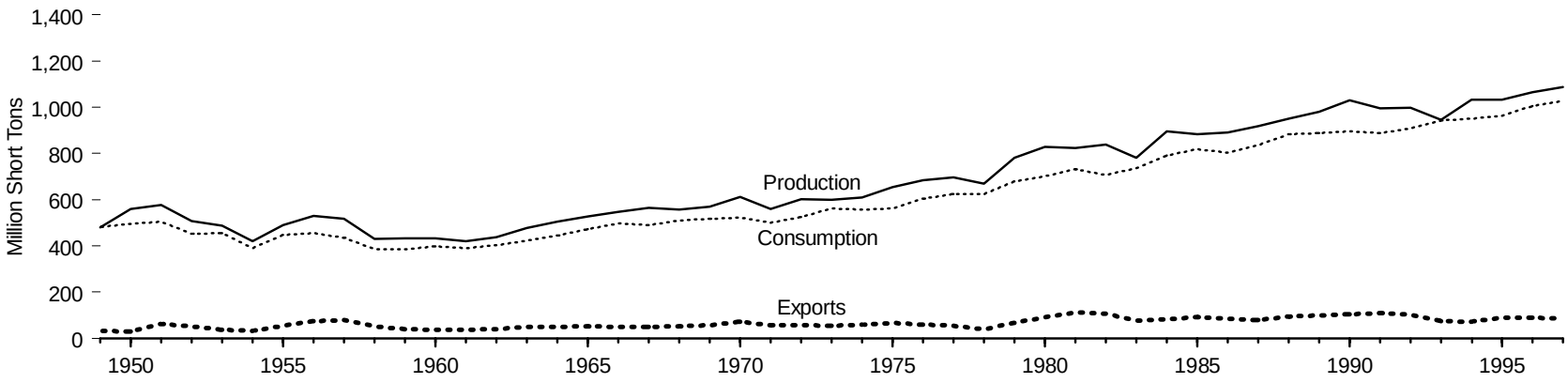


[a] Estimated.
[b] Includes 22.8 million short tons consumed by independent power producers.

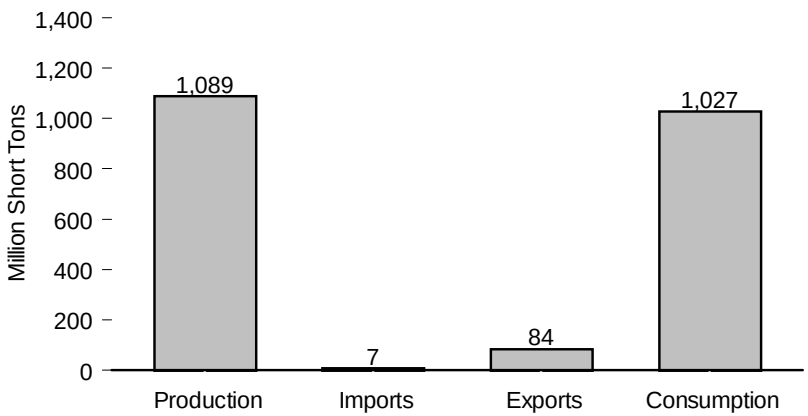
Notes: • Data are preliminary. • Totals may not equal sum of components due to independent rounding.
Sources: Tables 7.1, 7.2, and 7.3.

Figure 7.1 Coal Overview

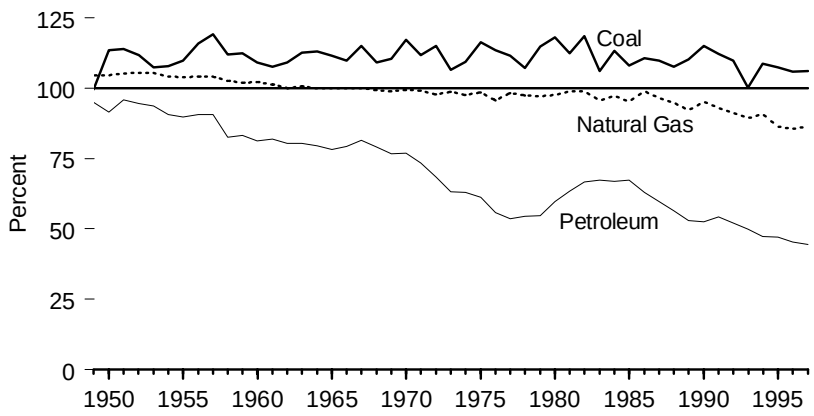
Overview, 1949-1997



Overview, 1997



Production as Share of Consumption by Type of Fossil Fuel, 1949-1997



Sources: Tables 5.1, 6.1, and 7.1.

Table 7.1 Coal Overview, 1949-1997

(Million Short Tons)

Year	Production	Imports	Exports	Stock Change [1]	Losses and Unaccounted for [2]	Consumption [3]
1949	480.6	0.3	32.8	(4)	[5]-35.1	483.2
1950	560.4	0.4	29.4	(4)	[5]37.3	494.1
1951	576.3	0.3	62.7	(4)	[5]8.1	505.9
1952	507.4	0.3	52.2	(4)	[5]1.4	454.1
1953	488.2	0.3	36.5	(4)	[5]-2.8	454.8
1954	420.8	0.2	33.9	(4)	[5]-2.8	389.9
1955	490.8	0.3	54.4	(4)	[5]-10.3	447.0
1956	529.8	0.4	73.8	(4)	[5]-0.5	456.9
1957	518.0	0.4	80.8	(4)	[5]3.2	434.5
1958	431.6	0.3	52.6	(4)	[5]-6.4	385.7
1959	432.7	0.4	39.0	(4)	[5]9.0	385.1
1960	434.3	0.3	38.0	(4)	[5]-1.5	398.1
1961	420.4	0.2	36.4	(4)	[5]-6.2	390.4
1962	439.0	0.2	40.2	(4)	[5]-3.2	402.3
1963	477.2	0.3	50.4	(4)	[5]3.6	423.5
1964	504.2	0.3	49.5	(4)	[5]9.3	445.7
1965	527.0	0.2	51.0	(4)	[5]4.1	472.0
1966	546.8	0.2	50.1	(4)	[5]-0.8	497.7
1967	564.9	0.2	50.1	(4)	[5]23.6	491.4
1968	556.7	0.2	51.2	(4)	[5]-4.1	509.8
1969	571.0	0.1	56.9	(4)	[5]-2.2	516.4
1970	612.7	(s)	71.7	(4)	[5]17.7	523.2
1971	560.9	0.1	57.3	(4)	[5]2.2	501.6
1972	602.5	(s)	56.7	(4)	[5]21.5	524.3
1973	598.6	0.1	53.6	(4)	[5]-17.5	562.6
1974	610.0	2.1	60.7	-8.9	2.0	558.4
1975	654.6	0.9	66.3	32.2	-5.5	562.6
1976	684.9	1.2	60.0	8.5	13.8	603.8
1977	697.2	1.6	54.3	22.6	-3.4	625.3
1978	670.2	3.0	40.7	-4.9	12.1	625.2
1979	781.1	2.1	66.0	36.2	0.4	680.5
1980	829.7	1.2	91.7	25.6	10.8	702.7
1981	823.8	1.0	112.5	-19.0	-1.4	732.6
1982	838.1	0.7	106.3	22.6	3.1	706.9
1983	782.1	1.3	77.8	-29.5	-1.6	736.7
1984	895.9	1.3	81.5	28.7	-4.3	791.3
1985	883.6	2.0	92.7	-27.9	2.8	818.0
1986	890.3	2.2	85.5	4.0	-1.2	804.2
1987	918.8	1.7	79.6	6.5	-2.5	836.9
1988	950.3	2.1	95.0	-24.9	-1.3	883.6
1989	980.7	2.9	100.8	-13.7	6.8	889.7
1990	1,029.1	2.7	105.8	26.5	3.9	895.5
1991	996.0	3.4	109.0	-0.9	3.7	887.6
1992	997.5	3.8	102.5	-3.0	-5.8	[R,3]907.7
1993	945.4	7.3	74.5	-51.9	-13.9	[R]944.1
1994	1,033.5	7.6	71.4	23.6	-5.3	[R]951.5
1995	1,033.0	7.2	88.5	-0.3	-10.1	[R]962.0
1996	[R]1,063.9	7.1	90.5	-17.5	-7.6	[R]1,005.6
1997	1,088.6	7.5	83.5	-12.5	-2.1	1,027.1

[1] Includes changes in stocks at electric utilities, coke plants, other industries, retail dealers, producers and distributors. A negative value indicates a decrease in stocks; and a positive value indicates an increase in stocks.

[2] Production plus imports minus exports, stock change, and consumption.

[3] Independent power producers' use of coal (nonutility power producers in SIC 49, "Electric Gas, and Sanitary Services") are included beginning in 1992. See Table 7.3.

[4] Included in "Losses and Unaccounted for."

[5] Includes "Stock Change."

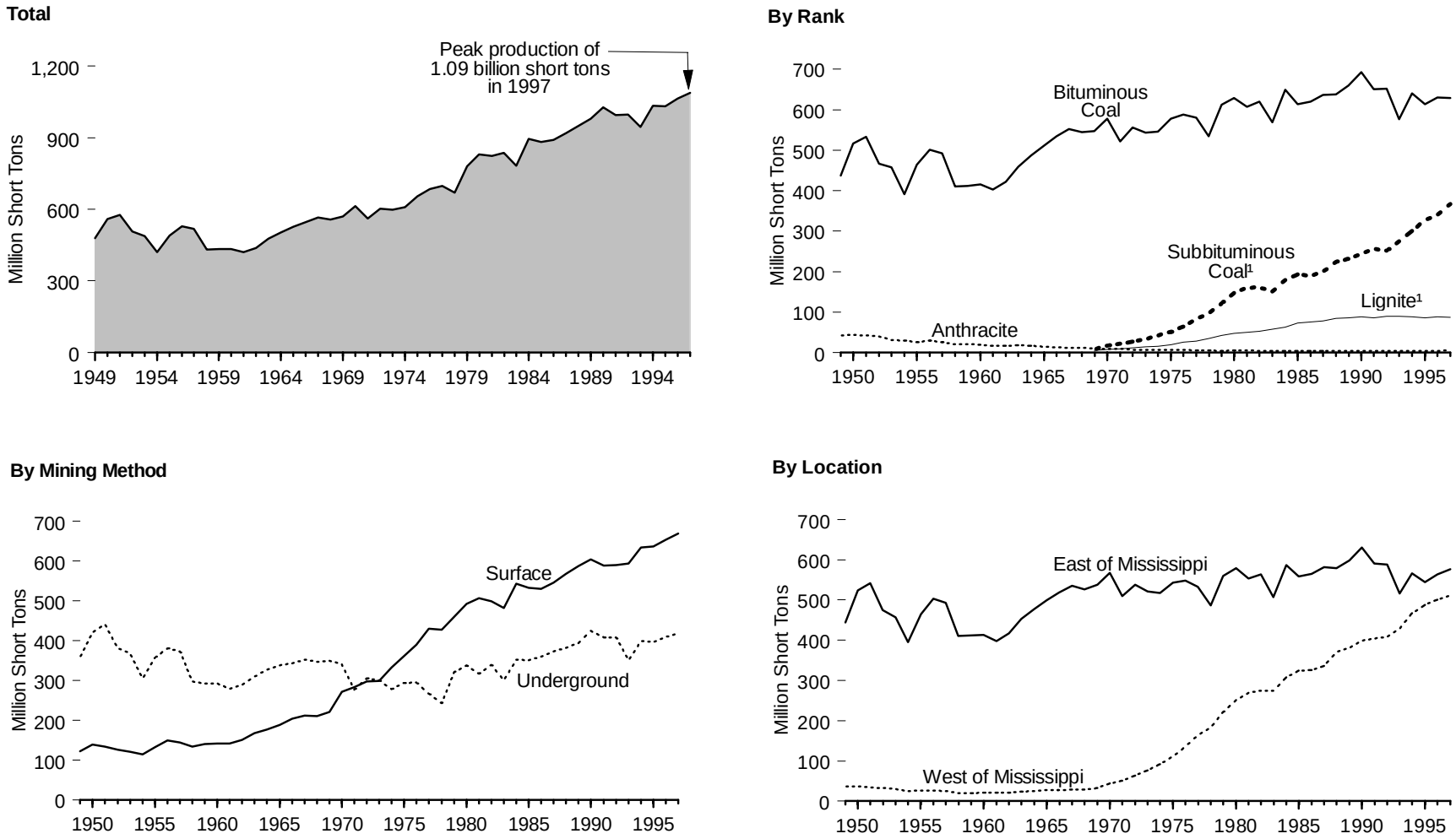
R=Revised. (s)=Less than 0.05 million short tons.

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

Web Page: http://www.eia.doe.gov/fuellcoal.html.

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.* • 1981-1996—EIA, *Weekly Coal Production, Coal Production* (annual), *Coal Industry Annual 1996,* (November 1997), and *Quarterly Coal Report October-December 1996* (May 1997), Table 1. • 1997—Tables, 7.2, 7.3, and 7.4 of this report, and EIA, *Monthly Energy Review* (March 1998), Table 6.1.

Figure 7.2 Coal Production, 1949-1997



¹ Included with bituminous coal prior to 1969.
Note: Because vertical scales differ, graphs should not be compared.

Source: Table 7.2.

Table 7.2 Coal Production, 1949-1997

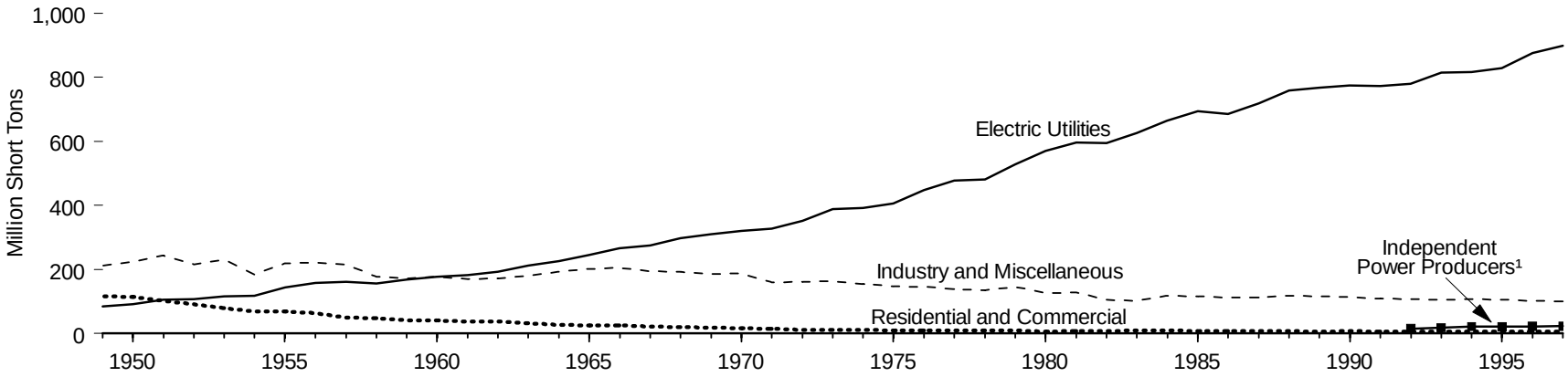
(Million Short Tons)

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	650.7	255.3	86.5	3.4	407.2	588.8	404.7	591.3	996.0
1992	[R]651.8	[R]252.2	90.1	3.5	407.2	590.3	409.0	588.6	997.5
1993	576.7	274.9	89.5	4.3	351.1	594.4	429.2	516.2	945.4
1994	640.3	300.5	88.1	4.6	399.1	634.4	467.2	566.3	1,033.5
1995	613.8	328.0	86.5	4.7	396.2	636.7	488.7	544.2	1,033.0
1996	[R]630.8	[R]340.3	[R]88.1	[R]4.8	[R]409.8	[R]654.0	[R]500.2	[R]563.7	[R]1,063.9
1997	[E]629.3	[E]366.9	[E]87.6	[P]4.9	[E]419.1	[E]669.5	[P]511.3	[P]577.3	[P]1,088.6

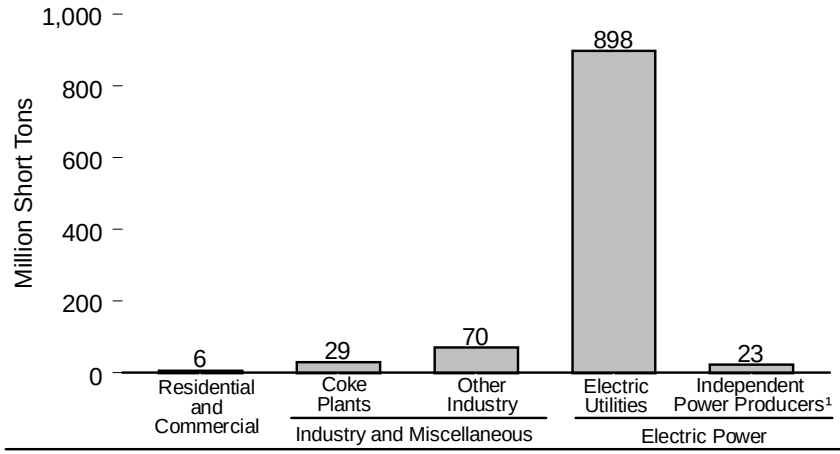
[1] Included in bituminous coal.
R=Revised. E=Estimated.
Note: Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelcoal.html.
Sources: • 1949-1975—Bureau of Mines, *Minerals Yearbook,* "Coal-Bituminous and Lignite" and "Coal-Pennsylvania Anthracite" 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). • 1981-1992—EIA, *Weekly Coal Production* and *Coal Production* (annual). • 1993–1996—EIA, *Coal Industry Annual 1996* (November 1997), Tables 1, 3, and 9. • 1997—EIA estimates.

Figure 7.3 Coal Consumption by Sector

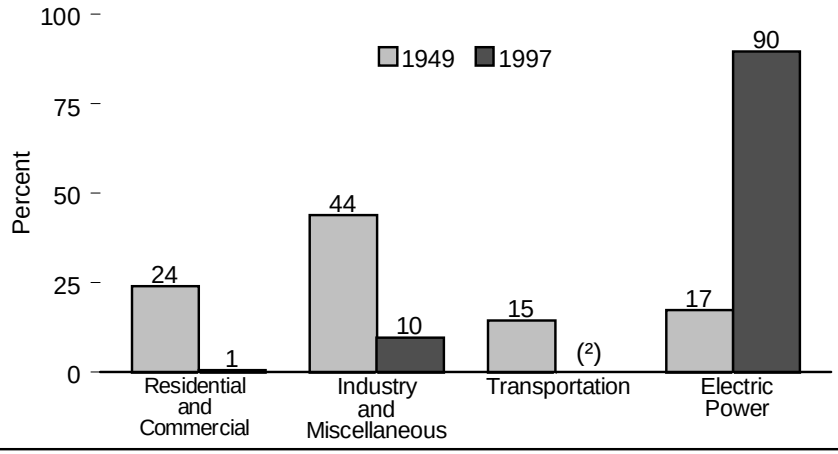
By Sector, 1949-1997



By Sector, 1997



Shares by Sector, 1949 and 1997



[1]Wholesale producers of electricity that are not franchised utilities and not cogeneration plants included in the commercial or industrial sector.

[2]Small amounts of coal for transportation use are included in Industry and Miscellaneous.

Source: Table 7.3.

Table 7.3 Coal Consumption by Sector, 1949-1997

(Million Short Tons)

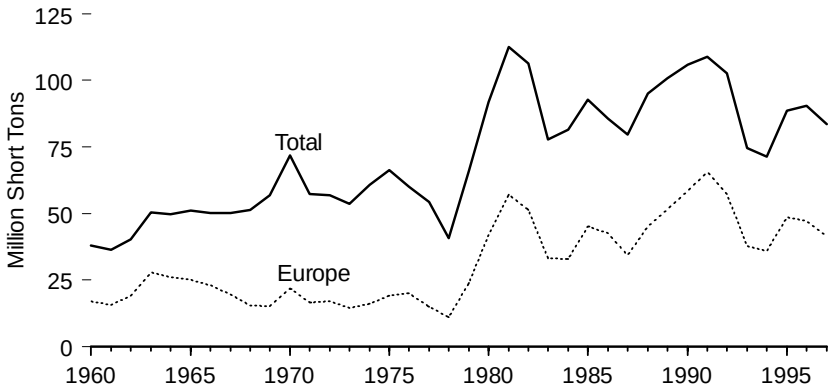
Year	Residential and Commercial	Industry and Miscellaneous			Transportation	Electric Power Industry			Total
		Coke Plants	Other Industry [1] and Miscellaneous	Total		Electric Utilities	Independent Power Producers [2]	Total	
1949	116.5	91.4	121.2	212.6	70.2	84.0	NA	84.0	483.2
1950	114.6	104.0	120.6	224.6	63.0	91.9	NA	91.9	494.1
1951	101.5	113.7	128.7	242.4	56.2	105.8	NA	105.8	505.9
1952	92.3	97.8	117.1	214.9	39.8	107.1	NA	107.1	454.1
1953	79.2	113.1	117.0	230.1	29.6	115.9	NA	115.9	454.8
1954	69.1	85.6	98.2	183.9	18.6	118.4	NA	118.4	389.9
1955	68.4	107.7	110.1	217.8	17.0	143.8	NA	143.8	447.0
1956	64.2	106.3	114.3	220.6	13.8	158.3	NA	158.3	456.9
1957	49.0	108.4	106.5	214.9	9.8	160.8	NA	160.8	434.5
1958	47.9	76.8	100.5	177.4	4.7	155.7	NA	155.7	385.7
1959	40.8	79.6	92.7	172.3	3.6	168.4	NA	168.4	385.1
1960	40.9	81.4	96.0	177.4	3.0	176.7	NA	176.7	398.1
1961	37.3	74.2	95.9	170.1	0.8	182.2	NA	182.2	390.4
1962	36.5	74.7	97.1	171.7	0.7	193.3	NA	193.3	402.3
1963	31.5	78.1	101.9	180.0	0.7	211.3	NA	211.3	423.5
1964	27.2	89.2	103.1	192.4	0.7	225.4	NA	225.4	445.7
1965	25.7	95.3	105.6	200.8	0.7	244.8	NA	244.8	472.0
1966	25.6	96.4	108.7	205.1	0.6	266.5	NA	266.5	497.7
1967	22.1	92.8	101.8	194.6	0.5	274.2	NA	274.2	491.4
1968	20.0	91.3	100.4	191.6	0.4	297.8	NA	297.8	509.8
1969	18.9	93.4	93.1	186.6	0.3	310.6	NA	310.6	516.4
1970	16.1	96.5	90.2	186.6	0.3	320.2	NA	320.2	523.2
1971	15.2	83.2	75.6	158.9	0.2	327.3	NA	327.3	501.6
1972	11.7	87.7	72.9	160.6	0.2	351.8	NA	351.8	524.3
1973	11.1	94.1	68.0	162.1	0.1	389.2	NA	389.2	562.6
1974	11.4	90.2	64.9	155.1	0.1	391.8	NA	391.8	558.4
1975	9.4	83.6	63.6	147.2	(s)	406.0	NA	406.0	562.6
1976	8.9	84.7	61.8	146.5	(s)	448.4	NA	448.4	603.8
1977	9.0	77.7	61.5	139.2	(s)	477.1	NA	477.1	625.3
1978	9.5	71.4	63.1	134.5	(3)	481.2	NA	481.2	625.2
1979	8.4	77.4	67.7	145.1	(3)	527.1	NA	527.1	680.5
1980	6.5	66.7	60.3	127.0	(3)	569.3	NA	569.3	702.7
1981	7.4	61.0	67.4	128.4	(3)	596.8	NA	596.8	732.6
1982	8.2	40.9	64.1	105.0	(3)	593.7	NA	593.7	706.9
1983	8.4	37.0	66.0	103.0	(3)	625.2	NA	625.2	736.7
1984	9.1	44.0	73.7	117.8	(3)	664.4	NA	664.4	791.3
1985	7.8	41.1	75.4	116.4	(3)	693.8	NA	693.8	818.0
1986	7.7	35.9	75.6	111.5	(3)	685.1	NA	685.1	804.2
1987	6.9	37.0	75.2	112.1	(3)	717.9	NA	717.9	836.9
1988	7.1	41.9	76.3	118.1	(3)	758.4	NA	758.4	883.6
1989	6.2	40.5	76.1	116.6	(3)	766.9	NA	766.9	889.7
1990	6.7	38.9	76.3	115.2	(3)	773.5	NA	773.5	895.5
1991	6.1	33.9	75.4	109.3	(3)	772.3	NA	772.3	887.6
1992	6.2	32.4	74.0	106.4	(3)	779.9	R15.2	R,4795.1	R,4907.7
1993	6.2	31.3	74.9	106.2	(3)	813.5	R18.1	R831.6	R944.1
1994	6.0	31.7	75.2	106.9	(3)	817.3	R21.3	R838.5	R951.5
1995	5.8	33.0	R73.1	R106.1	(3)	829.0	21.2	850.2	R962.0
1996	6.0	R31.7	R70.9	102.6	(3)	R874.7	R22.2	R896.9	R1,005.6
1997	6.0	29.4	70.4	99.8	(3)	898.5	E22.8	921.3	1,027.1

[1] See Note at end of section.
[2] Wholesale producers of electricity that are not franchised utilities and not cogeneration plants that are included in the commercial and industrial sectors.
[3] After 1977, small amounts of coal consumed by Transportation Sector are included in "Other Industry and Miscellaneous."
[4] There is a discontinuity in this time series between 1991 and 1992 due to the addition of the coal consumed by independent power producers beginning in 1992.
R=Revised. E=Estimated. NA=Not available. (s)=Less than 0.05 million short tons.
Notes: • See Note at end of section. • Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelcoal.html.

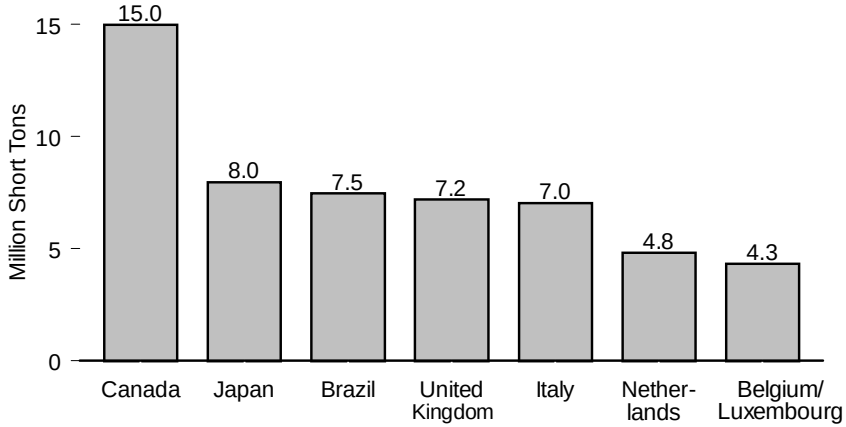
Sources: **Independent Power Producers:** Energy Information Administration (EIA), Form EIA-867, "Annual Nonutility Power Producers Report." **All Other Data:** • 1949-1975—Bureau of Mines, *Minerals Yearbook,* "Coal-Bituminous and Lignite" and "Coal-Pennsylvania Anthracite" chapters. • 1976—EIA, Energy Data Report, *Coal-Bituminous and Lignite in 1976* and *Coal-Pennsylvania Anthracite 1976.* • 1977 and 1978—EIA, Energy Data Report, *Coal-Pennsylvania Anthracite 1977; 1978,* and *Weekly Coal Report.* • 1979 and 1980—EIA, Energy Data Report, *Weekly Coal Report.* • 1981–1988—EIA, *Quarterly Coal Report October-December 1989* (May 1990), Table 23. • 1989–1994—EIA, *Quarterly Coal Report October-December 1995* (May 1996), Table 45. • 1995–1996—EIA, *Quarterly Coal Report October-December 1997* (May 1998), Table 45. • 1997—EIA, *Monthly Energy Review* (March 1998), Table 6.2.

Figure 7.4 Coal Exports by Country of Destination

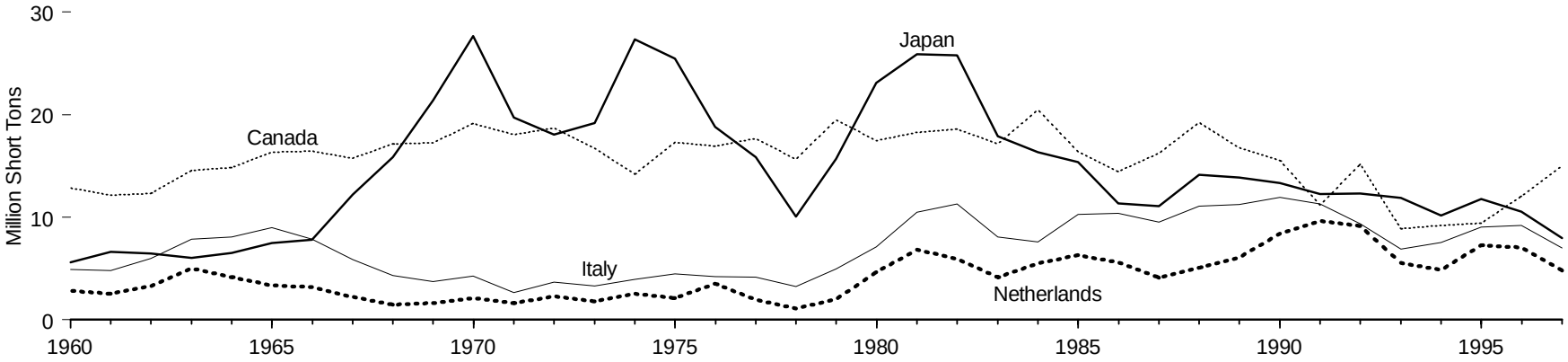
Total and Europe, 1960-1997



By Selected Country, 1997



By Selected Country, 1960-1997



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

Source: Table 7.4.

Table 7.4 Coal Exports by Country of Destination, 1960-1997

(Million Short Tons)

Year	Canada	Brazil	Europe										Japan	Other	Total
			Belgium/ Luxembourg	Denmark	France	Germany [1]	Italy	Netherlands	Spain	United Kingdom	Other	Total			
1960	12.8	1.1	1.1	0.1	0.8	4.6	4.9	2.8	0.3	0.0	2.4	17.1	5.6	1.3	38.0
1961	12.1	1.0	1.0	0.1	0.7	4.3	4.8	2.6	0.2	0.0	2.0	15.7	6.6	1.0	36.4
1962	12.3	1.3	1.3	(s)	0.9	5.1	6.0	3.3	0.8	(s)	1.8	19.1	6.5	1.0	40.2
1963	14.6	1.2	2.7	(s)	2.7	5.6	7.9	5.0	1.5	0.0	2.4	27.7	6.1	0.9	50.4
1964	14.8	1.1	2.3	(s)	2.2	5.2	8.1	4.2	1.4	0.0	2.6	26.0	6.5	1.1	49.5
1965	16.3	1.2	2.2	(s)	2.1	4.7	9.0	3.4	1.4	(s)	2.3	25.1	7.5	0.9	51.0
1966	16.5	1.7	1.8	(s)	1.6	4.9	7.8	3.2	1.2	(s)	2.5	23.1	7.8	1.0	50.1
1967	15.8	1.7	1.4	0.0	2.1	4.7	5.9	2.2	1.0	0.0	2.1	19.4	12.2	1.0	50.1
1968	17.1	1.8	1.1	0.0	1.5	3.8	4.3	1.5	1.5	0.0	1.9	15.5	15.8	0.9	51.2
1969	17.3	1.8	0.9	0.0	2.3	3.5	3.7	1.6	1.8	0.0	1.3	15.2	21.4	1.2	56.9
1970	19.1	2.0	1.9	0.0	3.6	5.0	4.3	2.1	3.2	(s)	1.8	21.8	27.6	1.2	71.7
1971	18.0	1.9	0.8	0.0	3.2	2.9	2.7	1.6	2.6	1.7	1.1	16.6	19.7	1.1	57.3
1972	18.7	1.9	1.1	0.0	1.7	2.4	3.7	2.3	2.1	2.4	1.1	16.9	18.0	1.2	56.7
1973	16.7	1.6	1.2	0.0	2.0	1.6	3.3	1.8	2.2	0.9	1.3	14.4	19.2	1.6	53.6
1974	14.2	1.3	1.1	0.0	2.7	1.5	3.9	2.6	2.0	1.4	0.9	16.1	27.3	1.8	60.7
1975	17.3	2.0	0.6	0.0	3.6	2.0	4.5	2.1	2.7	1.9	1.6	19.0	25.4	2.6	66.3
1976	16.9	2.2	2.2	(s)	3.5	1.0	4.2	3.5	2.5	0.8	2.1	19.9	18.8	2.1	60.0
1977	17.7	2.3	1.5	0.1	2.1	0.9	4.1	2.0	1.6	0.6	2.1	15.0	15.9	3.5	54.3
1978	15.7	1.5	1.1	0.0	1.7	0.6	3.2	1.1	0.8	0.4	2.2	11.0	10.1	2.5	40.7
1979	19.5	2.8	3.2	0.2	3.9	2.6	5.0	2.0	1.4	1.4	4.4	23.9	15.7	4.1	66.0
1980	17.5	3.3	4.6	1.7	7.8	2.5	7.1	4.7	3.4	4.1	6.0	41.9	23.1	6.0	91.7
1981	18.2	2.7	4.3	3.9	9.7	4.3	10.5	6.8	6.4	2.3	8.8	57.0	25.9	8.7	112.5
1982	18.6	3.1	4.8	2.8	9.0	2.3	11.3	5.9	5.6	2.0	7.6	51.3	25.8	7.5	106.3
1983	17.2	3.6	2.5	1.7	4.2	1.5	8.1	4.2	3.3	1.2	6.4	33.1	17.9	6.1	77.8
1984	20.4	4.7	3.9	0.6	3.8	0.9	7.6	5.5	2.3	2.9	5.3	32.8	16.3	7.2	81.5
1985	16.4	5.9	4.4	2.2	4.5	1.1	10.3	6.3	3.5	2.7	10.3	45.1	15.4	9.9	92.7
1986	14.5	5.7	4.4	2.1	5.4	0.8	10.4	5.6	2.6	2.9	8.4	42.6	11.4	11.4	85.5
1987	16.2	5.8	4.6	0.9	2.9	0.5	9.5	4.1	2.5	2.6	6.6	34.2	11.1	12.3	79.6
1988	19.2	5.3	6.5	2.8	4.3	0.7	11.1	5.1	2.5	3.7	8.5	45.1	14.1	11.3	95.0
1989	16.8	5.7	7.1	3.2	6.5	0.7	11.2	6.1	3.3	4.5	8.9	51.6	13.8	12.9	100.8
1990	15.5	5.8	8.5	3.2	6.9	1.1	11.9	8.4	3.8	5.2	9.5	58.4	13.3	12.7	105.8
1991	11.2	7.1	7.5	4.7	9.5	1.7	11.3	9.6	4.7	6.2	10.4	65.5	12.3	13.0	109.0
1992	15.1	6.4	7.2	3.8	8.1	1.0	9.3	9.1	4.5	5.6	8.5	57.3	12.3	11.4	102.5
1993	8.9	5.2	5.2	0.3	4.0	0.5	6.9	5.6	4.1	4.1	6.9	37.6	11.9	11.0	74.5
1994	9.2	5.5	4.9	0.5	2.9	0.3	7.5	4.9	4.1	3.4	7.3	35.8	10.2	10.7	71.4
1995	9.4	6.4	4.5	2.1	3.7	2.0	9.1	7.3	4.7	4.7	10.7	48.6	11.8	12.4	88.5
1996	12.0	6.5	4.6	1.3	3.9	1.1	9.2	7.1	4.1	6.2	[R]9.8	47.2	10.5	14.2	90.5
1997	15.0	7.5	4.3	0.4	3.4	0.9	7.0	4.8	4.1	7.2	9.2	41.3	8.0	11.8	83.5

[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.

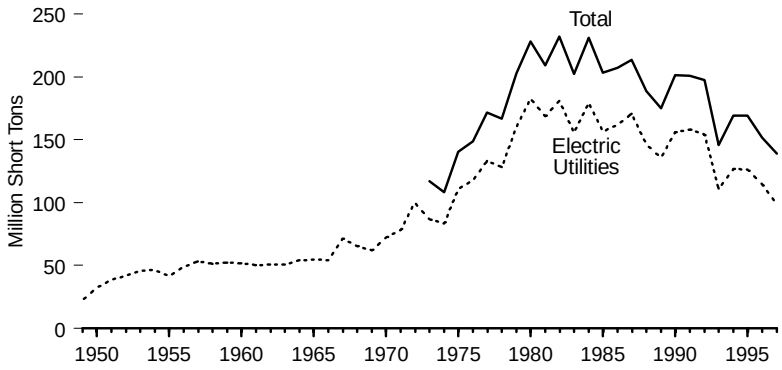
(s)=Less than 50,000 tons.

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

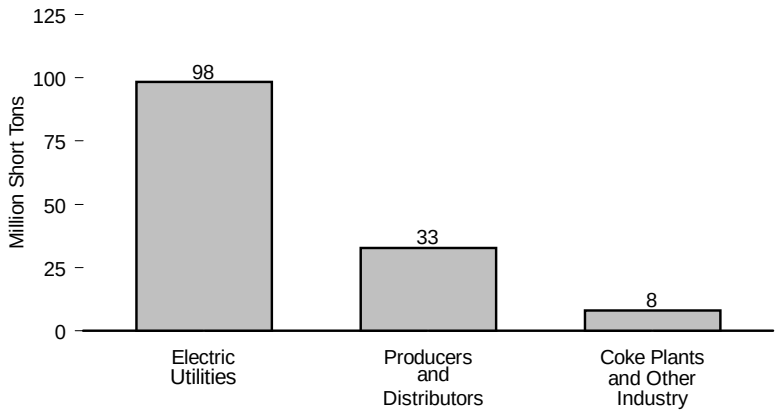
Sources: • 1960-1988—U.S. Department of Commerce, Bureau of the Census. *U.S. Exports by Schedule B Commodities, EM 522.* • 1989 forward—U.S. Department of Commerce, Bureau of the Census, Monthly Reports, EM-545.

Figure 7.5 Coal Stocks, End of Year

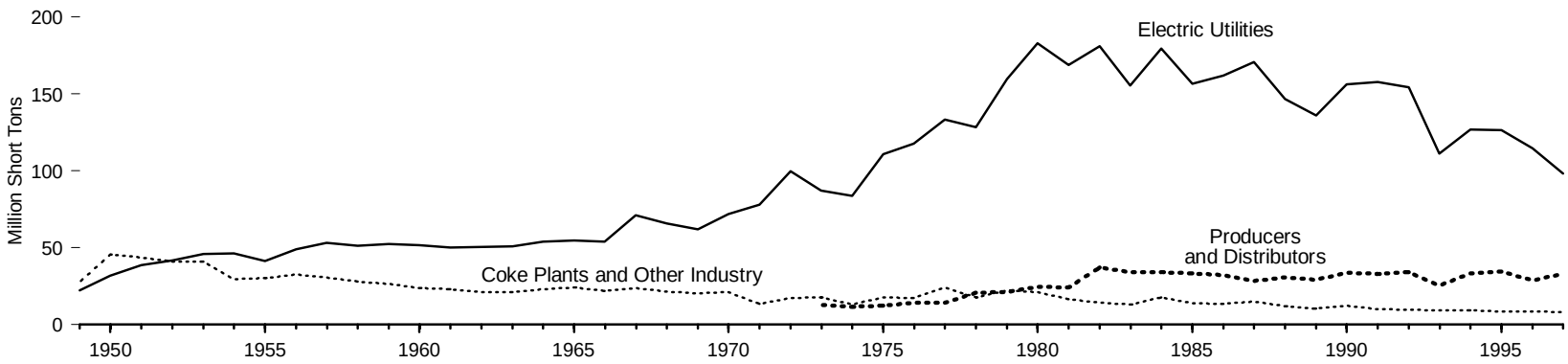
Total and Electric Utility Stocks, 1949-1997



By Holding Entity, 1997



By Holding Entity, 1949-1997



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

Source: Table 7.5.

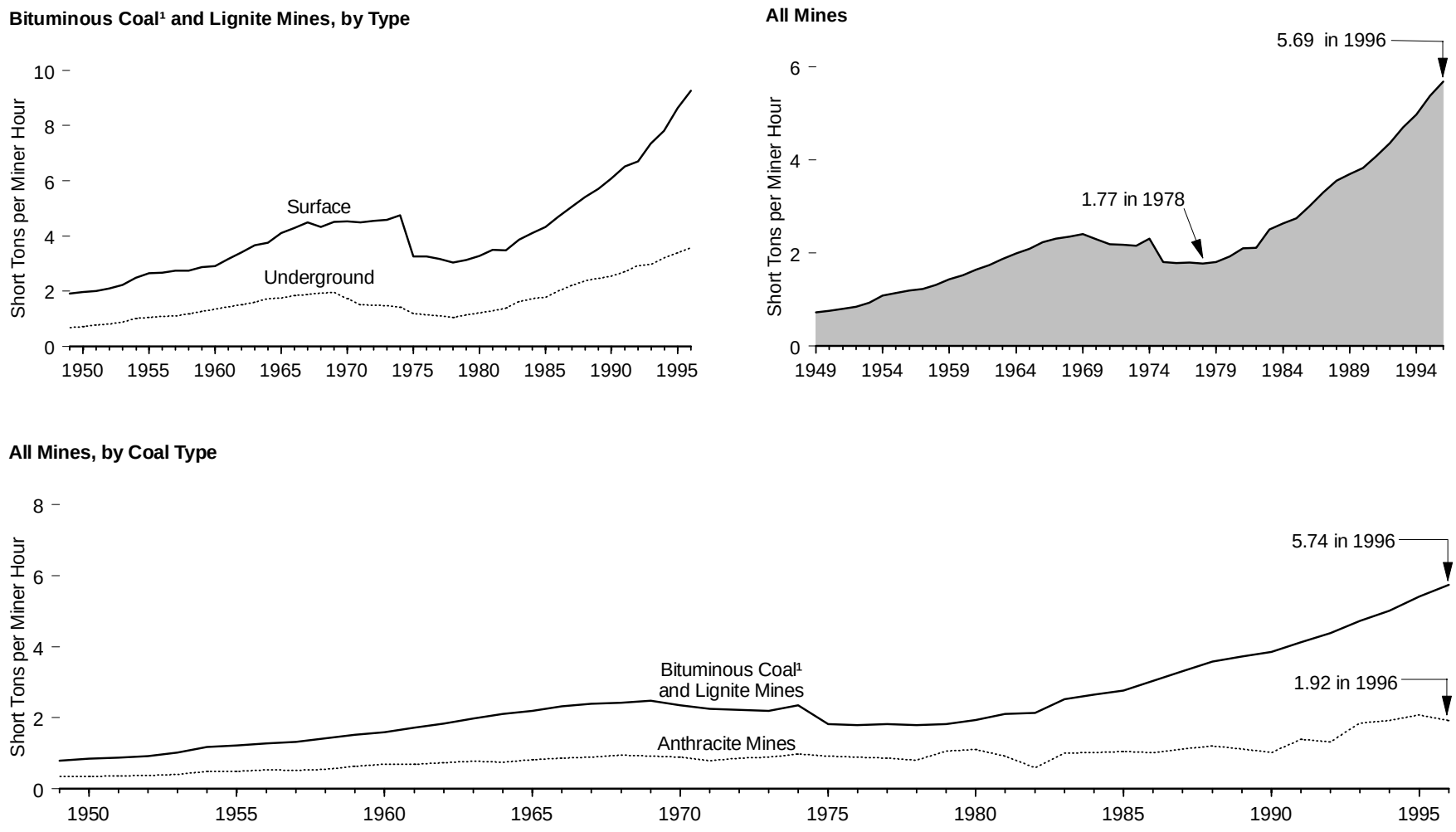
Table 7.5 Coal Stocks, End of Year 1949-1997

(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	24.1	209.4
1982	NA	4.6	9.5	181.1	195.3	36.8	232.0
1983	NA	4.3	8.7	155.6	168.7	33.9	202.6
1984	NA	6.2	11.3	179.7	197.2	34.1	231.3
1985	NA	3.4	10.4	156.4	170.2	33.1	203.4
1986	NA	3.0	10.4	161.8	175.2	32.1	207.3
1987	NA	3.9	10.8	170.8	185.5	28.3	213.8
1988	NA	3.1	8.8	146.5	158.4	30.4	188.8
1989	NA	2.9	7.4	135.9	146.1	29.0	175.1
1990	NA	3.3	8.7	156.2	168.2	33.4	201.6
1991	NA	2.8	7.1	157.9	167.7	33.0	200.7
1992	NA	2.6	7.0	154.1	163.7	34.0	197.7
1993	NA	2.4	6.7	111.3	120.5	25.3	145.7
1994	NA	2.7	6.6	126.9	136.1	33.2	169.4
1995	NA	2.6	5.7	126.3	134.6	34.4	169.1
1996	NA	R2.7	R5.7	114.6	R123.0	R28.6	R151.6
1997	NA	2.4	5.6	98.3	106.3	32.9	139.2

[1] Stocks at retail dealers, excluding anthracite.
[2] Includes transportation sector.
R=Revised. NA=Not available.
Note: Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelcoal.html.
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.* • 1981–1988—EIA, *Quarterly Coal Report October-December 1989* (May 1990), Table 31. • 1989–1994—EIA, *Quarterly Coal Report October-December 1995* (May 1996), Table 52. • 1987-1995—EIA, *Quarterly Coal Report October-December 1996* (May 1997), Table 52. • 1995–1996—EIA, *Quarterly Coal Report October-December 1997* (May 1998), Table 52. • 1997—EIA, *Monthly Energy Review* (March 1998), Table 6.3.

Figure 7.6 Coal Mining Productivity, 1949-1996



[1] Includes subbituminous coal.

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

Source: Table 7.6.

Table 7.6 Coal Mining Productivity, 1949-1996

(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
1991	2.70	6.51	4.12	1.39	4.09
1992	R2.93	R6.71	R4.39	1.33	4.36
1993	R2.96	R7.34	R4.73	R1.85	4.70
1994	3.20	R7.80	R5.01	R1.93	4.98
1995	R3.39	R8.64	R5.41	R2.08	5.38
1996	3.58	9.26	5.74	1.92	5.69

[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.

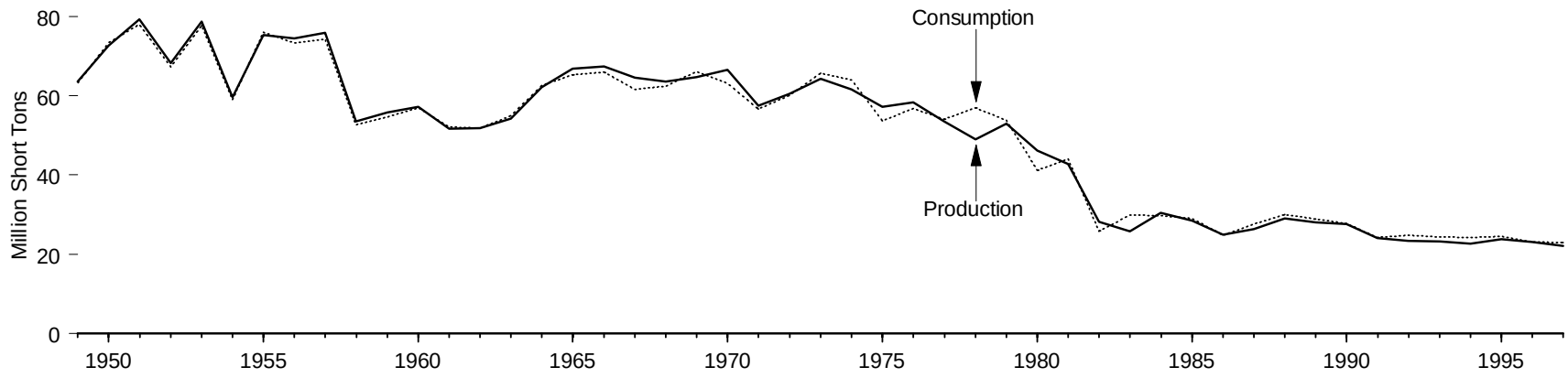
R=Revised.

Web Page: http://www.eia.doe.gov/fuelcoal.html.

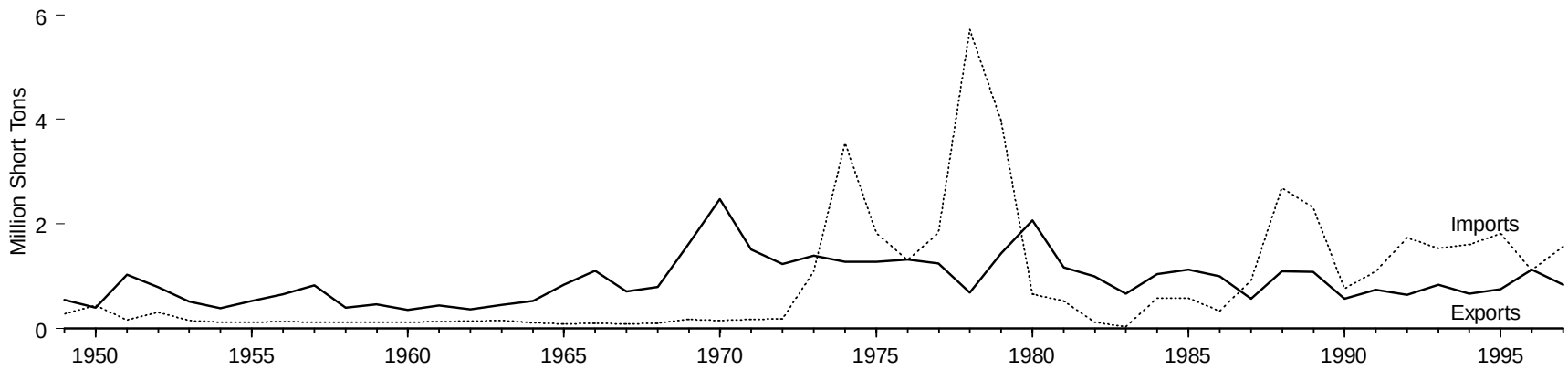
Sources: • 1949-1975—Bureau of Mines, *Minerals Yearbook,* "Coal-Bituminous and Lignite" and "Coal-Pennsylvania Anthracite" chapters. • 1976—Energy Information Administration (EIA), Energy Data Report, *Coal-Bituminous and Lignite in 1976* and *Coal-Pennsylvania Anthracite 1976.* • 1977 and 1978—EIA, Energy Data Report, *Bituminous Coal and Lignite Production and Mine Operations-1977; 1978* and *Coal-Pennsylvania Anthracite 1977; 1978.* • 1979—EIA, Energy Data Report, *Coal Production-1979.* • 1980-1992—EIA, *Coal Production* (annual). • 1993 forward—EIA, Energy Information Administration, Form EIA-7A, "Coal Production Report."

Figure 7.7 Coke Overview, 1949-1997

Production and Consumption



Imports and Exports



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

Source: Table 7.7.

Table 7.7 Coke Overview, 1949-1997

(Million Short Tons)

Year	Production	Imports	Exports	Stock Change [1]	Consumption [2]
1949	63.64	0.28	0.55	0.18	63.19
1950	72.72	0.44	0.40	-0.66	73.42
1951	79.33	0.16	1.03	0.37	78.09
1952	68.25	0.31	0.79	0.42	67.36
1953	78.84	0.16	0.52	0.78	77.70
1954	59.66	0.12	0.39	0.27	59.12
1955	75.30	0.13	0.53	-1.25	76.15
1956	74.48	0.13	0.66	0.63	73.32
1957	75.95	0.12	0.82	0.81	74.43
1958	53.60	0.12	0.39	0.68	52.66
1959	55.86	0.12	0.46	0.86	54.67
1960	57.23	0.13	0.35	0.06	56.95
1961	51.71	0.13	0.45	-0.70	52.09
1962	51.91	0.14	0.36	-0.14	51.82
1963	54.28	0.15	0.45	-1.02	55.00
1964	62.15	0.10	0.52	-0.91	62.64
1965	66.85	0.09	0.83	0.73	65.38
1966	67.40	0.10	1.10	0.38	66.02
1967	64.58	0.09	0.71	2.39	61.57
1968	63.65	0.09	0.79	0.52	62.44
1969	64.76	0.17	1.63	-2.87	66.17
1970	66.53	0.15	2.48	0.99	63.21
1971	57.44	0.17	1.51	-0.59	56.69
1972	60.51	0.19	1.23	-0.59	60.05
1973	64.33	1.09	1.40	-1.74	65.77
1974	61.58	3.54	1.28	-0.25	64.09
1975	57.21	1.82	1.27	4.06	53.69
1976	58.33	1.31	1.32	1.50	56.83
1977	53.51	1.83	1.24	-0.05	54.14
1978	49.01	5.72	0.69	-2.91	56.95
1979	52.94	3.97	1.44	1.65	53.83
1980	46.13	0.66	2.07	3.44	41.28
1981	42.79	0.53	1.17	-1.90	44.05
1982	28.12	0.12	0.99	1.47	25.78
1983	25.81	0.04	0.67	-4.67	29.85
1984	30.40	0.58	1.05	0.20	29.74
1985	28.44	0.58	1.12	-1.16	29.06
1986	24.92	0.33	1.00	-0.49	24.73
1987	26.30	0.92	0.57	-1.00	27.65
1988	28.95	2.69	1.09	0.52	30.02
1989	28.05	2.31	1.09	0.34	28.93
1990	27.62	0.77	0.57	(s)	27.81
1991	24.05	1.10	0.74	0.19	24.22
1992	23.41	1.74	0.64	-0.22	24.73
1993	23.18	1.53	0.84	-0.42	24.30
1994	22.69	1.61	0.66	-0.53	24.16
1995	23.75	1.82	0.75	0.37	24.45
1996	23.08	1.11	1.12	0.02	R23.04
1997	22.12	1.57	0.83	(s)	22.85

[1] Producer and distributor stocks at end of year. A negative value indicates a decrease in stocks; a positive value indicates an increase in stocks.

[2] Consumption is the sum of production, imports, and stock change minus exports.

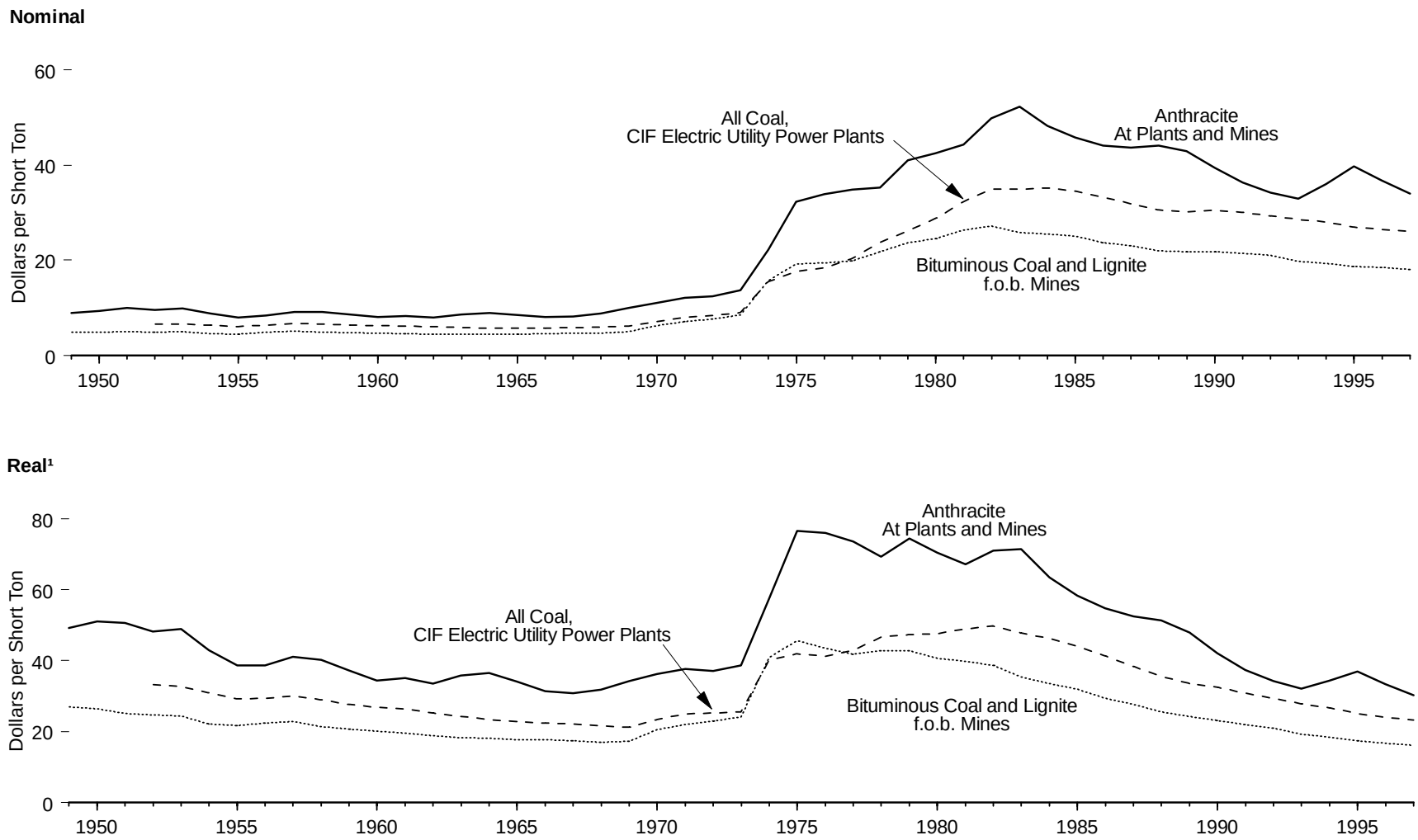
R=Revised. (s)=Less than 0.005 million short tons.

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

Web Page: http://www.eia.doe.gov/fuelcoal.html.

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. • 1982-1989—EIA, *Quarterly Coal Report October-December 1990* (May 1991), Table A1. • 1990 forward—EIA, *Quarterly Coal Report October-December 1996* (May 1997), Table 2.

Figure 7.8 Coal Prices, 1949-1997



[1] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

Notes: • Bituminous coal includes subbituminous coal. • CIF=Cost, Insurance, and Freight. See Glossary. • f.o.b.=Free on board. • Because vertical scales differ, graphs should not be compared.

Source: Table 7.8.

Table 7.8 Coal Prices, 1949-1997

(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	R26.96	8.90	R49.17	NA	NA
1950	4.84	R26.45	9.34	R51.04	NA	NA
1951	4.92	R25.10	9.94	R50.71	NA	NA
1952	4.90	R24.62	9.58	R48.14	6.61	R33.22
1953	4.92	R24.36	9.87	R48.86	6.61	R32.72
1954	4.52	R22.16	8.76	R42.94	6.31	R30.93
1955	4.50	R21.74	8.00	R38.65	6.07	R29.32
1956	4.82	R22.42	8.33	R38.74	6.32	R29.40
1957	5.08	R22.88	9.11	R41.04	6.64	R29.91
1958	4.86	R21.41	9.14	R40.26	6.58	R28.99
1959	4.77	R20.74	8.55	R37.17	6.37	R27.70
1960	4.69	20.13	8.01	34.38	6.26	26.87
1961	4.58	R19.49	8.26	R35.15	6.20	R26.38
1962	4.48	R18.82	7.99	R33.57	6.02	R25.29
1963	4.39	R18.22	8.64	R35.85	5.86	R24.32
1964	4.45	18.16	8.93	36.45	5.74	23.43
1965	4.44	17.76	8.51	34.04	5.71	22.84
1966	4.54	17.67	8.08	31.44	5.76	22.41
1967	4.62	17.43	8.15	30.75	5.85	22.08
1968	4.67	R16.92	8.78	R31.81	5.93	R21.49
1969	4.99	R17.27	9.91	R34.29	6.13	R21.21
1970	6.26	R20.52	11.03	R36.16	7.13	R23.38
1971	7.07	R22.02	12.08	R37.63	8.00	R24.92
1972	7.66	R22.93	12.40	R37.13	8.44	R25.27
1973	8.53	R24.16	13.65	R38.67	9.01	R25.52
1974	15.75	40.91	22.19	57.64	15.46	40.16
1975	19.23	R45.68	32.26	R76.63	17.63	R41.88
1976	19.43	43.57	33.92	76.05	18.38	41.21
1977	19.82	41.81	34.86	73.54	20.37	42.97
1978	21.78	R42.79	35.25	R69.25	23.75	R46.66
1979	23.65	R42.84	41.06	R74.38	26.15	R47.37
1980	24.52	R40.66	42.51	R70.50	28.76	R47.69
1981	26.29	R39.83	44.28	R67.09	32.32	R48.97
1982	27.14	R38.66	49.85	R71.01	34.91	R49.73
1983	25.85	R35.31	52.29	R71.43	34.99	R47.80
1984	25.51	33.61	48.22	63.53	35.12	46.27
1985	25.10	R31.97	45.80	R58.34	34.53	R43.99
1986	23.70	29.40	44.12	54.74	33.30	41.32
1987	23.00	27.68	43.65	52.53	31.83	38.30
1988	22.00	25.55	44.16	51.29	30.64	35.59
1989	21.76	24.26	42.93	47.86	30.15	33.61
1990	21.71	23.19	39.40	42.09	30.45	32.53
1991	21.45	22.05	36.34	37.35	30.02	30.85
1992	R20.99	R20.99	34.24	34.24	29.36	29.36
1993	19.79	19.29	32.94	32.11	28.58	27.86
1994	R19.34	R18.40	36.07	R34.32	28.03	R26.67
1995	18.74	R17.38	39.78	R36.90	27.01	R25.06
1996	R18.42	R16.72	R36.78	R33.38	26.45	R24.00
1997	E18.11	E16.11	E34.01	E30.26	26.16	23.27

[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 chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

R=Revised. E=Estimated. NA=Not available.

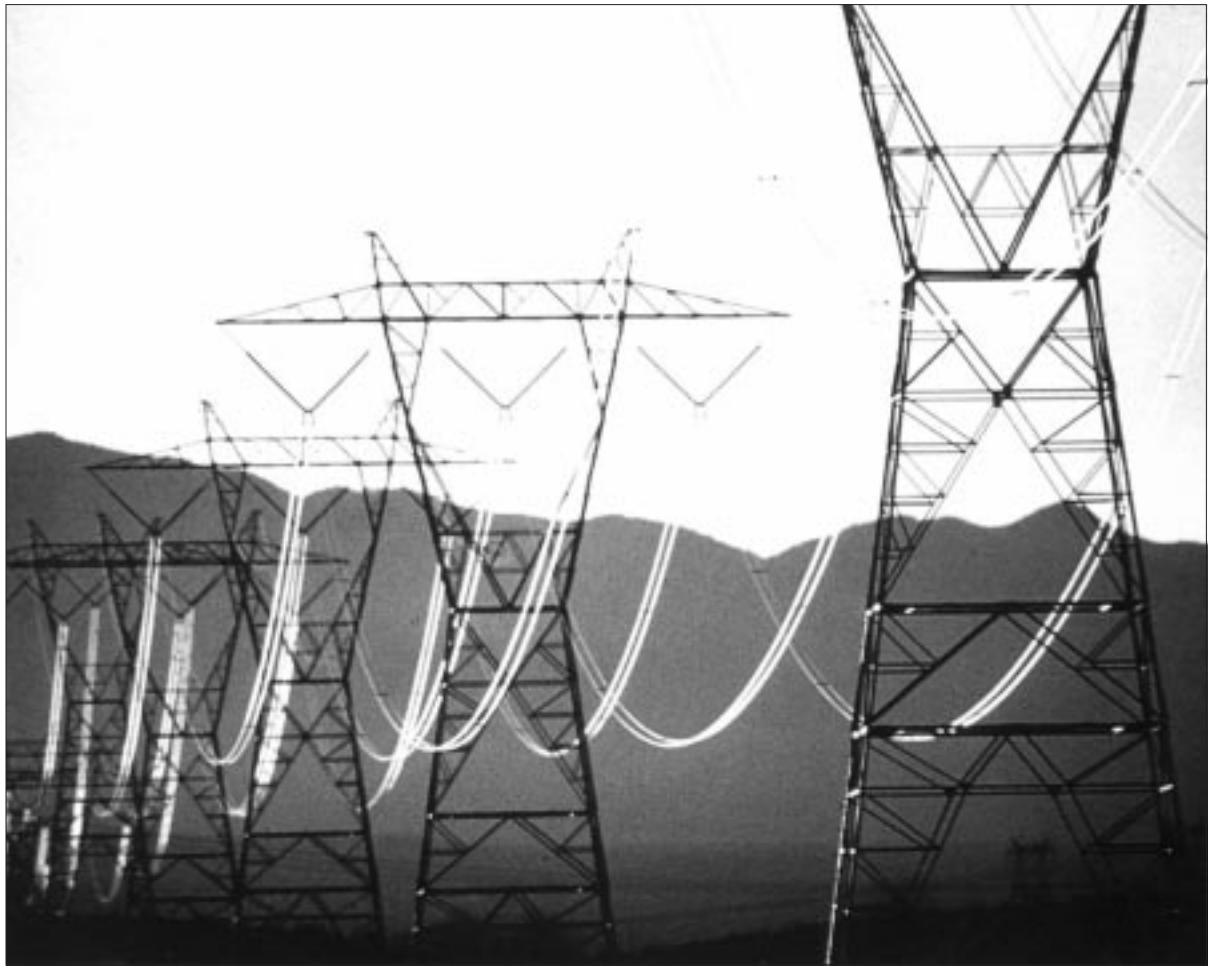
Web Page: http://www.eia.doe.gov/fuelcoal.html.

Sources: **Bituminous Coal and Lignite, F.O.B. Mines:** • 1949-1975—Bureau of Mines, *Minerals Yearbook,* "Coal-Bituminous and Lignite" chapter. • 1976—Energy Information Administration (EIA), Energy Data Report, *Coal-Bituminous and Lignite in 1976.* • 1977 and 1978—EIA, Energy Data Report, *Bituminous Coal and Lignite Production and Mine Operations-1977; 1978.* • 1979-1992—EIA, *Coal Production,* (annual). • 1993-1996—EIA, Form EIA-7A, "Coal Production Report." • 1997—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.* • 1980-1992—EIA, *Coal Production,* (annual). • 1993-1996—EIA, Form EIA-7A, "Coal Production Report." • 1997—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." • 1983-1990—Federal Energy Regulatory Commission, Form FERC-423, "Monthly Report of Cost and Quality of Fuel for Electric Utilities." • 1991 forward—EIA, *Quarterly Coal Report October-December 1997,* Table 21.

Coal Note

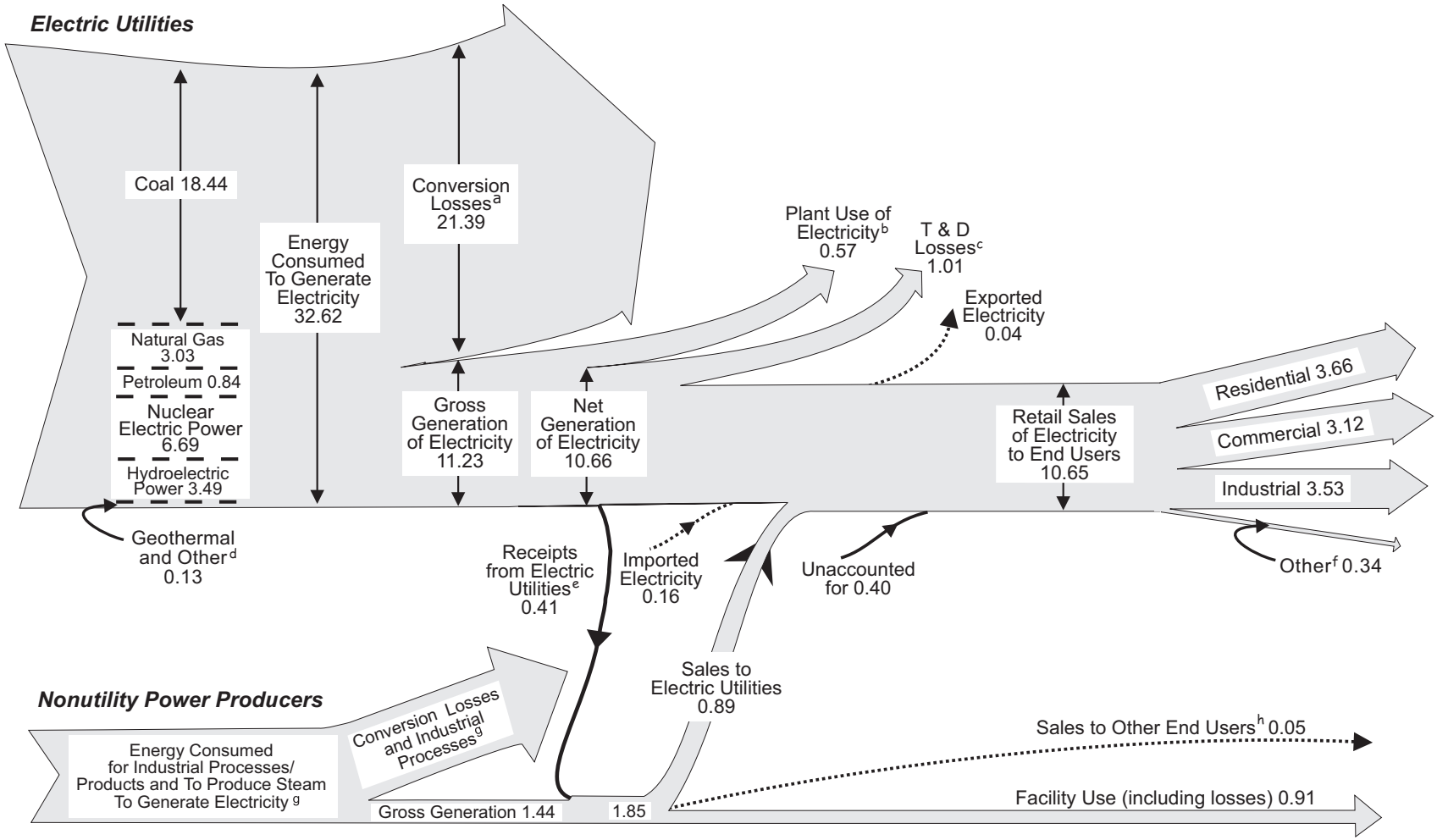
Data in this report on the consumption of bituminous coal (including subbituminous coal), lignite, and anthracite are generated primarily from consumption data reported in surveys. Included are data reported by all electric utility companies and coke plant companies. Data on coal consumption by all industrial and manufacturing establishments and by the residential and commercial sector are based on distribution data obtained quarterly from coal companies. Included in each sector's data are the following: Electric Power Industry–consumption by privately and publicly owned establishments engaged in the generation and/or distribution of electric power primarily for sale or resale; Industrial and Miscellaneous Sector–consumption at manufacturing plants, large commercial establishments, coking plants, and by agriculture, mining (other than coal mining), and construction industries; Transportation Sector–sales to railroads and vessel bunkers; Residential and Commercial Sector–retail dealer sales to households and small commercial establishments.

8 Electricity



High-tension power lines and towers. Source: U.S. Department of Energy.

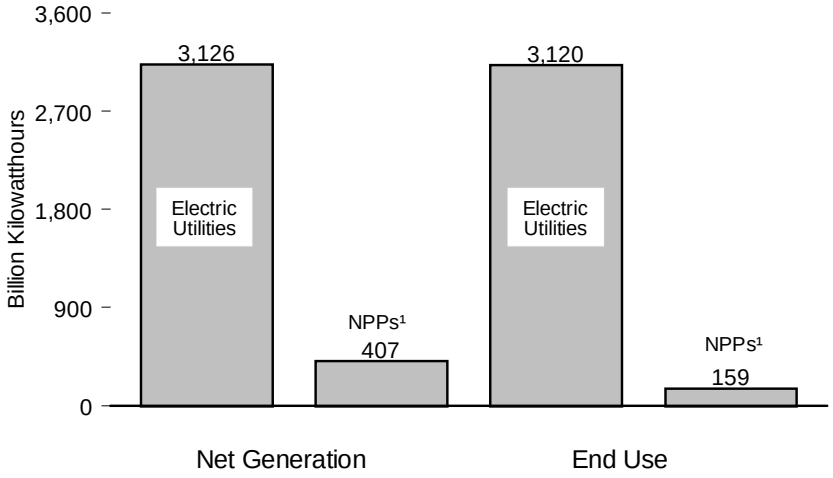
Diagram 5. Electricity Flow, 1997
(Quadrillion Btu)



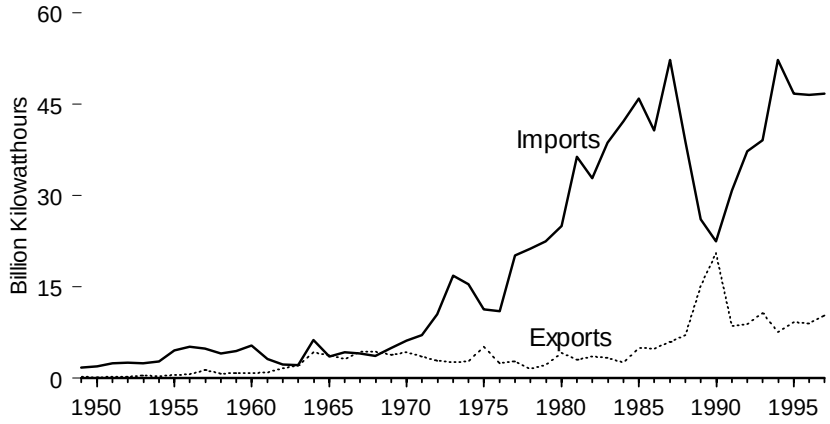
[a] Approximately two-thirds of the energy consumed at electric utilities to generate electricity. See Note 1 at end of section.
[b] Estimated as 5 percent of gross generation of electricity by utilities. See Note 1 at end of section.
[c] Estimated as 9 percent of gross generation of electricity by utilities. See Note 1 at end of section.
[d] Wood, waste, wind, photovoltaic, and solar thermal energy used to generate electricity for distribution. See Table 8.3.
[e] Sales, interchanges, and exchanges of electric energy with utilities and other nonutilities. Data are included in industrial sales.
[f] Public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.
[g] No data are available.
[h] Includes sales, interchanges, and exchanges of electric energy with other nonutilities.
Note: Totals may not equal sum of components due to independent rounding.
Sources: Tables 8.1, 8.3, 8.8, 8.9, 8.14, and A7.

Figure 8.1 Electricity Overview

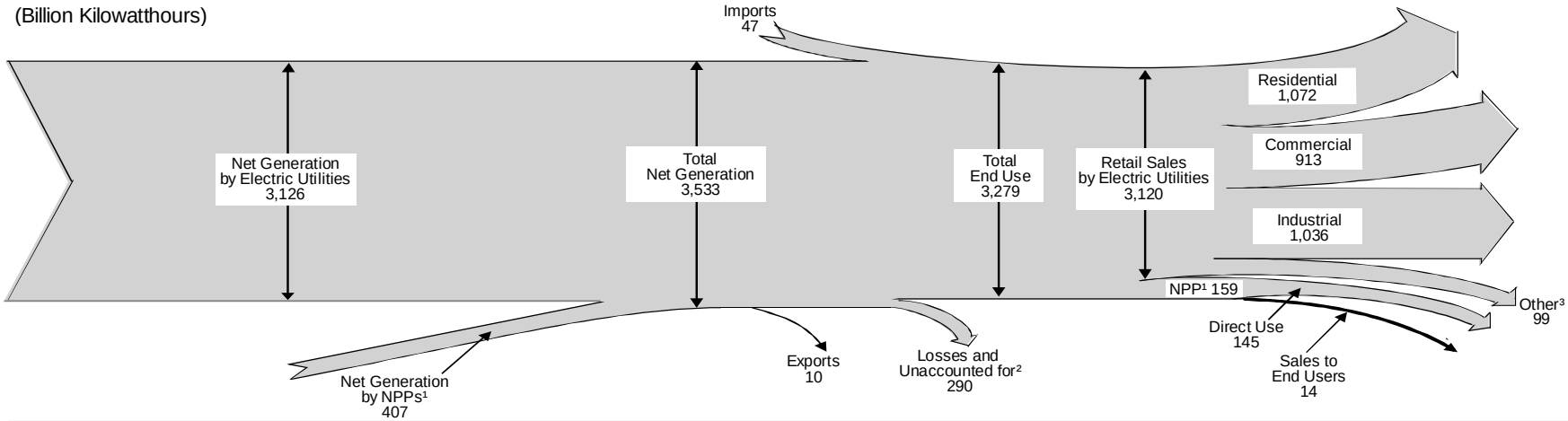
Net Generation and End Use, 1997



International Electricity Trade, 1949-1997



Net-Generation-to-End-Use Flow, 1997
(Billion Kilowatthours)



[1] Nonutility power producers. See Glossary.
[2] Energy losses that occur between the point of generation and delivery to the customer, and data collection frame differences and nonsampling error.
[3] Public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.
Note: Because vertical scales differ, graphs should not be compared.
Sources: Tables 8.1 and 8.9.

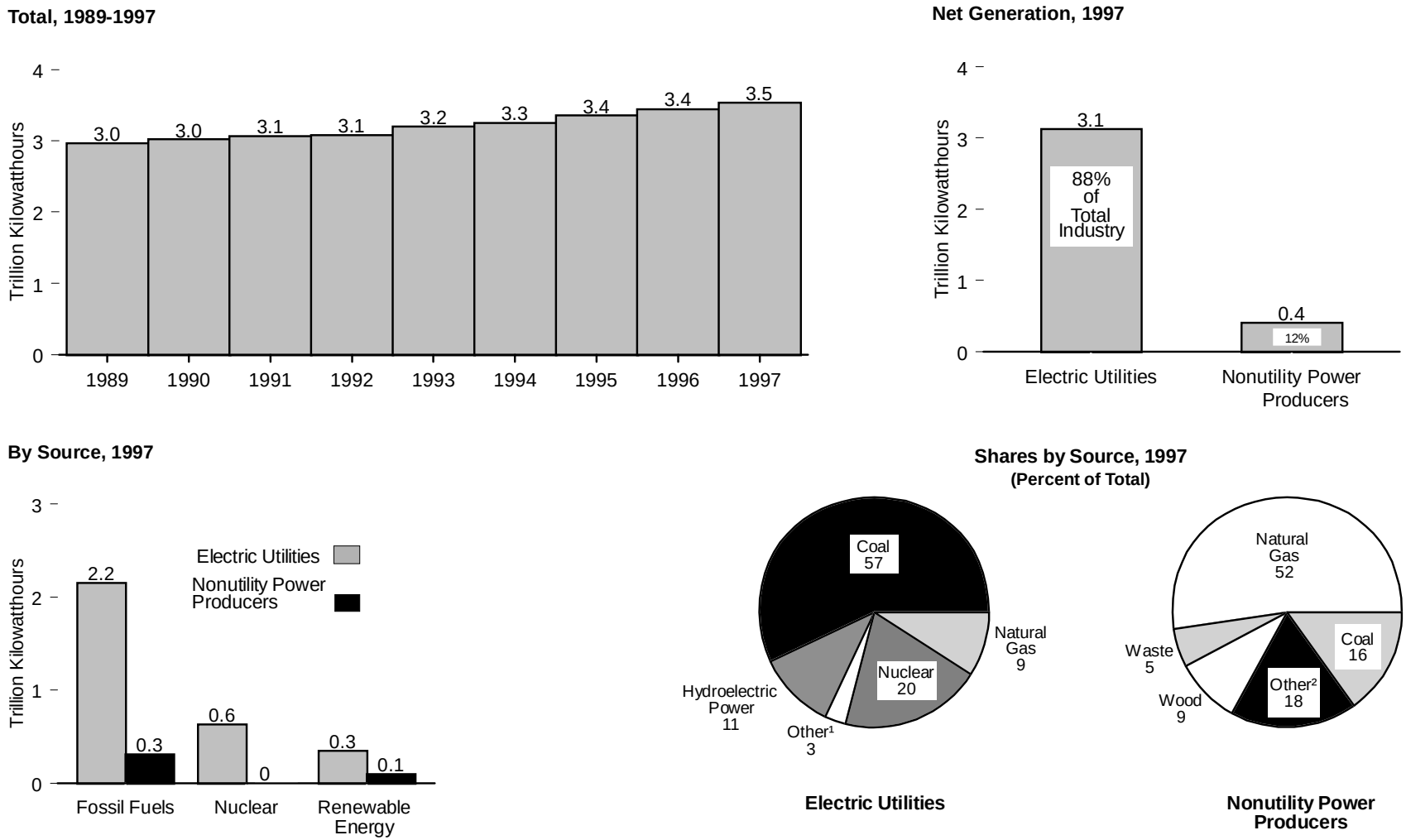
Table 8.1 Electricity Overview, 1949-1997

(Billion Kilowatthours)

Year	Net Generation[1]			Imports [2]	Exports [2]	Losses and Unaccounted for [3]	End Use			
								Nonutility Power Producers		
	Electric Utilities	Nonutility Power Producers	Total				Electric Utility Retail Sales	Direct Use [4]	Sales to End Users	Total
1949	291	NA	NA	2	(s)	NA	255	NA	NA	NA
1950	329	NA	NA	2	(s)	NA	291	NA	NA	NA
1951	371	NA	NA	2	(s)	NA	330	NA	NA	NA
1952	399	NA	NA	3	(s)	NA	356	NA	NA	NA
1953	443	NA	NA	2	(s)	NA	396	NA	NA	NA
1954	472	NA	NA	3	(s)	NA	424	NA	NA	NA
1955	547	NA	NA	5	(s)	NA	497	NA	NA	NA
1956	601	NA	NA	5	1	NA	546	NA	NA	NA
1957	632	NA	NA	5	1	NA	576	NA	NA	NA
1958	645	NA	NA	4	1	NA	588	NA	NA	NA
1959	710	NA	NA	4	1	NA	647	NA	NA	NA
1960	756	NA	NA	5	1	NA	688	NA	NA	NA
1961	794	NA	NA	3	1	NA	722	NA	NA	NA
1962	855	NA	NA	2	2	NA	778	NA	NA	NA
1963	917	NA	NA	2	2	NA	833	NA	NA	NA
1964	984	NA	NA	6	4	NA	896	NA	NA	NA
1965	1,055	NA	NA	4	4	NA	954	NA	NA	NA
1966	1,144	NA	NA	4	3	NA	1,035	NA	NA	NA
1967	1,214	NA	NA	4	4	NA	1,099	NA	NA	NA
1968	1,329	NA	NA	4	4	NA	1,203	NA	NA	NA
1969	1,442	NA	NA	5	4	NA	1,314	NA	NA	NA
1970	1,532	NA	NA	6	4	NA	1,392	NA	NA	NA
1971	1,613	NA	NA	7	4	NA	1,470	NA	NA	NA
1972	1,750	NA	NA	10	3	NA	1,595	NA	NA	NA
1973	1,861	NA	NA	17	3	NA	1,713	NA	NA	NA
1974	1,867	NA	NA	15	3	NA	1,706	NA	NA	NA
1975	1,918	NA	NA	11	5	NA	1,747	NA	NA	NA
1976	2,038	NA	NA	11	2	NA	1,855	NA	NA	NA
1977	2,124	NA	NA	20	3	NA	1,948	NA	NA	NA
1978	2,206	NA	NA	21	1	NA	2,018	NA	NA	NA
1979	2,247	NA	NA	23	2	NA	2,071	NA	NA	NA
1980	2,286	NA	NA	25	4	NA	2,094	NA	NA	NA
1981	2,295	NA	NA	36	3	NA	2,147	NA	NA	NA
1982	2,241	NA	NA	33	4	NA	2,086	NA	NA	NA
1983	2,310	NA	NA	39	3	NA	2,151	NA	NA	NA
1984	2,416	NA	NA	42	3	NA	2,286	NA	NA	NA
1985	2,470	NA	NA	46	5	NA	2,324	NA	NA	NA
1986	2,487	NA	NA	41	5	NA	2,369	NA	NA	NA
1987	2,572	NA	NA	52	6	NA	2,457	NA	NA	NA
1988	2,704	NA	NA	39	7	NA	2,578	NA	NA	NA
1989	2,784	R184	2,968	26	15	232	2,647	83	18	2,747
1990	2,808	R213	3,021	23	21	206	2,713	84	20	2,817
1991	2,825	R244	3,069	31	9	218	2,762	100	11	2,873
1992	2,797	286	3,083	37	9	227	2,763	111	11	2,885
1993	2,883	314	3,197	39	11	237	2,861	111	16	2,988
1994	2,911	343	3,254	52	8	223	2,935	123	18	3,075
1995	2,995	R363	R3,358	47	9	R233	3,013	134	16	3,162
1996	R3,077	R370	R3,447	R47	R9	R238	R3,098	R135	R14	R3,247
1997	P3,126	E407	E3,533	P47	P10	E290	P3,120	E145	E14	E3,279

[1] See Note 1 at end of section.
[2] Electricity transmitted across U.S. borders with Canada and Mexico.
[3] Energy losses that occur between the point of generation and delivery to the customer, and data collection frame differences and nonsampling error. See Note 2 at end of section.
[4] Power generated and consumed onsite. Differs from Table 8.14's "Facility Use," which also includes purchases from other producers.
R=Revised. P=Preliminary. E=Estimated. NA=Not available. (s)=Less than 0.5 billion kilowatthours.
Notes: • See Note 3 at end of section. • Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelelectric.html.
Sources: **Net Generation, Electric Utilities:** See Table 8.3. **Net Generation, Nonutility Power Producers:** See Table 8.4. **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." • 1989-1996—Fossil Energy, Form FE-781R, "Annual Report of International Electrical Export/Import Data." • 1997—EIA estimates based on preliminary data from the National Energy Board of Canada and Department of Energy, Fossil Energy. **Losses and Unaccounted For:** Estimated as Total End Use and Exports minus Total Net Generation and Imports. **End Use, Electric Utility Retail Sales:** See Table 8.9. **End Use, Nonutility Power Producers:** See Table 8.14.

Figure 8.2 Electric Power Industry Net Generation



[1] Other gas, petroleum, geothermal energy, wood, waste, solar, and wind.

[2] Other gas, petroleum, nuclear, hydroelectric power, geothermal energy, wind, solar, hydrogen, sulfur, batteries, and chemicals.

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

Sources: Tables 8.2, 8.3, and 8.4.

Table 8.2 Electric Power Industry Net Generation, 1989-1997

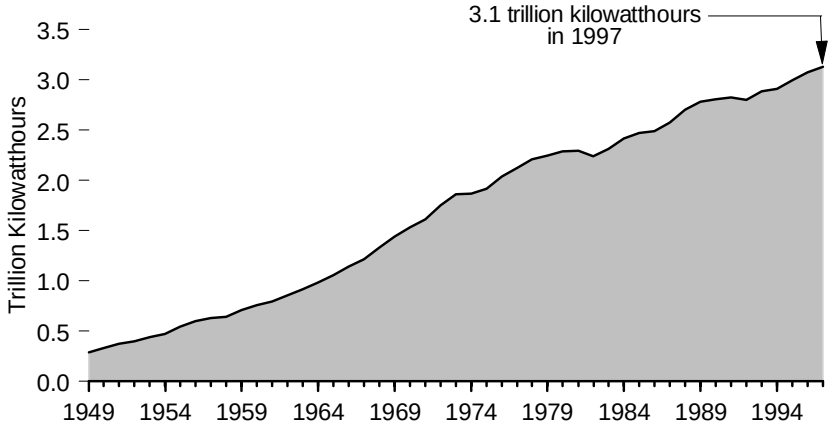
(Billion Kilowatthours)

Year	Fossil Fuels				Nuclear Electric Power	Hydroelectric Pumped Storage [4]	Renewable Energy							Total [9]
										Waste				
	Coal [1]	Natural Gas	Other Gas [2]	Petroleum [3]			Conventional Hydroelectric Power	Geothermal Energy	Wood [5]	MSW [6] and LFG [7]	Other Waste [8]	Wind Energy	Solar Energy	
1989	1,583.8	363.6	NA	163.9	529.4	0	272.1	14.6	27.7	7.2	1.9	1.8	0.5	[10]2,968.2
1990	1,590.3	377.9	NA	124.0	577.0	-3.5	291.5	15.6	30.4	10.2	2.2	2.2	0.6	[10]3,021.2
1991	1,589.9	392.4	NA	119.0	612.6	-4.5	288.2	15.9	33.2	11.9	3.2	2.6	0.8	[10]3,068.5
1992	1,621.1	418.3	NA	99.4	618.8	-4.2	253.1	16.4	35.6	14.0	3.8	2.9	0.7	[10]3,083.4
1993	1,690.0	428.4	NA	112.4	610.4	-4.0	280.5	17.0	36.8	14.5	4.1	3.0	0.9	[10]3,196.9
1994	1,691.7	465.9	12.1	105.5	640.5	-3.4	260.2	16.8	37.8	15.5	3.6	3.4	0.8	3,253.8
1995	[R]1,710.2	[R]498.5	13.6	[R]75.3	673.4	-2.7	311.0	14.4	36.4	16.9	3.3	3.2	0.8	[R]3,357.8
1996	[R]1,795.8	[R]455.9	14.4	[R]81.7	674.7	-3.1	347.4	[R]15.1	[R]36.8	16.4	4.1	3.4	0.9	[R]3,447.1
1997[E]	1,853.1	497.1	14.8	95.5	629.4	-4.1	359.9	16.3	38.4	18.6	4.7	3.7	1.0	3,532.6

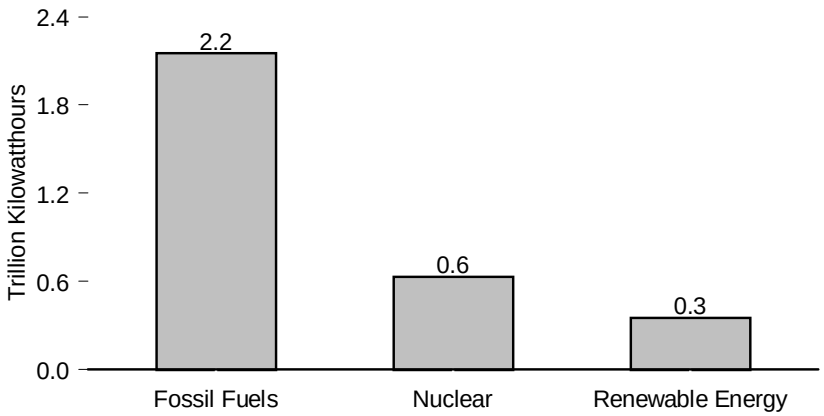
[1] Coal, anthracite culm, and coal waste.
[2] Butane, ethane, and propane.
[3] Petroleum, petroleum coke, diesel, kerosene, petroleum sludge, and tar.
[4] Pumped storage facility production minus energy used for pumping.
[5] Wood, wood waste, wood liquors, peat, railroad ties, wood sludge, and spent sulfite liquor.
[6] Municipal solid waste.
[7] Landfill gases.
[8] Agricultural waste, straw, tires, fish oils, paper pellets, tall oil, sludge waste, and waste alcohol.
[9] Includes hydrogen, sulfur, batteries, and chemicals.
[10] Includes other gas for electric utilities. For nonutilities, other gas data are not available.
R=Revised. P=Preliminary. E=Estimated. NA=Not available.
Web Page: http://www.eia.doe.gov/fuelelectric.html.
Source: Tables 8.3 and 8.4.

Figure 8.3 Electric Utility Net Generation

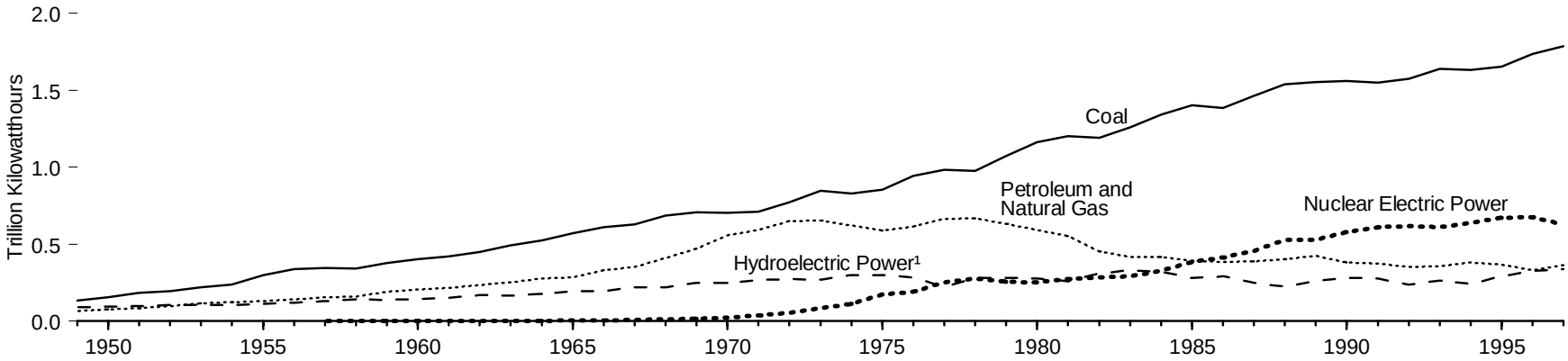
Total, 1949-1997



By Source, 1997



By Source, 1949-1997



¹ Conventional and pumped-storage hydroelectric power.
Note: Because vertical scales differ, graphs should not be compared.

Source: Table 8.3.

Table 8.3 Electric Utility Net Generation, 1949-1997

(Billion Kilowatthours)

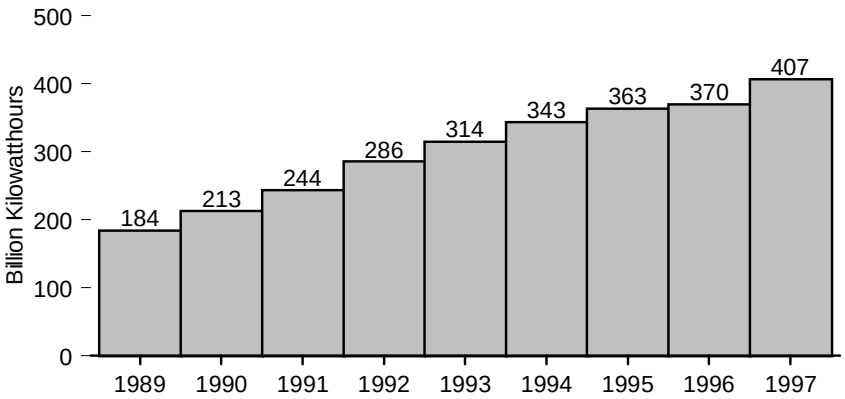
Year	Fossil Fuels				Nuclear Electric Power	Hydroelectric Pumped Storage [3]	Renewable Energy							Total
										Waste				
	Coal	Natural Gas	Other Gas [1]	Petroleum [2]			Conventional Hydroelectric Power	Geothermal Energy	Wood [4]	MSW [5] and LFG [6]	Other Waste [7]	Wind Energy	Solar Energy	
1949	135.5	37.0	NA	28.5	0	(8)	89.7	0	0.4	NA	NA	0	0	291.1
1950	154.5	44.6	NA	33.7	0	(8)	95.9	0	0.4	NA	NA	0	0	329.1
1951	185.2	56.6	NA	28.7	0	(8)	99.8	0	0.4	NA	NA	0	0	370.7
1952	195.4	68.5	NA	29.7	0	(8)	105.1	0	0.5	NA	NA	0	0	399.2
1953	218.8	79.8	NA	38.4	0	(8)	105.2	0	0.4	NA	NA	0	0	442.7
1954	239.1	93.7	NA	31.5	0	(8)	107.1	0	0.3	NA	NA	0	0	471.7
1955	301.4	95.3	NA	37.1	0	(8)	113.0	0	0.3	NA	NA	0	0	547.0
1956	338.5	104.0	NA	35.9	0	(8)	122.0	0	0.2	NA	NA	0	0	600.7
1957	346.4	114.2	NA	40.5	(s)	(8)	130.2	0	0.2	NA	NA	0	0	631.5
1958	344.4	119.8	NA	40.4	0.2	(8)	140.3	0	0.2	NA	NA	0	0	645.1
1959	378.4	146.6	NA	46.8	0.2	(8)	137.8	0	0.2	NA	NA	0	0	710.0
1960	403.1	158.0	NA	48.0	0.5	(8)	145.8	(s)	0.1	NA	NA	NA	0	755.5
1961	421.9	169.3	NA	48.5	1.7	(8)	152.2	0.1	0.1	NA	NA	NA	0	793.8
1962	450.2	184.3	NA	48.9	2.3	(8)	168.6	0.1	0.1	NA	NA	NA	0	854.5
1963	493.9	201.6	NA	52.0	3.2	(8)	165.8	0.2	0.1	NA	NA	NA	0	916.8
1964	526.2	220.0	NA	57.0	3.3	(8)	177.1	0.2	0.1	NA	NA	NA	0	984.0
1965	570.9	221.6	NA	64.8	3.7	(8)	193.9	0.2	0.3	NA	NA	NA	0	1,055.3
1966	613.5	251.2	NA	78.9	5.5	(8)	194.8	0.2	0.3	NA	NA	NA	0	1,144.4
1967	630.5	264.8	NA	89.3	7.7	(8)	221.5	0.3	0.3	NA	NA	NA	0	1,214.4
1968	684.9	304.4	NA	104.3	12.5	(8)	222.5	0.4	0.4	NA	NA	NA	0	1,329.4
1969	706.0	333.3	NA	137.8	13.9	(8)	250.2	0.6	0.3	NA	NA	NA	0	1,442.2
1970	704.4	372.9	NA	184.2	21.8	(8)	247.7	0.5	0.1	NA	NA	NA	0	1,531.9
1971	713.1	374.0	NA	220.2	38.1	(8)	266.3	0.5	0.1	NA	NA	NA	0	1,612.6
1972	771.1	375.7	NA	274.3	54.1	(8)	272.6	1.5	0.1	NA	NA	NA	0	1,749.7
1973	847.7	340.9	NA	314.3	83.5	(8)	272.1	2.0	0.1	NA	NA	NA	0	1,860.7
1974	828.4	320.1	NA	300.9	114.0	(8)	301.0	2.5	0.1	NA	NA	NA	0	1,867.1
1975	852.8	299.8	NA	289.1	172.5	(8)	300.0	3.2	(s)	NA	NA	NA	0	1,917.6
1976	944.4	294.6	NA	320.0	191.1	(8)	283.7	3.6	0.1	NA	NA	NA	0	2,037.7
1977	985.2	305.5	NA	358.2	250.9	(8)	220.5	3.6	0.3	NA	NA	NA	0	2,124.3
1978	975.7	305.4	NA	365.1	276.4	(8)	280.4	3.0	0.2	NA	NA	NA	0	2,206.3
1979	1,075.0	329.5	NA	303.5	255.2	(8)	279.8	3.9	0.3	NA	NA	NA	0	2,247.4
1980	1,161.6	346.2	NA	246.0	251.1	(8)	276.0	5.1	0.3	NA	NA	NA	0	2,286.4
1981	1,203.2	345.8	NA	206.4	272.7	(8)	260.7	5.7	0.2	NA	NA	NA	0	2,294.8
1982	1,192.0	305.3	NA	146.8	282.8	(8)	309.2	4.8	0.2	NA	NA	NA	0	2,241.2
1983	1,259.4	274.1	NA	144.5	293.7	(8)	332.1	6.1	0.2	NA	NA	(s)	0	2,310.3
1984	1,341.7	297.4	NA	119.8	327.6	(8)	321.2	7.7	0.5	NA	NA	(s)	0	2,416.3
1985	1,402.1	291.9	NA	100.2	383.7	(8)	281.1	9.3	0.7	NA	NA	(s)	0	2,469.8
1986	1,385.8	248.5	NA	136.6	414.0	(8)	290.8	10.3	0.5	NA	NA	(s)	0	2,487.3
1987	1,463.8	272.6	NA	118.5	455.3	(8)	249.7	10.8	0.8	NA	NA	(s)	0	2,572.1
1988	1,540.7	252.8	NA	148.9	527.0	(8)	222.9	10.3	0.9	NA	NA	(s)	0	2,704.3
1989	1,553.7	266.6	(s)	158.3	529.4	(8)	265.1	9.3	1.0	0.5	0.5	(s)	(s)	2,784.3
1990	1,559.6	264.1	(s)	117.0	576.9	-3.5	283.4	8.6	0.8	0.7	0.6	(s)	(s)	2,808.2
1991	1,551.2	264.2	(s)	111.5	612.6	-4.5	280.1	8.1	0.7	0.7	0.6	(s)	(s)	2,825.0
1992	1,575.9	263.9	(s)	88.9	618.8	-4.2	243.7	8.1	0.8	0.7	0.6	(s)	(s)	2,797.2
1993	1,639.2	258.9	(s)	99.5	610.3	-4.0	269.1	7.6	0.9	0.7	0.4	(s)	(s)	2,882.5
1994	1,635.5	291.1	(s)	91.0	640.4	-3.4	247.1	6.9	0.8	0.9	0.4	(s)	(s)	2,910.7
1995	1,652.9	307.3	(s)	60.8	673.4	-2.7	296.4	4.7	0.6	0.9	0.2	(s)	(s)	2,994.5
1996	R1,737.5	262.7	0.1	R67.3	674.7	-3.1	R331.1	5.2	0.8	0.9	0.2	(s)	(s)	R3,077.4
1997P	1,788.7	283.6	0.1	79.0	629.4	-4.1	341.4	5.5	0.7	1.0	0.2	(s)	(s)	3,125.5

[1] Butane, methane, propane, and other gases.
[2] Petroleum, petroleum coke, diesel, kerosene, petroleum sludge, and tar.
[3] Pumped storage facility production minus energy used for pumping.
[4] Wood, wood waste, wood liquors, peat, railroad ties, wood sludge and spent sulfite liquor.
[5] Municipal solid waste.
[6] Landfill gas.
[7] Agricultural waste, straw, tires, fish oils, tall oil, sludge waste, and waste alcohol.
[8] Included in conventional hydroelectric power.

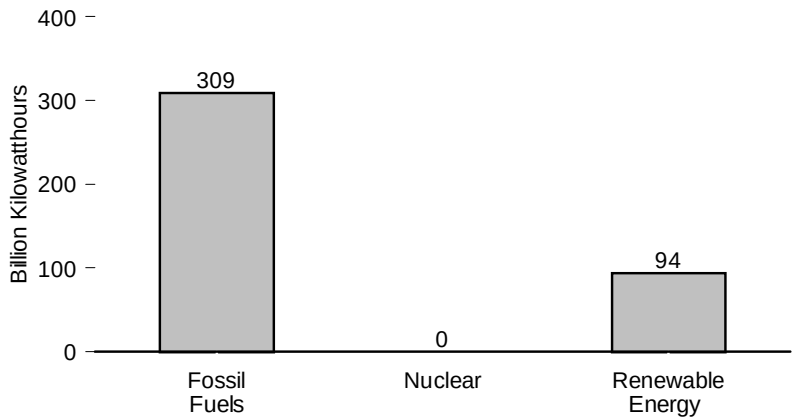
R=Revised. P=Preliminary. NA=Not available. (s)=Less than 0.05 billion killowatthours.
Notes: • See Notes 1 and 3 at the end of section.
Web Page: http://www.eia.doe.gov/fuelelectric.html.
Sources: • 1949-September 1977—Federal Power Commission, Form FPC-4, "Monthly Power Plant Report." • October 1977-1981—Fedreal Energy Regulatory Commission, Form FPC-4, "Monthly Power Plant Report." • 1982 forward—Energy Information Administration, Form EIA-759, "Monthly Power Plant Report."

Figure 8.4 Nonutility Power Net Generation

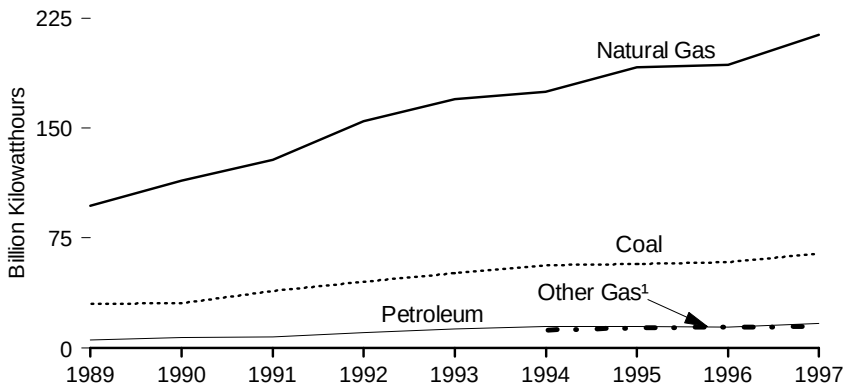
Total, 1989-1997



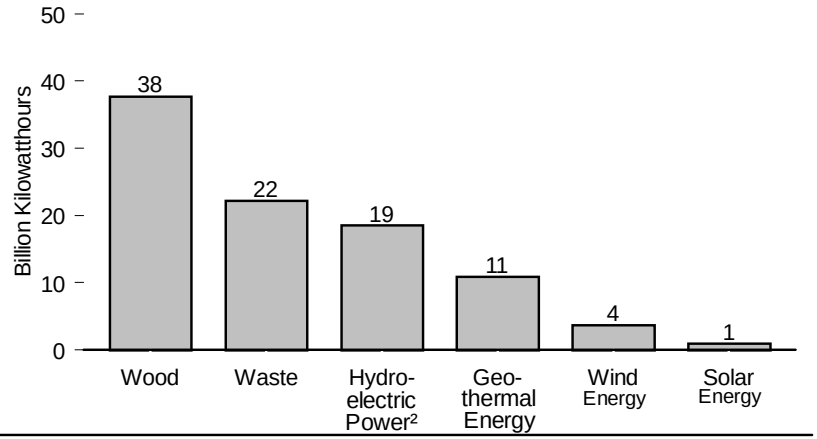
By Source, 1997



Fossil Fuels by Type, 1989-1997



Renewable Energy Sources, 1997



[1] Butane, methane, propane, and other gases.
[2] Conventional hydroelectric power only.
Note: Because vertical scales differ, graphs should not be compared.

Source: Table 8.4.

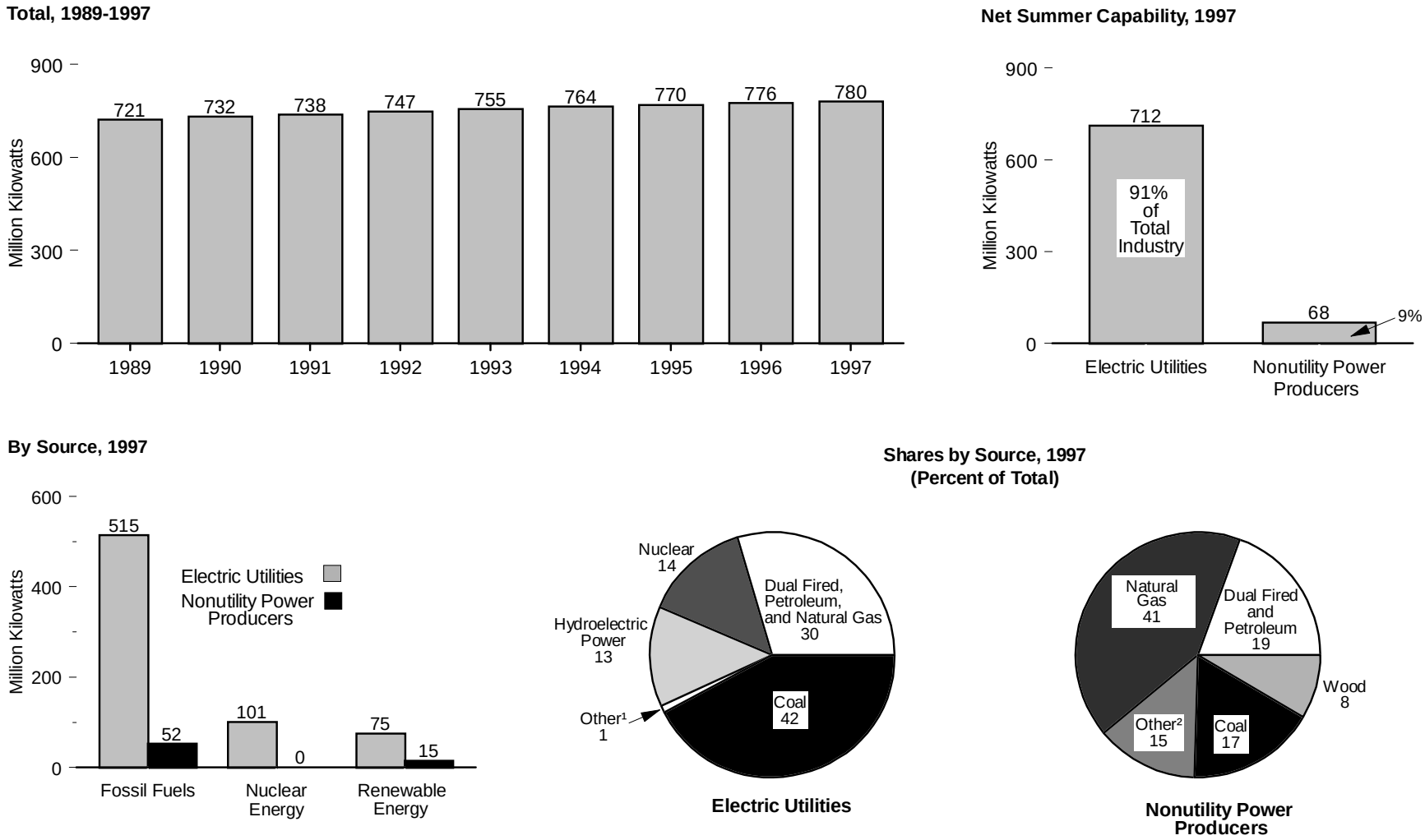
Table 8.4 Nonutility Power Net Generation, 1989-1997

(Billion Kilowatthours)

Year	Fossil Fuels				Nuclear Electric Power [4]	Renewable Energy							Total [10]
									Waste				
	Coal [1]	Natural Gas	Other Gas [2]	Petroleum [3]		Conventional Hydroelectric Power [5]	Geothermal Energy	Wood [6]	MSW [7] and LFG [8]	Other Waste [9]	Wind Energy	Solar Energy	
1989	30.2	97.0	([11])	5.5	(s)	7.1	5.3	26.8	6.8	1.4	1.8	0.5	183.9
1990	30.7	113.8	([11])	7.0	0.1	8.1	7.0	29.6	9.5	1.7	2.2	0.6	213.0
1991	38.8	128.2	([11])	7.5	0.1	8.1	7.8	32.4	11.2	2.6	2.6	0.8	243.5
1992	45.2	154.4	([11])	10.5	0.1	9.4	8.3	34.8	13.3	3.2	2.9	0.7	286.1
1993	50.9	169.5	([11])	12.8	0.1	11.4	9.5	35.9	13.8	3.7	3.0	0.9	314.4
1994	56.2	174.8	12.1	14.5	0.1	13.1	9.8	37.0	14.6	3.2	3.4	0.8	343.1
1995	[R]57.3	191.2	13.6	[R]14.4	0.0	14.6	9.6	[R]35.8	16.0	3.2	3.2	0.8	[R]363.3
1996	[R]58.3	[R]193.2	14.3	[R]14.3	0.0	[R]16.4	[R]9.9	[R]36.0	15.5	3.9	3.4	0.9	[R]369.7
1997[E]	64.3	213.5	14.7	16.5	0.0	18.5	10.9	37.6	17.6	4.5	3.7	1.0	407.0

[1] Coal, anthracite culm, and coal waste.
[2] Butane, methane, propane, and other gases.
[3] Petroleum, petroleum coke, diesel, kerosene, petroleum sludge, and tar.
[4] Nuclear reactor and generator at Argonne National Laboratory used primarily for research and development in testing reactor fuels as well as for training. Generation from the unit is for internal combustion.
[5] Conventional hydropower only; there are no pumped storage projects among the nonutility power producers.
[6] Wood, wood waste, wood liquors, peat, railroad ties, pitch, wood sludge, and spent sulfite liquor.
[7] Municipal solid waste.
[8] Landfill gas.
[9] Agricultural waste, straw, tires, fish oils, paper pellets, tall oil, sludge waste, and waste alcohol.
[10] Includes hydrogen, sulfur, batteries, and chemicals.
[11] Included in natural gas.
R=Revised. E=Estimated. (s)=Less than 0.05 billion killowatthours.
Note: Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelelectric.html.
Source: Energy Information Administration, estimated from Form EIA-867, "Annual Nonutility Power Producer Report" gross generation data.

Figure 8.5 Electric Power Industry Net Summer Capability



[1]Geothermal energy, wood, waste, wind, solar, hydrogen, sulfur, batteries, and chemicals.

[2] Other gas, conventional hydroelectric power, geothermal energy, waste, wind, solar, hydrogen, sulfur, batteries, and chemicals.

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

Sources: Tables 8.5, 8.6, and 8.7.

Table 8.5 Electric Power Industry Net Summer Capability, 1989-1997

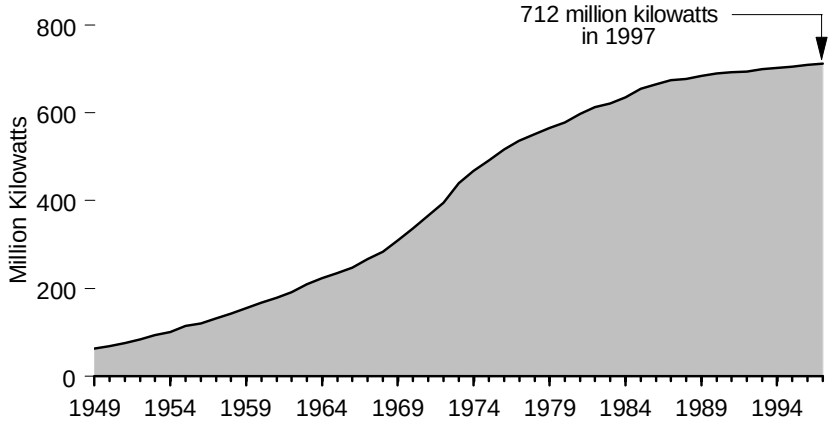
(Million Kilowatts)

Year	Fossil Fuels					Nuclear Electric Power	Hydroelectric Pumped Storage	Renewable Energy						Total [7]
	Coal [1]	Natural Gas	Other Gas [2]	Petroleum [3]	Dual Fired [4]			Conventional Hydroelectric Power	Geothermal Energy	Wood [5]	Waste [6]	Wind Energy	Solar Energy	
1989	302.6	29.1	NA	56.6	130.8	98.2	18.1	74.0	2.5	5.5	1.9	1.3	0.2	721.0
1990	306.4	30.5	NA	56.4	133.2	99.6	19.5	73.3	2.6	6.0	2.4	1.4	0.3	731.9
1991	306.5	34.7	NA	54.0	135.2	99.6	18.4	75.6	2.6	6.6	2.8	1.7	0.3	738.4
1992	308.5	35.1	NA	51.5	141.2	99.0	21.2	74.8	2.9	6.7	3.0	1.8	0.3	746.6
1993	309.9	37.4	NA	49.7	144.7	99.1	21.1	77.4	3.0	6.9	3.2	1.8	0.3	755.0
1994	310.8	43.1	1.1	47.6	147.0	99.1	21.2	78.0	3.0	7.3	3.2	1.7	0.3	764.0
1995	R310.8	41.9	1.1	48.0	152.4	99.5	21.4	78.6	3.0	6.8	3.5	1.7	0.3	769.5
1996	R313.7	R49.4	0.2	48.7	R151.5	100.8	21.1	76.4	2.9	R5.8	R2.6	1.7	0.3	775.9
1997E	313.9	50.9	0.2	48.1	154.1	100.8	21.1	76.7	2.9	5.9	2.7	1.7	0.3	779.9

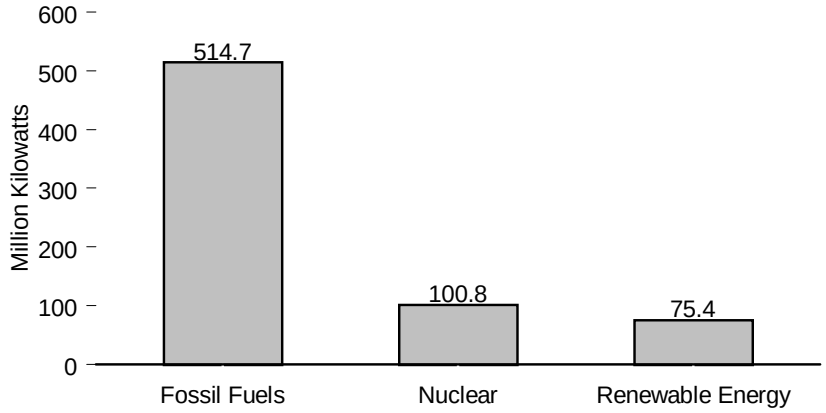
[1] Coal, anthracite culm, and coal waste.
[2] Butane, methane, propane, and other gases.
[3] Petroleum, petroleum coke, diesel, kerosene, petroleum sludge, and tar.
[4] Petroleum and natural gas.
[5] Wood, wood waste, wood liquors, peat, railroad ties, wood sludge, and spent sulfite liquor.
[6] Municipal solid waste, landfill gas, agricultural waste, straw, tires, fish oils, paper pellets, tall oil, sludge waste, and waste alcohol.
[7] Includes hydrogen, sulfur, batteries, and chemicals.
R=Revised. E=Estimated. NA=Not available.
Note: See Note 4 at end of section.
Web Page: http://www.eia.doe.gov/fuelelectric.html.
Source: Tables 8.6 and 8.7.

Figure 8.6 Electric Utility Net Summer Capability

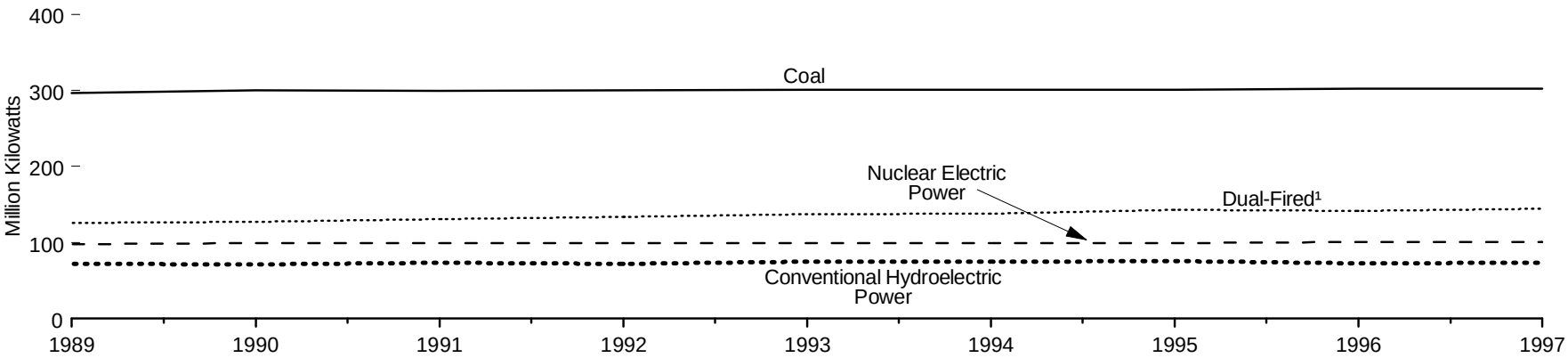
Total, 1949-1997



By Source, 1997



By Selected Sources, 1989-1997



[1] Petroleum and natural gas.

Note: Because vertical scales differ, graphs should not be compared.
Source: Table 8.6.

Table 8.6 Electric Utility Net Summer Capability, 1949-1997

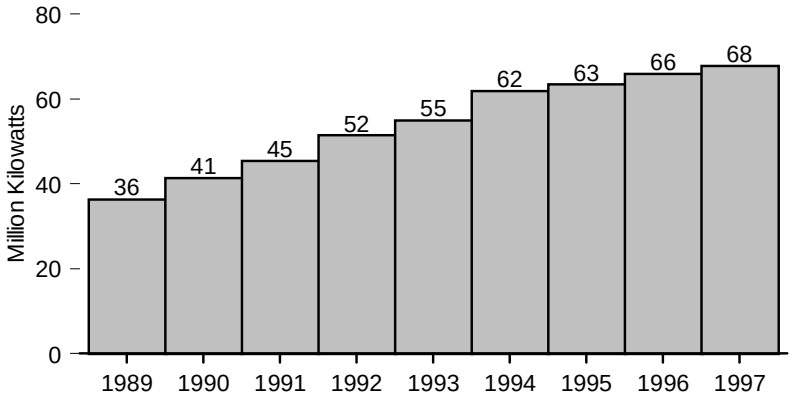
(Million Kilowatts)

Year	Fossil Fuels				Nuclear Electric Power	Hydroelectric Pumped Storage	Renewable Energy						Total
	Coal	Natural Gas	Petroleum [1]	Dual Fired [2]			Conventional Hydroelectric Power	Geothermal Energy	Wood [3]	Waste [4]	Wind Energy	Solar Energy	
1949	NA	NA	NA	NA	0	([5])	18.5	0	(s)	([6])	0	0	63.4
1950	NA	NA	NA	NA	0	([5])	19.2	0	(s)	([6])	0	0	69.2
1951	NA	NA	NA	NA	0	([5])	20.5	0	(s)	([6])	0	0	75.5
1952	NA	NA	NA	NA	0	([5])	22.4	0	(s)	([6])	0	0	83.2
1953	NA	NA	NA	NA	0	([5])	23.8	0	(s)	([6])	0	0	93.3
1954	NA	NA	NA	NA	0	([5])	22.5	0	(s)	([6])	0	0	100.0
1955	NA	NA	NA	NA	0	([5])	27.4	0	(s)	([6])	0	0	114.2
1956	NA	NA	NA	NA	0	([5])	28.5	0	(s)	([6])	0	0	119.7
1957	NA	NA	NA	NA	0.1	([5])	30.7	0	0.1	([6])	0	0	131.1
1958	NA	NA	NA	NA	0.1	([5])	32.5	0	0.1	([6])	0	0	143.3
1959	NA	NA	NA	NA	0.1	([5])	34.8	0	0.1	([6])	0	0	155.9
1960	NA	NA	NA	NA	0.4	([5])	35.8	(s)	0.1	([6])	NA	0	167.1
1961	NA	NA	NA	NA	0.4	([5])	40.7	(s)	0.1	([6])	NA	0	179.0
1962	NA	NA	NA	NA	0.7	([5])	44.0	(s)	0.1	([6])	NA	0	192.1
1963	NA	NA	NA	NA	0.8	([5])	47.0	(s)	0.1	([6])	NA	0	209.7
1964	NA	NA	NA	NA	0.8	([5])	49.4	(s)	0.1	([6])	NA	0	223.7
1965	NA	NA	NA	NA	0.8	([5])	51.0	(s)	0.1	([6])	NA	0	234.8
1966	NA	NA	NA	NA	1.7	([5])	51.2	(s)	0.1	([6])	NA	0	247.5
1967	NA	NA	NA	NA	2.7	([5])	55.0	0.1	0.1	([6])	NA	0	266.7
1968	NA	NA	NA	NA	2.7	([5])	57.9	0.1	0.1	([6])	NA	0	284.0
1969	NA	NA	NA	NA	4.4	([5])	61.6	0.1	0.1	([6])	NA	0	309.8
1970	NA	NA	NA	NA	7.0	([5])	63.8	0.1	0.1	([6])	NA	0	336.4
1971	NA	NA	NA	NA	9.0	([5])	69.1	0.2	0.1	([6])	NA	0	366.4
1972	NA	NA	NA	NA	14.5	([5])	70.5	0.3	0.1	([6])	NA	0	396.0
1973	NA	NA	NA	NA	22.7	([5])	75.4	0.4	0.1	([6])	NA	0	439.8
1974	NA	NA	NA	NA	31.9	([5])	75.5	0.4	0.1	([6])	NA	0	468.5
1975	NA	NA	NA	NA	37.3	([5])	78.4	0.5	0.1	([6])	NA	0	491.3
1976	NA	NA	NA	NA	43.8	([5])	78.0	0.5	0.1	([6])	NA	0	517.2
1977	NA	NA	NA	NA	46.3	([5])	78.6	0.5	0.1	([6])	NA	0	535.9
1978	NA	NA	NA	NA	50.8	([5])	79.9	0.5	0.1	([6])	NA	0	552.1
1979	NA	NA	NA	NA	49.7	([5])	82.9	0.7	0.1	([6])	NA	0	565.5
1980	NA	NA	NA	NA	51.8	([5])	81.7	0.9	0.1	([6])	NA	0	578.6
1981	NA	NA	NA	NA	56.0	([5])	82.4	0.9	0.1	([6])	(s)	0	598.3
1982	NA	NA	NA	NA	60.0	([5])	83.0	1.0	0.1	([6])	(s)	0	613.7
1983	NA	NA	NA	NA	63.0	([5])	83.9	1.2	0.2	([6])	(s)	0	621.1
1984	NA	NA	NA	NA	69.7	([5])	85.3	1.2	0.3	([6])	(s)	0	635.1
1985	NA	NA	NA	NA	79.4	([5])	88.9	1.6	0.2	0.2	(s)	0	655.2
1986	NA	NA	NA	NA	85.2	([5])	89.3	1.6	0.2	0.2	(s)	0	664.8
1987	NA	NA	NA	NA	93.6	([5])	89.7	1.5	0.2	0.2	(s)	0	674.1
1988	NA	NA	NA	NA	94.7	([5])	90.3	1.7	0.2	0.2	(s)	0	677.7
1989	296.6	15.4	55.6	126.3	98.2	18.1	[R]72.4	1.6	0.2	0.2	(s)	(s)	684.6
1990	299.9	15.0	55.4	127.5	99.6	[R]19.5	[R]71.4	1.6	0.2	0.2	(s)	(s)	690.5
1991	299.6	16.7	52.6	130.5	99.6	18.4	73.6	1.6	0.2	0.2	(s)	(s)	693.0
1992	300.5	16.4	49.9	133.7	99.0	[R]21.2	[R]72.2	1.7	0.2	0.2	(s)	(s)	695.1
1993	300.8	17.0	47.8	137.2	99.0	21.1	74.8	1.7	0.2	0.2	(s)	(s)	700.0
1994	301.1	19.8	45.5	138.4	99.1	21.2	74.8	1.7	0.3	0.3	(s)	(s)	702.2
1995	300.6	17.7	46.1	143.2	99.5	21.4	75.3	1.7	0.3	0.3	(s)	(s)	706.1
1996	[R]302.4	[R]22.7	[R]45.7	[R]142.0	[R]100.8	21.1	[R]73.1	1.6	[R]0.2	[R]0.2	(s)	(s)	[R]709.9
1997[P]	302.5	23.1	44.6	144.5	100.8	21.1	73.4	1.6	0.2	0.2	(s)	(s)	712.0

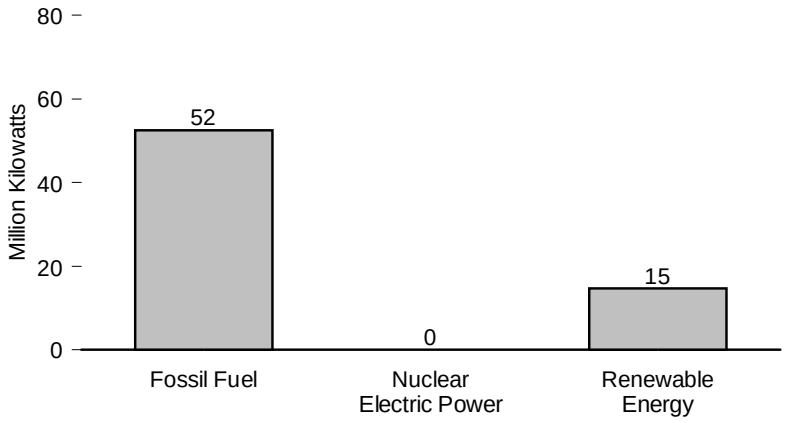
[1] Petroleum, petroleum coke, diesel, kerosene, petroleum sludge, and tar.
[2] Petroleum and natural gas.
[3] Wood, wood waste, wood liquors, peat, railroad ties, wood sludge, and spent sulfite liquor.
[4] Municipal solid waste, landfill gas, agricultural waste, straw, tires, fish oils, paper pellets, tall oil, sludge waste, and waste alcohol.
[5] Included in "Conventional Hydroelectric Power."
[6] Included in "Wood."
R=Revised. P=Preliminary. NA=Not available. (s)=Less than 0.05 million killowatthours.
Web Page: http://www.eia.doe.gov/fuelelectric.html.
Source: Energy Information Administration, Form EIA-860, "Annual Electric Generator Report" and EIA, Form EIA-759, "Monthly Power Plant Report."

Figure 8.7 Nonutility Power Net Summer Capability

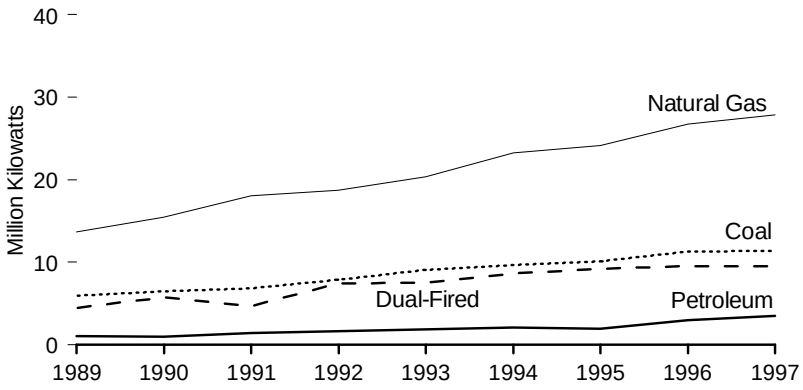
Total, 1989-1997



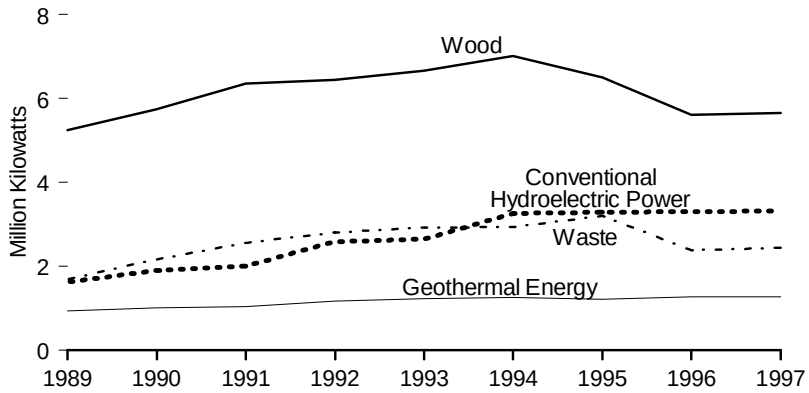
By Source, 1997



Fossil Fuels by Type, 1989-1997



Selected Renewable Energy Sources, 1989-1997



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

Source: Table 8.7.

Table 8.7 Nonutility Power Net Summer Capability, 1989-1997

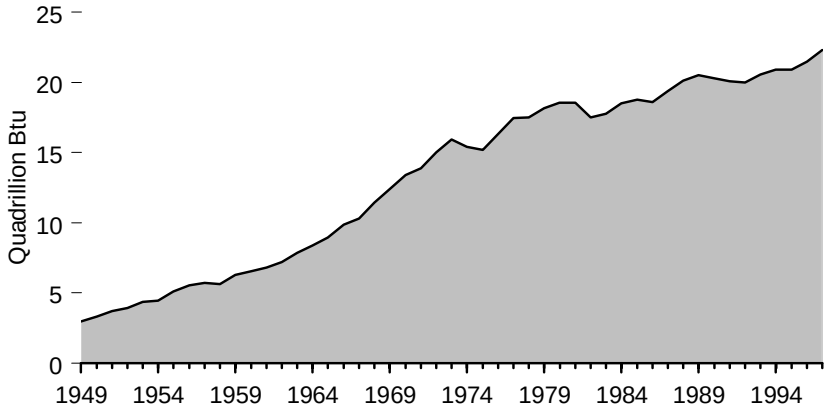
(Million Kilowatts)

Year	Fossil Fuels					Nuclear Electric Power	Renewable Energy							Total [10]
	Coal [1]	Natural Gas	Other Gas [2]	Petroleum [3]	Dual Fired [4]		Conventional Hydroelectric Power [5]	Geothermal Energy	Wood [6]	Waste: MSL [7] and LFG [8]	Waste: Other Waste [9]	Wind Energy	Solar Energy	
1989	6.0	13.7	NA	1.1	4.4	(s)	1.6	0.9	5.2	1.5	0.2	1.3	0.2	36.4
1990	6.5	15.5	NA	1.0	5.8	(s)	1.9	1.0	5.7	1.8	0.4	1.4	0.3	41.4
1991	6.8	18.0	NA	1.4	4.7	(s)	2.0	1.0	6.3	2.0	0.5	1.7	0.3	45.4
1992	7.9	18.7	NA	1.6	7.5	(s)	2.6	1.2	6.4	2.2	0.6	1.8	0.3	51.5
1993	9.1	20.3	NA	1.9	7.5	(s)	2.6	1.2	6.7	2.2	0.7	1.8	0.3	55.0
1994	9.7	23.2	1.1	2.1	8.6	0	3.3	1.3	7.0	2.4	0.5	1.7	0.3	61.8
1995	10.2	24.2	1.1	2.0	9.2	0	3.3	1.2	[R]6.5	2.6	0.6	1.7	0.3	63.4
1996	[R]11.3	[R]26.7	0.2	3.0	[R]9.5	0	3.3	1.3	[R]5.6	1.9	0.5	1.7	0.3	65.9
1997[E]	11.4	27.8	0.2	3.5	9.5	0	3.3	1.3	5.7	1.9	0.5	1.7	0.3	67.8

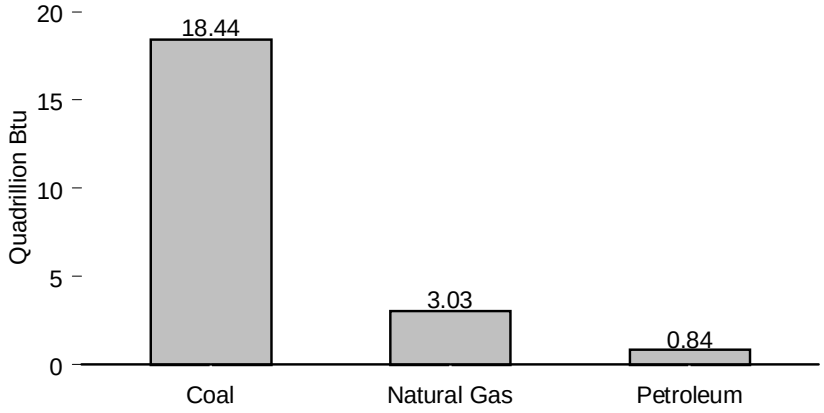
[1] Coal, anthracite culm, and coal waste.
[2] Butane, methane, propane, and other gases.
[3] Petroleum, petroleum coke, diesel, kerosene, petroleum sludge, and tar.
[4] Petroleum and natural gas.
[5] Pumped storage facility production minus energy used for pumping.
[6] Wood, wood waste, wood liquors, peat, railroad ties, wood sludge, and spend sulfite liquor.
[7] Municipal solid waste.
[8] Landfill gas.
[9] Agricultural waste, straw, tires, fish oils, paper pellets, tall oil, sludge waste, and waste alcohol.
[10] Includes hydrogen, sulfur, batteries, and chemicals.
R=Revised. E=Estimated. NA=Not available. (s)=Less than 0.05 million killowatthours.
Web Page: http://www.eia.doe.gov/fuelelectric.html.
Source: Energy Information Administration, estimated data using Form EIA-867, "Annual Nonutility Power Producer Report."

Figure 8.8 Electric Utility Consumption of Fossil Fuels To Generate Electricity

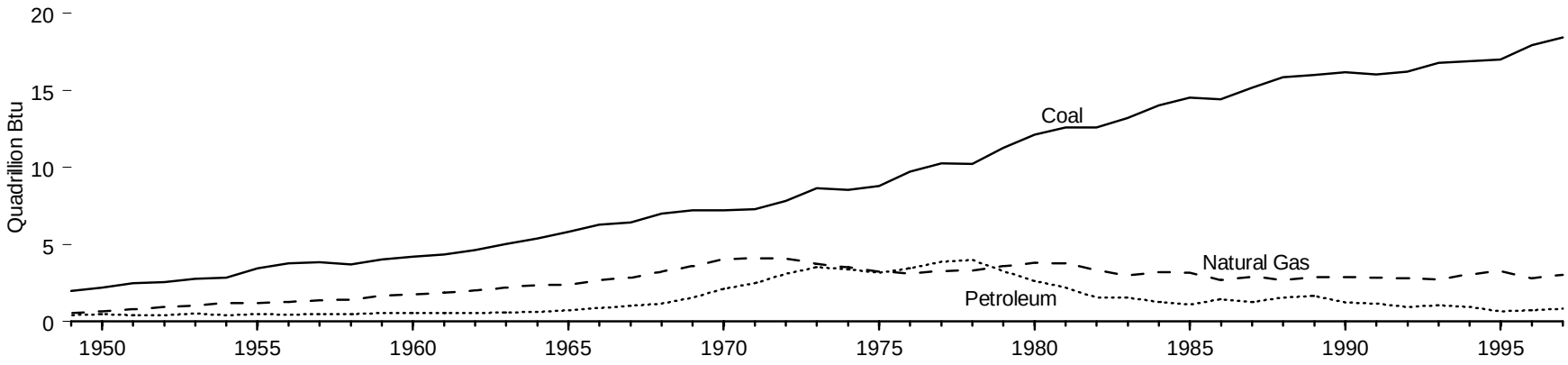
Total, 1949-1997



By Energy Source, 1997



By Energy Source, 1949-1997



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

Source: Table 8.8.

Table 8.8 Electric Utility Consumption of Fossil Fuels To Generate Electricity, 1949-1997

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	772.3	16.03	2,789.0	2.86	188.5	1.18	20.06
1992	779.9	16.21	2,765.6	2.83	152.3	0.95	19.99
1993	813.5	16.79	2,682.4	2.74	168.6	1.05	20.58
1994	817.3	16.90	2,987.1	3.05	155.4	0.97	20.92
1995	829.0	16.99	3,196.5	3.28	106.0	0.66	20.92
1996	R874.7	R17.95	R2,732.1	2.80	R116.7	R0.72	R21.48
1997P	898.5	18.44	2,962.4	3.03	135.3	0.84	22.31

[1] These data show petroleum consumed by electric utilities and do not equate to petroleum supplied to (or delivered to) electric utilities. Included are residual fuel oil (including crude oil burned as fuel), distillate fuel oil, jet fuel, and petroleum coke. Petroleum coke is reported in short tons and has been converted to barrels at a rate of 5 barrels per short ton.

R=Revised. P=Preliminary.

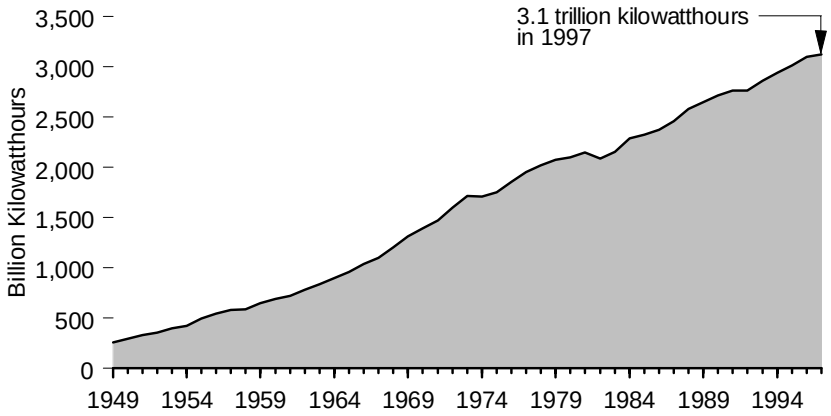
Notes: • See Note 3 at end of section. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelelectric.html.

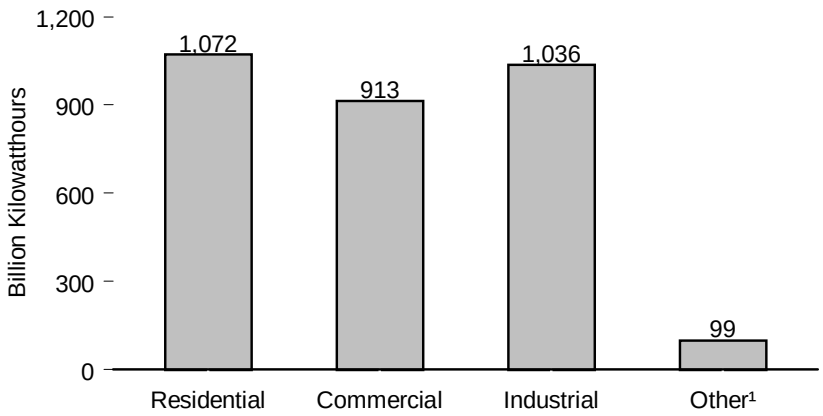
Sources: • 1949-September 1977—Federal Power Commission, Form FPC-4, "Monthly Power Plant Report." • October 1977-1981—Federal Energy Regulatory Commission, Form FPC-4, "Monthly Power Plant Report." • 1982 forward—Energy Information Administration, Form EIA-759, "Monthly Power Plant Report."

Figure 8.9 Electric Utility Retail Sales of Electricity by End-Use Sector

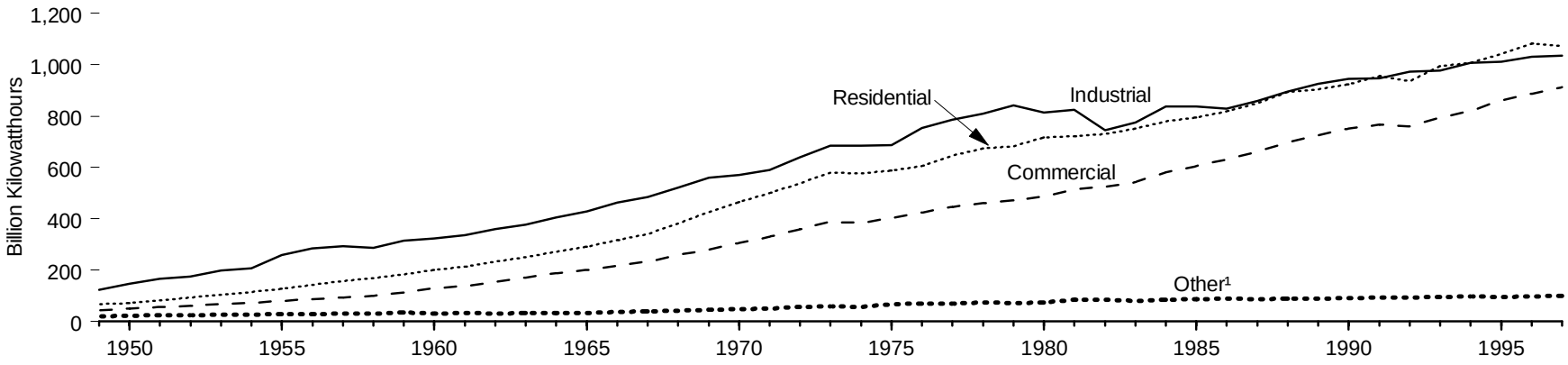
Total, 1949-1997



By End-Use Sector, 1997



By End-Use Sector, 1949-1997



¹ Public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

Note: Because vertical scales differ, graphs should not be compared.
Source: Table 8.9.

Table 8.9 Electric Utility Retail Sales of Electricity by End-Use Sector, 1949-1997

(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	780	583	838	85	2,286
1985	794	606	837	87	2,324
1986	819	631	831	89	2,369
1987	850	660	858	88	2,457
1988	893	699	896	90	2,578
1989	906	726	926	90	2,647
1990	924	751	946	92	2,713
1991	955	766	947	94	2,762
1992	936	761	973	93	2,763
1993	995	795	977	95	2,861
1994	1,008	820	1,008	98	2,935
1995	1,043	863	1,013	95	3,013
1996	[R]1,082	[R]887	[R]1,030	[R]98	[R]3,098
1997[P]	1,072	913	1,036	99	3,120

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

R=Revised. P=Preliminary.

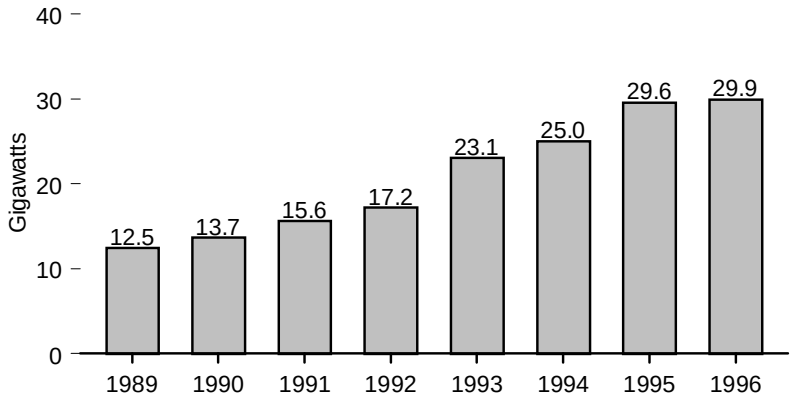
Notes: • See Note 5 at end of section. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelelectric.html.

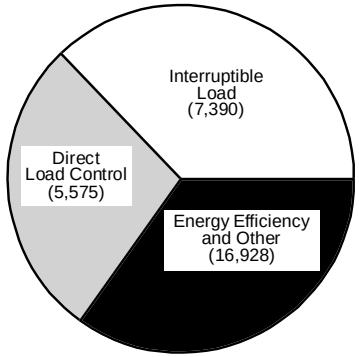
Sources: • 1949-September 1977—Federal Power Commission, Form FPC-5, "Monthly Statement of Electric Operating Revenue and Income." • October 1977-February 1980—Federal Energy Regulatory Commission (FERC), Form FPC-5, "Monthly Statement of Electric Operating Revenue and Income." • March 1980-1982—FERC, Form FPC-5, "Electric Utility Company Monthly Statement." • 1983—Energy Information Administration (EIA), Form EIA-826, "Electric Utility Company Monthly Statement." • 1984-1996—EIA, Form EIA-861, "Annual Electric Utility Report." • 1997—EIA, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions."

Figure 8.10 Electric Utility Demand-Side Management Programs: Peakload Reductions, Energy Savings, and Costs

Actual Peakload Reductions, Total of All Programs, 1989-1996

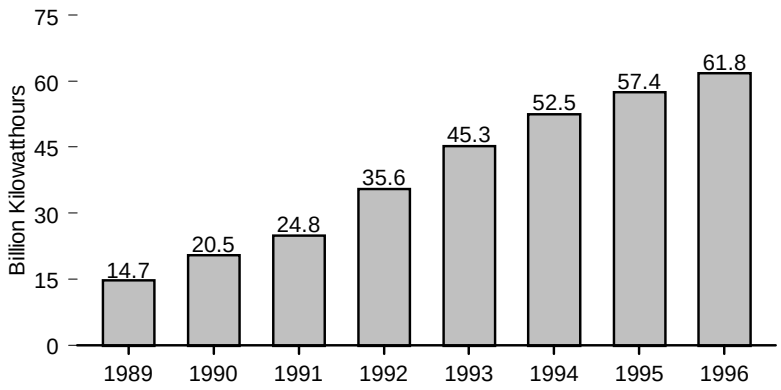


Actual Peakload Reductions by Program, 1996

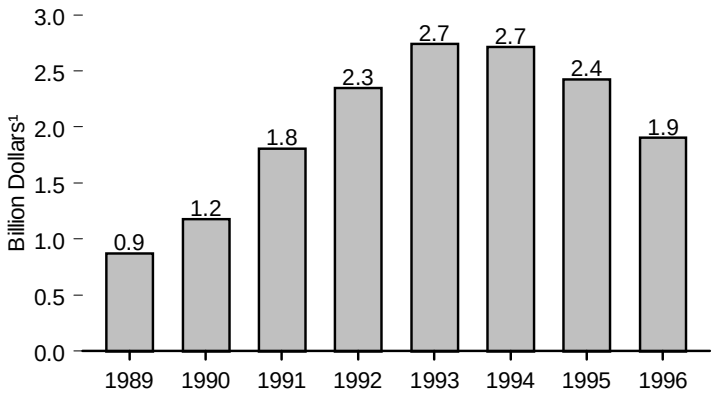


Total: 29,893 Megawatts

Energy Savings, 1989-1996



Costs, 1989-1996



[1] Nominal dollars.

Source: Table 8.10.

Table 8.10 Electric Utility Demand-Side Management Programs: Peakload Reductions, Energy Savings, and Costs, 1989-1996

Year	Actual Peakload Reductions (megawatts)				Energy Savings (million kilowatthours)	Costs (thousand dollars [6])
	Direct Load Control [1,2]	Interruptible Load [1,3]	Energy Efficiency [4] and Other [5]	Total		
1989	NA	NA	NA	12,463	14,672	872,935
1990	3,692	4,219	5,793	13,704	20,458	1,177,457
1991	5,093	3,674	6,852	15,619	24,848	1,803,773
1992	3,779	3,579	9,847	17,204	35,563	2,348,094
1993	3,955	6,628	12,486	23,069	45,294	2,743,533
1994	4,179	6,743	14,079	25,001	52,483	2,715,657
1995	5,352	8,401	15,807	29,561	57,421	2,421,261
1996	5,575	7,390	16,928	29,893	61,842	1,902,197

[1] The actual reduction in peak load reflects the change in demand for electricity that results from a utility demand-side management program that is in effect at the time that the utility experiences its actual peak load as opposed to the potential installed peakload reduction capability. Differences between actual and potential peak reduction result from changes in weather, economic activity, and other variable conditions.

[2] Direct load control refers to program activities that can interrupt consumer load at the time of annual peak load by direct control of the utility system operator by interrupting power supply to individual appliances or equipment on consumer premises. This type of control usually involves residential consumers.

[3] Interruptible load refers to program activities that, in accordance with contractual arrangements, can interrupt consumer load at times of seasonal peak load by direct control of the utility system operator or by action of the consumer at the direct request of the system operator. It usually involves commercial and industrial consumers. In some instances, the load reduction may be affected by direct action of the system operator (remote tripping) after notice to the consumer in accordance with contractual provisions.

[4] Energy efficiency refers to programs that are aimed at reducing the energy used by specific end-use devices and systems, typically without affecting the services provided. These programs reduce overall electricity consumption, often without explicit consideration for the timing of program-induced savings. Such savings are generally achieved by substituting technically more advanced equipment to produce the same level of end-use services (e.g., lighting, heating, motor drive) with less electricity. Examples include high-efficiency appliances, efficient lighting programs, high-efficiency heating, ventilating, and air conditioning systems or control modifications, efficient building design, advanced electric motor drives, and heat recovery systems.

[5] For example, programs that promote consumer's substitution of electricity by other energy types and programs that limit or shift peak load from on-peak to off-peak time periods, such as space heating and water heating storage systems, cool storage systems, and load-limiting devices in energy management systems.

[6] Nominal dollars.

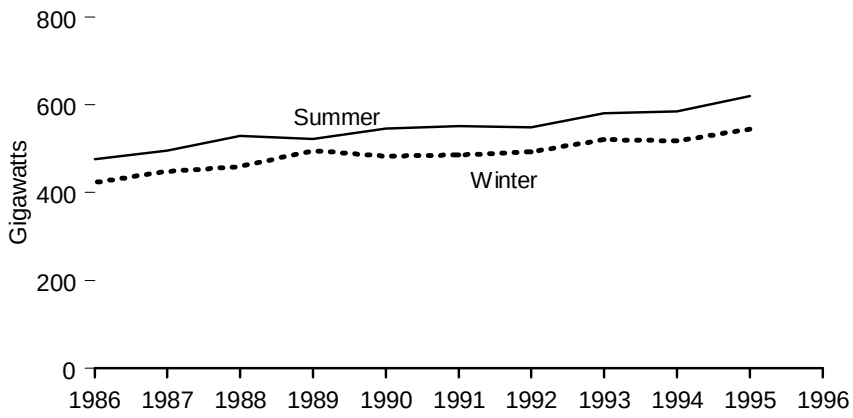
NA=Not available.

Web Page: http://www.eia.doe.gov/fuelelectric.html.

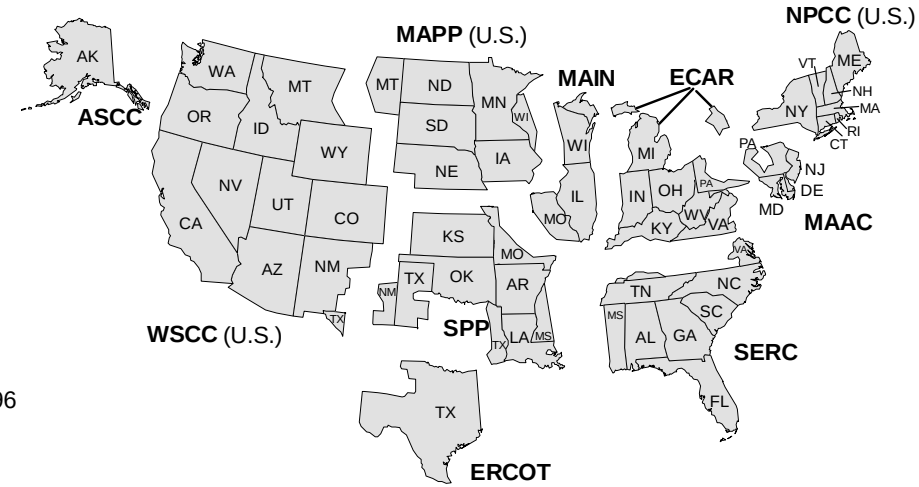
Source: Energy Information Administration, Form EIA-861, "Annual Electric Utility Report."

Figure 8.11 Electric Utility Noncoincidental Peak Load

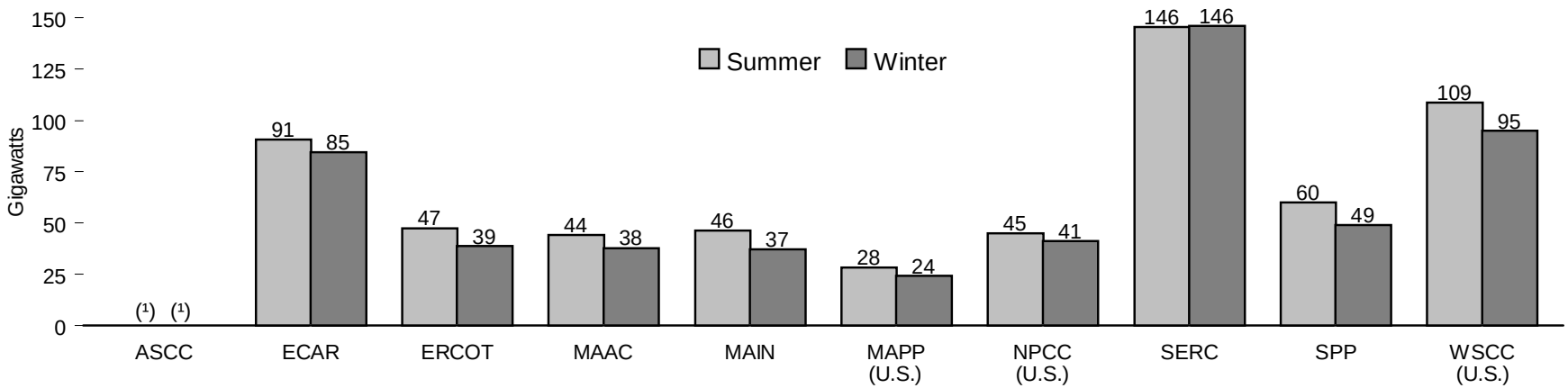
In the Contiguous United States, 1986-1996



North American Electric Reliability Council Map for the United States



By NERC Regions, 1996



[1] Data for ASCC (Alaska) were not filed for 1996.

Notes: • Noncoincidental peak load is the sum of two or more peak loads on individual systems that do not occur at the same time interval. See Glossary for information on North American Electric Reliability Council (NERC). • Because vertical scales differ, graphs should not be compared.

Source: Table 8.11.

Table 8.11 Electric Utility Noncoincidental Peak Load by Region, 1986-1996

(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	([2])
1987	72,561	39,339	40,526	37,446	23,162	42,651	109,798	47,723	82,967	496,173	([2])
1988	79,149	40,843	43,110	41,139	24,899	45,245	115,168	49,356	90,551	529,460	([2])
1989	75,442	40,402	41,614	39,460	23,531	45,031	117,051	49,439	90,657	522,627	455
1990	79,258	42,737	42,613	40,740	24,994	44,116	121,149	52,541	97,389	545,537	463
1991	81,539	41,870	45,937	41,598	25,498	46,594	124,688	51,885	92,096	551,705	471
1992	78,550	42,619	43,658	38,819	22,638	43,658	128,236	51,324	99,205	548,707	504
1993	85,930	44,255	46,494	41,956	24,396	46,706	136,101	57,106	97,809	580,753	511
1994	87,165	44,162	46,019	42,562	27,000	47,581	132,584	56,035	102,212	585,320	524
1995	92,619	46,618	48,577	45,782	29,192	47,705	146,569	59,595	103,592	620,249	622
1996	90,798	47,480	44,302	46,402	28,253	45,094	145,650	60,072	108,739	616,790	([3])
						Winter					
1986	64,561	28,730	32,807	28,036	18,850	37,976	101,849	33,877	76,171	422,857	([2])
1987	68,118	31,399	35,775	30,606	19,335	41,902	105,476	34,472	81,182	448,265	([2])
1988	67,771	34,621	36,363	30,631	20,162	42,951	108,649	35,649	82,937	459,734	([2])
1989	73,080	38,388	38,161	33,770	20,699	42,588	121,995	42,268	84,768	495,717	626
1990	67,097	35,815	36,551	32,461	21,113	40,545	117,231	38,949	94,252	484,014	613
1991	71,181	35,448	37,983	33,420	21,432	41,786	119,575	38,759	86,097	485,681	622
1992	72,885	35,055	37,915	31,289	21,866	41,125	121,250	39,912	91,686	492,983	635
1993	81,846	35,407	41,406	34,966	21,955	42,063	133,635	41,644	88,811	521,733	632
1994	75,638	36,180	40,653	33,999	23,033	42,547	132,661	42,505	91,037	518,253	641
1995	83,465	36,965	40,790	35,734	23,429	42,755	142,032	44,626	94,890	544,686	676
1996	84,534	38,868	37,806	37,162	24,251	41,200	146,030	49,095	95,135	554,081	([3])

[1] See Glossary for information on the North American Electric Reliablility Council (NERC). This table includes the U.S. portion of NERC only and does not cover Hawaii, Puerto Rico, and U.S. Trust Territories. See Figure 8.11 for an illustration of NERC regions.

[2] Data submission for ASCC (Alaska) began in 1989.

[3] Data for ASCC (Alaska) were not filed for 1996.

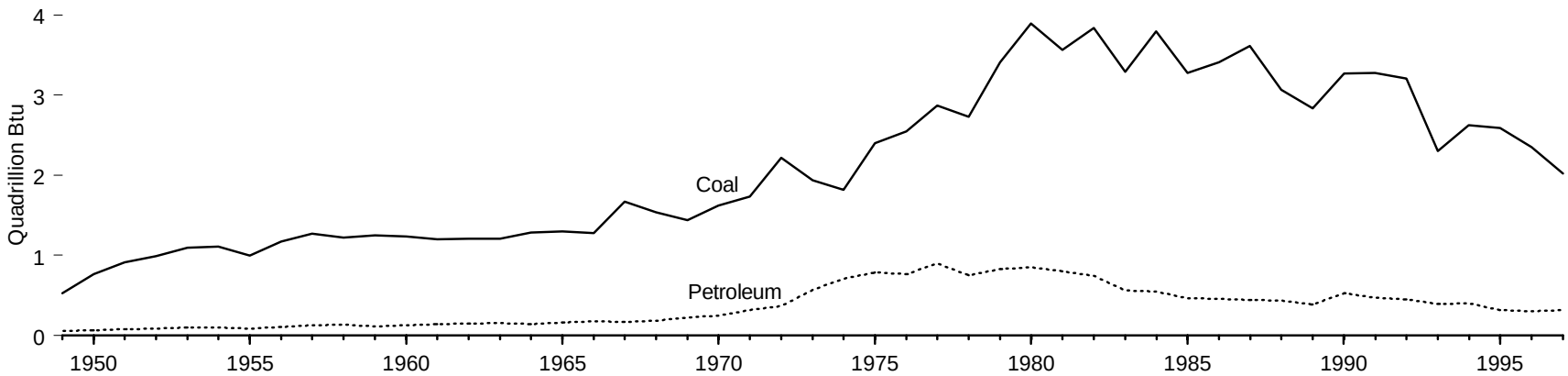
Note: Noncoincidental peak load is the sum of two or more peak loads on individual systems that do not occur at the same time interval.

Web Page: http://www.eia.doe.gov/fuelelectric.html.

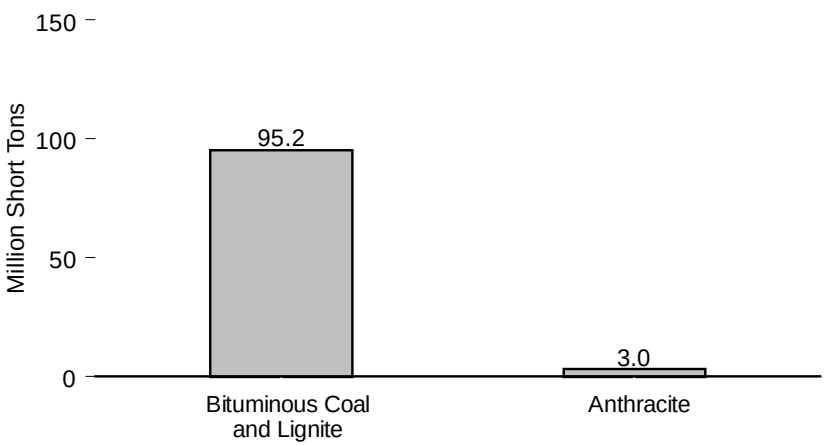
Sources: • 1986—Energy Information Administration (EIA), *Electric Power Annual 1990* (January 1992), Table 53. • 1987—EIA, *Electric Power Annual 1991* (February 1993), Table 52. • 1988—EIA, *Electric Power Annual 1992* (January 1994), Table 57. • 1989—EIA, *Electric Power Annual 1993* (December 1994), Table 57. • 1990 forward—EIA, *Electric Power Annual 1996, Volume II* (February 1997), Table 35.

Figure 8.12 Electric Utility Stocks of Coal and Petroleum, End of Year

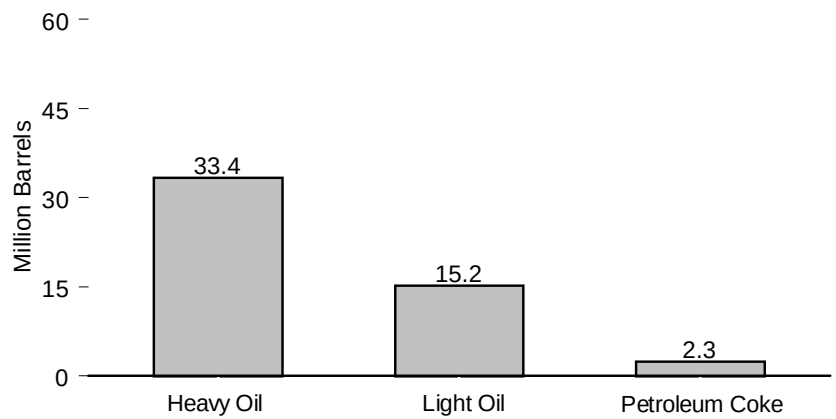
Coal and Petroleum, 1949-1997



Coal, 1997



Petroleum, 1997



Source: Table 8.12.

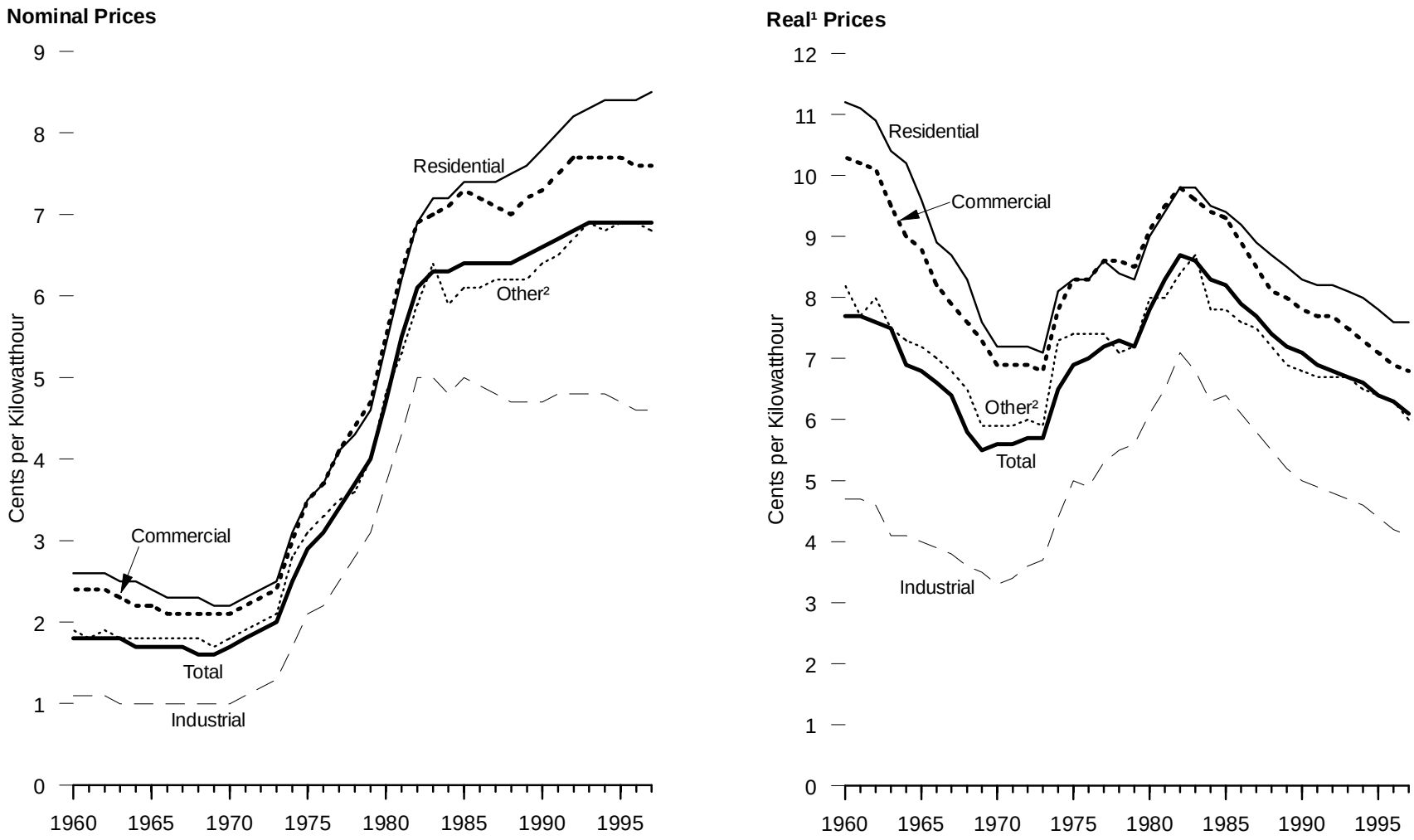
Table 8.12 Electric Utility Stocks of Coal and Petroleum, End of Year 1949-1997

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	6.5	151.4	157.9	3,277	58.6	16.4	75.0	0.4	75.3	471
1992	6.2	147.9	154.1	3,204	56.1	15.7	71.8	0.3	72.2	451
1993	5.6	105.7	111.3	2,298	46.8	15.7	62.4	0.4	62.9	392
1994	4.9	122.0	126.9	2,623	46.3	16.6	63.0	0.3	63.3	395
1995	4.3	122.0	126.3	2,589	35.1	15.4	50.5	0.3	50.8	316
1996	3.7	110.9	114.6	R2,353	32.5	R15.2	R47.7	0.5	R48.1	R299
1997P	3.0	95.2	98.3	2,017	33.4	15.2	48.6	2.3	50.9	316

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

Notes: • See Note 3 at end of section. • Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelelectric.html.
Sources: • 1949-September 1977—Federal Power Commission, Form FPC-4, "Monthly Power Plant Report." • October 1977-1981—Federal Energy Regulatory Commission, Form FPC-4, "Monthly Power Plant Report." • 1982 forward—Energy Information Administration, Form EIA-759, "Monthly Power Plant Report."

Figure 8.13 Retail Prices of Electricity Sold by Electric Utilities, 1960-1997



[1] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

[2] Public street and highway lighting, other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

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

Source: Table 8.13.

Table 8.13 Retail Prices of Electricity Sold by Electric Utilities, 1960-1997

(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	11.2	2.4	10.3	1.1	4.7	1.9	8.2	1.8	7.7
1961	2.6	R11.1	2.4	10.2	1.1	4.7	1.8	R7.7	1.8	R7.7
1962	2.6	10.9	2.4	R10.1	1.1	4.6	1.9	R8.0	1.8	R7.6
1963	2.5	R10.4	2.3	9.5	1.0	4.1	1.8	R7.5	1.8	R7.5
1964	2.5	10.2	2.2	9.0	1.0	4.1	1.8	7.3	1.7	6.9
1965	2.4	9.6	2.2	8.8	1.0	4.0	1.8	7.2	1.7	6.8
1966	2.3	8.9	2.1	8.2	1.0	3.9	1.8	7.0	1.7	6.6
1967	2.3	8.7	2.1	7.9	1.0	3.8	1.8	6.8	1.7	6.4
1968	2.3	8.3	2.1	7.6	1.0	3.6	1.8	6.5	1.6	5.8
1969	2.2	7.6	2.1	R7.3	1.0	R3.5	1.7	5.9	1.6	5.5
1970	2.2	7.2	2.1	6.9	1.0	3.3	1.8	5.9	1.7	5.6
1971	2.3	R7.2	2.2	R6.9	1.1	3.4	1.9	5.9	1.8	5.6
1972	2.4	7.2	2.3	6.9	1.2	3.6	2.0	6.0	1.9	5.7
1973	2.5	7.1	2.4	6.8	1.3	3.7	2.1	5.9	2.0	R5.7
1974	3.1	8.1	3.0	7.8	1.7	4.4	2.8	7.3	2.5	6.5
1975	3.5	8.3	3.5	8.3	2.1	5.0	3.1	R7.4	2.9	6.9
1976	3.7	8.3	3.7	8.3	2.2	4.9	3.3	7.4	3.1	7.0
1977	4.1	8.6	4.1	8.6	2.5	5.3	3.5	7.4	3.4	7.2
1978	4.3	8.4	4.4	8.6	2.8	5.5	3.6	7.1	3.7	7.3
1979	4.6	8.3	4.7	8.5	3.1	5.6	4.0	7.2	4.0	7.2
1980	5.4	R9.0	5.5	9.1	3.7	6.1	4.8	R8.0	4.7	7.8
1981	6.2	9.4	6.3	R9.5	4.3	6.5	5.3	8.0	5.5	8.3
1982	6.9	9.8	6.9	9.8	5.0	7.1	5.9	8.4	6.1	8.7
1983	7.2	9.8	7.0	9.6	5.0	6.8	6.4	R8.7	6.3	8.6
1984[3]	7.2	9.5	7.1	9.4	4.8	6.3	5.9	7.8	6.3	8.3
1985[3]	7.4	9.4	7.3	9.3	5.0	6.4	6.1	7.8	6.4	8.2
1986[3]	7.4	9.2	7.2	8.9	4.9	6.1	6.1	7.6	6.4	7.9
1987[3]	7.4	8.9	7.1	8.5	4.8	5.8	6.2	7.5	6.4	7.7
1988	7.5	8.7	7.0	8.1	4.7	5.5	6.2	7.2	6.4	7.4
1989	7.6	8.5	7.2	8.0	4.7	5.2	6.2	6.9	6.5	7.2
1990	7.8	8.3	7.3	7.8	4.7	5.0	6.4	6.8	6.6	7.1
1991	8.0	8.2	7.5	7.7	4.8	4.9	6.5	6.7	6.7	6.9
1992	8.2	8.2	7.7	7.7	4.8	4.8	6.7	6.7	6.8	6.8
1993	8.3	8.1	7.7	7.5	4.8	4.7	6.9	6.7	6.9	6.7
1994	8.4	8.0	7.7	7.3	4.8	4.6	6.8	6.5	6.9	6.6
1995	8.4	7.8	7.7	R7.1	4.7	4.4	6.9	6.4	6.9	6.4
1996	8.4	R7.6	7.6	6.9	4.6	4.2	R6.9	R6.3	6.9	6.3
1997P	8.5	7.6	7.6	6.8	4.6	4.1	6.8	6.0	6.9	6.1

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

[2] In chained (1992) dollars, calculated by using gross domestic product implicit price deflators. See Table 3.1.

[3] These data were taken from Form EIA-861, "Annual Electric Utility Report," and differ from the Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions," data published in previous issues of this publication.

R=Revised. P=Preliminary.

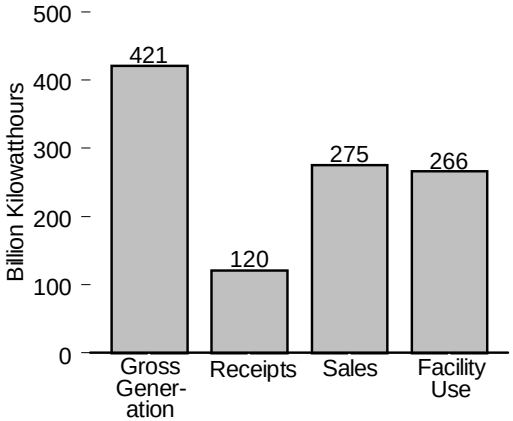
Note: Data for 1979 and earlier data are for Classes A and B privately owned electric utilities only. Data for 1980 forward are for selected Class A utilities whose electric operating revenues were $100 million or more during the previous year.

Web Page: http://www.eia.doe.gov/fuelelectric.html.

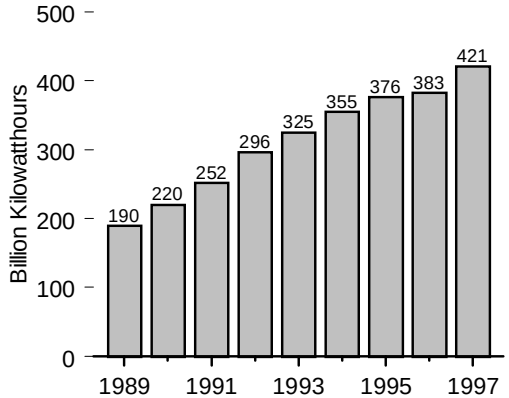
Sources: • 1960 through September 1977—Federal Power Commission, Form FPC-5, "Monthly Statement of Electric Operating Revenues and Income." • October 1977 through February 1980—Federal Energy Regulatory Commission (FERC), Form FPC-5, "Monthly Statement of Electric Operating Revenues and Income." • March 1980 through 1982—FERC, Form FERC-5, "Electric Utility Company Monthly Statement." • 1983—Energy Information Administration (EIA), Form EIA-826, "Electric Utility Company Monthly Statement." • 1984-1996—EIA, Form EIA-861, "Annual Electric Utility Report." • 1997—EIA, Form EIA-826, "Monthly Electric Utility Sales and Revenue Report with State Distributions."

Figure 8.14 Nonutility Power Overview

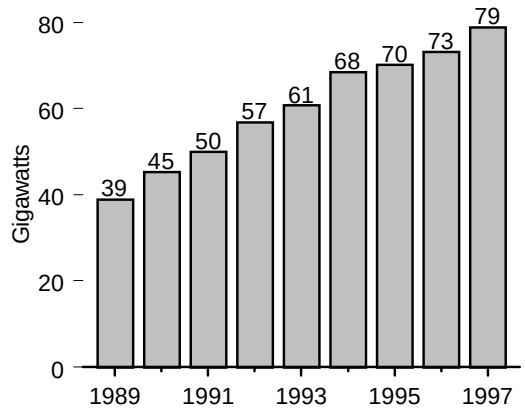
Supply and Disposition, 1997



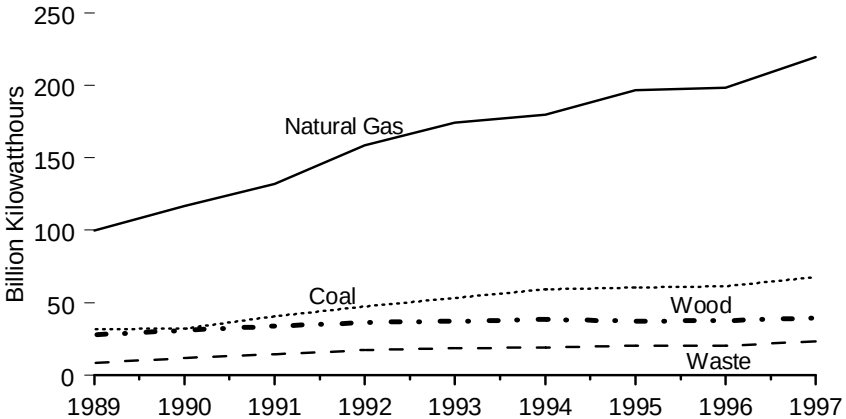
Gross Generation, 1989-1997



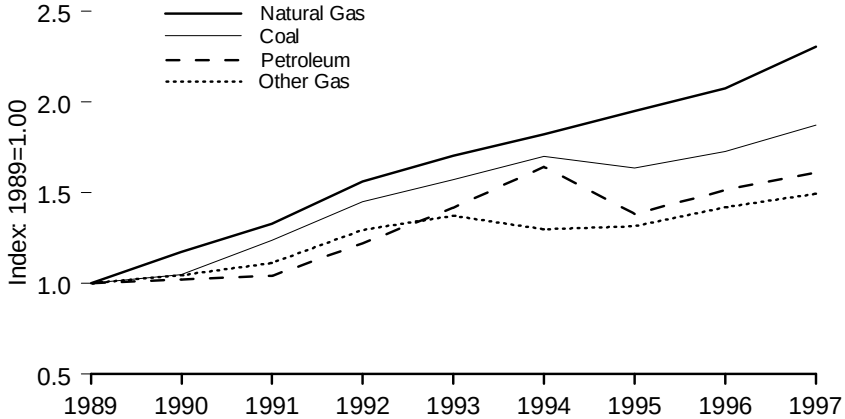
Installed Nameplate Capacity, 1989-1997



Gross Generation by Selected Fuel Types, 1989-1997



Fossil Fuel Consumption by Selected Fuel Types, Indexed, 1989-1997



Notes: • Nonutility electric generating facilities with a total generator capacity of 1 megawatt or greater. See Table 8.14 for a description of fuels. • Because vertical scales differ, graphs should not be compared.

Source: Table: 8.14.

Table 8.14 Nonutility Power Overview, 1989-1997

Item	1989	1990	1991	1992	1993	1994	1995	1996	1997[E]
Supply and Disposition (million kilowatthours)									
Gross Generation	[R]**189,896**	[R]**220,058**	[R]**251,747**	**296,001**	**325,226**	**354,925**	[R]**375,901**	[R]**382,530**	**421,199**
Receipts [1]	[R]58,939	[R]60,926	[R]64,964	83,421	85,323	94,166	89,919	[R]104,101	120,279
Sales to Utilities [2]	[R]81,229	[R]106,224	[R]129,118	164,374	187,466	204,688	[R]217,906	[R]224,675	260,760
Sales to Other End Users [3]	[R]17,687	[R]19,824	[R]11,419	[R]10,786	[R]15,569	[R]17,626	[R]15,548	[R]14,283	14,320
Facility Use	[R]149,918	[R]154,936	[R]176,175	204,261	207,514	226,777	[R]232,367	[R]247,673	266,399
Fossil Fuel Consumption									
Coal (thousand short tons)	[R]30,762	[R]32,300	[R]38,113	44,607	48,343	52,261	[R]50,328	[R]53,202	57,651
Petroleum [4] (thousand barrels)	[R]28,377	[R]28,980	[R]29,509	[R]34,626	[R]40,142	[R]46,630	[R]39,219	[R]42,926	45,805
Natural Gas (million cubic feet)	[R]1,181,015	[R]1,386,741	[R]1,569,850	1,844,857	2,013,788	2,149,246	[R]2,303,944	[R]2,449,996	2,721,463
Other Gas [5] (million cubic feet)	[R]1,225,951	[R]1,279,176	[R]1,364,697	[R]1,587,632	[R]1,681,916	[R]1,591,051	[R]1,611,993	[R]1,738,362	1,830,382
Gross Generation (million kilowatthours)	[R]**189,896**	[R]**220,058**	[R]**251,747**	**296,001**	**325,226**	**354,925**	[R]**375,901**	[R]**382,530**	**421,199**
Coal [6]	[R]31,511	[R]32,131	[R]40,587	47,363	53,367	59,035	[R]60,234	[R]61,424	67,767
Petroleum [7]	[R]5,742	[R]7,330	[R]7,814	10,963	13,364	15,069	[R]15,049	[R]14,951	17,267
Natural Gas	[R]99,632	[R]116,969	[R]131,820	158,798	174,282	179,735	[R]196,633	[R]198,606	219,558
Other Gas [5]	([8])	([8])	([8])	([8])	([8])	12,480	[R]13,984	[R]14,753	15,123
Hydroelectric Power [9]	[R]7,124	[R]8,153	[R]8,180	9,446	11,511	13,227	14,774	[R]16,555	18,702
Geothermal Energy	[R]5,416	[R]7,235	[R]8,014	8,578	9,749	10,122	9,912	[R]10,198	11,212
Wood [10]	[R]27,835	[R]30,812	[R]33,785	36,255	37,421	38,595	[R]37,283	[R]37,549	39,229
Waste [11]	[R]8,515	[R]11,688	[R]14,475	17,352	18,325	18,797	[R]20,231	[R]20,449	23,379
Solar	489	663	779	746	897	824	824	[R]903	994
Wind	[R]1,833	[R]2,251	[R]2,606	2,916	3,052	3,482	3,185	[R]3,400	3,727
Nuclear [12]	49	116	80	67	78	54	[R]0	[R]0	0
Other [13]	[R]1,750	[R]2,710	[R]3,609	3,516	3,181	3,507	[R]3,792	[R]3,744	4,242
Installed Nameplate Capacity [14] (megawatts)	[R]**38,851**	[R]**45,271**	[R]**49,998**	**56,814**	**60,778**	**68,461**	[R]**70,255**	[R]**73,183**	**78,940**
Coal [6]	[R]6,422	[R]6,937	[R]7,351	8,503	9,772	10,372	[R]10,877	[R]12,122	12,582
Petroleum [7]	[R]1,129	[R]1,038	[R]1,514	1,730	2,043	2,262	[R]2,116	[R]3,185	3,315
Natural Gas	[R]14,820	[R]17,430	[R]20,694	21,542	23,463	26,925	[R]27,906	[R]30,840	32,639
Other Gas [5]	([8])	([8])	([8])	([8])	([8])	1,130	1,217	[R]184	184
Petroleum and Natural Gas (dual fired)	[R]4,732	[R]6,468	[R]5,292	8,478	8,505	9,820	10,479	[R]10,875	11,755
Hydroelectric Power [9]	[R]1,672	[R]1,968	[R]2,072	2,684	2,741	3,364	3,399	[R]3,419	5,041
Geothermal Energy	[R]1,001	[R]1,086	[R]1,103	1,254	1,318	1,335	1,295	[R]1,346	1,446
Wood [10]	[R]5,515	[R]6,049	[R]6,708	6,805	7,046	7,416	[R]6,885	[R]5,938	6,079
Waste [11]	[R]1,825	[R]2,323	[R]2,741	3,006	3,131	3,150	[R]3,430	[R]2,556	2,874
Solar	200	360	360	360	360	354	354	354	354
Wind	[R]1,339	[R]1,405	[R]1,652	1,822	1,813	1,737	1,723	[R]1,670	1,892
Nuclear [12]	20	20	20	20	20	0	0	0	0
Other [13]	[R]176	[R]187	[R]491	611	566	597	574	[R]694	779

[1] Purchases, interchanges, and exchanges of electric energy with utilities and other nonutilities.
[2] Sales, interchanges, and exchanges of electric energy with utilities.
[3] Sales, interchanges, and exchanges of electric energy with other nonutilities. The disparity in these data and data reported on other EIA surveys occurs due to differences in the respondent universe. The Form EIA-867 is filed by nonutilities reporting the energy delivered, while other data sources are filed by electric utilities reporting energy received. Differences in terminology and accounting procedures contribute to the disparity. In addition, because the frame for the Form EIA-867 is derived from utility surveys, the Form EIA-867 universe lags 1 year.
[4] Petroleum, diesel, kerosene, petroleum sludge, and tar. Does not include petroleum coke, which, in thousand barrels, was 23,700 in 1994; 20,940 in 1995; 22,420 in 1996; and an estimated 25,785 in 1997.
[5] Butane, methane, propane, and other gases.
[6] Coal, anthracite culm, and coal waste.
[7] Petroleum, petroleum coke, diesel, kerosene, petroleum sludge, and tar.
[8] Included in "Natural Gas."
[9] Conventional hydroelectric power only; there are no pumped-storage projects in the nonutility sector.
[10] Wood, wood waste, peat, wood liquors, railroad ties, pitch, and wood sludge.
[11] Municipal solid waste, agricultural byproducts, straw, tires, landfill gases, and other waste.
[12] Nuclear reactor and generator at Argonne National Laboratory used primarily for research and development in testing reactor fuels as well as for training. The generation from the unit is used for internal consumption.
[13] Hydrogen, sulfur, batteries, and chemicals. Data previously published has been reclassified by energy source and are included in the category that best reflects their characteristics.
[14] Installed nameplate capacity is the full-load continuous rating of a generator, prime mover, or other electrical equipment under specified conditions as designated by the manufacturer. It is usually indicated on a nameplate attached physically to the equipment. Installed station capacity does not include auxiliary or house units.

R=Revised. E=Estimated.

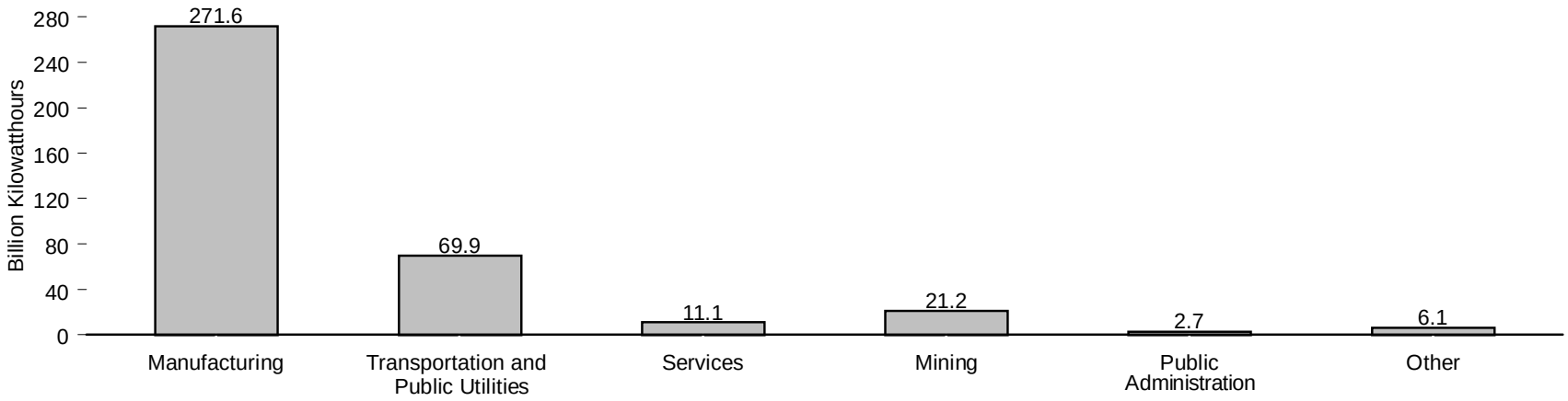
Notes: • Nonutility electric generating facilities with a total generator capacity of 1 megawatt or greater. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelelectric.html.

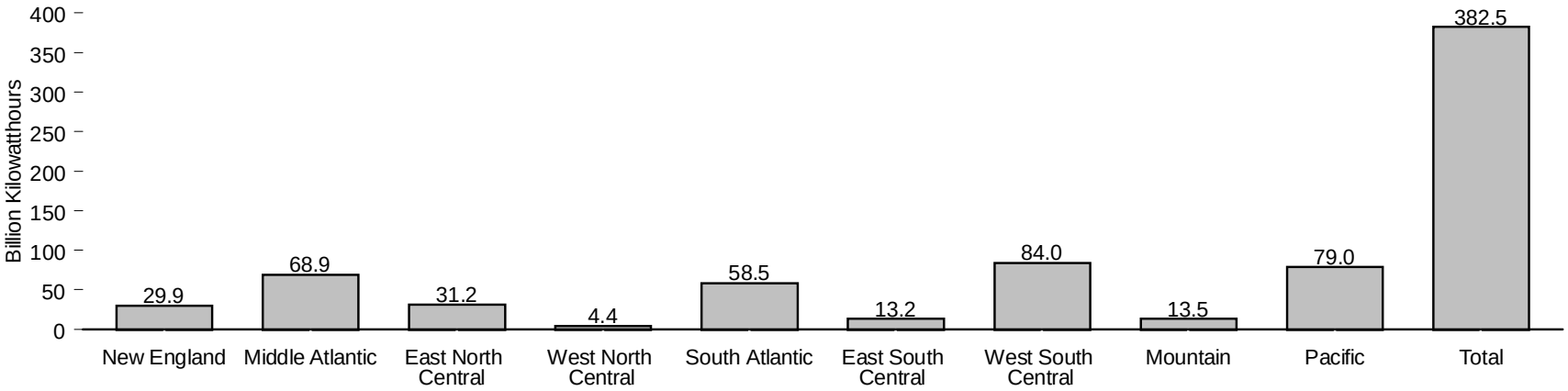
Sources: • 1989-1991—Estimated on the basis of data collected from Form EIA-867, "Annual Nonutility Power Producer Report." See Note 6 at end of section for additional information. • 1992—Energy Information Administration (EIA), *Electric Power Annual 1993* (December 1994), Table 74. • 1993-1996—EIA, *Electric Power Annual 1996, Volume II* (February 1997), Table 52. • 1997—EIA estimated data using Form EIA-867, "Annual Nonutility Power Producer Report."

Figure 8.15 Nonutility Power Gross Generation, 1996

By Producing Energy Group



By Census Division



Notes: • See Appendix D for Census divisions. • Because vertical scales differ, graphs should not be compared.

Source: Table 8.15.

Table 8.15 Nonutility Power Gross Generation, 1996

(Million Kilowatthours)

Division/Region	Manufacturing	Transportation and Public Utilities	Services	Mining	Public Administration	Other Industry Groups	Total
	Census Divisions						
New England	15,208	13,987	W	—	—	W	29,862
Middle Atlantic	48,575	12,347	3,819	W	W	1,621	68,860
East North Central	27,183	2,506	1,381	W	W	W	31,189
West North Central	2,830	561	403	W	—	W	4,362
South Atlantic	45,995	10,679	722	W	W	1,066	58,485
East South Central	12,983	69	W	118	W	—	13,249
West South Central	80,794	2,190	566	385	W	W	84,013
Mountain	5,347	3,921	863	550	—	2,800	13,480
Pacific	32,691	23,616	2,638	18,060	1,535	489	79,030
Total	**271,606**	**69,874**	**11,058**	**21,214**	**2,659**	**6,120**	**382,530**
	North American Electric Reliability Council Regions [1]						
ECAR	26,978	3,085	1,462	—	—	39	31,564
ERCOT	49,762	314	445	130	2	—	50,653
MAAC	22,588	7,736	1,553	1,467	443	1,148	34,935
MAIN	6,953	535	507	61	16	3	8,075
MAPP (U.S.)	2,925	548	290	568	—	(s)	4,332
NPCC (U.S.)	40,189	19,056	2,923	—	604	642	63,415
SERC	52,598	9,171	230	122	58	1,066	63,245
SPP	31,577	1,891	125	216	—	75	33,883
WSCC (U.S.)	34,139	26,775	3,462	18,146	1,367	3,084	86,974
Contiguous United States	**267,709**	**69,112**	**10,995**	**20,711**	**2,491**	**6,057**	**377,075**
ASCC (Alaska)	452	3	63	503	168	11	1,200
Hawaii	3,445	758	—	—	—	52	4,254
Total	**271,606**	**69,874**	**11,058**	**21,214**	**2,659**	**6,120**	**382,530**

[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 Puerto Rico and U.S. Trust Territories. See Figure 8.11 for an illustration of NERC regions. See Appendix D for Census Divisions

— = Not applicable. (s)=Less than 0.5 million kilowatthours. W=Withheld to avoid disclosure of individual company data.

Notes: • Nonutility electric generating facilities with a total generator capacity of 1 megawatt or greater. • Data are based on facilities' consumption. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelelectric.html.

Sources: **Census Divisions:** Energy Information Administration (EIA), *Electric Power Annual 1996,* Volume II, (February 1997), Table 61. **NERC Regions:** EIA, Form EIA-867, "Annual Nonutility Power Producer Report."

Electricity Notes

1. Data on the generation of electricity in Table 8.1 represent net generation, which is gross output of electricity (measured at the generator terminals) minus power plant use. Nuclear electricity generation data identified by individual countries in Section 11 are gross output of electricity.

2. Electrical system energy losses are estimated as the difference between total energy input at electric utilities and the total energy content of electricity sold to end-use consumers. Most of these losses occur at steam-electric power plants (conventional and nuclear) in the conversion of heat energy into mechanical energy to turn electric generators. This loss is a thermodynamically necessary feature of the steam-electric cycle. Part of the energy input-to-output losses are a result of imputing fossil energy equivalent inputs for hydroelectric and other energy sources, since there is no generally accepted practice for measuring these thermal conversion rates. In addition to conversion losses, other losses include power plant use of electricity, transmission and distribution of electricity from power plants to end-use consumers (also called "line-losses"), and unaccounted-for electricity. Total losses are allocated to the end-use sectors in proportion to each sector's share of total electricity sales. Overall, approximately 67 percent of total energy input is lost in conversion; of electricity generated, approximately 5 percent is lost in plant use and 9 percent is lost in transmission and distribution. Calculated electrical energy system losses may be less than actual losses, because primary consumption does not include the energy equivalent of utility purchases of electricity from non-electric utilities and from Canada and Mexico, although they are included in electricity sales.

3. Prior to 1985, electric utility supply and distribution statistics included data reported by institutions (such as universities) and military facilities that generated electricity primarily for their own use. Beginning in 1985, electricity statistics exclude data for these facilities and include data only for those organizations that generate electricity primarily for public use. In 1989, data for nonutility power producers (cogenerators, small power producers, and independent power producers) are provided.

4. Net summer capabilities were first collected on Form EIA-860 for 1984. Units not assigned a net summer capability rating by the utility were given an estimated rating by use of a statistical relationship between installed nameplate capacity and net summer capability for each prime mover. To estimate net summer capability for the years 1949 through 1984, two methods were used. For each prime mover except nuclear and "other," net summer capability estimates were calculated in two steps. First, the unit capacity values reported on Form EIA-860 and the unit start dates contained in the 1984 Generating Unit Reference File (GURF) were used to compute preliminary aggregate estimates of annual net summer capability and installed nameplate capacity. These preliminary estimates were obtained by aggregating unit capacity values for all units in service during a given year. Next, the ratio of the preliminary capability to nameplate estimate was computed for each year and multiplied by the previously published installed nameplate capacity values to produce the final estimates of net summer capability. The net summer capability data for nuclear and "other" units were used directly from the 1984 GURF for all years. Historical aggregates were then developed by using the unit start dates on the GURF.

Historical capacity has also been modified to estimate capability based upon the operable definition. This was accomplished by assuming that nonnuclear generating units became operable between 1 and 4 months prior to their commercial operation dates, depending upon the prime mover and time period. The actual operable dates for nuclear units were used. It should be noted that net summer capabilities are not currently collected for nonutilities.

5. Data on the sales of electric utility electricity represent gross output of electricity (measured at the generator terminals) minus power plant use and transmission and distribution losses. Included in each end-use sector are the following: Commercial Sector-sales of electricity to businesses that generally require less than 1,000 kilowatts of service; Industrial Sector-sales of electricity to businesses that generally require more than 1,000 kilowatts of service; Residential Sector-sales of electricity to residences for household purposes; "Other" Sector-sales of electricity for public street and highway lighting, to public authorities, railways, and railroads, and interdepartmental sales.

6. Year-to-year changes in data from the Form EIA-867, "Annual Nonutility Power Plant Report," can result from correcting misreported data and modifying the frame to account for new or retired facilities, among other improvements. Data for 1989, 1990, and 1991 were collected for facilities of 5 megawatts or more. In 1992, the threshold was lowered to include facilities with capacities of 1 megawatt or more. Estimates of the 1-to-5-megawatt range for prior years were derived from historical data. The estimation did not include retirements that occurred prior to 1992 and included only the capacity of facilities that came on line before 1992.

9

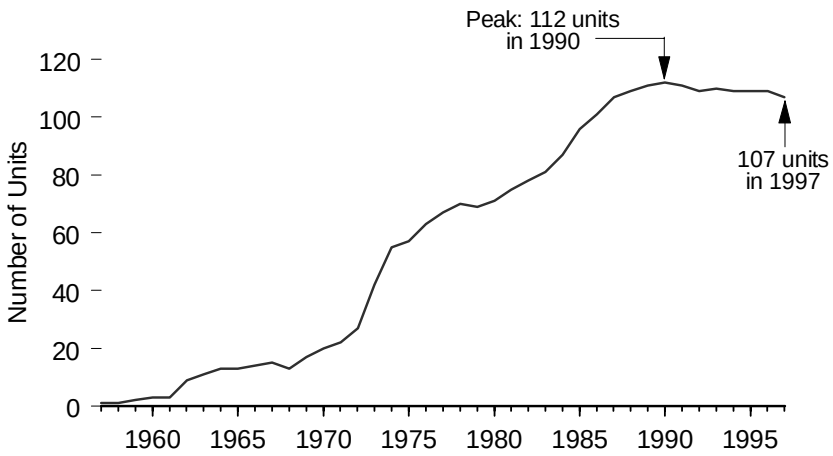
Nuclear Energy

Site of Shippingport atomic power station, the first commercial nuclear power plant in the United States (rectangular reactor building and foreground); background, Beaver Valley 1 and 2 nuclear power plants and Bruce Mansfield coal-fired power plant (southwestern Pennsylvania). Source: U.S. Department of Energy.

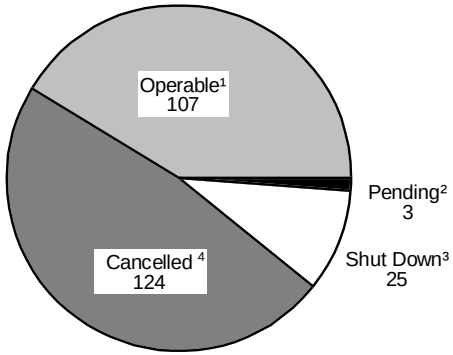
Figure 9.1 Nuclear Generating Units

Operable Units by Site, End of Year 1997

Operable Units, 1957-1997

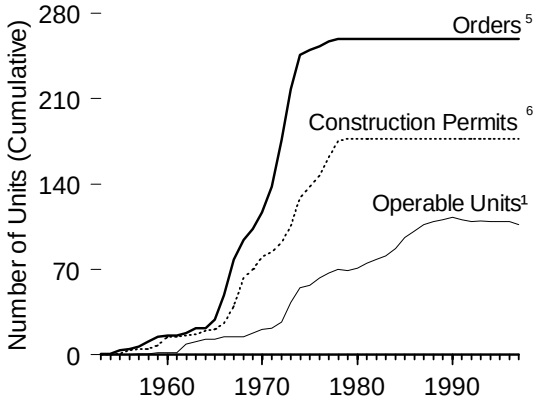


Status of All Ordered Units, 1953-1997

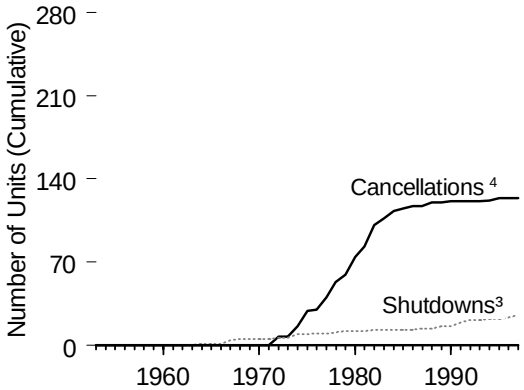


Total Units Ordered: 259

Orders, Permits, and Operable Units, 1953-1997



Cancellations and Shutdowns, 1953-1997



[1] Issuance by a regulatory authority of full-power operating license, or equivalent permission to operate.

[2] Ordered but not completed or cancelled.

[3] Ceased commercial operation permanently.

[4] Cancellation of ordered units.

[5] Placement of an order by a utility for a nuclear steam supply system.

[6] Issuance by regulatory authority of a permit, or equivalent permission, to begin construction.

Sources: **Map:** Based on Energy Information Administration data. **Other:** Table 9.1.

Table 9.1 Nuclear Generating Units, End of Year 1953-1997

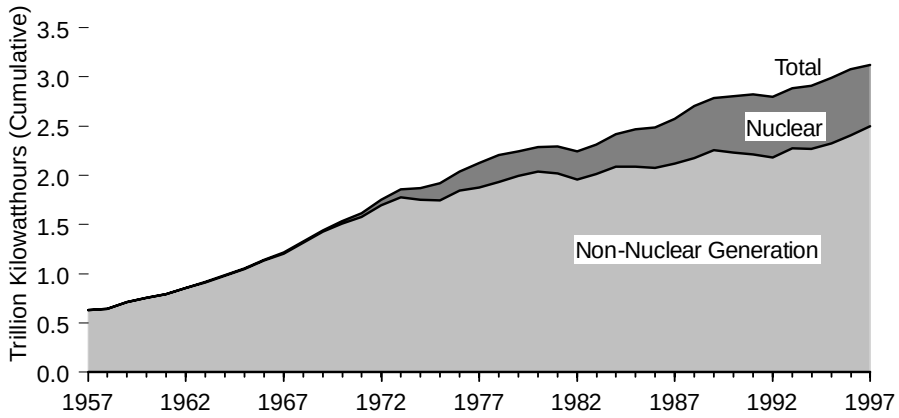
Year	Orders [1]	Construction Permits [2]	LPOL [3]	New Operable Units [4]	Shutdowns [5]	Total Operable Units [6]	Cancellations [7]	Cumulative Cancellations
1953	1	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0
1955	3	1	0	0	0	0	0	0
1956	1	3	0	0	0	0	0	0
1957	2	1	1	1	0	1	0	0
1958	4	0	0	0	0	1	0	0
1959	4	3	1	1	0	2	0	0
1960	1	7	1	1	0	3	0	0
1961	0	0	0	0	0	3	0	0
1962	2	1	7	6	0	9	0	0
1963	4	1	3	2	0	11	0	0
1964	0	3	2	3	1	13	0	0
1965	7	1	0	0	0	13	0	0
1966	20	5	1	2	1	14	0	0
1967	29	14	3	3	2	15	0	0
1968	16	23	0	0	2	13	0	0
1969	9	7	4	4	0	17	0	0
1970	14	10	4	3	0	20	0	0
1971	21	4	5	2	0	22	0	0
1972	38	8	6	6	1	27	7	7
1973	42	14	12	15	0	42	0	7
1974	28	23	14	15	2	55	9	16
1975	4	9	3	2	0	57	13	29
1976	3	9	7	7	1	63	1	30
1977	4	15	4	4	0	67	10	40
1978	2	13	3	4	1	70	13	53
1979	0	2	0	0	1	69	6	59
1980	0	0	5	2	0	71	15	74
1981	0	0	3	4	0	75	9	83
1982	0	0	6	4	1	78	18	101
1983	0	0	3	3	0	81	6	107
1984	0	0	7	6	0	87	6	113
1985	0	0	7	9	0	96	2	115
1986	0	0	7	5	0	101	2	117
1987	0	0	6	8	2	107	0	117
1988	0	0	1	2	0	109	3	120
1989	0	0	3	4	2	111	0	120
1990	0	0	1	2	1	112	1	121
1991	0	0	0	0	1	111	0	121
1992	0	0	0	0	2	109	0	121
1993	0	0	1	1	0	110	0	121
1994	0	0	0	0	1	109	1	122
1995	0	0	1	0	0	109	2	124
1996	0	0	0	1	1	109	0	124
1997	0	0	0	0	2	107	0	124

[1] Placement of an order by a utility or government agency for a nuclear steam supply system.
[2] Issuance by regulatory authority of a permit, or equivalent permission, to begin construction. Numbers reflect permits issued in a given year, not extant permits.
[3] Low-power operating license: Issuance by regulatory authority of license, or equivalent permission, to conduct testing but not to operate at full power.
[4] Issuance by regulatory authority of full-power operating license, or equivalent permission. Units generally did not begin immediate operation. See Note 1 at end of section.
[5] Ceased operation permanently, irrespective of intent.
[6] Total of units holding full-power licenses, or equivalent permission to operate, at the end of the year. See Note 1 at end of section.
[7] Cancellation by utilities of ordered units. Does not include three units (Bellefonte 1 and 2 and Watts Bar 2) where construction has been stopped indefinitely.

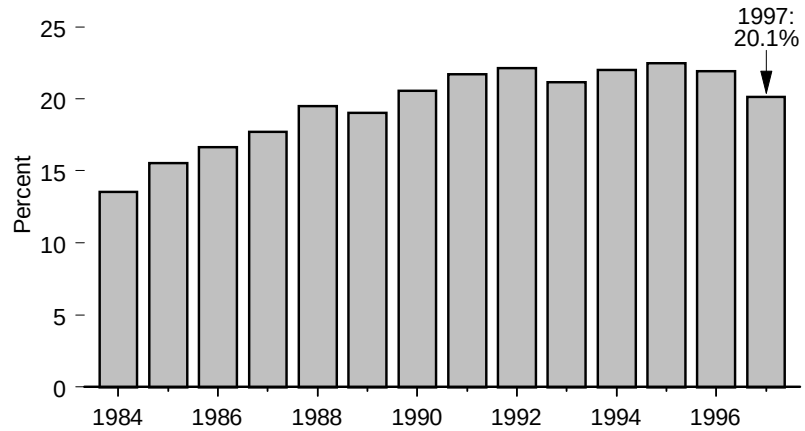
Sources: **Orders:** Energy Information Administration, *Commercial Nuclear Power 1991,* Appendix E, September 1991, and Nuclear Energy Institute, *Historical Profile of U.S. Nuclear Power Development,* 1988 edition; U.S. Atomic Energy Commission, *1973 Annual Report to Congress, Volume 2, Regulatory Activities;* various utilities. **Construction Permits:** Nuclear Regulatory Commission, *Information Digest,* 1997 edition, Appendix A; and Nuclear Energy Institute, *Historical Profile of U.S. Nuclear Power Development,* 1988 edition; various utility, Federal, and contractor officials. **Low-Power Operating Licenses:** Nuclear Energy Institute, *Historical Profile of U.S. Nuclear Power Development,* 1988 edition; U.S. Department of Energy, *Nuclear Reactors Built, Being Built, and Planned: 1995;* and various utility, Federal, and contractor officials. **New Operable Units:** Nuclear Regulatory Commission, *Information Digest,* 1997 edition, Table 11 and Appendices A and B; various utility, Federal, and contractor officials. **Shutdowns:** Energy Information Administration, *Commercial Nuclear Power 1991,* Appendix E, Nuclear Regulatory Commission, *Information Digest,* 1997 edition, Appendix B; U.S. Department of Energy, *Nuclear Reactors Built, Being Built, and Planned: 1995;* Tennessee Valley Authority officials. **Total Operable Units:** Running sum of licenses minus permanent shutdowns. **Cancellations:** Energy Information Administration, *Commercial Nuclear Power 1991,* Appendix E, September 1991; Nuclear Regulatory Commission, *Information Digest,* 1997 editon, Appendix C; and Nuclear Energy Institute, *Historical Profile of U.S. Nuclear Power Development,* 1988 edition.

Figure 9.2 Nuclear Power Plant Operations

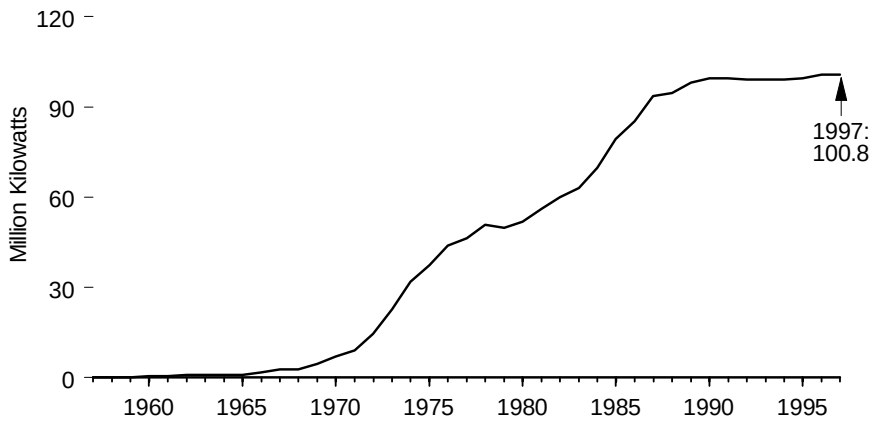
Nuclear and Total Net Generation of Electricity, 1957-1997



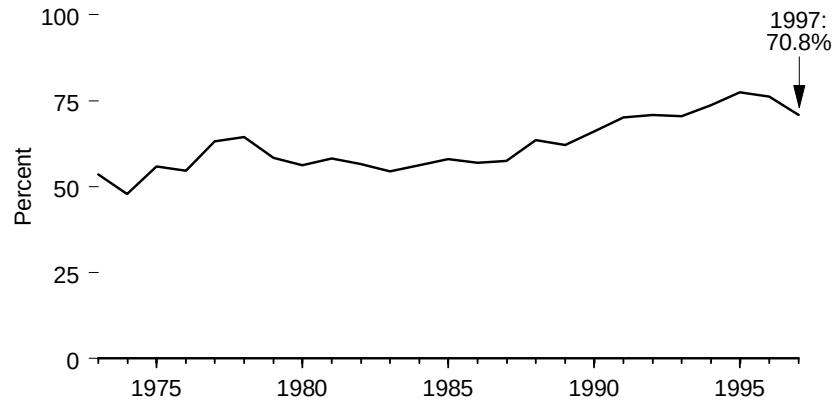
Nuclear Share of Electric Utility Net Generation, 1984-1997



Net Summer Capability of Operable Units, 1957-1997



Capacity Factor, 1973-1997



Sources: Tables 8.3 and 9.2.

Table 9.2 Nuclear Power Plant Operations, 1957-1997

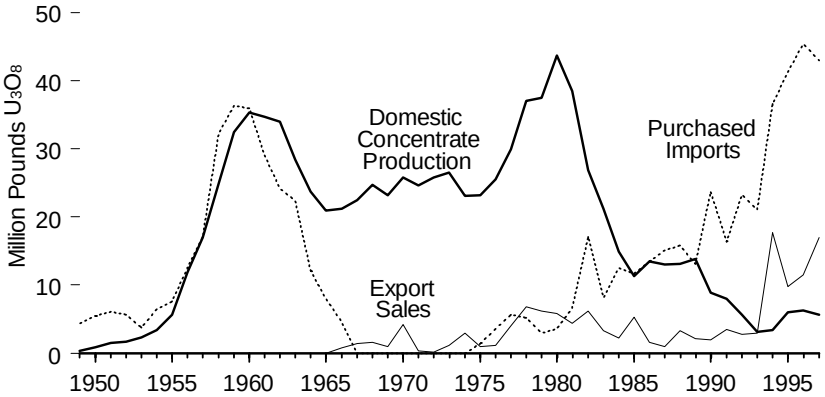
Year	Nuclear Electricity Net Generation	Nuclear Share of Electric Utility Net Generation	Net Summer Capability of Operable Units [1,2]	Capacity Factor [2]
	Billion Kilowatthours	Percent	Million Kilowatts	Percent
1957	(s)	(s)	0.1	NA
1958	0.2	(s)	0.1	NA
1959	0.2	(s)	0.1	NA
1960	0.5	0.1	0.4	NA
1961	1.7	0.2	0.4	NA
1962	2.3	0.3	0.7	NA
1963	3.2	0.4	0.8	NA
1964	3.3	0.3	0.8	NA
1965	3.7	0.3	0.8	NA
1966	5.5	0.5	1.7	NA
1967	7.7	0.6	2.7	NA
1968	12.5	0.9	2.7	NA
1969	13.9	1.0	4.4	NA
1970	21.8	1.4	7.0	NA
1971	38.1	2.4	9.0	NA
1972	54.1	3.1	14.5	NA
1973	83.5	4.5	22.7	53.5
1974	114.0	6.1	31.9	47.8
1975	172.5	9.0	37.3	55.9
1976	191.1	9.4	43.8	54.7
1977	250.9	11.8	46.3	63.3
1978	276.4	12.5	50.8	64.5
1979	255.2	11.4	49.7	58.4
1980	251.1	11.0	51.8	56.3
1981	272.7	11.9	56.0	58.2
1982	282.8	12.6	60.0	56.6
1983	293.7	12.7	63.0	54.4
1984	327.6	13.6	69.7	56.3
1985	383.7	15.5	79.4	58.0
1986	414.0	16.6	85.2	56.9
1987	455.3	17.7	93.6	57.4
1988	527.0	19.5	94.7	63.5
1989	529.4	19.0	98.2	62.2
1990	576.9	20.5	99.6	66.0
1991	612.6	21.7	99.6	70.2
1992	618.8	22.1	99.0	70.9
1993	610.3	21.2	99.0	70.5
1994	640.4	22.0	99.1	73.8
1995	673.4	22.5	99.5	77.4
1996	[R]674.7	21.9	100.8	[R]76.3
1997[P]	629.4	20.1	100.8	70.8

[1] At end of year.
[2] See Note 2 at end of section.
R=Revised. P=Preliminary. NA=Not available. (s)=Less than 0.05 billion kilowatthours or less than 0.05 percent.
Note: The performance data shown in this table are based on a universe of reactor units that differ in some respects from the reactor universe used to profile the nuclear power industry in Table 9.1, especially in the years prior to 1973. See Note 1 at end of section for further discussion.

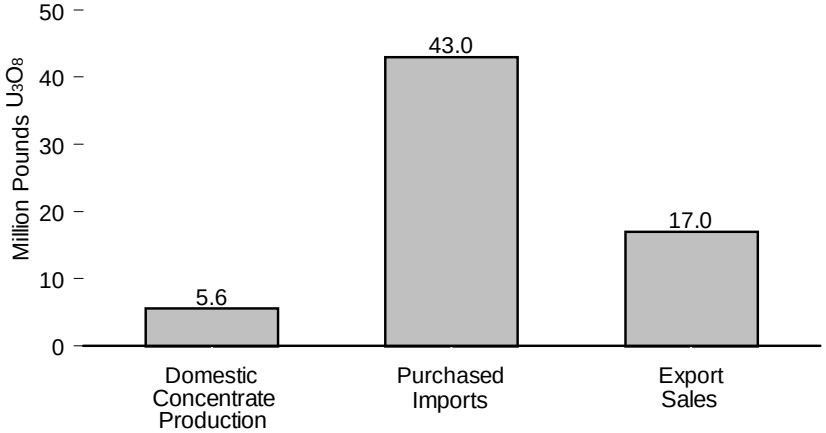
Sources: **Operable Units:** • 1957-1972—Federal Power Commission (FPC), Form FPC-4, "Monthly Power Plant Report." • 1973 forward—Nuclear Regulatory Commission, *Licensed Operating Reactors,* (NUREG-0020), monthly. **Electricity Generation:** • 1957-September 1977—FPC, Form FPC-4, "Monthly Power Plant Report." • October 1977-1981—Federal Energy Regulatory Commission, Form FPC-4, "Monthly Power Plant Report." • 1982 forward—Energy Information Administration (EIA), Form EIA-759, "Monthly Power Plant Report." **Net Summer Capability of Operable Units:** • 1957-1983—See Note 2 at end of section. • 1984 forward—EIA, Form EIA-860, "Annual Electric Generator Report."

Figure 9.3 Uranium Overview

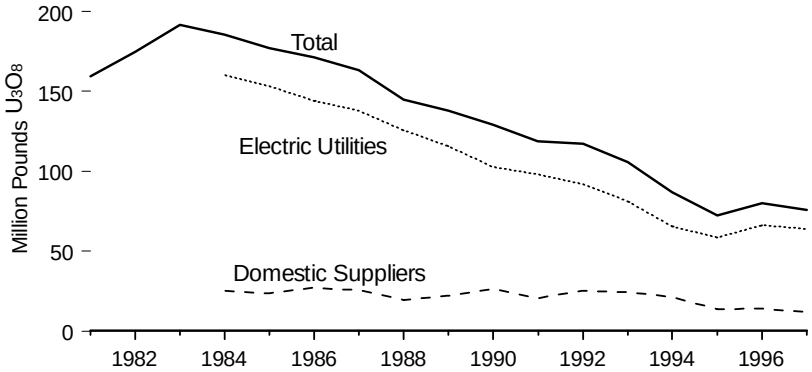
Production and Trade, 1949-1997



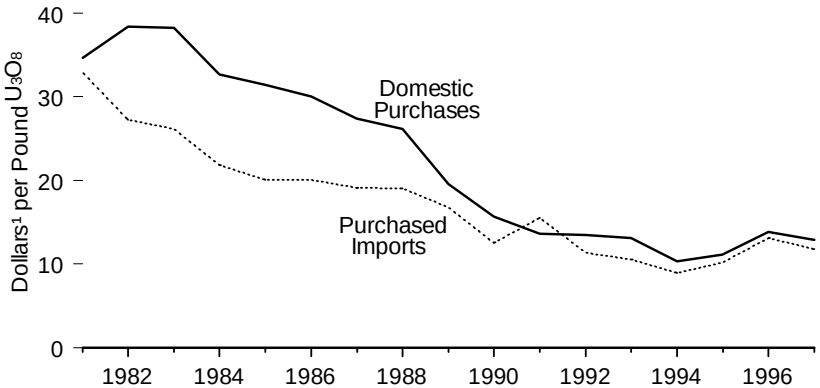
Production and Trade, 1997



Inventories, End of Year 1981-1997



Average Prices, 1981-1997



[1] Nominal dollars.

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

Source: Table 9.3.

Table 9.3 Uranium Overview, 1949-1997

Year	Domestic Concentrate Production	Purchased Imports [1]	Export [1] Sales	Utility Purchases from Domestic Suppliers	Loaded into U.S. Nuclear Reactors [2]	Inventories			Average Price	
						Domestic Suppliers	Electric Utilities	Total	Purchased Imports	Domestic Purchases
	Million Pounds U_3O_8								U.S. Dollars[3] per Pound U_3O_8	
1949	0.36	4.3	0.0	NA	NA	NA	NA	NA	NA	NA
1950	0.92	5.5	0.0	NA	NA	NA	NA	NA	NA	NA
1951	1.54	6.1	0.0	NA	NA	NA	NA	NA	NA	NA
1952	1.74	5.7	0.0	NA	NA	NA	NA	NA	NA	NA
1953	2.32	3.8	0.0	NA	NA	NA	NA	NA	NA	NA
1954	3.40	6.5	0.0	NA	NA	NA	NA	NA	NA	NA
1955	5.56	7.6	0.0	NA	NA	NA	NA	NA	NA	NA
1956	11.92	12.5	0.0	NA	NA	NA	NA	NA	NA	NA
1957	16.96	17.1	0.0	NA	NA	NA	NA	NA	NA	NA
1958	24.88	32.3	0.0	NA	NA	NA	NA	NA	NA	NA
1959	32.48	36.3	0.0	NA	NA	NA	NA	NA	NA	NA
1960	35.28	36.0	0.0	NA	NA	NA	NA	NA	NA	NA
1961	34.70	29.0	0.0	NA	NA	NA	NA	NA	NA	NA
1962	34.02	24.2	0.0	NA	NA	NA	NA	NA	NA	NA
1963	28.44	22.4	0.0	NA	NA	NA	NA	NA	NA	NA
1964	23.70	12.1	0.0	NA	NA	NA	NA	NA	NA	NA
1965	20.88	8.0	0.0	NA	NA	NA	NA	NA	NA	NA
1966	21.18	4.6	0.8	NA	NA	NA	NA	NA	NA	NA
1967	22.51	0.0	1.4	NA	NA	NA	NA	NA	—	NA
1968	24.74	0.0	1.6	NA	NA	NA	NA	NA	—	NA
1969	23.22	0.0	1.0	NA	NA	NA	NA	NA	—	NA
1970	25.81	0.0	4.2	NA	NA	NA	NA	NA	—	NA
1971	24.55	0.0	0.4	NA	NA	NA	NA	NA	—	NA
1972	25.80	0.0	0.2	NA	NA	NA	NA	NA	—	NA
1973	26.47	0.0	1.2	NA	NA	NA	NA	NA	—	NA
1974	23.06	0.0	3.0	NA	NA	NA	NA	NA	—	NA
1975	23.20	1.4	1.0	NA	NA	NA	NA	NA	NA	NA
1976	25.49	3.6	1.2	NA	NA	NA	NA	NA	NA	NA
1977	29.88	5.6	4.0	NA	NA	NA	NA	NA	NA	NA
1978	36.97	5.2	6.8	NA	NA	NA	NA	NA	NA	NA
1979	37.47	3.0	6.2	NA	NA	NA	NA	NA	NA	NA
1980	43.70	3.6	5.8	NA	NA	NA	NA	NA	NA	NA
1981	38.47	6.6	4.4	32.6	NA	NA	NA	159.2	32.90	34.65
1982	26.87	17.1	6.2	27.1	NA	NA	NA	174.8	27.23	38.37
1983	21.16	8.2	3.3	24.2	NA	NA	NA	191.8	26.16	38.21
1984	14.88	12.5	2.2	22.5	NA	25.0	160.2	185.2	21.86	32.65
1985	11.31	11.7	5.3	21.7	NA	23.7	153.2	176.9	20.08	31.43
1986	13.51	13.5	1.6	18.9	NA	27.0	144.1	171.1	20.07	30.01
1987	12.99	15.1	1.0	20.8	NA	25.4	137.8	163.2	19.14	27.37
1988	13.13	15.8	3.3	17.6	NA	19.3	125.5	144.8	19.03	26.15
1989	13.84	13.1	2.1	18.4	NA	22.2	115.8	138.1	16.75	19.56
1990	8.89	23.7	2.0	20.5	NA	26.4	102.7	129.1	12.55	15.70
1991	7.95	16.3	3.5	26.8	34.6	20.7	98.0	118.7	15.55	13.66
1992	5.65	23.3	2.8	23.4	43.0	25.2	92.1	117.3	11.34	13.45
1993	3.06	21.0	3.0	15.5	45.1	24.5	81.2	105.7	10.53	13.14
1994	3.35	36.6	17.7	22.7	40.4	21.5	65.4	86.9	8.95	10.30
1995	6.04	41.3	9.8	22.3	51.1	13.7	58.7	72.5	10.20	11.11
1996	6.32	45.4	11.5	22.9	R 46.2	R 13.9	R 66.1	R 80.0	13.15	13.81
1997P	5.64	43.0	17.0	18.7	48.7	11.9	63.9	75.8	11.81	12.87

[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. Trade data prior to 1982 were for transactions conducted by uranium suppliers only. For 1982 forward, transactions by uranium buyers (consumers) have been included. Buyer imports and exports prior to 1982 are believed to be small.
[2] Does not include any fuel rods removed from reactors and later reloaded.
[3] Nominal dollars.

R=Revised. P=Preliminary. NA=Not available. — = Not applicable.
Web Page: http://www.eia.doe.gov/fuelnuclear.html.
Sources: • 1949-1966—U.S. Department of Energy, Grand Junction Office, *Statistical Data of the Uranium Industry,* Report No. GJO-100, annual. • 1967-1996—Energy Information Administration (EIA), *Uranium Industry Annual,* annual reports. • 1997—EIA, *Uranium Industry Annual 1997* (April 1998), Tables H1, H2, H3, 5, 14, 27, 28, and 31.

Nuclear Energy Notes

1. In 1997 EIA undertook a major revision of Table 9.1 to more fully describe the history of the U.S. commercial nuclear power industry. The time series was extended back to the birth of the industry in 1953, and the data categories were revised for greater relevance to current industry conditions and trends. To acquire the data for the revised categories it was necessary to develop a reactor unit database employing different sources than those used previously for Table 9.1 and still used for Table 9.2.

In Table 9.1 "commercial" means that the units contributed power to the commercial electricity grid, whether or not they were owned by an electric utility. A total of 259 units ever ordered was identified. Although most orders were placed by electric utilities, several units are or were ordered, owned, and operated wholly or in part by the Federal government, including BONUS (Boiling Nuclear Superheater Power Station), Elk River, Experimental Breeder Reactor 2, Hallam, Hanford N, Piqua, and Shippingport.

A reactor is generally defined as operable in Table 9.1 while it possessed a full-power license from the Nuclear Regulatory Commission or its predecessor the Atomic Energy Commission, or equivalent permission to operate, at the end of the year. The definition is liberal in that it does not exclude units retaining full-power licenses during long, non-routine shutdowns. For example:

- In 1985 the five then-active Tennessee Valley Authority units (Browns Ferry 1, 2, and 3 and Sequoyah 1 and 2) were shut down under a regulatory forced outage. Browns Ferry 1 remains shut down and has been defueled, while the other units were idle for several years, restarting in 1991, 1995, 1988, and 1988, respectively. All five units are counted as operable during the shutdowns.

- Shippingport was shut down from 1974 through 1976 for conversion to a light-water breeder reactor, but is counted as operable until its retirement in 1982.

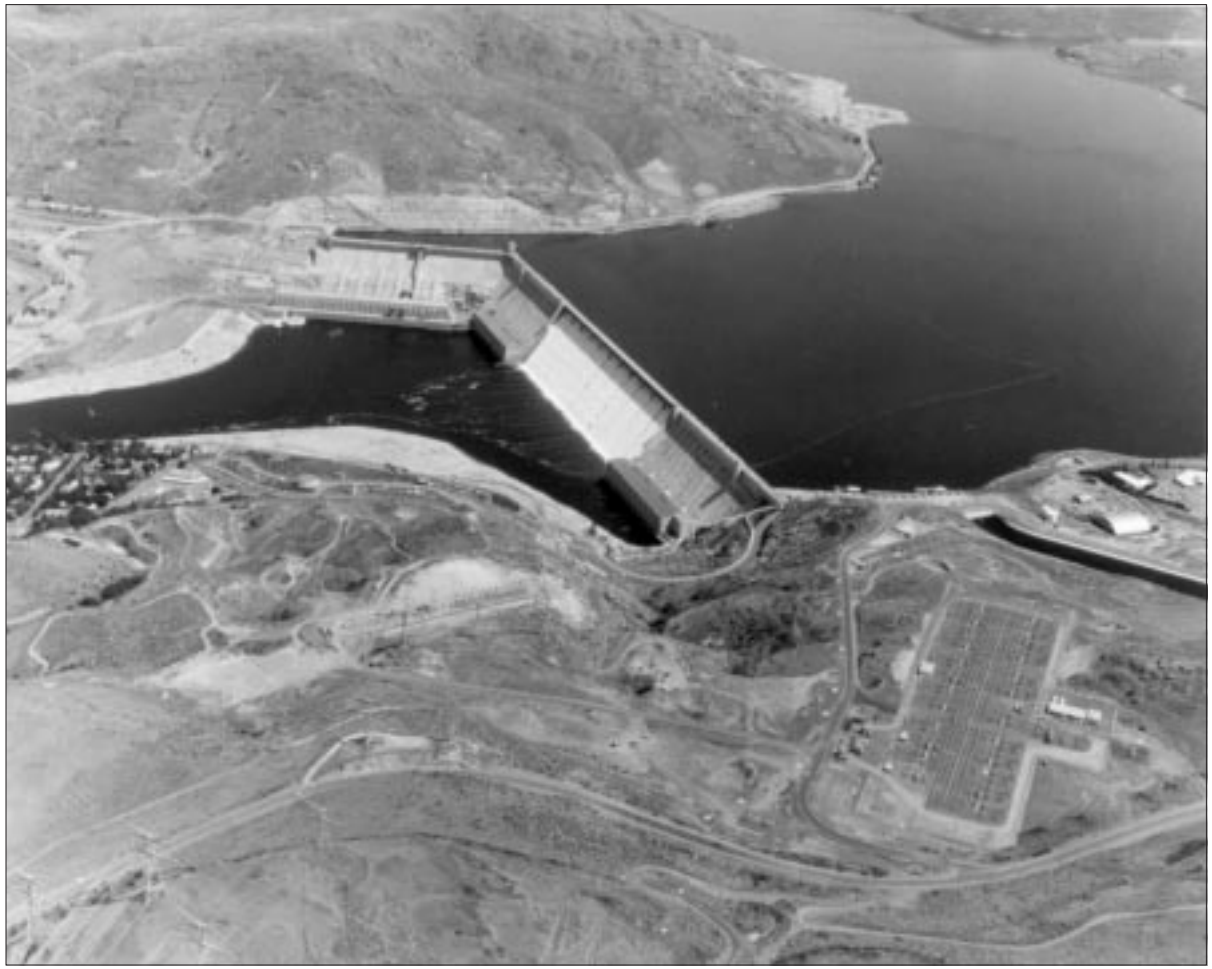
- Calvert Cliffs 2 was shut down in 1989 and 1990 for replacement of pressurizer heater sleeves but is counted as operable during those years.

Exceptions to the rule are Shoreham and Three Mile Island 2. Shoreham was granted a full-power license in April 1989, but was shut down two months later and never restarted. In 1991, the license was changed to Possession Only. Although not operable at the end of the year, Shoreham is treated as operable during 1989 and shut down in 1990, because counting it as operable and shut down in the same year would introduce a statistical discrepancy in the tallies. A major accident closed Three Mile Island 2 in 1979, and although the unit retained its full-power license for several years, it is considered permanently shut down since that year.

2. Net summer capabilities were first collected on Form EIA-860 for 1984. Units not assigned a net summer capability rating by the utility were given an estimated rating by use of a statistical relationship between installed nameplate capacity and net summer capability for each prime mover. To estimate net summer capability for 1949-1984, two methods were used. For each prime mover except nuclear and "other," net summer capability estimates were calculated in two steps. First, the unit capacity values reported on Form EIA-860 and the unit start dates contained in the 1984 Generating Unit Reference File (GURF) were used to compute preliminary aggregate estimates of annual net summer capability and installed nameplate capacity. These preliminary estimates were obtained by aggregating unit capacity values for all units in service during a given year. Next, the ratio of the preliminary capability to nameplate estimate was computed for each year and multiplied by the previously published installed nameplate capacity values to produce the final estimates of net summer capability. The net summer capability data for nuclear and "other" units were use directly from the 1984 GURF for all years. Historical aggregates were then developed by use of the unit start dates on the GURF.

Historical capacity has also been modified to estimate capability based upon the operable definition, by assuming that nonnuclear generating units became operable between 1 and 4 months prior to their commercial operation dates, depending upon the prime mover and time period. The actual operable dates for nuclear units were used.

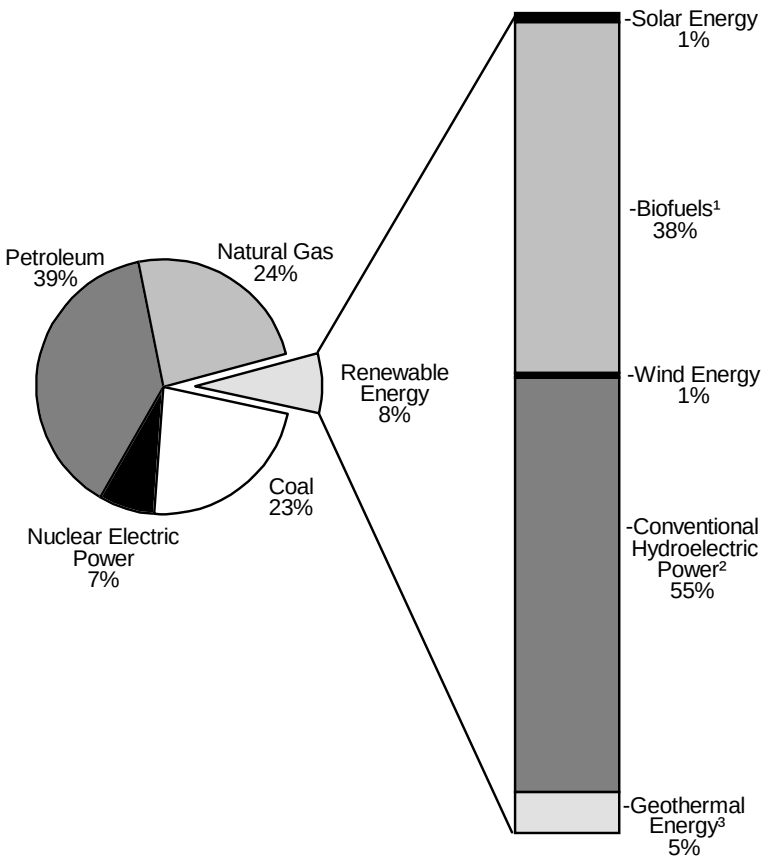
10 Renewable Energy



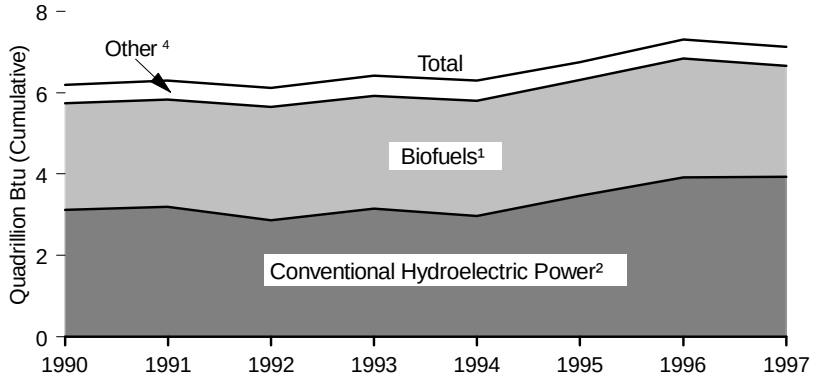
Grand Coulee Dam, Washington State. Source: U.S. Bureau of Reclamation.

Figure 10.1 Renewable Energy Consumption by Source

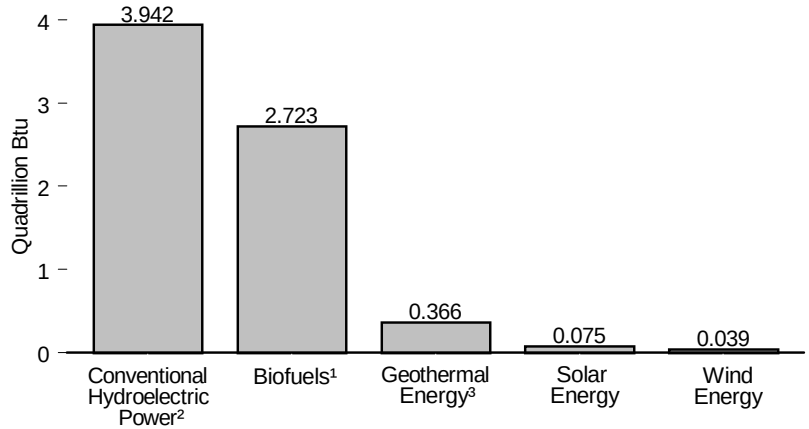
Renewable Energy as Share of Total Energy, 1997



Renewable Energy Consumption by Source, 1990-1997



Renewable Energy Consumption by Source, 1997



[1] Wood, wood waste, wood liquors, peat, railroad ties, wood sludge, spent sulfite liquors, agricultural waste, straw, tires, fish oils, tall oil, sludge waste, waste alcohol, municipal solid waste, landfill gases, other waste, and ethanol blended into motor gasoline.

[2] Includes electricity net imports from Canada that are derived from hydroelectric power.

[3] Includes electricity imports from Mexico that are derived from geothermal energy.

[4] Geothermal, solar, and wind energy.

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

Sources: Tables 1.3 and 10.1.

Table 10.1 Renewable Energy Consumption by Source, 1990-1997

(Quadrillion Btu)

Year	Biofuels [1]	Geothermal Energy [2]	Conventional Hydroelectric Power [3,4]	Solar Energy [5]	Wind Energy [6]	Total
1990	2.632	[R]0.355	[R]3.123	[R]0.063	0.023	[R]6.197
1991	2.642	[R]0.365	[R]3.205	[R]0.066	0.027	[R]6.304
1992	2.788	[R]0.379	[R]2.863	0.068	0.030	[R]6.128
1993	2.784	[R]0.393	[R]3.147	[R]0.071	0.031	[R]6.426
1994	2.838	[R]0.395	[R]2.969	[R]0.072	0.036	[R]6.309
1995	[R]2.846	[R]0.339	[R]3.472	[R]0.073	0.033	[R]6.763
1996	[R]2.938	[R]0.352	[R]3.914	0.075	[R]0.035	[R]7.315
1997[E]	2.723	0.366	3.942	0.075	0.039	7.145

[1] Wood, wood waste, wood liquors, peat, railroad ties, wood sludge, spent sulfite liquors, agricultural waste, straw, tires, fish oils, tall oil, sludge waste, waste alcohol, municipal solid waste, landfill gases, other waste, and ethanol blended into motor gasoline.

[2] Includes electricity imports from Mexico that are derived from geothermal energy. Includes grid-connected electricity, and geothermal heat pump and direct use energy. Excludes shaft power and remote electrical power.

[3] Hydroelectricity generated by pumped storage is not included in renewable energy.

[4] Includes electricity net imports from Canada that are derived from hydroelectric power.

[5] Includes solar thermal and photovoltaic energy.

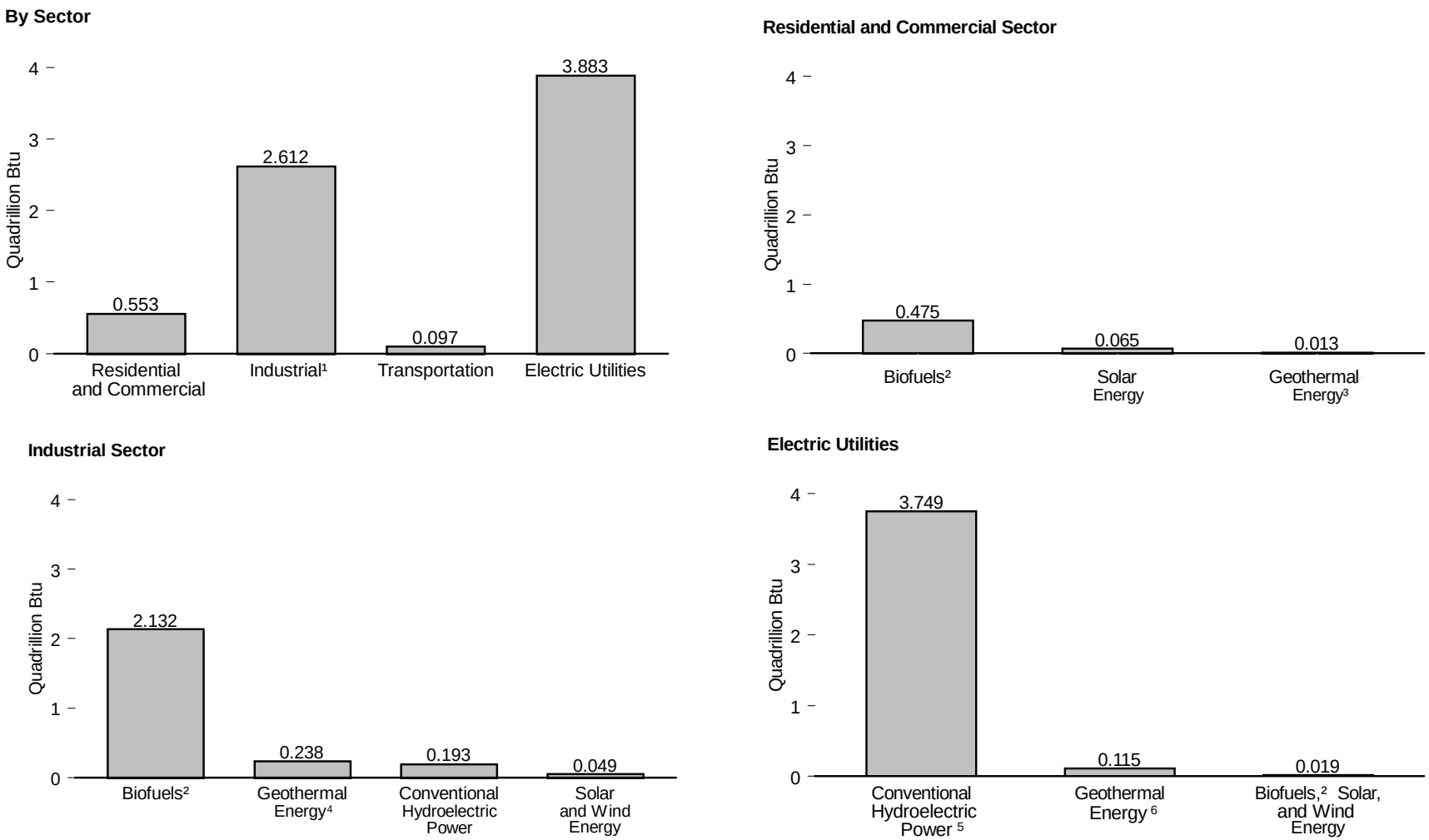
[6] Includes only grid-connected electricity. Excludes direct heat applications.

R=Revised. E=Estimated.

Web Page: http://www.eia.doe.gov/fuelrenewable.html.

Source: Energy Information Administration (EIA), Office of Coal, Nuclear, Electric and Alternative Fuels estimates, and Oregon Institute of Technology, Geoheat Center, for geothermal direct use and heat pumps. For more information about renewable energy, see EIA, *Renewable Energy Annual 1997,* Volume 1 (February 1998).

Figure 10.2 Renewable Energy Consumption by Sector, 1997



[1] Generation of electricity by cogenerators, independent power producers, and small power producers is included in the industrial sector, not the electric utility sector. Covers facilities of 1 megawatt or greater capacity.

[2] Wood, wood waste, wood liquors, peat, railroad ties, wood sludge, spent sulfite liquors, agricultural waste, straw, tires, fish oils, tall oil, sludge waste, waste alcohol, municipal solid waste,landfill gases,and other waste.

[3] Geothermal heat pump and direct energy use.

[4] Geothermal electricity generation, heat pump, and direct energy use.

[5] Includes electricity net imports from Canada that are derived from hydroelectric power. Includes electricity imports from Mexico that are derived from geothermal energy.

[6] Source: Table 10.2

Table 10.2 Renewable Energy Consumption by Sector, 1990-1997

(Quadrillion Btu)

	Residential and Commercial			Industrial [1]						Trans-portation	Electric Utility[1]					
Year	Biofuels [2]	Solar Energy [3]	Total [4]	Biofuels [2]	Geo-thermal Energy [5]	Conventional Hydro-electric Power [6]	Solar Energy	Wind Energy	Total	Biofuels [7]	Biofuels [2]	Geo-thermal Energy [8]	Conventional Hydro-electric Power [6,9]	Solar and Wind Energy	Total	Total
1990	0.581	R0.056	R0.645	1.948	R0.155	R0.085	0.007	0.023	R2.217	0.082	0.021	0.192	R3.039	(s)	R3.252	R6.197
1991	0.613	R0.058	R0.680	1.943	R0.170	0.085	0.008	0.027	R2.234	0.065	0.021	0.185	R3.120	(s)	R3.326	R6.304
1992	0.645	0.060	R0.714	2.042	R0.182	R0.098	0.008	0.030	R2.360	0.079	0.022	0.188	R2.765	(s)	R2.975	R6.128
1993	0.592	R0.062	R0.664	2.084	R0.206	R0.119	0.009	0.031	R2.449	0.088	0.020	0.177	R3.028	(s)	R3.225	R6.426
1994	0.582	R0.064	R0.656	2.138	R0.214	0.136	0.008	0.036	R2.533	0.097	0.020	0.170	R2.832	(s)	R3.023	R6.309
1995	0.641	R0.065	R0.717	R2.084	R0.210	0.152	0.008	0.033	R2.487	0.104	0.017	0.118	R3.319	(s)	R3.454	R6.763
1996	0.644	R0.066	R0.722	R2.200	R0.217	R0.171	0.009	R0.035	R2.633	0.074	0.020	0.123	R3.743	(s)	R3.886	R7.315
1997E	0.475	0.065	0.553	2.132	0.238	0.193	0.010	0.039	2.612	0.097	0.019	0.115	3.749	(s)	3.883	7.145

[1] Generation of electricity by cogenerators, independent power producers, and small power producers is included in the industrial sector, not the electric utility sector. Covers facilities of 1 megawatt or greater capacity.

[2] Wood, wood waste, wood liquors, peat, railroad ties, wood sludge, spent sulfite liquors, agricultural waste, straw, tires, fish oils, tall oil, sludge waste, waste alcohol, municipal solid waste, landfill gases, and other waste.

[3] The solar energy number of 0.06 quadrillion Btu for residential and commercial use is calculated by presuming an overall efficiency of 50 percent for all three categories of solar thermal collectors (low temperature, medium temperature, and high temperature), a 1,500-Btu per square foot average daily insolation, and the potential thermal energy production from the 227 million square feet of solar thermal collectors produced between 1978 and 1997. This is a simplified approach since low-temperature and high-temperature collectors have been rated at more than 50 percent efficient and medium-temperature collectors are generally less than 50 percent efficient.

[4] Includes geothermal heat pump and direct use energy.

[5] Geothermal electricity generation, heat pump, and direct use energy.

[6] Hydroelectricity generated by pumped storage is not included in renewable energy.

[7] Ethanol blended into motor gasoline.

[8] Includes electricity imports from Mexico that are derived from geothermal energy.

[9] Includes electricity net imports from Canada that are derived from hydroelectric power.

R=Revised. E=Estimated. (s)=Less than 0.5 trillion Btu.

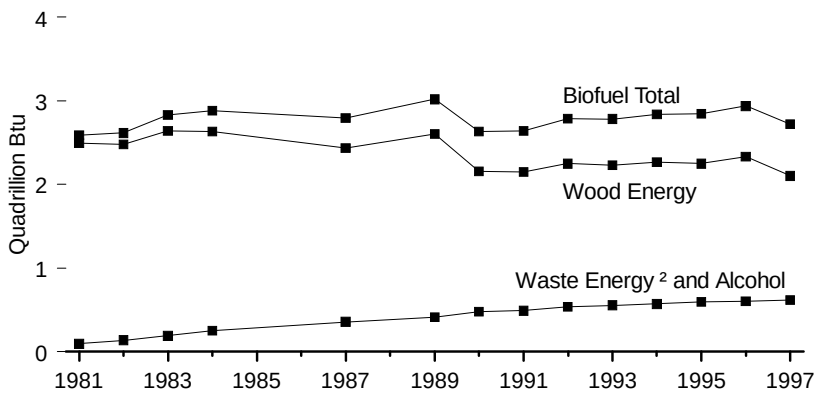
Note: Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelrenewable.html.

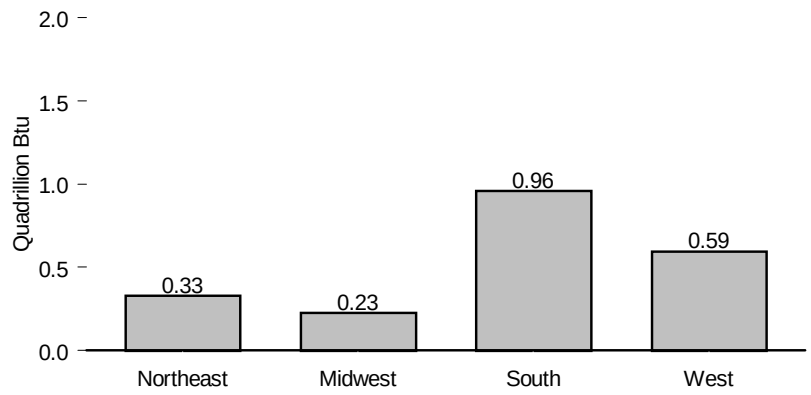
Sources: Energy Information Administration (EIA), Office of Coal, Nuclear, Electric and Alternative Fuels estimates, and Oregon Institute of Technology, Geoheat Center, for geothermal direct use and heat pumps. For more information about renewable energy, see EIA, *Renewable Energy Annual 1997, Volume 1* (February 1998).

Figure 10.3 Wood and Waste Energy and Alcohol Fuels Consumption Estimates

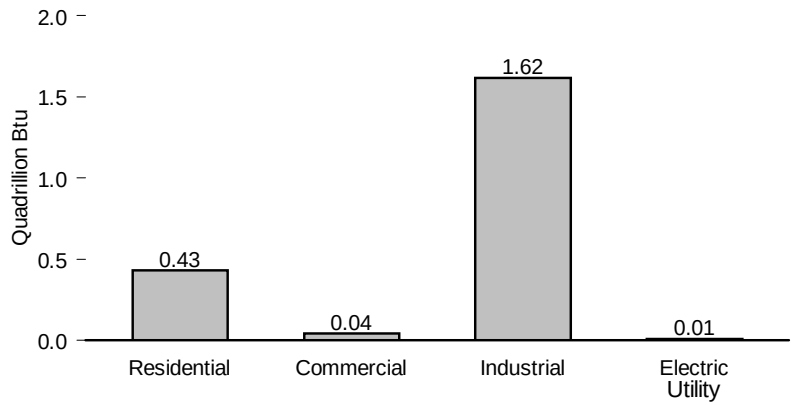
Biofuel Total, 1981-1984, 1987, and 1989-1997[1]



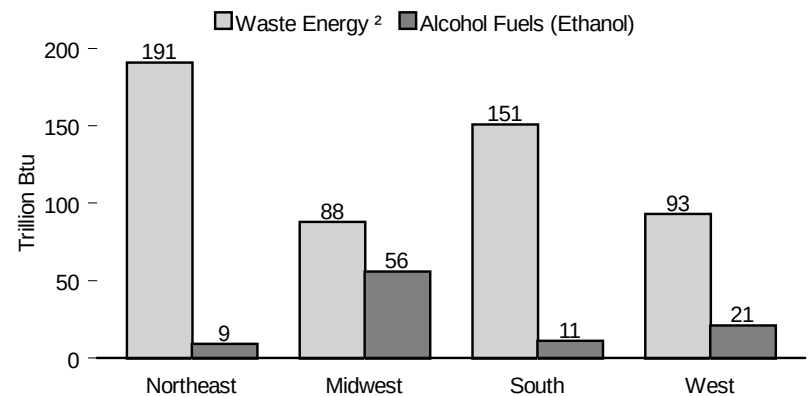
Wood Energy by Census Region, 1997



Wood Energy by Sector, 1997



Waste Energy and Alcohol Fuels by Census Region, 1997



[1] No data are available for 1985, 1986, and 1988.

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

Notes: • See Appendix D for Census regions. • Because vertical scales differ, graphs should not be compared.

Source: Table 10.3.

Table 10.3 Wood and Waste Energy and Alcohol Fuels Consumption Estimates by Sector and Census Region, Selected Years, 1981-1997

(Trillion Btu)

Energy Source	1981	1982	1983	1984	1987	1989	1990	1991	1992	1993	1994	1995	1996	1997
Wood Energy	**2,495**	**2,478**	**2,640**	**2,633**	**2,437**	**2,604**	**2,155**	**2,151**	**2,249**	**2,228**	**2,266**	**R2,250**	**R2,335**	**2,103**
Sector														
Residential	869	937	925	923	852	918	581	613	645	548	537	596	595	433
Commercial	21	22	22	22	([1])	([1])	([1])	([1])	([1])	44	45	45	49	42
Industrial	1,602	1,516	1,690	1,679	1,576	1,673	1,562	1,528	1,593	1,625	1,673	R1,598	R1,679	1,617
Electric Utility	3	2	3	9	9	13	12	10	11	11	11	11	12	11
Census Region														
Northeast	395	358	380	349	350	432	256	224	264	277	278	R343	R348	328
Midwest	335	343	323	341	474	552	330	290	286	222	223	R269	R269	226
South	1,349	1,392	1,526	1,482	1,147	1,161	1,064	1,167	1,234	1,405	1,437	R1,024	R1,074	957
West	416	385	411	461	467	459	505	469	466	324	328	R615	R644	592
Waste Energy [2]	**88**	**120**	**157**	**208**	**289**	**344**	**395**	**426**	**460**	**468**	**475**	**492**	**R529**	**523**
Census Region														
Northeast	16	20	36	39	60	84	119	134	148	151	171	173	R188	191
Midwest	5	13	17	21	47	64	89	99	84	85	76	88	R80	88
South	37	50	56	57	108	145	114	109	128	130	134	134	R158	151
West	30	36	48	91	74	51	73	87	100	102	95	96	R103	93
Alcohol Fuels (Ethanol)	**7**	**19**	**35**	**43**	**69**	**71**	**82**	**65**	**79**	**88**	**97**	**104**	**74**	**97**
Census Region														
Northeast	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)	3	R7	9
Midwest	4	11	22	25	38	38	55	45	55	61	68	74	R43	56
South	1	4	8	13	26	26	17	11	13	14	16	10	R8	11
West	2	4	5	5	4	7	10	9	10	11	12	17	R16	21
Biofuel Total	**2,590**	**2,617**	**2,832**	**2,884**	**2,795**	**3,019**	**2,632**	**2,642**	**2,788**	**2,784**	**2,838**	**R2,846**	**R2,938**	**2,723**

[1] Commercial wood energy use is not included because there are no accurate data sources to provide reliable estimates.

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

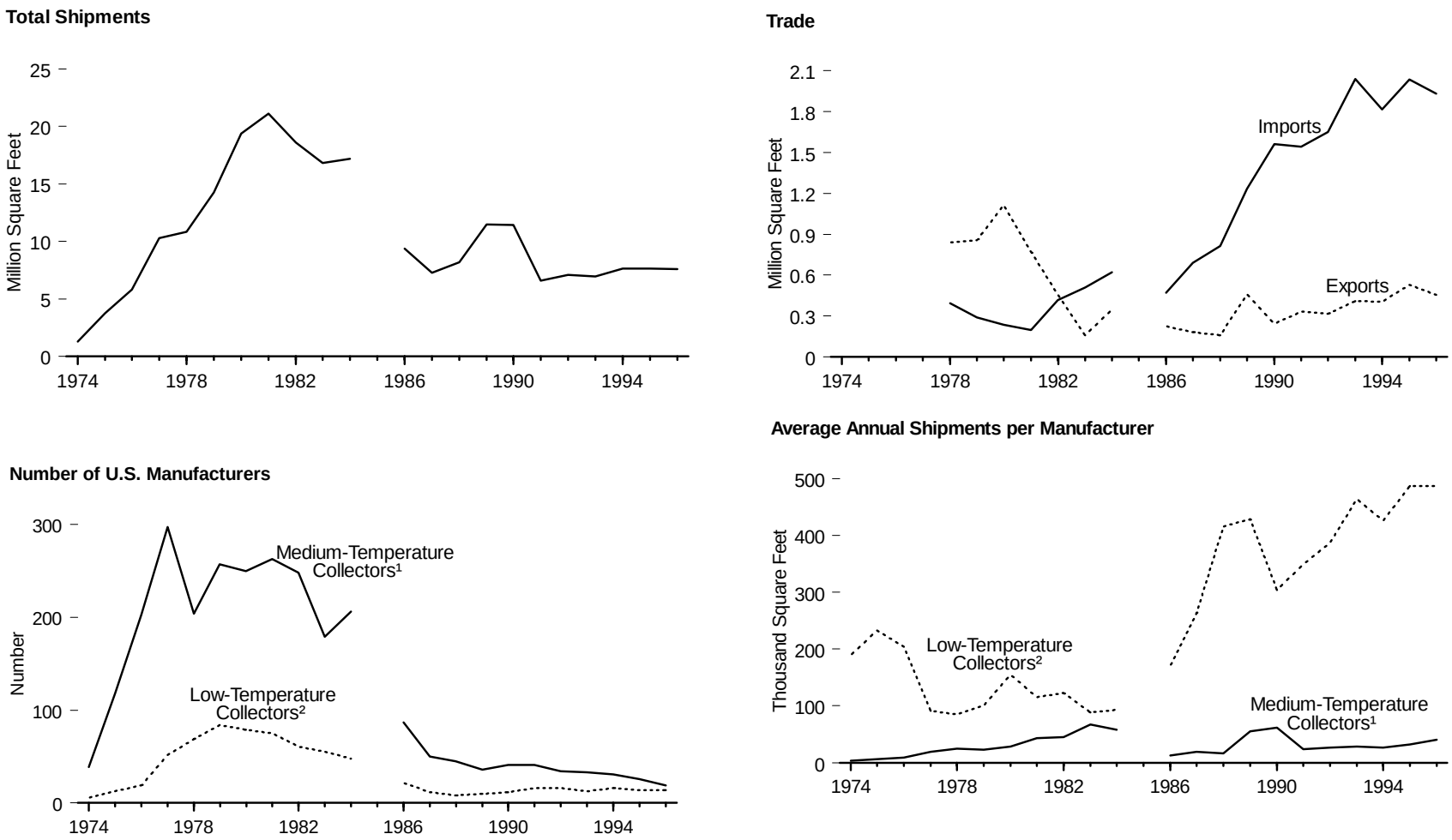
R=Revised. (s)=Less than 0.5 trillion Btu.

Notes: • No data are available for years not shown. • See Appendix D for Census regions. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelrenewable.html.

Sources: • **1981-1983, Wood Energy—**EIA, *Estimates of U.S. Wood Energy Consumption, 1980-1983* (November 1984), Tables ES1 and ES2. • **1981-1983 Waste Energy and Alcohol Fuels, and 1984 Data—**EIA, Office of Coal, Nuclear, Electric and Alternate Fuels, unpublished data. • **1987—**EIA, *Estimates of Biofuels Consumption in the United States During 1987,* Tables ES1 and ES2. • **1989—Wood Energy, Industrial Sector:** American Paper Institute, *Fact Sheet on 1990 Energy Use in the U.S. Pulp and Paper Industry* (July 31, 1991). **All Other Data:** EIA, *Estimates of U.S. Biofuels Consumption 1989* (April 1991), Table ES1. • **1990—Wood Energy, Industrial Sector:** American Paper Institute, *Fact Sheet on 1990 Energy Use in the U.S. Pulp and Paper Industry* (July 1991). **Wood Energy, Residential Sector:** EIA, 1990 Residential Energy Consumption Survey. **Waste Energy:** EIA, *Estimates of U.S. Biofuels Consumption 1990* (October 1991), Table ES1. **Alcohol Fuels:** U.S. Department of Transportation, *Monthly Motor Fuel Reported by States,* FHWA-PL-92-011 (September 1991); U.S. Department of Treasury, Bureau of Alcohol, Tobacco, and Firearms, *Monthly Distilled Spirits Report,* Report Symbol 76 (June 1991) and *Alcohol Fuels Report,* internal quarterly report (September 1991). • **1991 and 1992:** EIA, *Estimates of U.S. Biomass Energy Consumption 1992* (May 1994). • **1993-1997—Wood Energy, Residential Sector:** EIA, Form EIA-457, "1993 Residential Energy Consumption Survey," extrapolations from "1993 Residential Energy Consumption Survey" for 1994 through 1996 estimates, and "1997 Residential Energy Consumption Survey" for 1997. **Wood Energy, Commercial and Industrial Sectors:** EIA, Office of Coal, Nuclear, Electric and Alternate Fuels (CNEAF), estimates derived from information from other government agencies, trade journals, industry association reports, Form EIA-846, "1991 Manufacturing Energy Consumption Survey," and Form EIA-846, "1994 Manufacturing Energy Consumption Survey." **Wood Energy, Electric Utility:** EIA, Form EIA-861, "Annual Electric Utility Report," and Form EIA-759, "Monthly Power Plant Report." **Waste Energy:** Government Advisory Associates, *Resource Recovery Yearbook,* and *Methane Recovery Yearbook,* and CNEAF estimates. **Alcohol:** EIA, Form EIA-819M, "Monthly Oxygenate Telephone Report.

Figure 10.4 Solar Thermal Collector Shipments by Type and Trade, 1974-1984 and 1986-1996



[1] Collectors that generally operate in the temperature range of 140 degrees Fahrenheit to 180 degrees Fahrenheit but can also operate at temperatures as low as 110 degrees Fahrenheit.

[2] Collectors that generally operate at temperatures below 110 degrees Fahrenheit.

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

Source: Table 10.4.

Table 10.4 Solar Thermal Collector Shipments by Type and Trade, 1974-1996

Year	Low-Temperature Collectors [1]			Medium-Temperature Collectors [2]			High-Temperature Collector [3] Shipments (million square feet)	Total Shipments [4]	Imports	Exports
	Number of U.S. Manufacturers	Quantity Shipped (million square feet)	Average Annual Shipments per Manufacturer (thousand square feet)	Number of U.S. Manufacturers	Quantity Shipped (million square feet)	Average Annual Shipments per Manufacturer (thousand square feet)		Thousand Square Feet		
1974	6	1.14	189.5	39	0.14	3.5	NA	1,274	NA	NA
1975	13	3.03	232.8	118	0.72	6.1	NA	3,743	NA	NA
1976	19	3.88	204.0	203	1.93	9.5	NA	5,801	NA	NA
1977	52	4.74	91.2	297	5.57	18.8	NA	10,312	NA	NA
1978	69	5.87	85.1	204	4.99	24.5	NA	10,860	396	840
1979	84	8.39	100.0	257	5.86	22.8	NA	14,251	290	855
1980	79	12.23	154.8	250	7.17	28.7	NA	19,398	235	1,115
1981	75	8.68	115.7	263	11.46	43.6	NA	21,133	196	771
1982	61	7.48	122.6	248	11.15	44.9	NA	18,621	418	455
1983	55	4.85	88.2	179	11.98	66.9	NA	16,828	511	159
1984	48	4.48	93.3	206	11.94	58.0	0.77	17,191	621	348
1985	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1986	22	3.75	170.5	87	1.11	12.8	4.50	9,360	473	224
1987	12	3.16	263.1	50	0.96	19.1	3.16	7,269	691	182
1988	8	3.33	415.8	45	0.73	16.2	4.12	8,174	814	158
1989	10	4.28	428.3	36	1.99	55.3	5.21	11,482	1,233	461
1990	12	3.65	303.8	41	2.53	61.6	5.24	11,409	1,562	245
1991	16	5.59	349.0	41	0.99	24.1	(s)	6,574	1,543	332
1992	16	6.19	386.7	34	0.90	26.4	(s)	7,086	1,650	316
1993	13	6.03	463.5	33	0.93	28.2	0.01	6,968	2,039	411
1994	16	6.82	426.0	31	0.80	26.0	(s)	7,627	1,815	405
1995	14	6.81	487.0	26	0.84	32.0	0.01	7,666	2,037	530
1996	14	6.82	487.0	19	0.79	41.0	0.01	7,616	1,930	454

[1] Low-temperature collectors are solar thermal collectors that generally operate at temperatures below 110 degrees Fahrenheit.

[2] Medium-temperature collectors are solar thermal collectors that generally operate in the temperature range of 140 degrees Fahrenheit to 180 degrees Fahrenheit but can also operate at temperatures as low as 110 degrees Fahrenheit. Special collectors are included in this category. Special collectors are evacuated tube collectors or concentrating (focusing) collectors. They operate in the temperature range from just above ambient temperature (low concentration for pool heating) to several hundred degrees Fahrenheit (high concentration for air conditioning and specialized industrial processes).

[3] High-temperature collectors are solar thermal collectors that generally operate at temperatures above 180 degrees Fahrenheit.

[4] Total shipments as reported by respondents include all domestic and export shipments and may include imports that subsequently were shipped to domestic or to foreign customers.

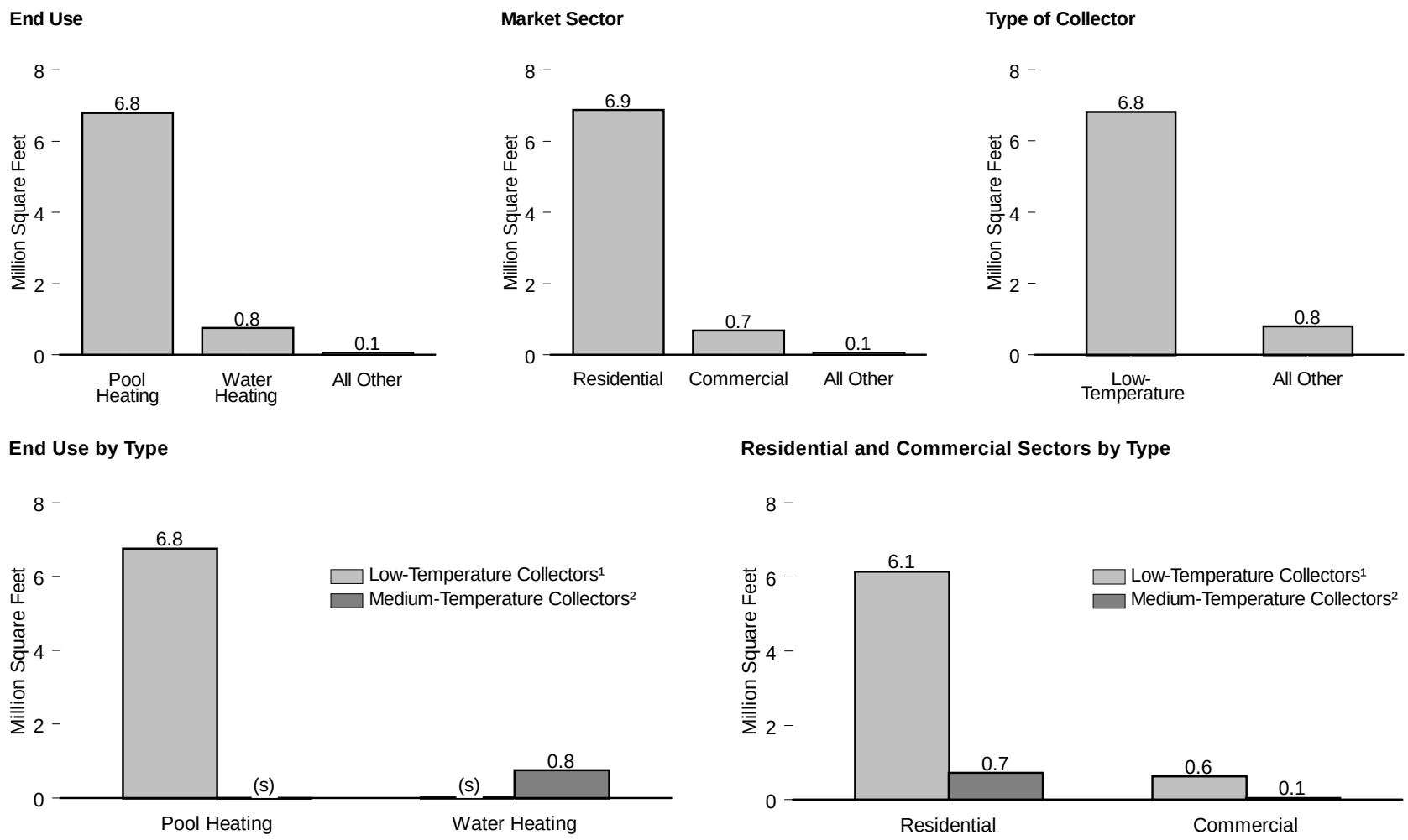
NA=Not available. (s)=Less than 0.005 million square feet.

Notes: • Manufacturers producing more than one type of collector are accounted for in both groups. • No data are available for 1985. • High-temperature collector shipments were dominated by one manufacturer.

Web Page: http://www.eia.doe.gov/fuelrenewable.html.

Sources: **Number of U.S. Manufacturers:** Energy Information Administration (EIA), Form CE-63A, "Annual Solar Thermal Collector Manufacturers Survey," and prior form, Form EIA-63, "Annual Solar Thermal Collector and Photovoltaic Module Manufacturing Survey." **Shipments Data by Type:** • 1974-1976—Federal Energy Administration, *Solar Collector Manufacturing Activity,* semi-annual. • 1977—EIA, *Solar Collector Manufacturing Activity, July through December, 1981* (March 1982). • 1978 and 1979—EIA, *Solar Collector Manufacturing Activity,* annual. • 1980-1985—EIA, *Solar Collector Manufacturing Activity 1993* (August 1994), Table 6. • 1986 forward—EIA, *Renewable Energy Annual 1997* (February 1998), Tables 11 and 12, and Form EIA 63-A, "Annual Solar Thermal Collector Manufactures Survey."

Figure 10.5 Solar Thermal Collector Shipments by End Use, Market Sector, and Type, 1996



¹ Collectors that generally operate at temperatures below 110 degrees Fahrenheit.
² Collectors that generally operate in the temperature range of 140 degrees Fahrenheit to 180 degrees Fahrenheit but can also operate at temperatures as low as 110 degrees Fahrenheit.

(s)=Less than 50 thousand square feet.
Source: Table 10.5.

Table 10.5 Solar Thermal Collector Shipments by End Use, Market Sector, and Type, 1996

(Thousand Square Feet)

End Use	Low-Temperature Collectors [1]	Medium-Temperature Collectors [2]	High-Temperature Collectors [3]	Total
End-Use Total	**6,821**	**785**	**10**	**7,616**
Pool Heating	6,766	21	0	6,787
Water Heating	4	754	7	765
Space Heating	51	6	0	57
Space Cooling	0	0	0	0
Combined Space and Water Heating	0	3	0	3
Process Heating	0	2	2	4
Electricity Generation	0	(s)	0	(s)
Other [4]	0	0	0	0
Market Sector Total	**6,821**	**785**	**10**	**7,616**
Residential	6,146	727	0	6,873
Commercial	625	50	7	682
Industrial	51	1	2	54
Electric Utility	0	(s)	0	(s)
Other [5]	(s)	7	0	7

[1] Low-temperature collectors are solar thermal collectors that generally operate at temperatures below 110 degrees Fahrenheit.

[2] Medium-temperature collectors are solar thermal collectors that generally operate in the temperature range of 140 degrees Fahrenheit to 180 degrees Fahrenheit but can also operate at temperatures as low as 110 degrees Fahrenheit. Special collectors are included in this category. Special collectors are evacuated tube collectors or concentrating (focusing) collectors. They operate in the temperature range from just above ambient temperature (low concentration for pool heating) to several hundred degrees Fahrenheit (high concentration for air conditioning and specialized industrial processes).

[3] Parabolic dish/trough collectors used primarily by independent power producers to generate electricity for the electric grid. High-temperature collectors are solar thermal collectors that generally operate at temperatures above 180 degrees Fahrenheit.

[4] "Other" includes shipments of solar thermal collectors for other uses, such as cooking foods, water pumping, water purification, desalinization, distilling, etc.

[5] "Other" includes shipments of solar thermal collectors to other sectors, such as government, including the military but excluding space applications.

(s)=Less than 0.5 thousand square feet.

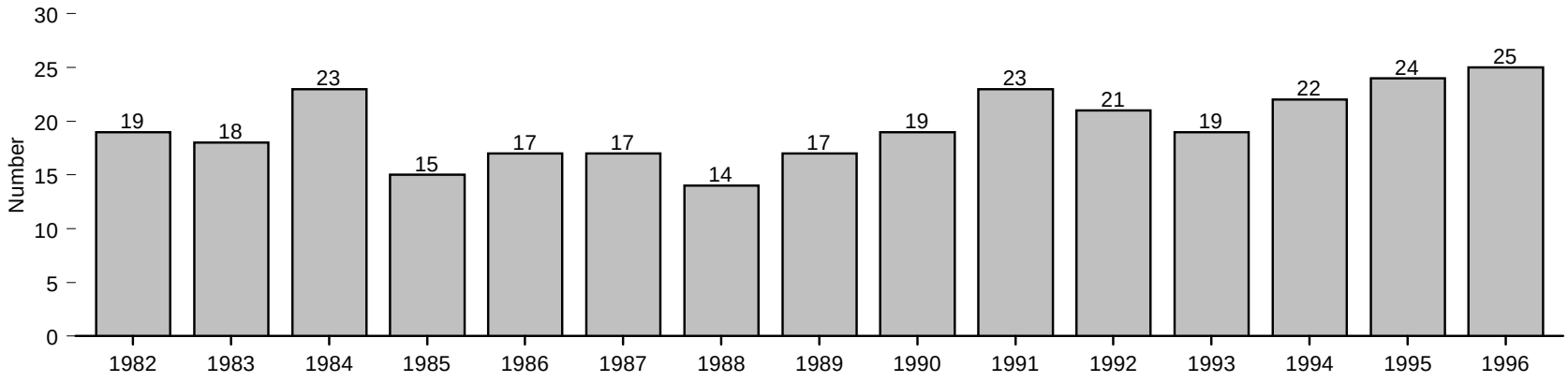
Notes: • Data represent shipments from U.S. manufacturers only. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/fuelrenewable.html.

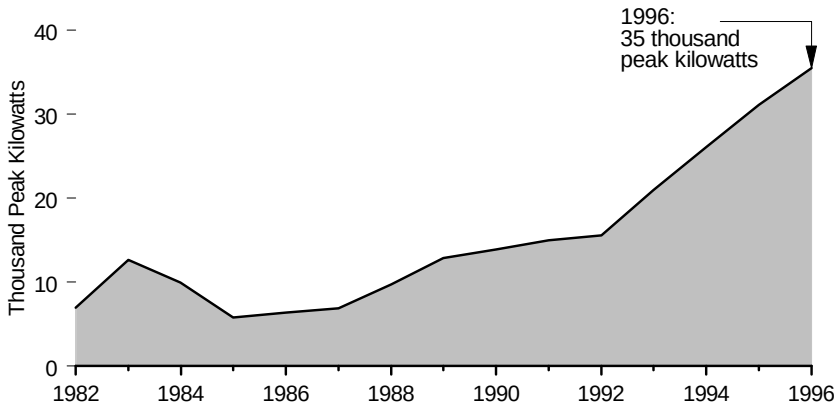
Source: Energy Information Administration, *Renewable Energy Annual 1997,* Volume 1 (February 1998), Table 16.

Figure 10.6 Photovoltaic Cell and Module Shipments and Trade

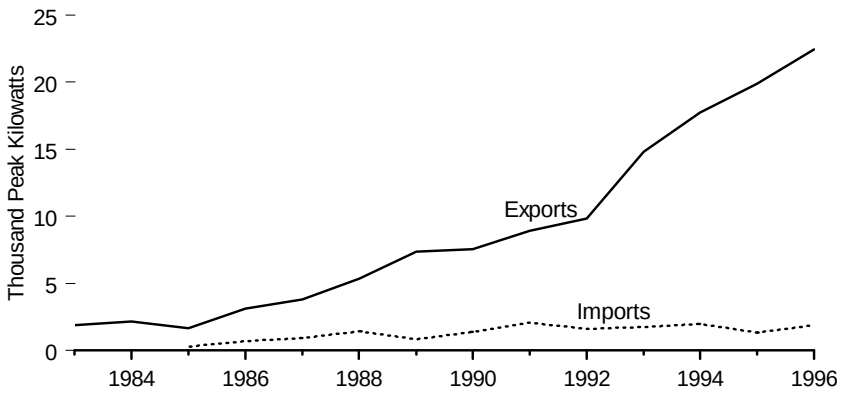
Number of U.S. Companies Reporting Shipments, 1982-1996



Total Shipments, 1982-1996



Trade, 1983-1996



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

Source: Table 10.6.

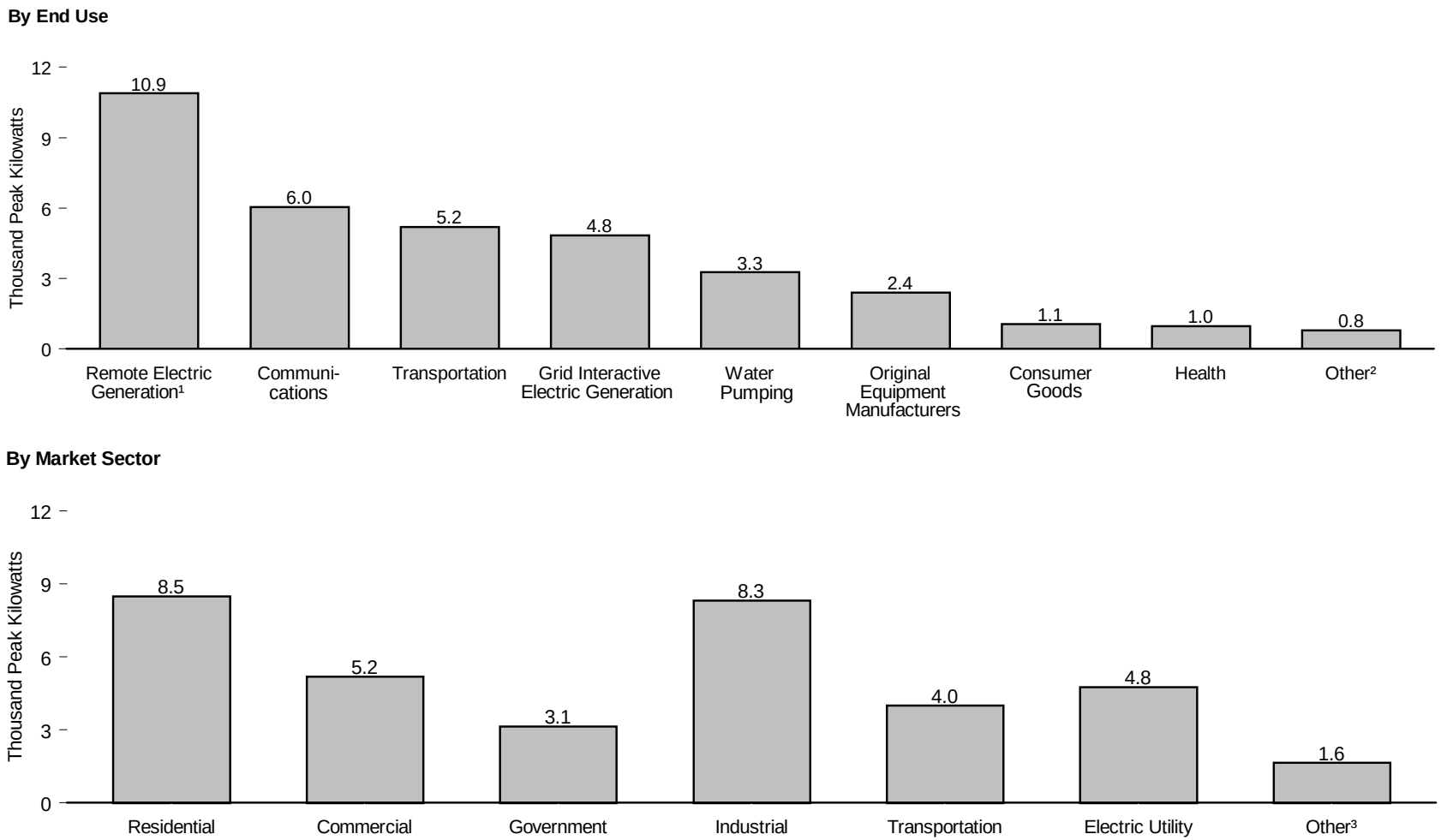
Table 10.6 Photovoltaic Cell and Module Shipments and Trade, 1982-1996

Year	Number of U.S. 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]19	[3]13,837	1,398	7,544
1991[2]	23	14,939	2,059	8,905
1992[2]	21	15,583	1,602	9,823
1993[2]	19	20,951	1,767	14,814
1994[2]	22	26,077	1,960	17,714
1995[2]	24	31,059	1,337	19,871
1996[2]	25	35,464	1,864	22,448

[1] Total shipments include all types of photovoltaic cells and modules (single-crystal silicon, cast silicon, ribbon silicon, thin-film silicon, and concentrator silicon) and internationally traded cells and modules.
[2] Shipments of cells and modules for space and satellite applications are not included.
[3] Data were imputed for one nonrespondent who exited the industry during 1990.
NA=Not available.

Web Page: http://www.eia.doe.gov/fuelrenewable.html.
Sources: • 1982-1984—Energy Information Administration (EIA), *Solar Collector Manufacturing Activity 1993* (August 1994), Table 16. • 1985 forward—EIA, *Renewable Energy Annual 1997,* Volume 1 (February 1998), Table 25.

Figure 10.7 Photovoltaic Cell and Module Shipments by End Use, 1996



¹ Units designed for installations that are not grid-interactive.
² Represents such applications as cooking food, desalinization, and distilling.
³ Shipments to foreign governments and for specialty purposes.
Source: Table 10.7.

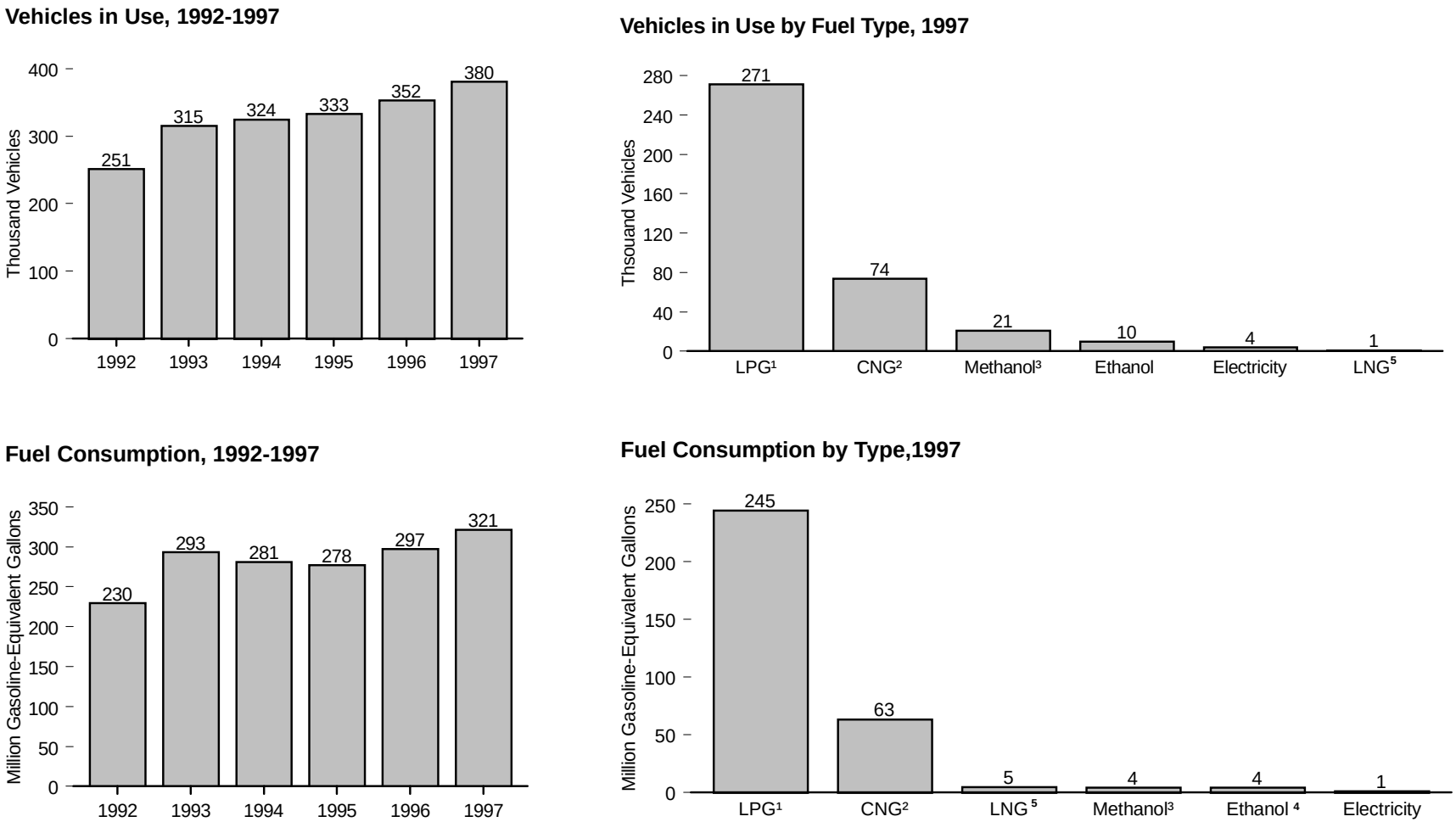
Table 10.7 Photovoltaic Cell and Module Shipments by End Use, 1989-1996

	End Use									Market Sector							
						Electric Generation											
Year	Health	Water Pumping	Trans-portation	Commun-ications	Consumer Goods	Grid Inter-active	Remote [1]	OEM [2]	Other [3]	Resi-dential	Com-mercial	Gov-ernment	Indus-trial	Trans-portation	Electric Utility	Other [4]	Total
	Amount Shipped (peak kilowatts)																
1989	5	711	1,196	2,590	2,788	1,251	2,620	1,595	69	1,439	3,850	1,077	3,993	1,130	785	551	12,825
1990	5	1,014	1,069	4,340	2,484	469	3,097	1,119	240	1,701	6,086	1,002	2,817	974	826	432	13,837
1991	61	729	1,523	3,538	3,312	856	3,594	1,315	13	3,624	3,345	815	3,947	1,555	1,275	377	14,939
1992	67	809	1,602	3,717	2,566	1,227	4,238	828	530	4,154	2,386	1,063	4,279	1,673	1,553	477	15,583
1993	674	2,294	4,238	3,846	946	1,096	5,761	2,023	74	5,237	4,115	1,325	5,352	2,564	1,503	856	20,951
1994	79	1,410	2,128	5,570	3,239	2,296	9,253	1,849	254	6,632	5,429	2,114	6,855	2,174	2,364	510	26,077
1995	776	2,727	4,203	5,154	1,025	4,585	8,233	3,188	1,170	6,272	8,100	2,000	7,198	2,383	3,759	1,347	31,059
1996	977	3,261	5,196	6,041	1,063	4,844	10,884	2,410	789	8,475	5,176	3,126	8,300	3,995	4,753	1,639	35,464
	Percent of Total																
1989	(s)	5.5	9.3	20.2	21.7	9.8	20.4	12.4	0.5	11.2	30.0	8.4	31.1	8.8	6.1	4.3	100.0
1990	(s)	7.3	7.7	31.4	18.0	3.4	22.4	8.1	1.7	12.3	44.0	7.2	20.4	7.0	6.0	3.1	100.0
1991	0.4	4.9	10.2	23.7	22.2	5.7	24.1	8.8	0.1	24.3	22.4	5.5	26.4	10.4	8.5	2.5	100.0
1992	0.4	5.2	10.3	23.9	16.5	7.9	27.2	5.3	3.4	26.7	15.3	6.8	27.5	10.7	10.0	3.1	100.0
1993	3.2	10.9	20.2	18.4	4.5	5.2	27.5	9.7	0.4	25.0	19.6	6.3	25.5	12.2	7.2	4.1	100.0
1994	0.3	5.4	8.2	21.4	12.4	8.8	35.5	7.1	1.0	25.4	20.8	8.1	26.3	8.3	9.1	2.0	100.0
1995	2.5	8.8	13.5	16.6	3.3	14.8	26.5	10.3	3.8	20.2	26.1	6.4	23.2	7.7	12.1	4.3	100.0
1996	2.8	9.2	14.7	17.0	3.0	13.7	30.7	6.8	2.2	23.9	14.6	8.8	23.4	11.3	13.4	4.6	100.0

[1] Electric power generation photovoltaic units designed for installations that are not grid-interactive.
[2] Original equipment manufacturers are non-photovoltaic manufacturers that combine photovoltaic technology into existing or newly developed product lines.
[3] Represents such applications as cooking food, desalinization, and distilling.
[4] Shipments to foreign governments and for specialty purposes.
(s)=Less than 0.05 percent.
Note: Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/fuelrenewable.html.

Sources: • 1989—Energy Information Administration (EIA), *Solar Collector Manufacturing Activity 1989* (March 1991), Tables 17 and 18. • 1990—EIA, *Solar Collector Manufacturing Activity 1991* (December 1992), Tables 22 and 23. • 1991—EIA, *Solar Collector Manufacturing Activity 1992* (November 1993), Tables 25 and 26. 1992—EIA, *Solar Collector Manufacturing Activity 1993* (August 1994), Tables 23 and 24. • 1993—EIA, *Renewable Energy Annual 1995* (December 1995), Table 38. • 1994 and 1995—EIA, *Renewable Energy Annual 1996* (March 1997), Table F19. • 1996— *EIA, Renewable Energy Annual 1997,* Volume 1 (February 1998), Table 29.

Figure 10.8 Alternative-Fueled Vehicles and Fuel Consumption by Type



[1]Liquefied petroleum gases.
[2]Compressed natural gas.
[3]Methanol, 85 percent, and methanol, neat.
[4]Ethanol, 85 percent, and ethanol, 95 percent.
[5]Liquefied natural gas.
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 10.8.

Table 10.8 Alternative-Fueled Vehicles and Fuel Consumption by Type, 1992-1997

Year	Liquefied Petroleum Gases [1]	Compressed Natural Gas	Liquefied Natural Gas	Methanol, 85 Percent [2]	Methanol, Neat	Ethanol, 85 Percent [2]	Ethanol, 95 Percent [2]	Electricity	Total
	Estimated Number of Vehicles in Use								
1992	221,000	23,191	90	4,850	404	172	38	1,607	251,352
1993	269,000	32,714	299	10,263	414	441	27	1,690	314,848
1994	264,000	41,227	484	15,484	415	605	33	2,224	324,472
1995	259,000	50,218	603	18,319	386	1,527	136	2,860	333,049
1996	[R]263,000	[R]60,144	[R]663	[R]20,265	[R]172	[R]4,536	[R]361	[R]3,280	[R]352,421
1997	271,000	73,773	965	20,656	172	9,389	357	4,040	380,352
	Estimated Fuel Consumption (Thousand Gasoline-Equivalent Gallons)								
1992	208,142	16,823	585	1,069	2,547	21	85	359	229,631
1993	264,655	21,603	1,901	1,593	3,166	48	80	288	293,334
1994	248,467	24,160	2,345	2,340	3,190	80	140	430	281,152
1995	232,701	35,162	2,759	[R]2,887	2,150	190	[R]995	663	[R]277,507
1996	[R]239,158	[R]46,923	[R]3,247	[R]3,390	[R]347	[R]694	[R]2,699	[R]773	[R]297,231
1997	244,612	63,258	4,567	3,625	347	1,416	2,628	936	321,389

[1] Vehicles in use represent lower bound estimates, rounded to the nearest thousand.
[2] Remaining portion is motor gasoline.
R=Revised data.

Web Page: http://www.eia.doe.gov/fuelrenewable.html.
Sources: Energy Information Administration, *Alternatives to Traditional Transportation Fuels 1996* (December 1997), Tables 1 and 10.

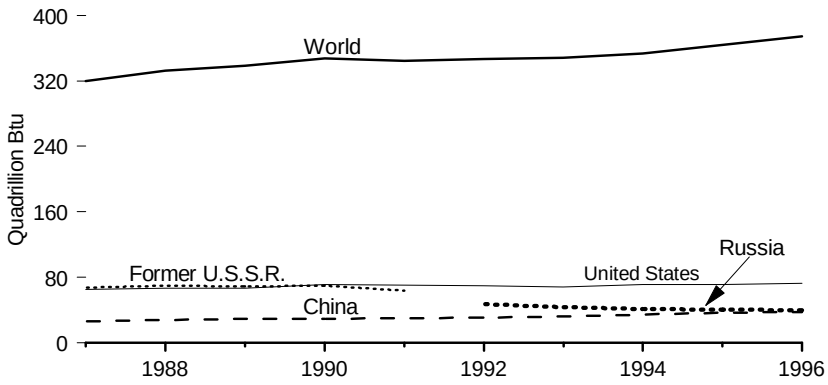
11

International Energy

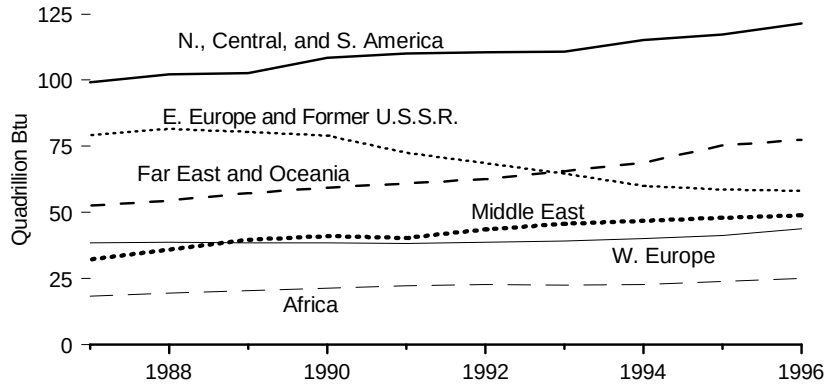
Drilling rig, Gansu Province, People's Republic of China. Source: U.S. Department of Energy.

Figure 11.1 World Primary Energy Production

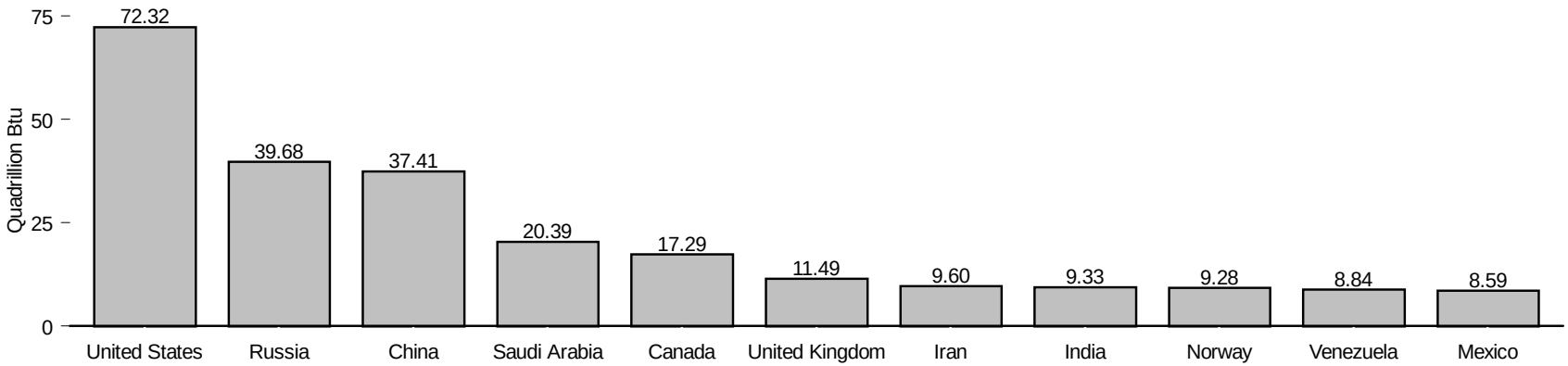
World and Leading Producers, 1987-1996



World Areas, 1987-1996



Top Producing Countries, 1996



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

Source: Table 11.1.

Table 11.1 World Primary Energy Production, 1987-1996

(Quadrillion Btu)

Region and Country	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996 P
North, Central, and South America	R**99.24**	R**102.22**	**102.80**	R**108.44**	**110.11**	R**110.62**	R**110.83**	R**115.17**	R**117.36**	**121.41**
Brazil	R3.48	R3.59	R3.75	R3.80	R3.95	R4.01	R4.17	R4.33	R4.57	4.96
Canada	12.54	13.41	13.36	13.36	R13.91	14.43	R15.36	R16.29	R16.83	17.29
Mexico	7.36	7.43	7.49	7.63	8.12	R8.15	R8.15	R8.13	R7.99	8.59
United States [1]	64.95	66.10	R66.16	R70.78	R,[1]70.45	R69.98	R68.34	R70.71	71.04	72.32
Venezuela	R5.17	R5.59	R5.77	6.31	6.97	R6.98	7.29	7.74	R8.15	8.84
Other	R5.74	R6.11	R6.27	R6.57	R6.72	R7.06	R7.52	R7.96	R8.80	9.41
Western Europe	R**38.59**	R**38.82**	R**38.46**	R**38.53**	R**38.41**	R**38.77**	R**39.28**	R**40.19**	R**41.30**	**43.81**
France	4.01	4.07	4.05	R4.26	R4.46	4.61	R4.83	R4.84	R4.91	4.97
Germany [2]	8.03	8.10	7.89	7.51	R6.30	6.11	5.78	R5.61	R5.54	5.53
Netherlands	R2.72	R2.41	R2.59	2.62	2.94	2.92	2.96	2.89	R2.88	3.23
Norway	4.40	4.77	5.71	5.94	6.22	7.08	7.28	R7.65	8.35	9.28
United Kingdom	10.32	9.99	9.02	9.11	9.29	9.05	9.33	10.09	R10.66	11.49
Other	R9.09	R9.47	R9.20	R9.08	R9.20	R9.00	R9.11	R9.11	R8.96	9.31
Eastern Europe and Former U.S.S.R.	R**79.28**	R**81.62**	R**80.43**	**78.93**	**72.53**	R**68.73**	R**64.68**	R**60.04**	R**58.68**	**58.29**
Kazakhstan	—	—	—	—	—	3.73	3.36	2.54	R2.25	2.23
Poland	R5.00	R5.01	R4.64	3.89	3.75	3.69	3.71	R3.76	R3.78	3.76
Former U.S.S.R.	R67.10	R69.48	R68.99	69.15	63.54	—	—	—	—	—
Russia	—	—	—	—	—	46.77	R43.40	R40.86	R39.98	39.68
Ukraine	—	—	—	—	—	4.27	4.13	R3.60	R3.48	3.28
Other	R7.17	R7.13	R6.80	5.89	5.24	R10.27	R10.08	R9.28	R9.18	9.34
Middle East	**32.21**	R**36.12**	**39.73**	R**41.03**	R**40.32**	R**43.58**	R**45.78**	R**46.95**	R**47.98**	**48.99**
Iran	5.67	5.71	R7.02	R7.67	R8.27	R8.53	R8.83	R9.15	9.35	9.60
Iraq	4.58	5.97	6.47	4.54	0.69	1.02	1.21	1.33	1.35	1.39
Kuwait	3.77	3.63	4.32	2.83	0.43	2.44	4.28	4.73	4.81	4.82
Saudi Arabia	10.84	12.86	12.81	15.92	19.75	20.39	20.11	20.00	R20.25	20.39
United Arab Emirates	4.21	4.22	4.99	5.51	6.24	6.11	5.78	5.84	R6.14	6.43
Other	3.14	R3.74	4.12	4.56	4.95	5.09	R5.56	5.91	R6.08	6.36
Africa	R**18.42**	R**19.51**	R**20.39**	R**21.40**	R**22.38**	R**22.73**	R**22.58**	R**22.77**	R**24.03**	**25.13**
Algeria	4.01	R4.08	4.28	4.52	4.81	4.82	4.65	4.57	R5.11	5.37
Libya	2.29	2.73	2.70	3.18	3.43	3.34	3.17	3.21	3.23	3.28
Nigeria	3.05	3.30	3.90	4.07	4.30	R4.43	4.45	4.37	R4.53	4.96
South Africa	R4.07	R4.23	R4.12	R4.05	R4.12	R4.26	R4.41	R4.61	R4.85	4.87
Other	4.99	R5.16	R5.39	R5.58	R5.72	R5.88	R5.90	R6.01	R6.31	6.65
Far East and Oceania	R**52.69**	R**54.43**	**57.24**	R**59.43**	**61.04**	R**62.59**	R**65.58**	R**68.79**	R**75.32**	**77.48**
Australia	R5.59	5.33	5.58	6.14	6.28	6.57	6.60	R6.90	R7.42	7.58
China	25.92	27.14	28.75	29.37	29.66	R30.31	R31.83	R34.05	R36.81	37.41
India	5.60	R5.93	6.21	6.53	6.81	R7.12	R7.31	R7.67	R9.11	9.33
Indonesia	4.46	4.56	4.96	5.12	5.67	R5.84	R6.18	6.43	R7.03	7.50
Japan	3.22	3.21	3.20	R3.27	3.44	3.36	3.73	3.63	R4.00	4.05
Other	R7.89	R8.28	R8.54	R9.01	9.19	R9.39	R9.93	R10.12	R10.94	11.61
World	R**320.42**	R**332.73**	R**339.05**	R**347.77**	R**344.80**	R**347.02**	R**348.74**	R**353.91**	R**364.67**	**375.11**

[1] There is a discontinuity in this time series between 1989 and 1990 due to the expanded coverage of renewable energy beginning in 1990.

[2] Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.

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

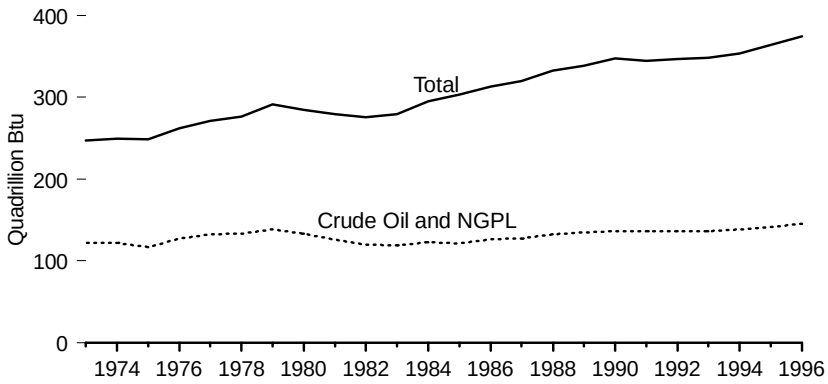
Notes: • See Note 1 at end of section. • World primary energy production includes crude oil and lease condensate, natural gas plant liquids, dry natural gas, coal, and net hydroelectric power, nuclear electric power, geothermal, photovoltaic, solar, wind, and some biofuel electric power. Data for the United States also include biofuels for other than electric power generation. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/emeu/international/reports.html.

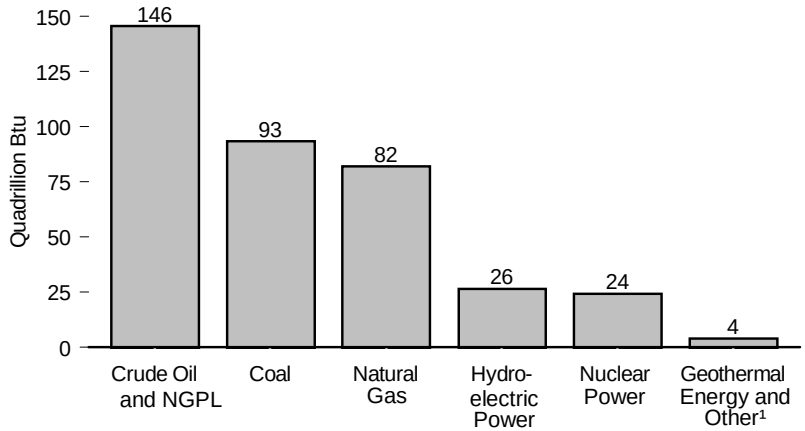
Sources: **United States:** Table 1.2. **All Other Data:** Energy Information Administration, *International Energy Annual 1996* (February 1998), Table F1, and the International Energy Database, May 1998.

Figure 11.2 World Primary Energy Production by Source

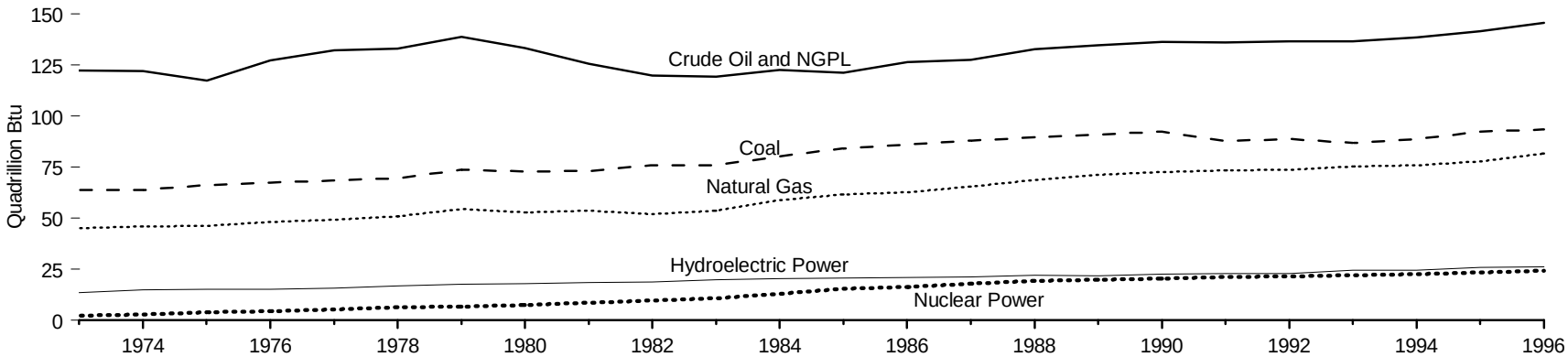
Total and Crude Oil and NGPL, 1973-1996



By Source, 1996



By Source, 1973-1996



¹ Photovoltaic, solar, wind, and some biofuels.

Source: Table 11.2.

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

Table 11.2 World Primary Energy Production by Source, 1973-1996

(Quadrillion Btu)

Year	Coal	Natural Gas [1]	Crude Oil [2]	Natural Gas Plant Liquids	Nuclear Power [3]	Hydroelectric Power [3]	Geothermal Energy [3] and Other [4]	Total
1973	63.87	45.00	117.88	4.23	2.15	13.52	0.21	246.86
1974	63.79	45.82	117.82	4.22	2.87	14.84	0.22	249.57
1975	66.20	46.17	113.09	4.12	3.85	15.04	0.24	248.70
1976	67.33	48.14	122.92	4.24	4.52	15.08	0.26	262.49
1977	68.47	49.35	127.75	4.40	5.41	15.56	0.27	271.21
1978	69.55	50.79	128.51	4.55	6.43	16.80	0.28	276.91
1979	73.80	54.44	133.87	4.87	6.69	17.69	0.34	291.70
1980	[R]72.94	[R]52.63	128.12	5.10	7.58	[R]18.07	[R]0.32	[R]284.76
1981	[R]73.07	[R]53.52	120.16	5.36	8.53	[R]18.36	[R]0.35	[R]279.35
1982	[R]75.68	[R]51.86	114.51	5.34	9.51	[R]18.83	[R]0.38	[R]276.11
1983	[R]75.92	[R]53.59	113.97	5.34	10.72	19.73	[R]0.43	[R]279.71
1984	[R]80.13	[R]58.91	116.86	5.71	12.99	[R]20.35	[R]0.49	[R]295.44
1985	[R]83.95	[R]61.56	115.40	5.82	15.37	[R]20.57	[R]0.54	[R]303.21
1986	[R]86.08	[R]62.55	120.24	6.12	16.34	[R]21.04	[R]0.60	[R]312.98
1987	[R]87.89	[R]65.49	121.16	6.32	17.80	[R]21.12	[R]0.65	[R]320.42
1988	[R]89.62	[R]68.67	125.93	6.63	19.30	[R]21.92	[R]0.66	[R]332.73
1989	[R]91.08	[R]71.12	127.98	6.67	19.81	[R]21.72	[R]0.66	[R]339.05
1990	[R]92.38	72.53	129.50	6.85	[R]20.37	[R]22.60	[R,5]3.54	[R]347.77
1991	[R]87.76	73.29	128.77	7.13	[R]21.29	[R]22.98	[R]3.58	[R]344.80
1992	[R]88.70	73.70	129.13	[R]7.38	[R]21.36	[R]22.98	[R]3.77	[R]347.02
1993	[R]86.85	75.18	[R]128.86	[R]7.67	[R]22.02	[R]24.36	[R]3.81	[R]348.74
1994	[R]88.87	[R]76.01	[R]130.46	[R]7.84	[R]22.45	[R]24.37	[R]3.91	[R]353.91
1995	[R]92.41	[R]77.77	[R]133.32	[R]8.14	23.31	[R]25.80	[R]3.91	[R]364.67
1996[P]	93.34	81.67	137.39	8.30	24.10	26.25	4.06	375.11

[1] Dry production.
[2] Includes lease condensate.
[3] Net generation, i.e., gross generation less plant use.
[4] Includes net photovoltaic, solar, wind, and some biofuel electric power. Data for the United States also include biofuels for other than electric power generation.
[5] There is a discontinuity in the series between 1989 and 1990 due to the expanded coverage of U.S. renewable energy beginning in 1990. See Table 1.2.

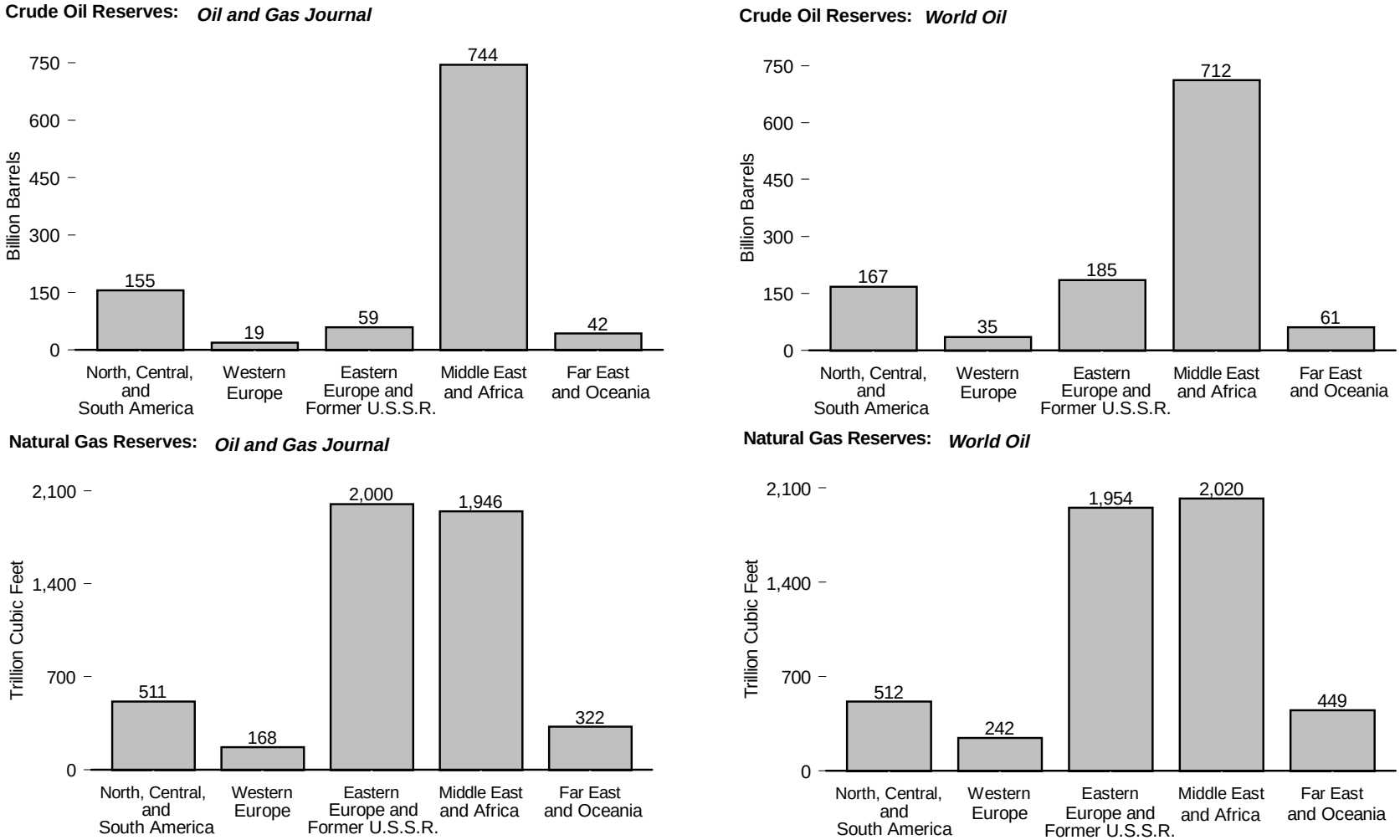
R=Revised. P=Preliminary.

Notes: • See Note 1 at end of section. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/emeu/international/reports.html.

Source: Energy Information Administration, International Energy Database, May 1998.

Figure 11.3 World Crude Oil and Natural Gas Reserves, January 1, 1997



Source: Table 11.3.

Table 11.3 World Crude Oil and Natural Gas Reserves, January 1, 1997

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	**75.7**	**76.0**	**302.3**	**298.5**
Canada	4.9	5.5	68.1	68.1
Mexico	48.8	48.5	67.7	63.9
United States	22.0	22.0	166.5	166.5
Central and South America	**79.1**	**91.2**	**208.5**	**213.9**
Argentina	2.4	2.6	21.9	24.3
Bolivia	0.1	0.1	4.5	4.4
Brazil	4.8	7.0	5.4	8.3
Colombia	2.8	3.4	8.3	8.0
Ecuador	2.1	3.3	3.7	3.4
Peru	0.8	0.7	7.0	7.0
Trinidad and Tobago	0.6	0.6	12.4	12.1
Venezuela	64.9	72.6	141.6	143.0
Other	0.7	1.1	3.7	3.5
Western Europe	**18.5**	**34.9**	**167.9**	**242.3**
Denmark	1.0	0.9	3.9	3.7
Germany	0.4	0.4	11.6	12.1
Italy	0.7	0.7	10.5	9.8
Netherlands	0.1	0.1	64.1	62.3
Norway	11.2	26.9	47.7	123.3
United Kingdom	4.5	5.0	24.7	26.8
Other	0.6	0.9	5.4	4.2
Eastern Europe and Former U.S.S.R.	**59.0**	**185.1**	**2,000.4**	**1,953.6**
Hungary	0.1	0.1	3.3	3.1
Romania	1.6	1.0	14.0	4.5
Former U.S.S.R.	57.0	183.8	1,977.0	1,939.3
Other [1]	0.2	0.2	6.1	6.7
Middle East	**676.4**	**635.7**	**1,617.1**	**1,675.0**
Bahrain	0.2	0.1	5.2	5.0
Iran	93.0	90.5	741.6	812.2
Iraq	112.0	112.0	118.0	118.5
Kuwait	96.5	94.7	52.9	52.7
Oman	5.1	3.6	30.0	21.1
Qatar	3.7	3.9	250.0	244.8
Saudi Arabia	261.5	261.8	189.1	191.5
Syria	2.5	2.4	8.3	8.2
United Arab Emirates	97.8	63.5	204.9	203.6
Yemen	4.0	3.1	16.9	17.0
Other	0.0	0.0	0.2	0.2
Africa	**67.6**	**76.2**	**328.6**	**344.6**
Algeria	9.2	13.0	130.3	138.9
Angola	5.4	3.6	1.7	1.7
Cameroon	0.4	0.1	3.9	3.9
Congo	1.5	1.6	3.2	4.3
Egypt	3.7	3.7	20.4	20.4
Libya	29.5	29.5	46.3	46.3
Nigeria	15.5	20.8	104.7	109.7
Tunisia	0.3	0.3	2.4	2.7
Other	2.0	3.6	15.7	16.7
Far East and Oceania	**42.3**	**60.8**	**321.8**	**448.7**
Australia	1.8	3.7	19.4	83.5
Brunei	1.4	1.1	14.1	13.5
China	24.0	34.1	41.4	39.6
India	4.3	5.0	24.2	19.5
Indonesia	5.0	9.2	72.3	135.9
Malaysia	4.0	5.2	80.2	79.1
New Zealand	0.1	0.1	2.4	2.2
Pakistan	0.2	0.2	22.0	18.3
Papua New Guinea	0.3	0.3	1.5	8.6
Thailand	0.3	0.3	7.1	7.1
Other	0.9	1.6	37.3	41.3
World	**1,018.5**	**1,160.1**	**4,946.7**	**5,176.6**

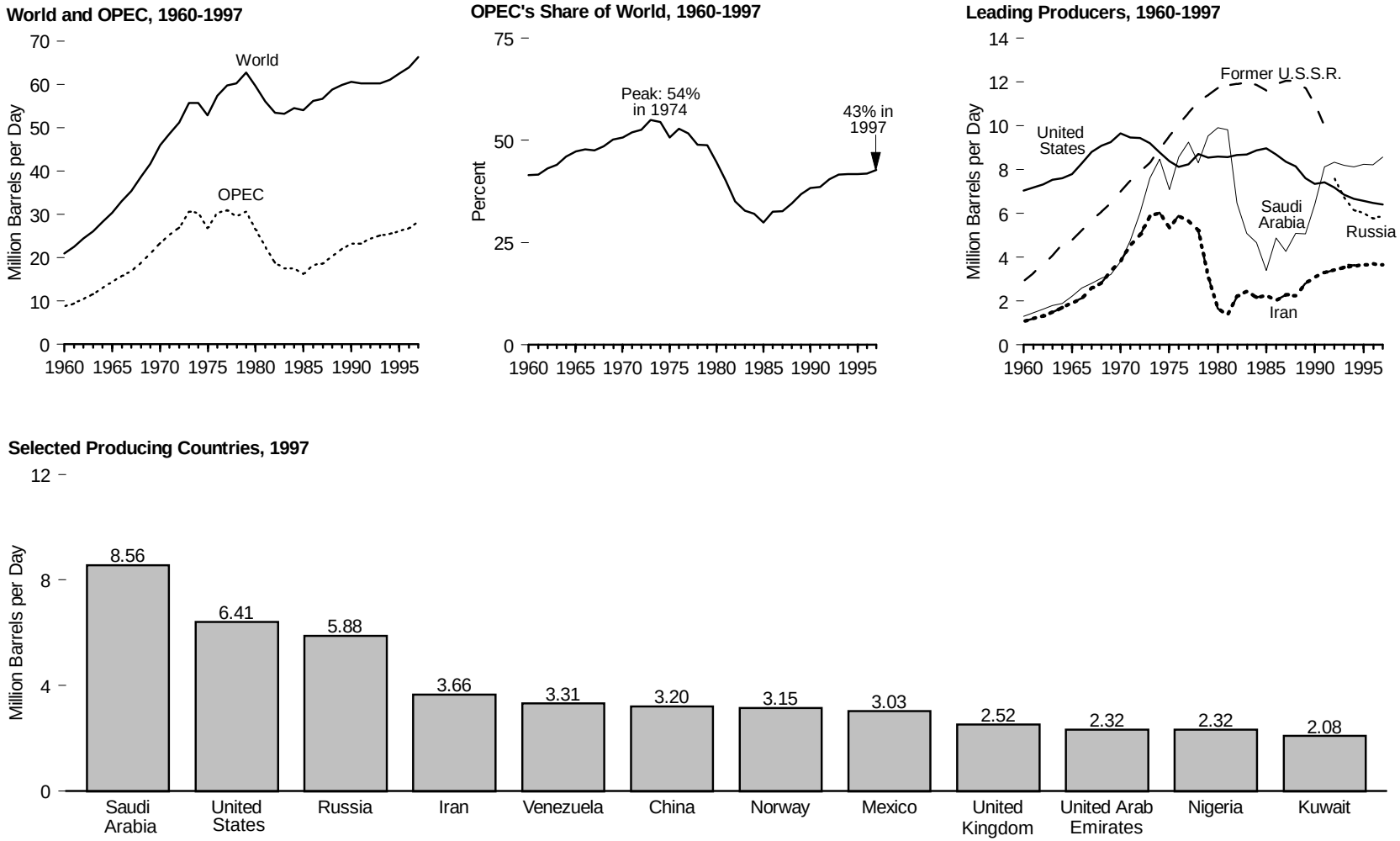
[1] Albania, Bulgaria, former Czech Republic, Poland, and Slovakia.

Notes: • Data for Kuwait and Saudi Arabia include one-half of the reserves in the Neutral Zone between Kuwait and Saudi Arabia. • All reserve figures except those for the former U.S.S.R. and natural gas reserves in Canada are proved reserves recoverable with present technology and prices. Former U.S.S.R. figures are "explored reserves," which include proved, probable, and some partially possible. The Canadian natural gas figure includes proved and some probable. The latest Energy Information Administration data for the United States are for December 31, 1996. See Table 4.8. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/emeu/international/reports.html.

Sources: **United States:** Energy Information Administration (EIA), *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, Annual Report 1996* (December 1997). **All Other Data:** PennWell Publishing Company, *Oil and Gas Journal,* December 30, 1996. Gulf Publishing Company, *World Oil,* August 1997.

Figure 11.4 World Crude Oil Production



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

Source: Table 11.4.

Table 11.4 World Crude Oil Production, 1960-1997

(Million Barrels per Day)

		Selected OPEC [1] Producers								Selected Non-OPEC Producers									
Year	Persian Gulf Nations [2]	Iran	Iraq	Kuwait[3]	Nigeria	Saudi Arabia [3]	United Arab Emirates	Venezuela	Total OPEC	Canada	China	Mexico	Norway	Former U.S.S.R.	Russia	United Kingdom	United States	Total Non-OPEC [4]	World
1960	5.27	1.07	0.97	1.69	0.02	1.31	0.00	2.85	8.70	0.52	0.10	0.27	0.00	2.91	—	(s)	7.04	12.29	20.99
1961	5.65	1.20	1.01	1.74	0.05	1.48	0.00	2.92	9.36	0.61	0.11	0.29	0.00	3.28	—	(s)	7.18	13.09	22.45
1962	6.19	1.33	1.01	1.96	0.07	1.64	0.01	3.20	10.51	0.67	0.12	0.31	0.00	3.67	—	(s)	7.33	13.84	24.35
1963	6.82	1.49	1.16	2.10	0.08	1.79	0.05	3.25	11.51	0.71	0.13	0.31	0.00	4.07	—	(s)	7.54	14.62	26.13
1964	7.61	1.71	1.26	2.30	0.12	1.90	0.19	3.39	12.98	0.75	0.18	0.32	0.00	4.60	—	(s)	7.61	15.20	28.18
1965	8.37	1.91	1.32	2.36	0.27	2.21	0.28	3.47	14.35	0.81	0.23	0.32	0.00	4.79	—	(s)	7.80	15.98	30.33
1966	9.32	2.13	1.39	2.48	0.42	2.60	0.36	3.37	15.77	0.88	0.29	0.33	0.00	5.23	—	(s)	8.30	17.19	32.96
1967	9.91	2.60	1.23	2.50	0.32	2.81	0.38	3.54	16.85	0.96	0.28	0.36	0.00	5.68	—	(s)	8.81	18.54	35.39
1968	10.91	2.84	1.50	2.61	0.14	3.04	0.50	3.60	18.79	1.19	0.30	0.39	0.00	6.08	—	(s)	9.10	19.84	38.63
1969	11.95	3.38	1.52	2.77	0.54	3.22	0.63	3.59	20.91	1.13	0.48	0.46	0.00	6.48	—	(s)	9.24	20.79	41.70
1970	13.39	3.83	1.55	2.99	1.08	3.80	0.78	3.71	23.30	1.26	0.60	0.49	0.00	6.99	—	(s)	9.64	22.59	45.89
1971	15.77	4.54	1.69	3.20	1.53	4.77	1.06	3.55	25.21	1.35	0.78	0.49	0.01	7.48	—	(s)	9.46	23.31	48.52
1972	17.54	5.02	1.47	3.28	1.82	6.02	1.20	3.22	26.89	1.53	0.90	0.51	0.03	7.89	—	(s)	9.44	24.25	51.14
1973	20.67	5.86	2.02	3.02	2.05	7.60	1.53	3.37	30.63	1.80	1.09	0.47	0.03	8.32	—	(s)	9.21	25.05	55.68
1974	21.28	6.02	1.97	2.55	2.26	8.48	1.68	2.98	30.35	1.55	1.32	0.57	0.04	8.91	—	(s)	8.77	25.37	55.72
1975	18.93	5.35	2.26	2.08	1.78	7.08	1.66	2.35	26.77	1.43	1.49	0.71	0.19	9.52	—	0.01	8.37	26.06	52.83
1976	21.51	5.88	2.42	2.15	2.07	8.58	1.94	2.29	30.33	1.31	1.67	0.83	0.28	10.06	—	0.25	8.13	27.01	57.34
1977	21.73	5.66	2.35	1.97	2.09	9.25	2.00	2.24	30.89	1.32	1.87	0.98	0.28	10.60	—	0.77	8.24	28.82	59.71
1978	20.61	5.24	2.56	2.13	1.90	8.30	1.83	2.17	29.46	1.32	2.08	1.21	0.36	11.11	—	1.08	8.71	30.70	60.16
1979	21.07	3.17	3.48	2.50	2.30	9.53	1.83	2.36	30.58	1.50	2.12	1.46	0.40	11.38	—	1.57	8.55	32.09	62.67
1980	17.96	1.66	2.51	1.66	2.06	9.90	1.71	2.17	26.61	1.44	2.11	1.94	0.53	11.71	—	1.62	8.60	32.99	59.60
1981	15.25	1.38	1.00	1.13	1.43	9.82	1.47	2.10	22.48	1.29	2.01	2.31	0.50	11.85	—	1.81	8.57	33.60	56.08
1982	12.16	2.21	1.01	0.82	1.30	6.48	1.25	1.90	18.78	1.27	2.05	2.75	0.52	11.91	—	2.07	8.65	34.70	53.48
1983	11.08	2.44	1.01	1.06	1.24	5.09	1.15	1.80	17.50	1.36	2.12	2.69	0.61	11.97	—	2.29	8.69	35.76	53.26
1984	10.78	2.17	1.21	1.16	1.39	4.66	1.15	1.80	17.44	1.44	2.30	2.78	0.70	11.86	—	2.48	8.88	37.05	54.49
1985	9.63	2.25	1.43	1.02	1.50	3.39	1.19	1.68	16.18	1.47	2.51	2.75	0.79	11.59	—	2.53	8.97	37.80	53.98
1986	11.70	2.04	1.69	1.42	1.47	4.87	1.33	1.79	18.28	1.47	2.62	2.44	0.87	11.90	—	2.54	8.68	37.95	56.23
1987	12.10	2.30	2.08	1.59	1.34	4.27	1.54	1.75	18.52	1.54	2.69	2.55	1.02	12.05	—	2.41	8.35	38.15	56.67
1988	13.46	2.24	2.69	1.49	1.45	5.09	1.57	1.90	20.32	1.62	2.73	2.51	1.16	12.05	—	2.23	8.14	38.42	58.74
1989	14.84	2.81	2.90	1.78	1.72	5.06	1.86	1.91	22.07	1.56	2.76	2.52	1.55	11.72	—	1.80	7.61	37.79	59.86
1990	15.28	3.09	2.04	1.18	1.81	6.41	2.12	2.14	23.20	1.55	2.77	2.55	1.70	10.98	—	1.82	7.36	37.37	60.57
1991	14.74	3.31	0.31	0.19	1.89	8.12	2.39	2.38	23.27	1.55	2.84	2.68	1.89	9.99	—	1.80	7.42	36.94	60.21
1992	15.97	3.43	0.43	1.06	1.94	8.33	2.27	2.37	24.40	1.61	2.85	2.67	2.23	—	7.63	1.83	7.17	35.82	60.22
1993	16.71	3.54	0.51	1.85	1.96	8.20	2.16	2.45	25.12	1.68	2.89	2.67	2.35	—	6.73	1.92	6.85	35.13	60.25
1994	16.96	3.62	0.55	2.03	1.93	8.12	2.19	2.59	25.51	1.75	2.94	2.69	2.52	—	6.14	2.37	6.66	35.49	61.00
1995	17.30	3.64	0.56	2.06	1.99	8.23	2.28	2.75	26.09	1.81	2.99	2.62	2.77	—	6.00	2.49	6.56	36.36	62.45
1996	17.37	3.69	0.58	2.06	2.19	8.22	2.28	3.05	26.77	1.82	3.13	R2.86	3.10	—	R5.77	2.57	R6.46	R37.20	R63.97
1997P	18.50	3.66	1.19	2.08	2.32	8.56	2.32	3.31	28.36	1.89	3.20	3.03	3.15	—	5.88	2.52	6.41	37.91	66.27

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

[2] Persian Gulf Nations are Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and United Arab Emirates.

[3] Includes about one-half of the production in the Neutral Zone between Kuwait and Saudi Arabia.

[4] Ecuador, which withdrew from OPEC on December 31, 1992, and Gabon, which withdrew on December 31,1994, are included in "Non-OPEC" for all years.

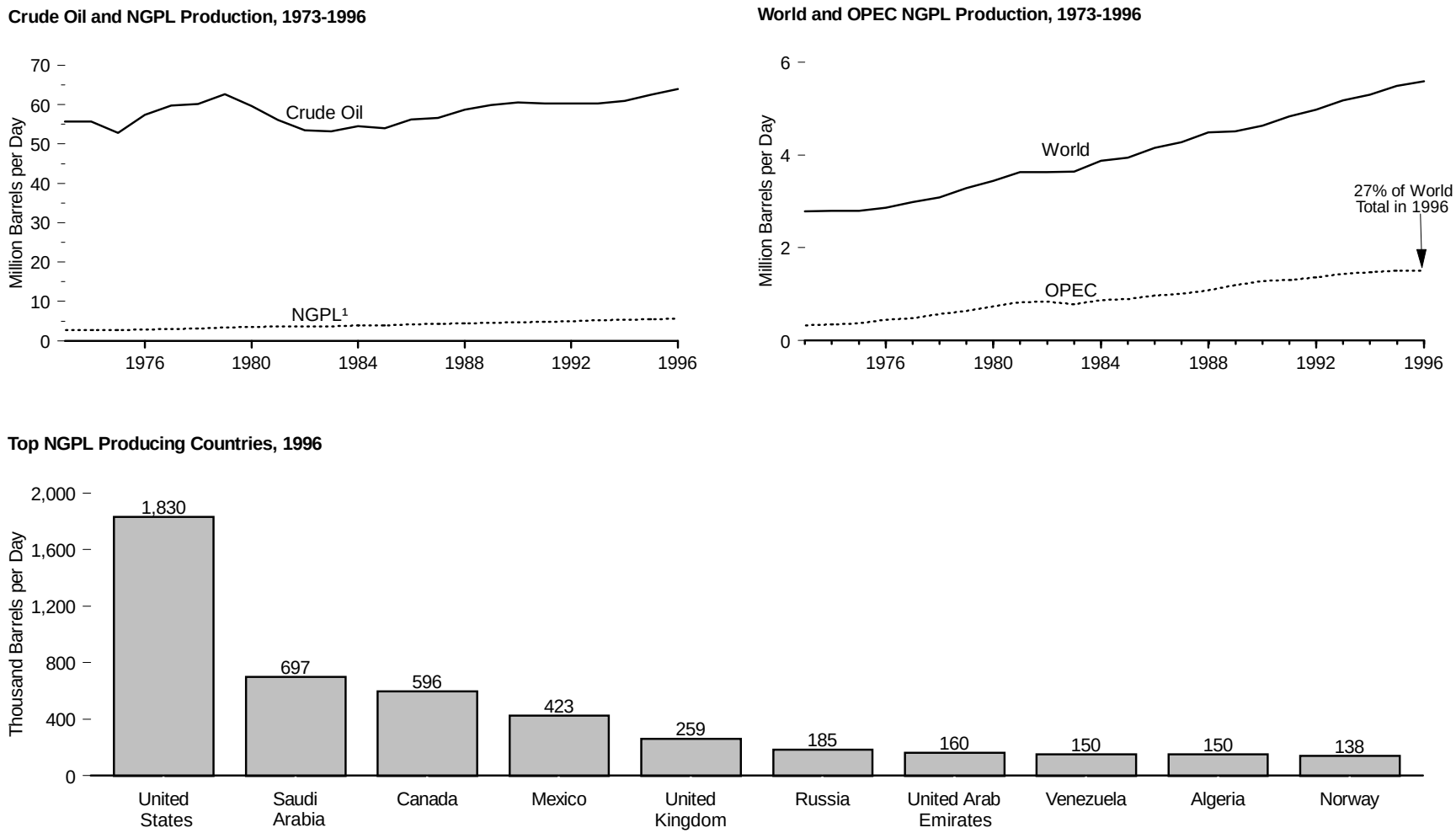
R=Revised. P=Preliminary. — = Not applicable. (s)=Less than 5,000 barrels per day.

Notes: • Includes lease condensate, excludes natural gas plant liquids. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/emeu/international/reports.html.

Sources: **China:** • 1960-1972—Central Intelligence Agency, unpublished data. • 1973-1979—Energy Information Administration (EIA), *International Energy Annual 1983,* Table 8. • 1980-1996—EIA, Office of Energy Markets and End Use, International Energy Database, March 1998. • 1997—EIA, *Monthly Energy Review* (March 1998), 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.* • 1981-1996—EIA, *Petroleum Supply Annual.* • 1997—EIA, *Monthly Energy Review* (March 1998), Table 10.1. **Former U.S.S.R.:** • 1960-1969—U.S.S.R. Central Statistical Office, *Narodnoye Khozyaystvo SSSR* (National Economy USSR). • 1970-1991—EIA, *International Petroleum Statistics Report,* February 1996, Table 4.1c. **Russia:** • 1992 forward—EIA, Office of Energy Markets and End Use, International Energy Database, March 1998. **OPEC Nations:** • 1960-1972—Organization of Petroleum Exporting Countries, *Annual Statistical Bulletin 1979.* • 1973-1979—EIA, *International Energy Annual 1983,* Table 8. • 1980-1996—EIA, Office of Energy Markets and End Use, International Energy Database, March 1998. • 1997—EIA, *Monthly Energy Review* (March 1998), 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. • 1980-1996—EIA, *International Energy Annual 1996* (February 1998), Table 2.2, and the International Energy Database, March 1998. • 1997—EIA, *Monthly Energy Review* (March 1998), Table 10.1.

Figure 11.5 World Natural Gas Plant Liquids Production



¹ Natural gas plant liquids.

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

Sources: Tables 11.4 and 11.5.

Table 11.5 World Natural Gas Plant Liquids Production, 1973-1996

(Thousand Barrels per Day)

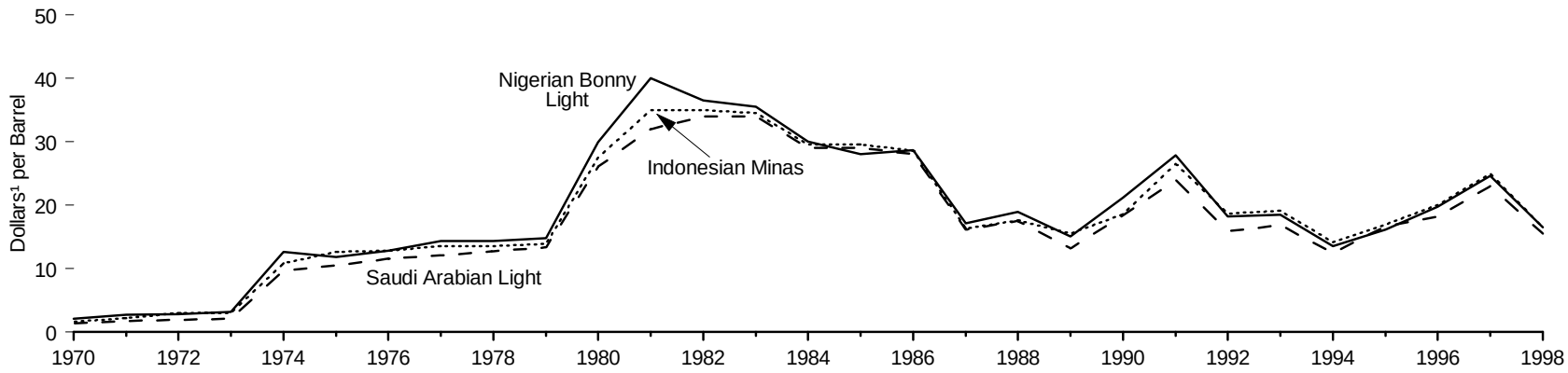
	Selected OPEC [1] Producers								Selected Non-OPEC Producers										
Year	Algeria	Indonesia	Kuwait [2]	Qatar	Saudi Arabia [2]	United Arab Emirates	Venezuela	Total OPEC	Australia	Canada	Kazakhstan	Mexico	Norway	Former U.S.S.R.	Russia	United Kingdom	United States	Total Non-OPEC [3]	World
1973	9	(s)	60	(s)	90	(s)	89	324	50	314	—	75	(s)	170	—	5	1,738	2,462	2,786
1974	12	(s)	50	5	130	(s)	84	347	50	314	—	80	(s)	190	—	5	1,688	2,443	2,790
1975	20	(s)	50	10	140	(s)	76	372	50	309	—	80	5	205	—	15	1,633	2,419	2,791
1976	24	10	50	10	185	(s)	77	442	50	289	—	95	20	220	—	15	1,604	2,425	2,867
1977	19	10	55	5	215	15	78	482	55	290	—	105	20	235	—	30	1,618	2,502	2,984
1978	25	30	75	5	250	30	61	566	60	281	—	115	35	255	—	40	1,567	2,514	3,080
1979	30	40	95	10	303	30	69	637	60	331	—	150	40	270	—	45	1,584	2,650	3,287
1980	36	70	95	10	369	35	60	732	60	331	—	193	40	285	—	45	1,573	2,712	3,444
1981	49	95	60	24	433	60	55	825	60	330	—	241	31	300	—	50	1,609	2,800	3,625
1982	58	80	40	30	430	90	60	842	52	318	—	255	33	315	—	78	1,550	2,784	3,626
1983	56	94	55	25	330	120	57	780	52	309	—	265	38	330	—	111	1,559	2,855	3,635
1984	105	75	67	28	355	130	57	869	54	336	—	257	36	340	—	136	1,630	3,000	3,869
1985	120	44	54	30	375	160	63	892	65	337	—	271	41	350	—	145	1,609	3,046	3,938
1986	120	30	75	22	385	185	97	969	60	328	—	352	53	440	—	152	1,551	3,181	4,150
1987	140	30	95	24	418	145	94	1,006	65	367	—	338	55	430	—	162	1,595	3,273	4,279
1988	120	30	100	30	499	130	98	1,077	67	381	—	370	75	450	—	159	1,625	3,404	4,481
1989	130	72	105	24	503	130	108	1,188	65	410	—	384	74	425	—	140	1,546	3,314	4,502
1990	130	77	65	40	620	135	114	1,281	63	426	—	428	78	425	—	108	1,559	3,351	4,632
1991	140	76	0	50	680	146	117	1,299	61	431	—	457	94	420	—	141	1,659	3,528	4,827
1992	140	75	34	55	713	144	113	1,364	56	460	86	454	95	—	230	160	1,697	R3,611	R4,975
1993	145	78	53	55	704	146	143	1,435	55	506	82	459	100	—	220	169	1,736	R3,746	R5,181
1994	140	80	85	50	698	150	146	1,465	56	529	63	461	103	—	200	218	1,727	R3,828	R5,293
1995	145	76	95	55	701	160	149	1,506	52	581	52	447	137	—	180	267	1,762	R3,979	R5,485
1996P	150	80	85	50	697	160	150	1,501	62	596	54	423	138	—	185	259	1,830	4,081	5,582

[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] Ecuador, which withdrew from OPEC on December 31, 1992, and Gabon, which withdrew on December 31,1994, are included in "Non-OPEC" for all years.
R=Revised. P=Preliminary. — = Not applicable. (s)=Less than 500 barrels per day.

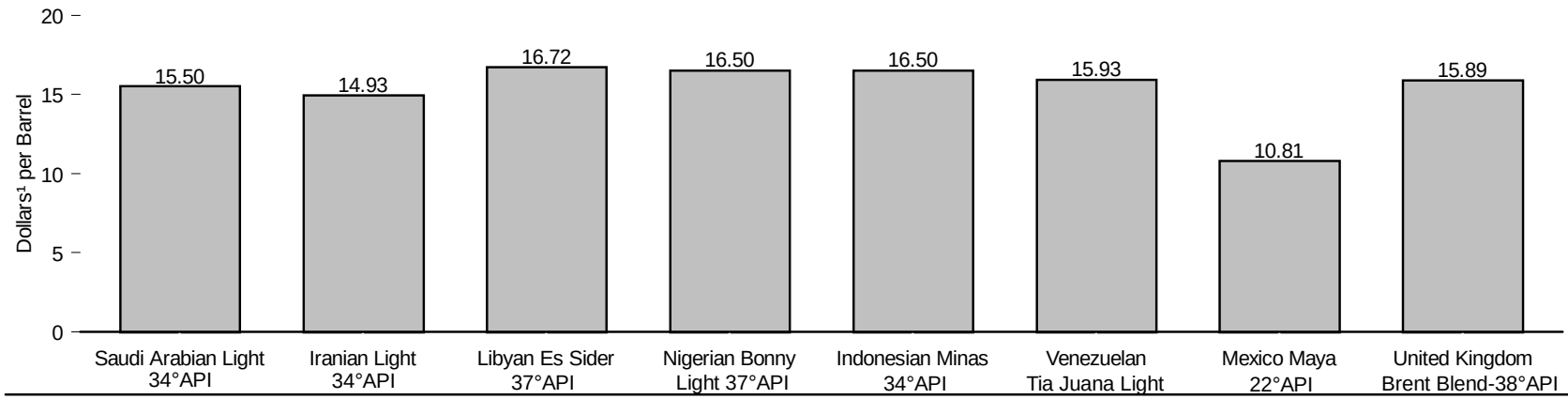
Note: Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/emeu/international/reports.html.
Source: Energy Information Administration, *International Energy Annual 1996* (February 1998), Table 2.3, and the International Energy Database, March 1998.

Figure 11.6 World Crude Oil Prices by Selected Type

Selected Types, 1970-1998



Selected Types, 1998



[1] Nominal dollars.

API=American Petroleum Institute.

Notes: • Prices are as of the first Friday in January, except in 1987, when prices are as of the first Friday in February. • Because vertical scales differ, graphs should not be compared.

Source: Table 11.6.

Table 11.6 World Crude Oil Prices by Selected Type, 1970-1998

(Dollars[1] per Barrel)

Year	Saudi Arabian Light-34 API	Iranian Light-34 API	Libyan [2] Es Sider-37 API	Nigerian [3] Bonny Light-37 API	Indonesian Minas-34 API	Venezuelan Tia Juana Light [4]	Mexico Maya-22 API	United Kingdom Brent Blend-38 API
1970	1.35	1.36	2.09	2.10	1.67	2.05	NA	NA
1971	1.75	1.76	2.80	2.65	2.18	2.45	NA	NA
1972	1.90	1.91	2.80	2.80	2.96	2.45	NA	NA
1973	2.10	2.11	3.10	3.10	2.96	2.60	NA	NA
1974	9.60	10.63	14.30	12.60	10.80	9.30	NA	NA
1975	10.46	10.67	11.98	11.80	12.60	11.00	NA	NA
1976	11.51	11.62	12.21	12.84	12.80	11.12	NA	NA
1977	12.09	12.81	13.74	14.33	13.55	12.72	NA	NA
1978	12.70	12.81	13.80	14.33	13.55	12.82	NA	NA
1979	13.34	13.45	14.52	14.80	13.90	13.36	15.45	15.70
1980	26.00	[5]30.37	34.50	29.97	27.50	25.20	28.00	26.02
1981	32.00	37.00	40.78	40.00	35.00	32.88	34.50	39.25
1982	34.00	34.20	36.50	36.50	35.00	32.88	26.50	36.60
1983	34.00	31.20	35.10	35.50	34.53	32.88	25.50	33.50
1984	29.00	28.00	30.15	30.00	29.53	27.88	25.00	30.00
1985	29.00	28.00	30.15	28.00	29.53	27.88	25.50	28.65
1986	28.00	28.05	30.15	28.65	28.53	28.05	21.93	26.00
1987	16.15	16.14	16.95	17.13	16.28	15.10	14.00	18.25
1988	17.52	15.55	18.52	18.92	17.56	17.62	11.10	18.00
1989	13.15	12.75	15.40	15.05	15.50	12.27	10.63	15.80
1990	18.40	18.20	20.40	21.20	18.55	24.69	17.05	21.00
1991	24.00	23.65	26.90	27.80	26.50	28.62	20.00	27.20
1992	15.90	15.50	17.20	18.20	18.65	19.67	10.75	17.75
1993	16.80	16.70	17.55	18.50	19.10	17.97	12.50	17.90
1994	12.40	12.40	12.55	13.50	14.15	12.97	9.01	13.15
1995	16.63	16.18	16.05	16.15	16.95	16.57	13.77	16.15
1996	18.20	17.73	19.20	19.70	20.05	18.52	15.79	19.37
1997	22.98	22.63	24.10	24.65	24.95	26.62	19.33	24.05
1998	15.50	14.93	16.72	16.50	16.50	15.93	10.81	15.89

[1] Nominal dollars.
[2] Prices for 1974 and 1975 are for crude oil with 40 API gravity. Prices for 1980 include $4.72 in retroactive charges and market premiums.
[3] Prices from 1977 forward include 2 cents per barrel harbor dues.
[4] 1970-1985—26 API; 1986 forward—31 API.
[5] Price for 1980 includes $1.87 market premiums and credit charges.

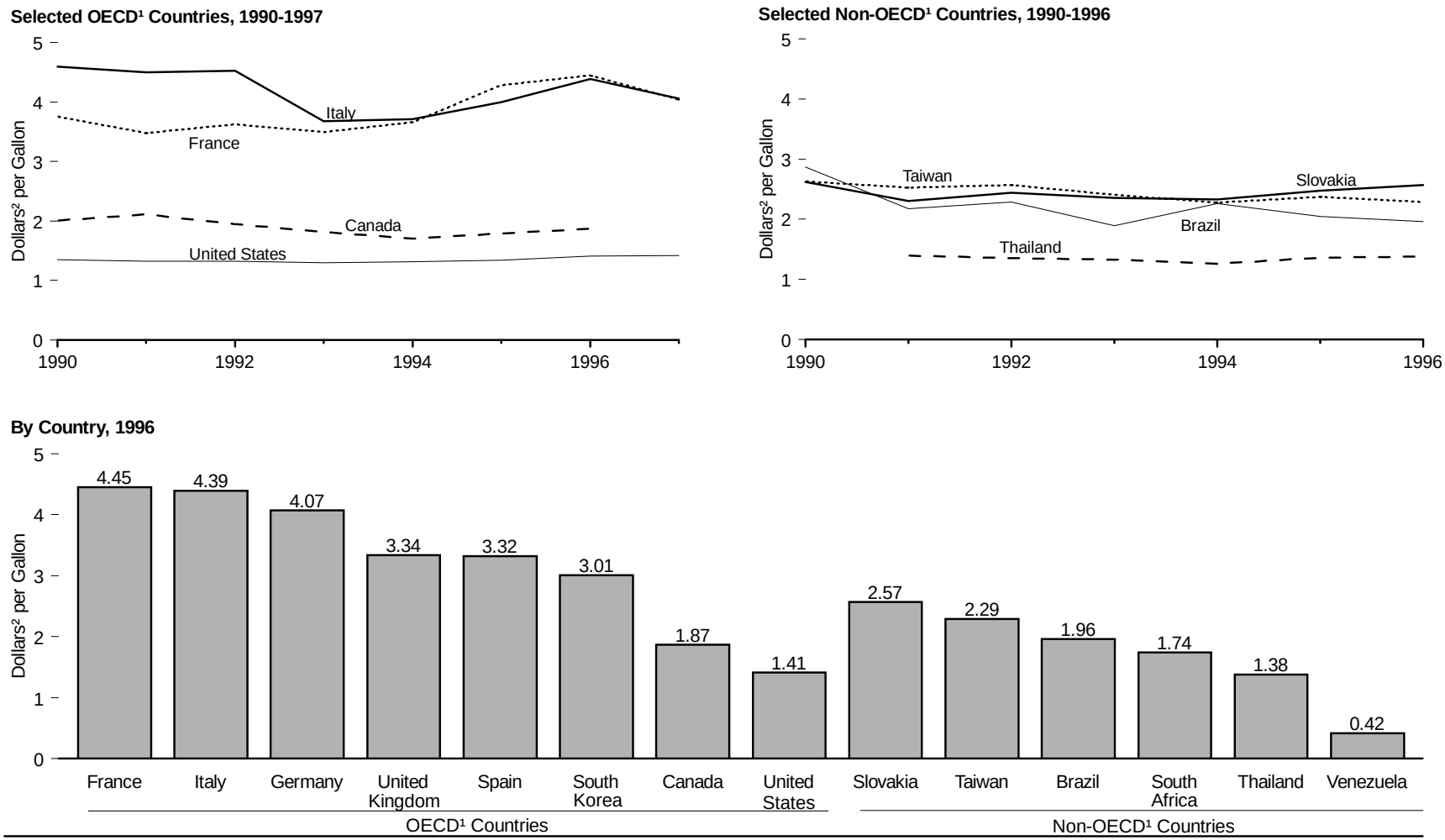
API=American Petroleum Institute. NA=Not available.

Notes: • Prices are usually f.o.b. at the foreign port of lading. • Prices are as of the first Friday in January, except in 1987, when prices are as of the first Friday in February.

Web Page: http://www.eia.doe.gov/emeu/international/prices.html.

Sources: • 1970-1978—Petroleum and Energy Intelligence Weekly, Inc., *Petroleum Intelligence Weekly.* • 1979 forward—Energy Information Administration, *Weekly Petroleum Status Report.*

Figure 11.7 World Retail Price of Premium Unleaded Motor Gasoline



[1] Organization for Economic Cooperation and Development. See Glossary for membership.

[2] Nominal dollars.

Source: Table 11.7.

Table 11.7 World Retail Price of Premium Unleaded Motor Gasoline, 1990-1997

(Dollars[1] per Gallon)

	Selected OECD [2] Countries								Selected Non-OECD Countries					
Year	Canada	France	Germany	Italy	South Korea [3]	Spain	United Kingdom	United States	Brazil	Slovakia	South Africa	Taiwan	Thailand	Venezuela
1990	2.01	3.76	2.77	4.60	2.05	—	2.82	1.35	2.87	2.62	—	2.63	—	—
1991	2.11	3.48	3.02	4.50	2.41	—	3.01	1.32	2.18	2.31	—	2.53	1.40	—
1992	1.95	3.63	3.39	4.53	2.67	3.49	3.06	1.32	2.29	2.44	—	2.57	1.35	—
1993	1.82	3.50	3.19	3.68	2.85	3.02	2.84	1.30	1.89	2.36	—	2.41	1.33	—
1994	1.70	3.66	3.63	3.71	2.92	2.99	2.99	1.31	2.26	2.33	—	2.28	1.26	0.15
1995	1.79	4.29	4.10	4.00	2.93	3.24	3.21	1.34	2.05	2.48	—	2.37	1.36	0.20
1996	1.87	4.45	4.07	4.39	3.01	3.32	3.34	1.41	1.96	2.57	1.74	2.29	1.38	0.42
1997	1.87	4.04	3.65	4.06	—	3.01	3.83	1.42	—	2.53	1.76	2.45	—	—

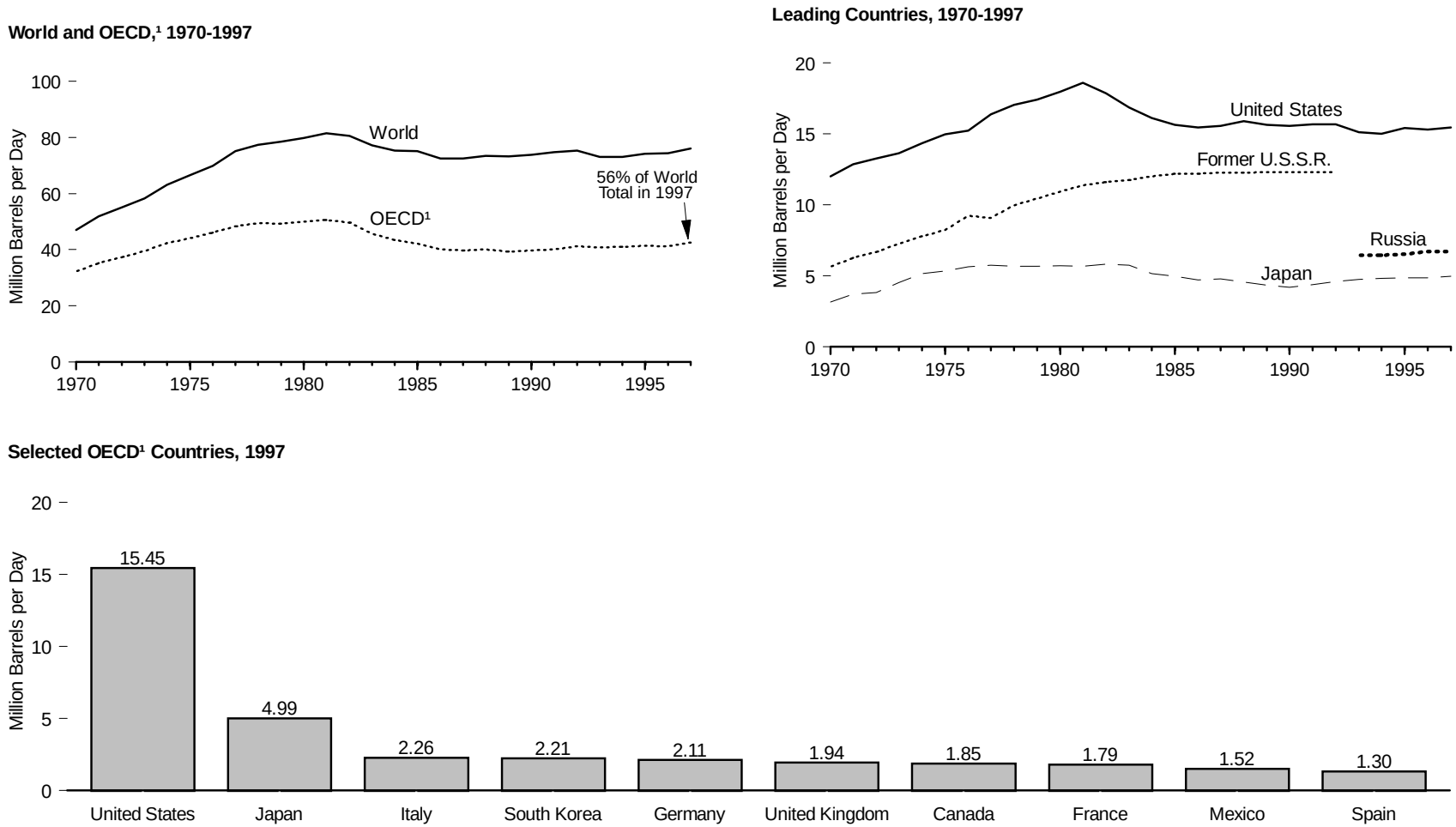
[1] Nominal dollars.
[2] Organization for Economic Cooperation and Development. See Glossary for membership.
[3] South Korea, which joined the OECD on December 12, 1996, is included in the OECD for all years shown in this table.
— = Not applicable.

Notes: • Prices for all countries, except the United States, have been converted from dollars per liter to dollars per gallon at 3.786 liters per gallon. Comparisons between prices and price trends in different countries require care. They are of limited validity because of fluctuations in exchange rates, differences in product quality, marketing practices, market structures, and the extent to which the standard categories of sales are representative of total national sales for a given period.

Web Page: http://www.eia.doe.gov/emeu/international/prices.html.

Sources: • **United States:** Table 5.22. • **All Other Data:** International Energy Agency, Organization for Economic Cooperation and Development, *Energy Prices and Taxes, Part II, Section D, and Part III, Section B,* various issues.

Figure 11.8 World Crude Oil Refining Capacity



[1] Organization for Economic Cooperation and Development. See Glossary for membership.

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

Source: Table 11.8.

Table 11.8 World Crude Oil Refining Capacity, 1970-1997

(Million Barrels per Day)

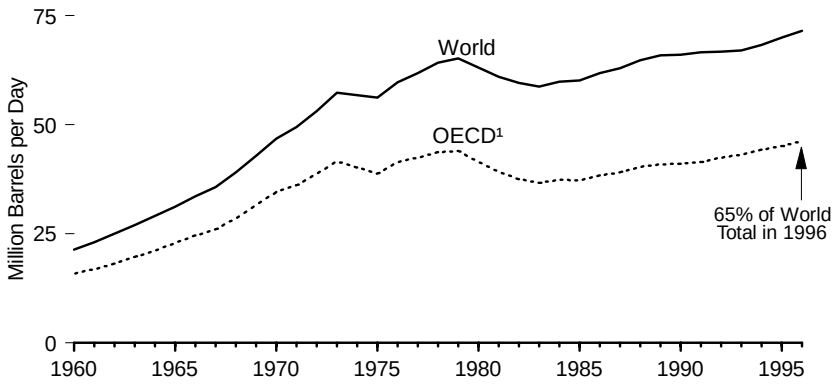
	Selected OECD [1] Countries											Selected Non-OECD Countries							
Year	Canada	France	Germany [2]	Italy	Japan	Mexico [3]	South Korea [3]	Spain	United Kingdom	United States	Total OECD [4]	Brazil	China	Former U.S.S.R.	Russia	Saudi Arabia	Ukraine	Total Non-OECD	World
1970	1.40	2.32	2.36	2.96	3.14	0.50	0.18	0.69	2.30	12.02	R32.18	0.50	0.30	5.64	—	0.38	—	R14.92	47.10
1971	1.45	2.53	2.54	3.24	3.70	0.57	0.25	0.85	2.39	12.86	R35.18	0.51	0.42	6.27	—	0.91	—	R16.73	51.91
1972	1.45	2.69	2.56	3.68	3.82	0.59	0.22	0.87	2.59	13.29	R37.22	0.56	0.48	6.68	—	0.51	—	R17.92	55.14
1973	1.73	2.95	2.70	3.59	4.53	0.63	0.43	1.03	2.47	13.64	R39.48	0.72	0.50	7.26	—	0.43	—	R18.72	58.20
1974	1.79	3.14	2.83	3.88	5.15	0.63	0.42	1.16	2.76	14.36	R42.41	0.79	0.60	7.81	—	0.43	—	R20.74	63.15
1975	1.88	3.34	2.99	3.95	5.35	0.76	0.43	1.17	2.78	14.96	R44.07	0.96	0.85	8.24	—	0.61	—	R22.45	66.52
1976	2.02	3.31	3.10	4.08	5.63	0.76	0.44	1.32	2.89	15.24	R46.16	0.99	1.01	9.23	—	0.54	—	R23.77	69.93
1977	2.10	3.52	3.08	4.26	5.76	0.94	0.42	1.28	3.01	16.40	R48.34	1.12	1.40	9.10	—	0.60	—	R26.77	75.11
1978	2.17	3.46	3.08	4.23	5.67	1.38	0.48	1.27	2.91	17.05	R49.37	1.16	1.46	9.98	—	0.59	—	R28.09	77.46
1979	2.23	3.47	3.10	4.20	5.68	1.24	0.54	1.43	2.53	17.44	R49.31	1.21	1.58	10.48	—	0.49	—	R29.27	78.58
1980	2.22	3.40	2.99	4.13	5.71	1.39	0.60	1.46	2.53	17.99	R50.07	1.21	1.60	10.95	—	0.49	—	R29.78	79.85
1981	2.17	3.34	3.02	4.09	5.66	1.39	0.61	1.46	2.63	18.62	R50.57	1.40	1.81	11.40	—	0.49	—	R30.99	81.56
1982	2.20	3.29	2.94	4.00	5.81	1.47	0.76	1.52	2.48	17.89	R49.70	1.41	1.81	11.60	—	0.49	—	R30.93	80.63
1983	2.02	2.87	2.47	3.28	5.73	1.29	0.76	1.52	2.26	16.86	R45.79	1.22	2.00	11.75	—	0.71	—	R31.42	77.21
1984	1.81	2.67	2.39	3.05	5.17	1.27	0.78	1.49	2.09	16.14	R43.41	1.30	2.05	12.00	—	0.86	—	R32.01	75.42
1985	1.87	2.39	2.17	3.10	4.97	1.27	0.78	1.49	2.01	15.66	R42.10	1.31	2.15	12.20	—	0.84	—	R33.02	75.12
1986	1.86	1.95	1.93	2.74	4.72	1.27	0.78	1.37	1.79	15.46	R40.00	1.31	2.15	12.20	—	1.12	—	R32.55	72.55
1987	1.76	1.83	1.72	2.68	4.79	1.35	0.86	1.31	1.78	15.57	R39.64	1.32	2.20	12.26	—	1.13	—	R32.93	72.57
1988	1.87	1.94	1.65	2.56	4.57	1.35	0.82	1.31	1.80	15.92	R40.03	1.41	2.20	12.26	—	1.38	—	R33.54	73.57
1989	1.86	1.88	1.52	2.45	4.36	1.35	0.88	1.29	1.80	15.65	R39.35	1.41	2.20	12.30	—	1.38	—	R33.99	73.34
1990	1.85	1.82	1.51	2.80	4.20	1.51	0.87	1.29	1.83	15.57	R39.66	1.40	2.20	12.30	—	1.48	—	R34.20	73.86
1991	1.88	1.82	2.07	2.39	4.38	1.68	0.87	1.32	1.87	15.68	R40.16	1.41	2.20	12.30	—	1.86	—	R34.60	74.76
1992	1.91	1.82	2.06	2.39	4.61	1.57	1.16	1.32	1.86	15.70	R41.17	1.41	2.20	12.30	—	1.86	—	R34.17	75.34
1993	1.87	1.85	2.23	2.42	4.74	1.52	1.15	1.30	1.84	15.12	R40.81	1.40	2.20	—	6.46	1.86	1.24	R32.29	73.10
1994	1.88	1.86	2.27	2.26	4.81	1.52	1.15	1.28	1.87	15.03	R40.97	1.25	2.20	—	6.46	1.61	1.24	R32.09	73.06
1995	1.91	1.77	2.32	2.26	4.85	1.52	1.17	1.28	1.87	15.43	R41.42	1.25	2.87	—	6.53	1.66	1.26	R32.83	74.25
1996	1.85	1.78	2.13	2.28	4.87	1.52	1.24	1.33	1.89	15.33	R41.23	1.26	2.87	—	6.72	1.66	1.26	R33.20	74.43
1997	1.85	1.79	2.11	2.26	4.99	1.52	2.21	1.30	1.94	15.45	42.46	1.26	2.87	—	6.73	1.66	1.25	33.63	76.09

[1] Organization for Economic Cooperation and Development. See Glossary for membership.
[2] Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.
[3] Mexico, which joined the OECD on May 18, 1994, and South Korea, which joined the OECD on December 12, 1996, are included in the OECD for all years shown in this table.
[4] Hungary and Poland, which joined the OECD on May 7, 1996, and November 22, 1996, respectively, are included in Total OECD beginning in 1992, the first year that data for these countries were available. The Czech Republic, which joined the OECD on December 21, 1995, is included in Total OECD beginning in 1994, the first year that data for the country were available.
R=Revised. — = Not applicable.

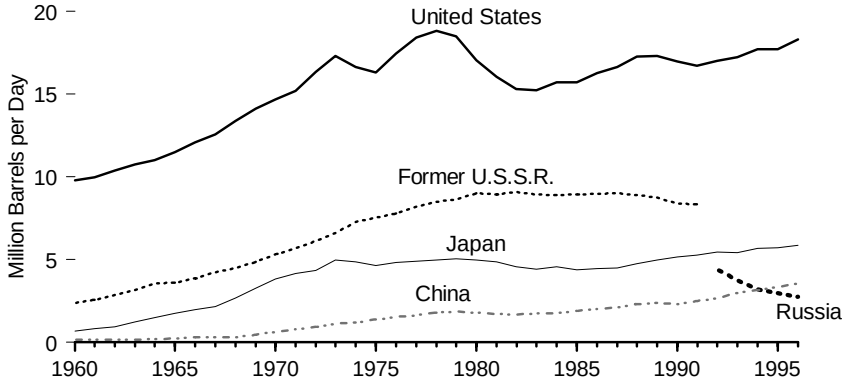
Notes: • Capacity for all years is as of January 1. • Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/emeu/international/petroleu.html.
Sources: **United States:** • 1970-1977—Bureau of Mines, Mineral Industry Surveys, *Petroleum Refineries, Annual.* • 1978-1981—Energy Information Administration (EIA), Energy Data Reports, *Petroleum Refineries in the United States and U.S. Territories.* • 1982 forward—EIA, *Petroleum Supply Annual.* **China and U.S.S.R.:** • 1970-1976—Ballinger Publishing Company, *The Energy Decade, 1970-1980, A Statistical and Graphic Chronicle.* • 1977-forward—PennWell Publishing Company, *Oil and Gas Journal.* **All Other Countries:** PennWell Publishing Company, *Oil and Gas Journal.*

Figure 11.9 World Petroleum Consumption

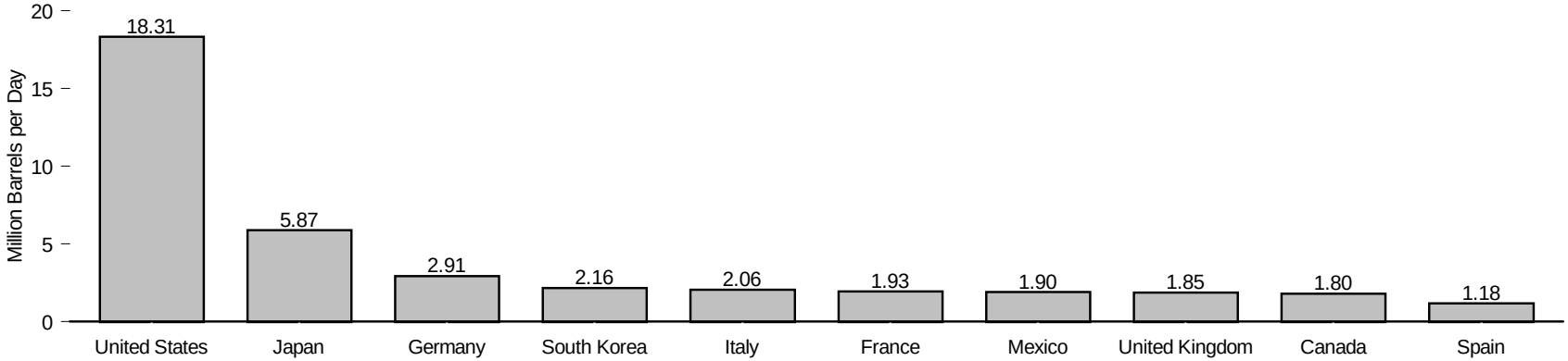
World and OECD,[1] 1960-1996



Leading Consumers, 1960-1996



Selected OECD[1] Consumers, 1996



[1] Organization for Economic Cooperation and Development. See Glossary for membership.

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

Source: Table 11.9.

Table 11.9 World Petroleum Consumption, 1960-1996

(Million Barrels per Day)

Year	Selected OECD [1] Consumers											Selected Non-OECD Consumers						World
	Canada	France	Germany [2]	Italy	Japan	Mexico [3]	South Korea [3]	Spain	United Kingdom	United States	Total OECD [4]	Brazil	China	India	Former U.S.S.R.	Russia	Total Non-OECD	
1960	0.84	0.56	0.63	0.44	0.66	0.30	0.01	0.10	0.94	9.80	R15.78	0.27	0.17	0.16	2.38	—	R5.56	21.34
1961	0.87	0.63	0.79	0.54	0.82	0.29	0.02	0.12	1.04	9.98	R16.77	0.28	0.17	0.17	2.57	—	R6.23	23.00
1962	0.92	0.73	1.00	0.67	0.93	0.30	0.02	0.12	1.12	10.40	R18.06	0.31	0.14	0.18	2.87	—	R6.83	24.89
1963	0.99	0.86	1.17	0.77	1.21	0.31	0.03	0.12	1.27	10.74	R19.60	0.34	0.17	0.21	3.15	—	R7.32	26.92
1964	1.05	0.98	1.36	0.90	1.48	0.33	0.02	0.20	1.36	11.02	R21.05	0.35	0.20	0.22	3.58	—	R8.03	29.08
1965	1.14	1.09	1.61	0.98	1.74	0.34	0.03	0.23	1.49	11.51	R22.81	0.33	0.23	0.25	3.61	—	R8.33	31.14
1966	1.21	1.19	1.80	1.08	1.98	0.36	0.04	0.31	1.58	12.08	R24.60	0.38	0.30	0.28	3.87	—	R8.96	33.56
1967	1.25	1.34	1.86	1.19	2.14	0.39	0.07	0.36	1.64	12.56	R25.94	0.38	0.28	0.26	4.22	—	R9.65	35.59
1968	1.34	1.46	1.99	1.40	2.66	0.41	0.10	0.46	1.82	13.39	R28.56	0.46	0.31	0.31	4.48	—	R10.40	38.96
1969	1.42	1.66	2.33	1.69	3.25	0.45	0.15	0.49	1.98	14.14	R31.54	0.48	0.44	0.34	4.87	—	R11.35	42.89
1970	1.52	1.94	2.83	1.71	3.82	0.50	0.20	0.58	2.10	14.70	R34.49	0.53	0.62	0.40	5.31	—	R12.32	46.81
1971	1.56	2.12	2.94	1.84	4.14	0.52	0.23	0.64	2.14	15.21	R36.07	0.58	0.79	0.42	5.66	—	R13.35	49.42
1972	1.66	2.32	3.13	1.95	4.36	0.59	0.23	0.68	2.28	16.37	R38.74	0.66	0.91	0.46	6.12	—	R14.35	53.09
1973	1.73	2.60	3.34	2.07	4.95	0.67	0.28	0.78	2.34	17.31	R41.53	0.78	1.12	0.49	6.60	—	R15.71	57.24
1974	1.78	2.45	3.06	2.00	4.86	0.71	0.29	0.86	2.21	16.65	R40.12	0.86	1.19	0.47	7.28	—	R16.56	56.68
1975	1.78	2.25	2.96	1.86	4.62	0.75	0.31	0.87	1.91	16.32	R38.82	0.92	1.36	0.50	7.52	—	R17.38	56.20
1976	1.82	2.42	3.21	1.97	4.84	0.83	0.36	0.97	1.89	17.46	R41.39	1.00	1.53	0.51	7.78	—	R18.28	59.67
1977	1.85	2.29	3.21	1.90	4.88	0.88	0.42	0.94	1.91	18.43	R42.43	1.02	1.64	0.55	8.18	—	R19.40	61.83
1978	1.90	2.41	3.29	1.95	4.95	0.99	0.48	0.98	1.94	18.85	R43.62	1.11	1.79	0.62	8.48	—	R20.54	64.16
1979	1.97	2.46	3.37	2.04	5.05	1.10	0.53	1.02	1.97	18.51	R44.01	1.18	1.84	0.66	8.64	—	R21.21	65.22
1980	1.87	2.26	3.08	1.93	4.96	1.27	0.54	0.99	1.73	17.06	R41.41	1.15	1.77	0.64	9.00	—	R21.66	63.07
1981	1.77	2.02	2.80	1.87	4.85	1.40	0.54	0.94	1.59	16.06	R39.14	1.09	1.71	0.73	8.94	—	R21.76	60.90
1982	1.58	1.88	2.74	1.78	4.58	1.48	0.53	1.00	1.59	15.30	R37.45	1.06	1.66	0.74	9.08	—	R22.05	59.50
1983	1.45	1.84	2.66	1.75	4.40	1.35	0.56	1.01	1.53	15.23	R36.59	0.98	1.73	0.77	8.95	—	R22.15	58.74
1984	1.47	1.75	2.66	1.65	4.58	1.45	0.59	0.91	1.85	15.73	R37.43	1.03	1.74	0.82	8.91	—	R22.41	59.84
1985	1.50	1.78	2.70	1.72	4.38	1.47	0.57	0.85	1.63	15.73	R37.23	1.08	1.89	0.90	8.95	—	R22.87	60.10
1986	1.51	1.77	2.86	1.74	4.44	1.49	0.61	0.88	1.65	16.28	R38.28	1.24	2.00	0.95	8.98	—	R23.48	61.76
1987	1.55	1.79	2.77	1.86	4.48	1.52	0.64	0.90	1.60	16.67	R38.96	1.26	2.12	0.99	9.00	—	R24.04	63.00
1988	1.69	1.80	2.74	1.84	4.75	1.55	0.73	0.98	1.70	17.28	R40.24	1.30	2.28	1.08	8.89	—	R24.58	64.82
1989	1.73	1.86	2.58	1.93	4.98	1.64	0.84	1.03	1.74	17.33	R40.88	1.32	2.38	1.15	8.74	—	R25.04	65.92
1990	1.69	1.82	2.66	1.87	5.14	1.68	1.03	1.01	1.75	16.99	R40.92	1.34	2.30	1.17	8.39	—	R25.07	65.99
1991	1.62	1.94	2.83	1.86	5.28	1.70	1.20	1.07	1.80	16.71	R41.40	1.35	2.50	1.19	8.35	—	R25.18	66.58
1992	1.64	1.93	2.84	1.94	5.45	1.72	1.46	1.11	1.80	17.03	R42.41	1.37	2.66	1.28	—	4.42	R24.33	66.74
1993	1.69	1.88	2.90	1.85	5.40	1.78	1.69	1.06	1.82	17.24	R43.05	1.40	2.96	1.31	—	3.75	R23.99	67.04
1994	1.73	1.83	2.88	1.84	5.67	1.82	1.86	1.13	1.84	17.72	R44.20	1.45	3.14	1.41	—	3.18	R24.11	68.31
1995	1.76	1.90	2.88	2.05	5.71	R1.86	R2.03	1.26	R1.84	17.72	R45.07	R1.49	R3.33	R1.57	—	R2.98	R24.86	R69.93
1996P	1.80	1.93	2.91	2.06	5.87	1.90	2.16	1.18	1.85	18.31	46.15	1.53	3.55	1.66	—	2.73	25.37	71.52

[1] Organization for Economic Cooperation and Development. See Glossary for membership.
[2] Through 1969, the data for Germany are for the former West Germany only. For 1970 through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.
[3] Mexico, which joined the OECD on May 18, 1994, and South Korea, which joined the OECD on December 12, 1996, are included in the OECD for all years shown in this table.
[4] Hungary and Poland, which joined the OECD on May 7, 1996, and November 22, 1996, respectively, are included in Total OECD beginning in 1970, the first year that data for these countries were available. The Czech Republic, which joined the OECD on December 21, 1995, is included in Total OECD beginning in 1993, the year that it came into existence.

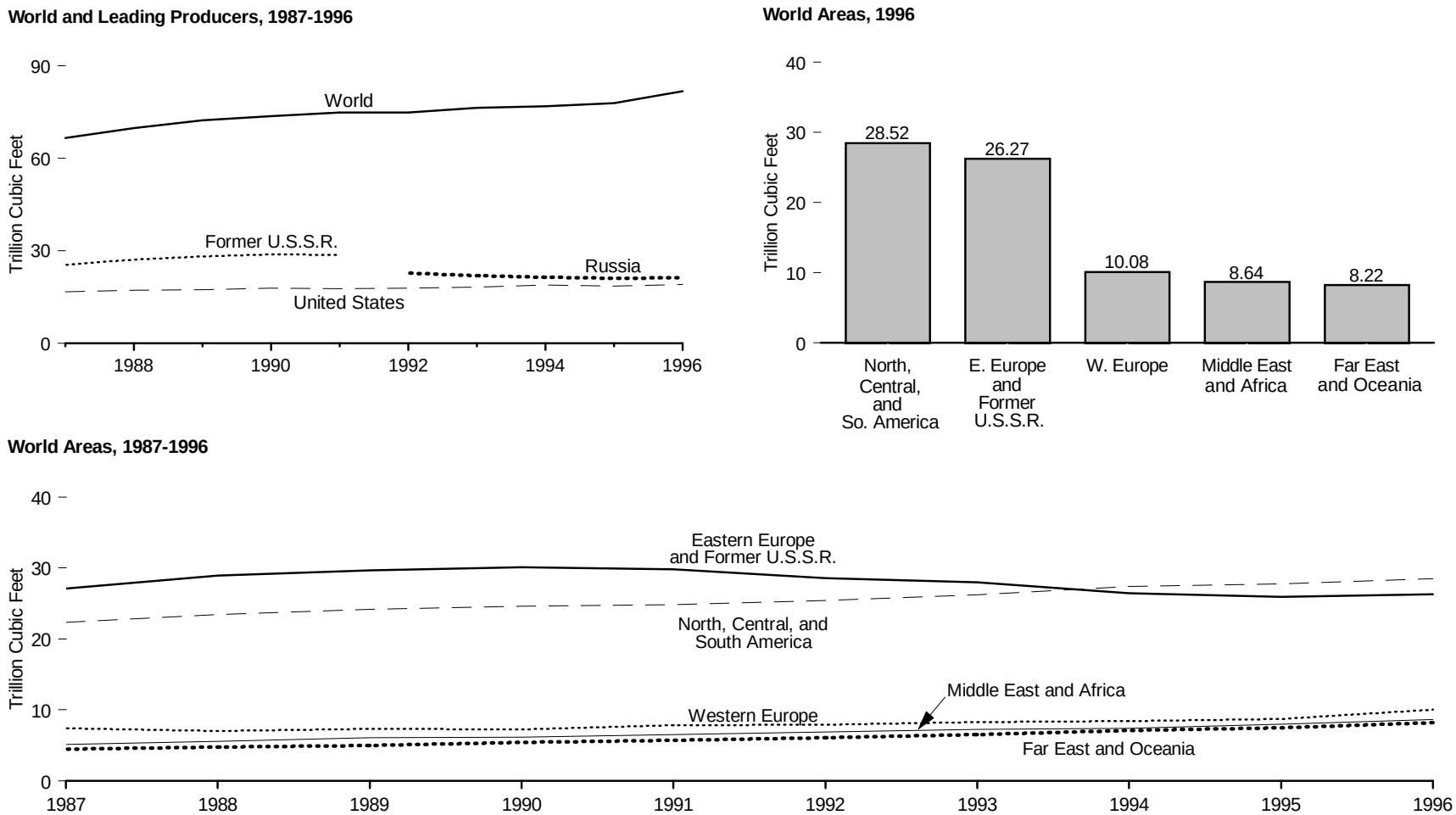
R=Revised. P=Preliminary. — = Not applicable.

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

Web Page: http://www.eia.doe.gov/emeu/international/reports.html.

Source: Energy Information Administration, *International Energy Annual 1996* (February 1998), Tables 1.1 and 1.2, and the International Energy Database, March 1998.

Figure 11.10 World Dry Natural Gas Production



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

Source: Table 11.10.

Table 11.10 World Dry Natural Gas Production, 1987-1996

(Trillion Cubic Feet)

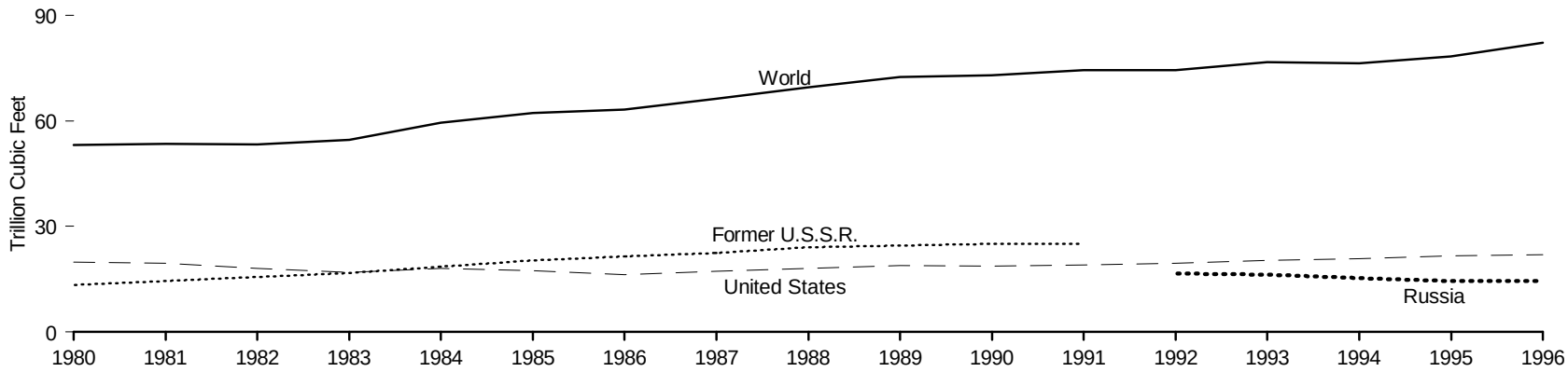
Region and Country	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996 P
North, Central, and South America	**22.33**	**23.47**	**24.16**	**24.62**	**24.84**	**25.42**	**26.20**	**27.44**	**R27.76**	**28.52**
Argentina	0.53	0.63	0.72	0.63	0.70	0.71	0.76	0.79	R0.88	1.02
Canada	3.10	3.57	3.80	3.85	4.06	4.52	4.91	5.26	R5.64	5.85
Mexico	0.86	0.92	0.93	0.94	0.94	0.92	0.90	0.91	0.94	0.99
United States	16.62	17.10	17.31	17.81	17.70	17.84	18.10	18.82	18.60	18.79
Venezuela	0.66	0.66	0.77	0.76	0.79	0.76	0.82	0.88	R0.89	0.96
Other	0.56	0.58	0.64	0.62	0.65	0.66	0.73	0.78	R0.81	0.91
Western Europe	**7.44**	**7.07**	**7.32**	**7.24**	**7.83**	**7.89**	**8.32**	**8.40**	**R8.75**	**10.08**
Germany [1]	0.92	0.90	0.86	0.72	0.67	0.68	0.68	0.67	R0.71	0.78
Italy	0.58	0.59	0.60	0.61	0.61	0.64	0.69	0.73	R0.72	0.71
Netherlands	2.77	2.45	2.67	2.69	3.04	3.06	3.11	2.95	R2.97	3.37
Norway	1.06	1.05	1.09	0.98	0.97	1.04	0.97	1.04	R1.08	1.45
United Kingdom	1.68	1.62	1.58	1.75	2.01	1.93	2.31	2.47	R2.67	3.17
Other	0.44	0.47	0.51	0.50	0.53	0.54	0.56	0.54	R0.60	0.60
Eastern Europe and Former U.S.S.R.	**27.14**	**28.95**	**29.70**	**30.13**	**29.85**	**28.58**	**27.99**	**26.47**	**R25.93**	**26.27**
Romania	1.32	1.28	1.13	1.00	0.88	0.78	0.75	0.69	0.68	0.63
Former U.S.S.R.	25.36	27.19	28.11	28.78	28.62	—	—	—	—	—
Russia	—	—	—	—	—	22.62	21.81	21.45	21.01	21.23
Turkmenistan	—	—	—	—	—	2.02	2.29	1.26	1.14	1.31
Ukraine	—	—	—	—	—	0.74	0.68	0.64	0.62	0.64
Uzbekistan	—	—	—	—	—	1.51	1.59	1.67	1.70	1.70
Other	0.47	0.48	0.46	0.35	0.35	0.91	0.87	0.76	0.78	0.76
Middle East and Africa	**5.13**	**5.55**	**6.08**	**6.17**	**6.52**	**6.91**	**7.24**	**7.41**	**R8.00**	**8.64**
Algeria	1.52	1.63	1.71	1.79	1.93	1.97	1.90	1.81	2.05	2.19
Egypt	0.22	0.24	0.27	0.29	0.32	0.35	0.40	0.42	0.44	0.47
Iran	0.57	0.71	0.78	0.84	0.92	0.88	0.96	1.12	R1.25	1.38
Qatar	0.20	0.21	0.22	0.28	0.33	0.40	0.48	0.48	0.48	0.48
Saudi Arabia	0.95	1.03	1.05	1.08	1.13	1.20	1.27	1.33	R1.34	1.46
United Arab Emirates	0.68	0.66	0.81	0.78	0.92	1.02	0.94	0.91	R1.11	1.28
Other	1.00	1.07	1.24	1.13	0.98	1.08	1.30	1.34	R1.33	1.38
Far East and Oceania	**4.50**	**4.78**	**4.98**	**5.44**	**5.76**	**6.07**	**6.55**	**7.09**	**R7.49**	**8.22**
Australia	0.53	0.56	0.57	0.72	0.75	0.82	0.86	0.92	R1.03	1.06
China	0.49	0.49	0.51	0.51	0.53	0.53	0.56	0.59	0.60	0.67
India	0.23	0.31	0.32	0.40	0.45	0.48	0.53	0.59	R0.63	0.70
Indonesia	1.29	1.34	1.42	1.53	1.72	1.79	1.97	2.21	R2.24	2.38
Malaysia	0.55	0.58	0.61	0.65	0.75	0.80	0.88	0.92	R1.02	1.30
Pakistan	0.42	0.44	0.47	0.48	0.53	0.55	0.58	0.63	R0.65	0.70
Other	0.98	1.06	1.09	1.15	1.03	1.10	1.16	1.23	R1.32	1.41
World	**66.54**	**69.81**	**72.25**	**73.61**	**74.81**	**74.87**	**76.30**	**76.80**	**R77.92**	**81.73**

[1] Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.
R=Revised. P=Preliminary. — = Not applicable.
Note: Totals may not equal sum of components due to independent rounding and the inclusion of more recent U.S. data from an alternative source.

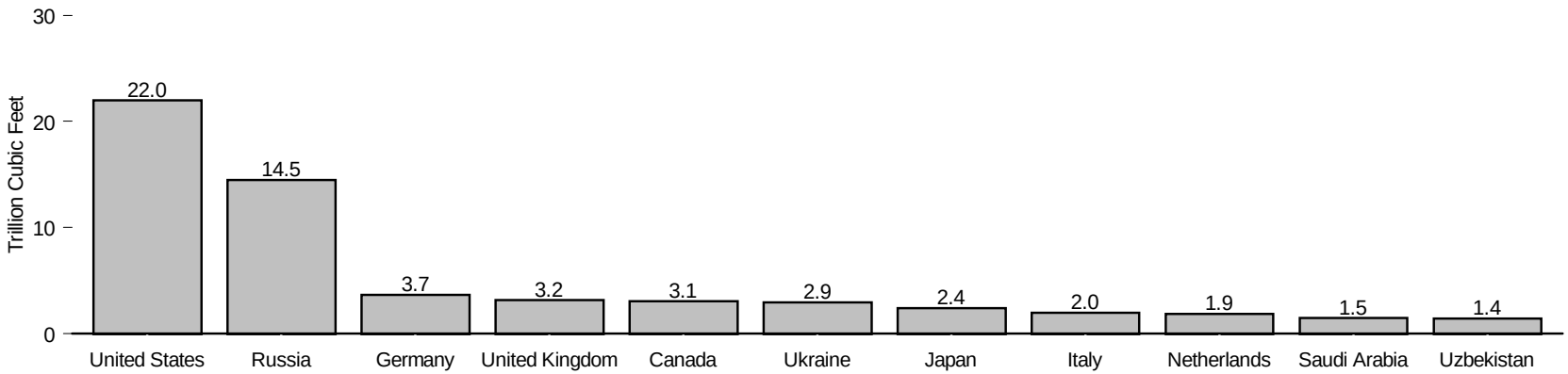
Web Page: http://www.eia.doe.gov/emeu/international/reports.html.
Sources: **United States:** Table 6.1. **All Other Data:** Energy Information Administration, *International Energy Annual 1996* (February 1998), Table 2.4, and the International Energy Database, March 1998.

Figure 11.11 World Dry Natural Gas Consumption

World and Leading Consumers, 1980-1996



Top Consuming Countries, 1996



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

Source: Table 11.11.

Table 11.11 World Dry Natural Gas Consumption, 1980-1996

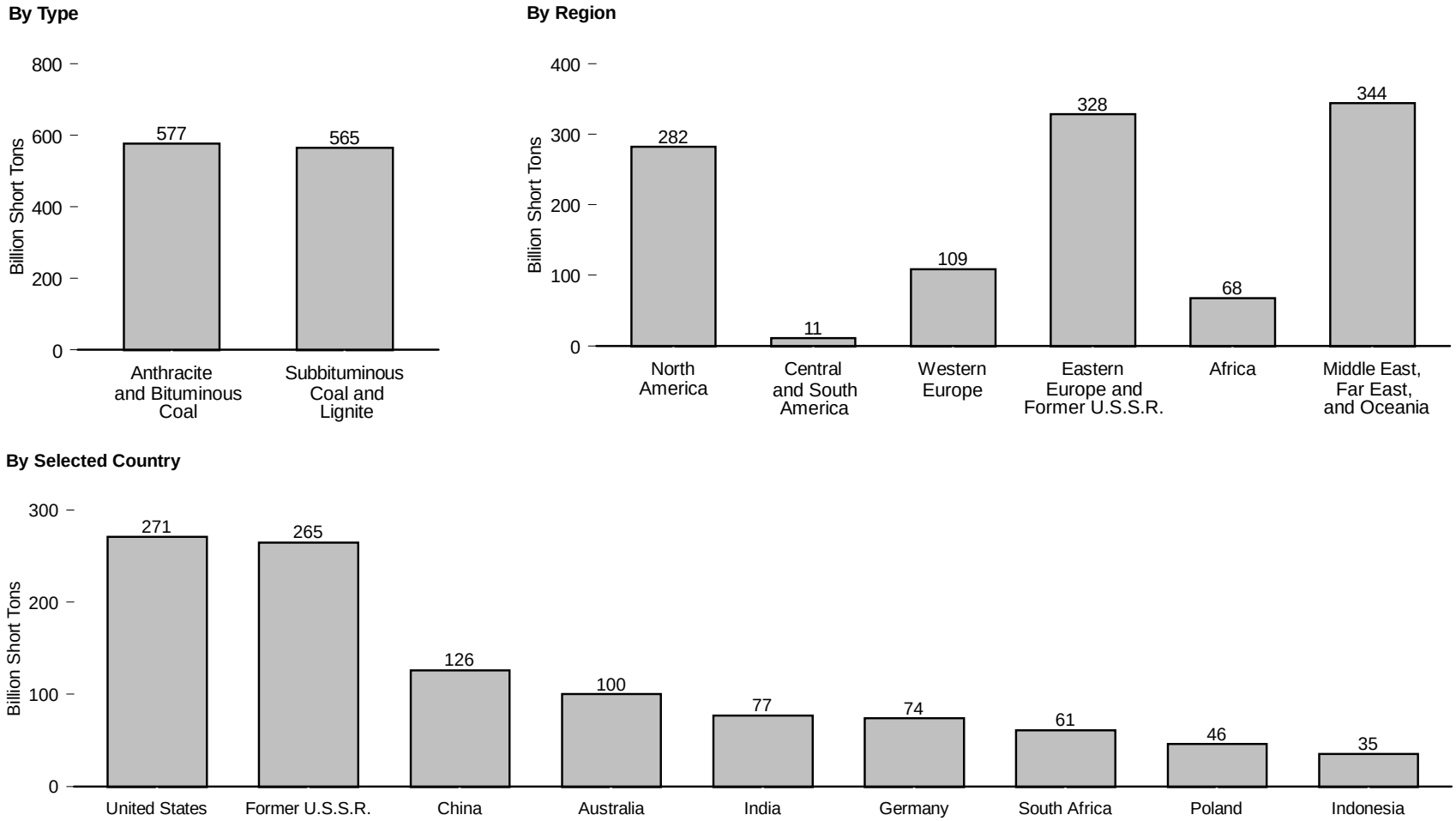
(Billion Cubic Feet)

Year	Canada	France	Germany [1]	Indonesia	Iran	Italy	Japan	Nether-lands	Former U.S.S.R.	Russia	Saudi Arabia	Ukraine	United Kingdom	United States	Uzbek-istan	Other	World
1980	1,883	1,006	2,621	195	232	973	903	1,493	13,328	—	334	—	1,702	19,877	—	8,521	53,068
1981	1,708	996	2,513	232	155	983	886	1,421	14,440	—	564	—	1,671	19,404	—	8,502	53,475
1982	1,664	913	2,334	218	200	989	919	1,511	15,522	—	430	—	1,570	18,001	—	9,048	53,319
1983	1,807	1,049	2,397	302	310	1,009	1,008	1,371	16,822	—	418	—	1,774	16,835	—	9,590	54,692
1984	1,855	1,029	2,584	365	476	1,171	1,367	1,395	18,512	—	620	—	1,900	17,951	—	10,235	59,460
1985	2,165	1,120	2,546	513	600	1,156	1,468	1,613	20,302	—	716	—	1,991	17,281	—	10,770	62,240
1986	2,131	1,127	2,595	441	536	1,238	1,494	1,620	21,522	—	890	—	2,020	16,221	—	11,358	63,192
1987	2,112	1,057	2,733	542	565	1,371	1,543	1,672	22,462	—	946	—	2,079	17,211	—	11,989	66,283
1988	2,331	961	2,716	492	706	1,460	1,618	1,513	24,092	—	1,028	—	1,972	18,030	—	12,655	69,573
1989	2,498	991	2,835	546	784	1,578	1,731	1,550	24,529	—	1,052	—	1,951	18,801	—	13,672	72,518
1990	2,378	1,022	2,669	547	837	1,672	1,851	1,538	24,961	—	1,077	—	2,059	18,716	—	13,634	72,961
1991	2,400	1,143	2,883	557	811	1,773	1,976	1,715	25,014	—	1,130	—	2,218	19,035	—	13,868	74,523
1992	2,596	1,139	2,858	673	883	1,757	2,023	1,669	—	16,482	1,201	3,503	2,127	19,544	1,095	16,893	74,443
1993	2,713	1,173	3,042	850	938	1,801	1,949	1,696	—	16,185	1,268	3,871	2,440	20,279	1,541	16,941	76,686
1994	2,823	1,134	3,088	965	1,123	1,748	2,180	1,648	—	15,214	1,331	3,327	2,542	20,708	1,229	17,305	76,365
1995	[R]2,867	[R]1,183	[R]3,364	[R]1,061	[R]1,243	[R]1,921	[R]2,207	[R]1,694	—	14,507	[R]1,343	[R]2,970	[R]2,690	21,581	1,349	[R]18,310	[R]78,290
1996[P]	3,065	1,325	3,666	1,137	1,374	1,981	2,390	1,862	—	14,504	1,459	2,935	3,185	21,967	1,434	19,920	82,204

[1] Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.
R=Revised. P=Preliminary. — = Not applicable.
Note: Totals may not equal sum of components due to independent rounding and the inclusion of more recent U.S. data from an alternative source.

Web Page: http://www.eia.doe.gov/emeu/international/reports.html.
Sources: **United States:** Table 6.1. **All Other Data:** Energy Information Administration, *International Energy Annual 1996* (February 1998), Table 1.3, and the International Energy Database, March 1998.

Figure 11.12 World Recoverable Reserves of Coal



Notes: • Recoverable reserves are as of December 31, 1993, except for U.S. recoverable reserves, which are as of January 1, 1997. • Because vertical scales differ, graphs should not be compared.

Source: Table 11.12.

Table 11.12 World Recoverable Reserves of Coal

(Million Short Tons)

Region and Country	Anthracite and Bituminous Coal	Subbituminous Coal and Lignite	Total
North America	R **128,110**	R **153,832**	R **281,942**
Canada	4,970	4,535	9,505
Greenland	0	202	202
Mexico	948	387	1,335
United States [1]	R 122,192	R 148,708	R 270,901
Central and South America	**6,227**	**5,013**	**11,240**
Brazil	0	3,136	3,136
Chile	34	1,268	1,302
Colombia	4,674	330	5,003
Peru	1,058	110	1,168
Other	461	170	631
Western Europe	**30,544**	**78,281**	**108,825**
Germany	26,455	47,730	74,186
Greece	0	3,307	3,307
Spain	937	661	1,598
Turkey	179	7,701	7,879
United Kingdom	2,205	551	2,756
Former Yugoslavia	70	18,152	18,222
Other	698	179	877
Eastern Europe and Former U.S.S.R.	**149,200**	**179,232**	**328,431**
Albania	0	(s)	(s)
Bulgaria	14	2,974	2,988
Czech Republic	1,810	3,858	5,668
Hungary	657	4,260	4,917
Poland	32,077	14,330	46,407
Romania	1	3,436	3,437
Slovakia	0	251	251
Former U.S.S.R.	114,640	150,122	264,762
Africa	**66,585**	**1,397**	**67,982**
Botswana	3,858	0	3,858
South Africa	60,994	0	60,994
Swaziland	128	1,101	1,229
Zimbabwe	809	0	809
Other	796	295	1,091
Middle East, Far East, and Oceania	**196,630**	**146,941**	**343,571**
Australia	49,979	50,265	100,244
China	68,564	57,651	126,215
India	75,009	2,094	77,103
Indonesia	1,060	34,283	35,343
Japan	886	19	905
Pakistan	0	809	809
Thailand	(s)	1,101	1,101
Other	1,132	719	1,850
World	R **577,296**	R **564,696**	R **1,141,992**

[1] U.S. data are more current than other data on this table. They represent recoverable reserves as of January 1, 1997; data for the other countries are as of December 31, 1993, the most recent period for which they are available. U.S. reserves represent both measured and indicated tonnage. The U.S. term "measured" approximates the term "proved," which is used by the World Energy Council. The U.S. "measured and indicated" data have been combined prior to depletion adjustments and cannot be recaptured as "measured alone."

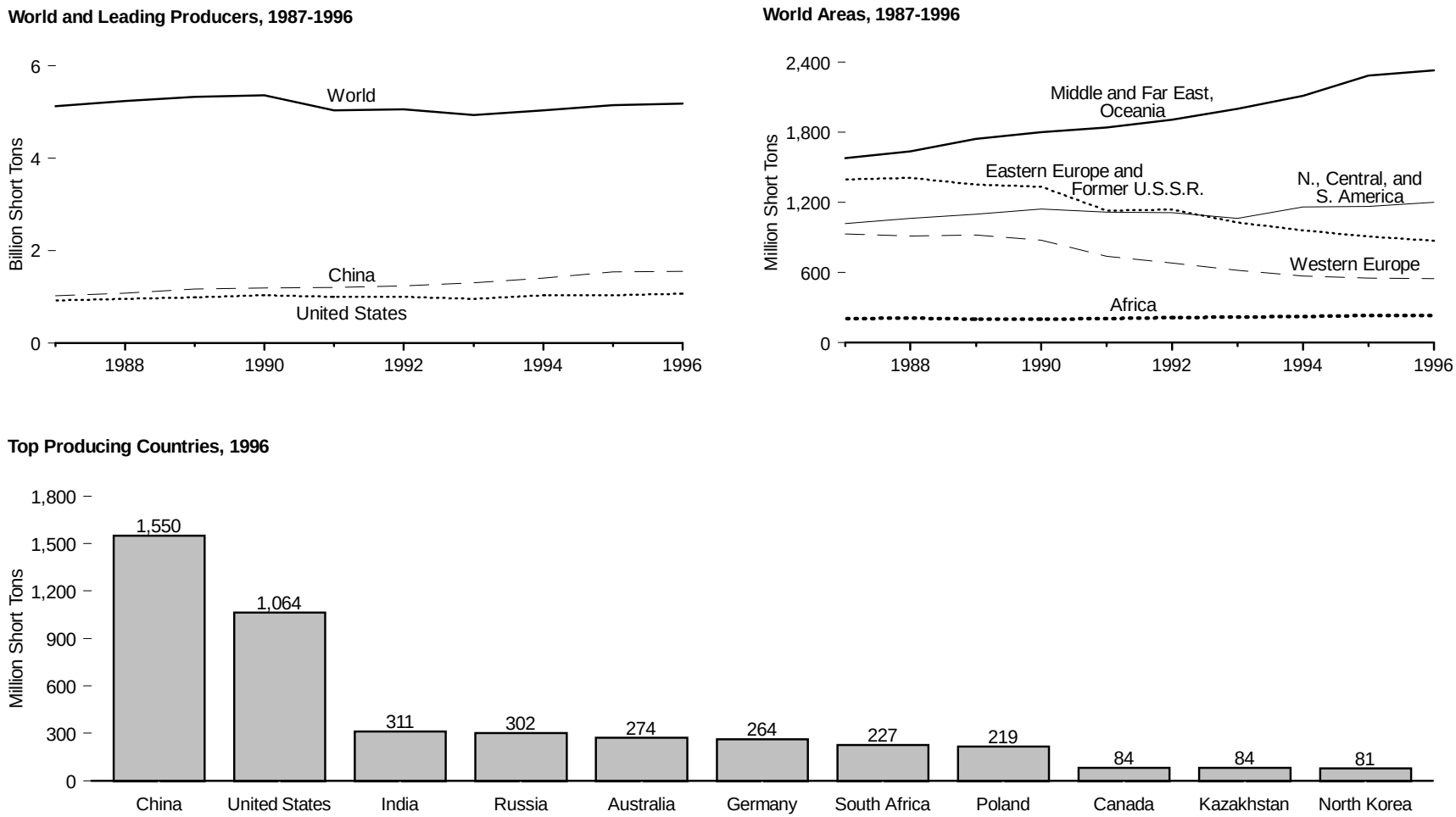
R=Revised. (s)=Less than 500 thousand short tons.

Notes: • World Energy Council definition of "Proved Recoverable Reserves" is the tonnage of Proved Amount in Place that can be recovered (extracted from the earth in raw form) under present and expected local economic conditions with existing technology. • The EIA does not certify the international reserves data but reproduces the information as a matter of convenience for the reader. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/emeu/international/reports.html.

Sources: **United States:** Energy Information Administration, Unpublished File Data of the Coal Reserves Database, (December 1997). **All Other Data:** World Energy Council, *1995 Survey of Energy Resources.* World Energy Conference (1995).

Figure 11.13 World Coal Production



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

Source: Table 11.13.

Table 11.13 World Coal Production, 1987-1996

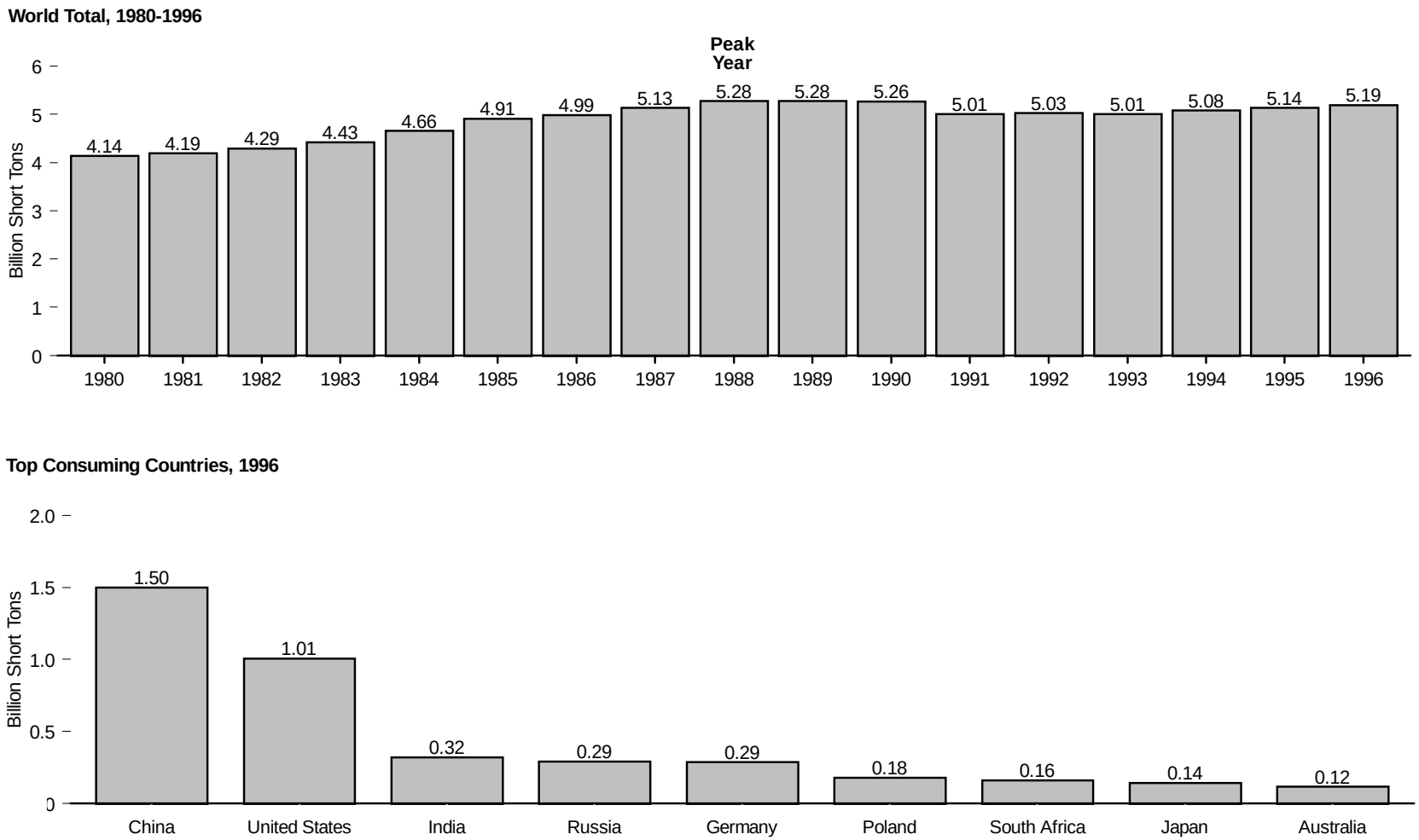
(Million Short Tons)

Region and Country	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996 P
North, Central, and South America	**R1,020**	**1,065**	**1,100**	**1,144**	**1,118**	**R1,114**	**R1,064**	**R1,160**	**R1,165**	**1,201**
Canada	67	78	78	75	78	72	76	80	83	84
Colombia	R15	17	R20	23	26	26	R24	R25	29	33
Mexico	9	8	8	7	6	7	R8	10	10	10
United States	919	950	981	1,029	996	998	945	1,034	1,033	1,064
Other	10	12	13	10	11	R11	11	12	R11	10
Western Europe	**929**	**912**	**921**	**875**	**R740**	**R680**	**R616**	**R571**	**R550**	**547**
France	20	16	16	15	14	13	12	R10	R9	10
Germany[1]	554	552	541	514	388	346	315	292	274	264
Greece	49	53	57	57	58	61	60	63	64	66
Serbia and Montenegro	—	—	—	—	—	—	41	R40	44	43
Spain	47	45	48	40	37	37	35	33	31	33
Turkey	52	43	58	52	51	57	54	60	R61	62
United Kingdom	115	115	111	106	107	95	76	54	52	56
Former Yugoslavia	79	80	82	84	78	0	—	—	—	0
Other	12	8	7	7	6	R25	R23	R20	R15	14
Eastern Europe and Former U.S.S.R.	**1,397**	**1,411**	**1,354**	**1,335**	**1,129**	**1,137**	**R1,030**	**962**	**R907**	**874**
Bulgaria	41	38	38	35	31	33	32	32	31	32
Czech Republic	—	—	—	—	—	—	—	82	79	77
Estonia	—	—	—	—	—	—	16	16	15	12
Hungary	25	23	22	19	19	17	16	16	15	17
Kazakhstan	—	—	—	—	—	—	R124	115	92	84
Poland	293	294	275	237	231	219	219	221	R221	219
Romania	57	65	69	42	36	42	43	45	44	45
Former U.S.S.R.	838	851	816	882	702	0	—	—	—	—
Russia	—	—	—	—	—	—	364	320	310	302
Ukraine	—	—	—	—	—	—	128	104	R92	77
Other	143	141	134	120	110	112	12	R11	8	8
Africa	**203**	**208**	**202**	**201**	**205**	**R212**	**R216**	**225**	**R232**	**233**
South Africa	195	200	194	193	196	R203	R207	216	227	227
Other	8	8	8	8	9	9	8	9	R5	5
Middle East, Far East, and Oceania	**1,582**	**1,639**	**1,747**	**1,801**	**R1,841**	**R1,910**	**R2,003**	**R2,114**	**R2,289**	**2,331**
Australia	209	196	216	226	236	249	248	R248	R267	274
China	1,023	1,080	1,162	1,190	1,199	R1,229	R1,304	R1,404	R1,537	1,550
India	209	215	221	233	253	R270	R281	R291	R301	311
Indonesia	4	5	9	12	15	R25	R32	R33	R45	53
Japan	15	14	13	11	10	9	8	8	7	7
Mongolia	9	10	10	10	9	8	8	8	8	9
North Korea	62	66	69	71	73	74	78	78	78	81
South Korea	27	27	23	19	17	13	10	8	6	5
Thailand	8	8	10	14	16	17	17	19	R20	21
Other	17	18	14	15	R14	16	R17	R17	R19	19
World	**R5,130**	**5,235**	**5,324**	**5,356**	**5,033**	**R5,052**	**R4,930**	**R5,033**	**R5,144**	**5,185**

[1] Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.
R=Revised. P=Preliminary. — = Not applicable.
Notes: • Coal includes anthracite, subanthracite, bituminous coal, subbituminous coal, lignite, and brown coal. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/emeu/international/reports.html.
Source: Energy Information Administration, *International Energy Annual 1996* (February 1998), Table 2.5, and the International Energy Database, May 1998.

Figure 11.14 World Coal Consumption



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

Source: Table 11.14.

Table 11.14 World Coal Consumption, 1980-1996

(Million Short Tons)

Year	Australia	China	Germany [1]	Greece	India	Japan	North Korea	Poland	Former U.S.S.R.	Russia	South Africa	Turkey	Ukraine	United Kingdom	United States	Other	World
1980	74	679	R535	26	130	98	51	221	751	—	105	20	—	134	703	R612	R4,138
1981	75	680	544	30	139	106	51	200	R748	—	116	23	—	130	733	R617	R4,193
1982	80	726	548	31	147	105	53	208	771	—	124	26	—	122	707	R648	R4,294
1983	78	768	549	36	161	100	56	213	764	—	127	29	—	123	737	R683	R4,425
1984	81	R845	573	36	180	113	61	227	770	—	137	35	—	88	791	R728	R4,664
1985	86	921	R579	42	194	119	62	238	779	—	142	46	—	116	818	R767	R4,909
1986	84	962	576	44	208	109	63	247	803	—	145	R54	—	123	804	R765	R4,988
1987	93	1,027	565	49	206	111	65	258	807	—	148	54	—	129	837	R783	R5,132
1988	96	1,098	562	56	215	123	69	253	821	—	151	R51	—	123	884	R781	R5,282
1989	104	1,113	553	59	226	123	72	242	777	—	140	60	—	126	890	R794	R5,280
1990	R105	1,124	528	59	242	R125	74	202	848	—	139	R60	—	R121	895	R739	R5,262
1991	R108	1,165	R406	R59	252	R128	75	202	672	—	144	64	—	120	888	R723	R5,005
1992	114	R1,199	R359	R62	R274	R126	76	192	—	400	R149	65	R154	112	R908	R840	R5,031
1993	R109	R1,276	R335	R62	R286	R129	80	194	—	361	R153	R60	132	97	944	R793	R5,012
1994	R110	R1,390	R314	R66	R303	R133	80	185	—	323	R160	R66	R107	R91	951	R803	R5,083
1995	R113	R1,489	R298	R65	R312	140	R80	R183	—	R303	R162	67	R95	R79	962	R794	R5,141
1996P	117	1,500	290	66	321	144	83	179	—	289	165	72	80	81	1,006	797	5,190

[1] Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.

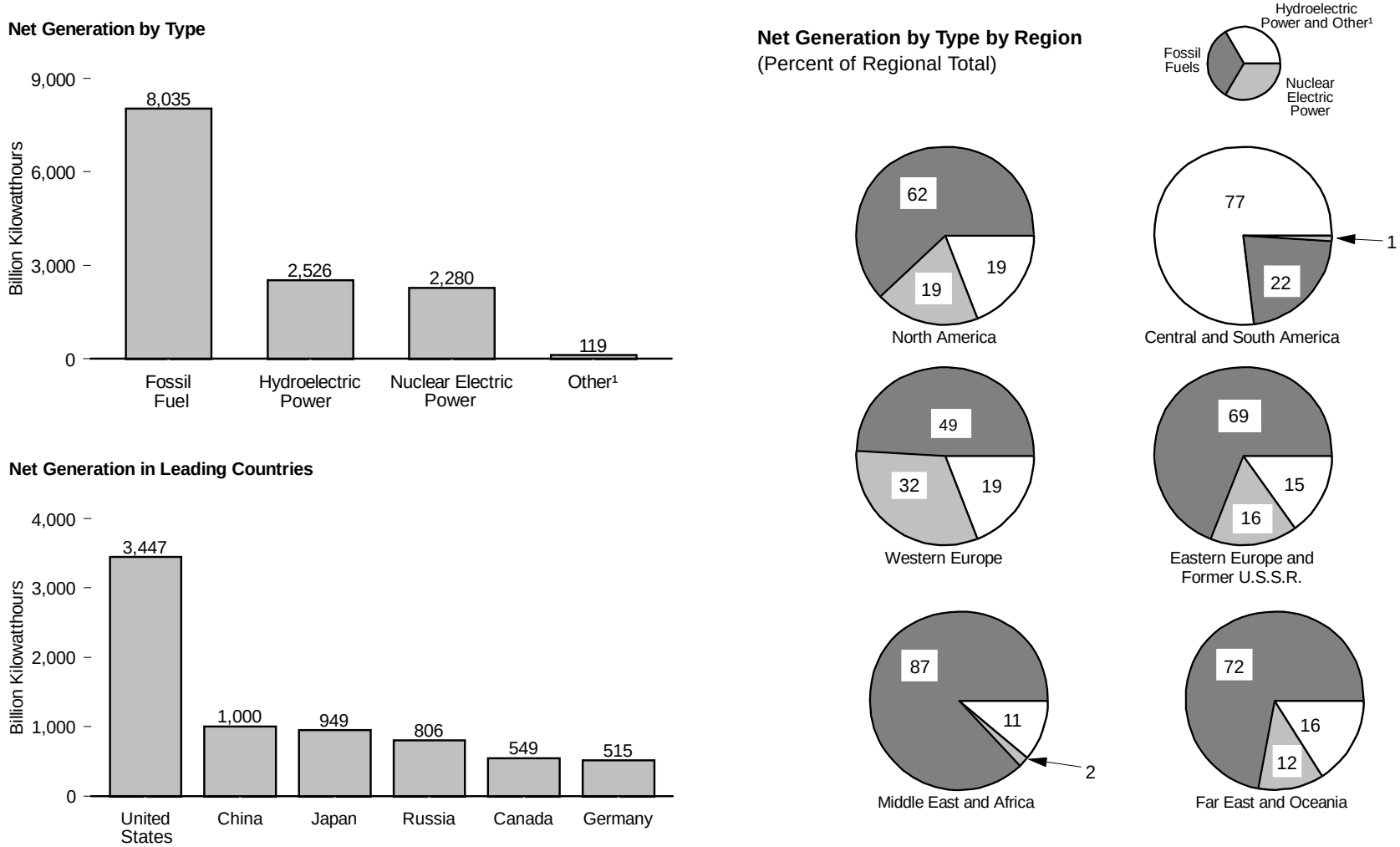
R=Revised. P=Preliminary. — = Not applicable.

Notes: • Totals may not equal sum of components due to independent rounding and the inclusion of more recent U.S. data from an alternative source.

Web Page: http://www.eia.doe.gov/emeu/international/reports.html.

Sources: **United States:** Table 7.1. **All Other Data:** Energy Information Administration, *International Energy Annual 1996* (February 1998), Table 1.4, and the International Energy Database, May 1998.

Figure 11.15 World Net Generation of Electricity, 1996



¹ Geothermal, biofuels, wind, photovoltaic, solar thermal generation, hydrogen, sulfur, batteries, and chemicals.
Notes: • Data include both electric utility and non-electric utility sources.

• Because vertical scales differ, graphs should not be compared.
Source: Table 11.15.

Table 11.15 World Net Generation of Electricity by Type, 1994-1996

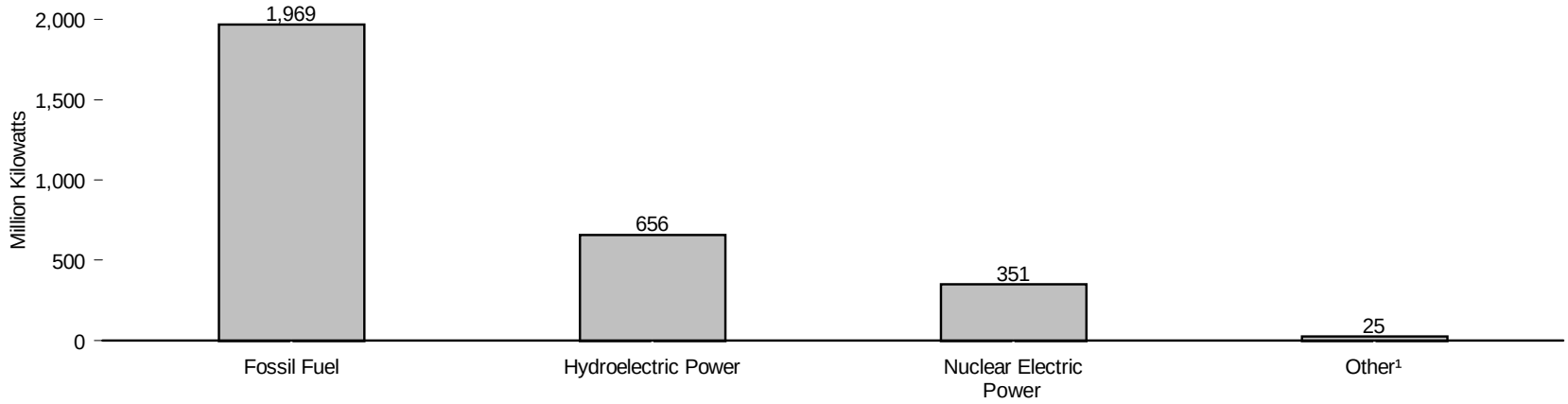
(Billion Kilowatthours)

Region and Country	Fossil Fuel			Nuclear Electric Power			Hydroelectric Power [1]			Total [2]		
	1994	1995	1996 P	1994	1995	1996 P	1994	1995	1996 P	1994	1995	1996 P
North America	R **2,497.6**	**2,515.0**	**2,570.5**	R **747.0**	**774.4**	**770.3**	R **601.4**	**666.2**	**724.7**	R **3,932.6**	**4,039.7**	**4,151.4**
Canada	111.1	112.5	111.7	R 102.4	93.0	88.1	324.7	330.7	349.2	R 538.4	536.2	549.2
Mexico	110.5	104.2	110.3	4.0	8.0	7.5	19.8	27.3	31.1	R 139.7	144.9	154.4
United States	R 2,275.2	2,297.5	2,347.7	640.5	673.4	674.7	R 256.8	308.3	344.4	R 3,253.8	3,357.8	3,447.1
Other	0.8	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.8
Central and South America	**134.5**	**139.3**	**144.9**	**7.9**	**9.5**	**9.2**	R **453.2**	**479.5**	**505.6**	R **604.0**	**637.0**	**669.1**
Argentina	28.7	28.9	29.1	7.8	7.1	6.9	R 33.3	33.4	28.6	R 69.8	69.4	64.7
Brazil	R 9.1	10.6	12.5	0.1	2.4	2.3	R 240.3	251.4	263.1	R 256.6	271.8	285.7
Colombia	R 10.4	10.4	10.4	0.0	0.0	0.0	32.0	33.9	43.4	R 42.4	44.3	53.7
Venezuela	20.4	18.1	15.0	0.0	0.0	0.0	50.9	55.0	58.0	71.3	73.2	73.0
Other	R 65.9	71.2	78.0	0.0	0.0	0.0	R 96.8	105.8	112.5	R 164.0	178.4	192.0
Western Europe	R **1,170.8**	**1,218.2**	**1,245.2**	**771.9**	**789.9**	**828.0**	R **497.2**	**501.0**	**483.5**	R **2,448.1**	**2,518.3**	**2,566.4**
Austria	15.4	16.9	18.1	0.0	0.0	0.0	35.3	36.7	34.1	R 50.7	53.6	52.2
Finland	32.3	29.8	36.9	18.5	18.3	18.8	11.7	12.8	11.7	R 62.5	60.9	67.5
France	R 33.2	37.8	41.9	342.0	358.4	376.2	76.5	70.6	62.1	R 452.2	467.3	480.8
Germany	331.9	334.9	341.1	143.6	146.4	153.5	18.3	19.6	18.0	R 495.7	503.2	515.1
Italy	169.5	184.0	181.4	0.0	0.0	0.0	44.2	37.4	41.4	R 217.3	225.0	226.7
Netherlands	70.8	71.8	75.4	3.8	3.8	4.0	0.1	0.1	0.1	74.9	76.0	79.8
Norway	0.6	0.7	0.8	0.0	0.0	0.0	R 110.4	120.1	102.6	R 111.0	120.8	103.4
Spain	R 72.5	81.6	70.6	52.5	52.7	53.5	27.9	22.9	39.1	R 153.2	157.4	163.5
Sweden	9.7	9.4	13.2	69.5	66.4	71.1	R 58.5	66.3	50.7	R 137.8	142.2	135.2
Switzerland	R 2.0	2.1	2.2	23.1	23.7	23.7	R 38.7	34.8	28.9	R 63.8	60.6	54.8
Turkey	44.8	47.6	51.1	0.0	0.0	0.0	30.3	35.2	40.0	R 75.2	82.9	91.2
United Kingdom	R 216.4	224.0	223.8	76.0	76.6	81.5	5.0	5.2	4.0	R 297.7	306.1	309.7
Other	R 171.4	177.7	188.7	42.9	43.8	45.5	R 40.3	39.3	50.9	R 256.0	262.3	286.8
Eastern Europe and Former U.S.S.R.	R **1,124.9**	**1,113.6**	**1,091.3**	**217.7**	**224.3**	**249.8**	R **272.4**	**270.5**	**247.8**	R **1,615.0**	**1,608.4**	**1,589.1**
Czech Republic	41.3	43.6	46.2	12.3	11.6	12.2	R 1.4	2.0	1.8	R 55.1	57.2	60.2
Kazakhstan	53.8	54.8	50.0	0.4	0.1	0.1	9.1	8.2	7.5	63.2	63.2	57.6
Poland	123.7	127.0	130.8	0.0	0.0	0.0	3.7	3.8	3.9	127.4	130.8	134.7
Romania	39.6	40.0	42.7	0.0	0.0	0.9	12.9	16.5	15.6	R 52.5	56.5	59.2
Russia	R 583.7	569.6	549.0	92.9	94.3	103.3	R 174.2	174.5	153.1	R 850.9	838.5	805.6
Ukraine	R 120.3	120.6	115.0	65.4	67.0	76.0	R 12.2	10.1	9.5	R 197.8	197.6	200.5
Other	R 162.5	158.0	157.6	46.8	51.2	57.3	R 58.8	55.4	56.4	R 268.1	264.6	271.3
Middle East	R **292.5**	**301.6**	**307.8**	**0.0**	**0.0**	**0.0**	R **15.7**	**15.7**	**15.9**	R **308.1**	**317.3**	**323.7**
Iran	67.4	69.4	72.0	0.0	0.0	0.0	7.4	7.5	7.5	74.8	76.8	79.5
Saudi Arabia	R 91.0	93.9	95.0	0.0	0.0	0.0	R 0.0	0.0	0.0	R 91.0	93.9	95.0
Other	R 134.1	138.3	140.8	0.0	0.0	0.0	R 8.3	8.2	8.4	R 142.3	146.5	149.2
Africa	R **270.7**	**276.5**	**286.8**	**9.7**	**11.3**	**11.8**	R **56.4**	**56.4**	**57.7**	R **337.0**	**344.6**	**356.7**
Egypt	R 36.4	35.8	35.0	0.0	0.0	0.0	R 10.6	10.7	11.0	R 47.1	46.5	46.0
South Africa	R 160.0	164.4	173.9	9.7	11.3	11.8	1.1	0.5	1.3	R 170.7	176.3	186.9
Other	R 74.3	76.3	78.0	0.0	0.0	0.0	R 44.6	45.1	45.4	R 119.2	121.8	123.7
Far East and Oceania	R **2,171.0**	**2,283.2**	**2,388.7**	R **363.6**	**393.6**	**410.9**	R **449.3**	**494.7**	**491.0**	R **2,995.7**	**3,184.6**	**3,304.2**
Australia	R 142.1	148.0	151.9	0.0	0.0	0.0	R 16.2	15.7	14.7	R 158.3	163.8	166.7
China	R 701.2	756.1	805.3	13.5	12.4	13.6	R 165.1	184.9	181.3	R 879.8	953.4	1,000.2
India	R 290.4	315.7	325.0	4.7	6.5	7.4	70.4	70.9	72.0	R 365.5	393.2	404.5
Indonesia	R 48.5	53.2	55.0	0.0	0.0	0.0	R 11.1	10.3	10.0	R 61.1	65.2	66.8
Japan	580.4	568.0	583.1	255.7	276.7	283.0	66.6	81.4	79.0	R 904.7	929.1	948.6
South Korea	96.1	105.4	118.8	55.7	63.7	70.2	4.1	5.4	5.1	155.9	174.5	194.2
Taiwan	76.6	84.2	89.6	R 33.5	33.9	36.3	8.8	8.8	8.9	R 118.8	126.9	134.9
Thailand	65.7	72.3	75.0	0.0	0.0	0.0	4.5	6.6	7.0	70.2	79.0	82.0
Other	R 170.0	180.3	184.9	0.6	0.5	0.3	R 102.7	110.5	112.9	R 281.5	299.6	306.5
World	R **7,661.8**	**7,847.4**	**8,035.2**	**2,117.8**	**2,203.0**	**2,280.0**	R **2,345.5**	**2,484.0**	**2,526.2**	**12,240.6**	**12,649.9**	**12,960.7**

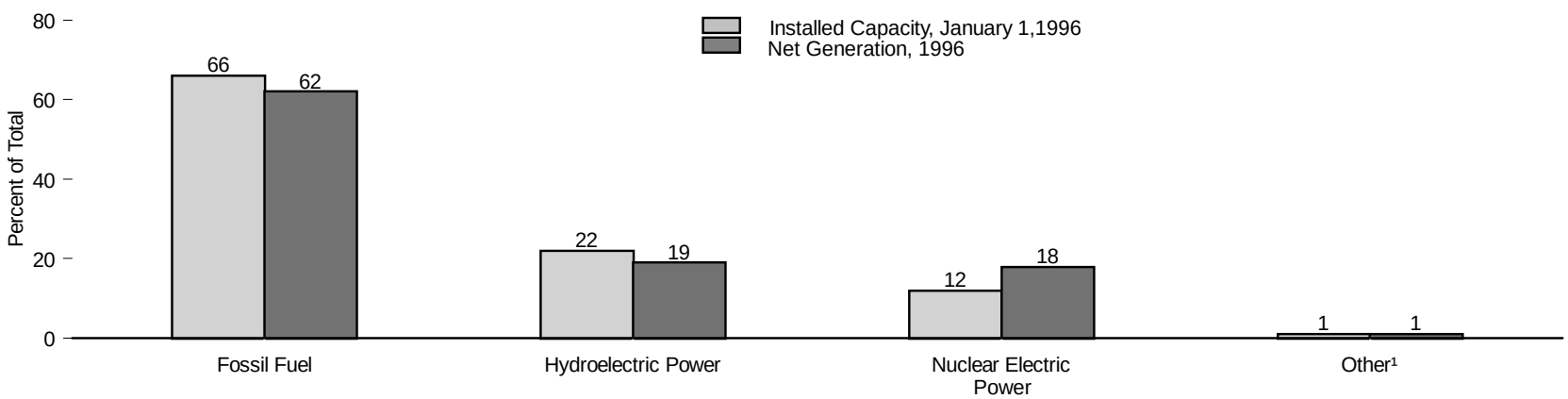
[1] Excludes pumped storage, except for the United States.
[2] Geothermal, biofuels, wind, photovoltaic, solar thermal generation, hydrogen, sulfur, batteries, and chemicals are included in total.
R=Revised. P=Preliminary.
Notes: • Data include both electric utility and non-electric utility sources. • Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/emeu/international/electric.html.
Source: **United States:** Table 8.2 in this report. **All Other Data:** Energy Information Administration, *International Energy Annual 1996* (February 1998), Table 6.3, and the International Energy Database, March 1998.

Figure 11.16 World Electrical Installed Capacity by Type, January 1, 1996

By Type



Comparison of Installed Capacity and Net Generation Shares by Type



[1]Geothermal, biofuels, wind, photovoltaic, solar thermal capacity, hydrogen, sulfur, batteries, and chemicals.

Note: Data include both electric utility and non-electric utility sources.
Sources: Tables 11.15 and 11.16.

Table 11.16 World Electrical Installed Capacity by Type, 1994-1996

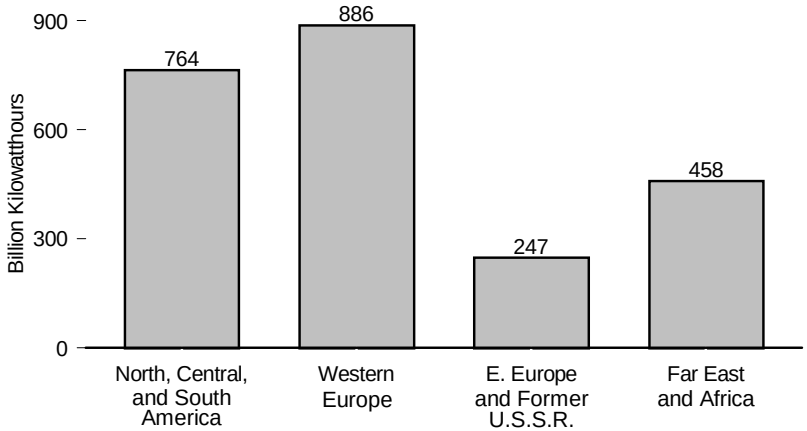
(Million Kilowatts)

Region and Country	Fossil Fuel			Nuclear Electric Power			Hydroelectric Power [1]			Total [2]		
	1994	1995	1996 P	1994	1995	1996 P	1994	1995	1996 P	1994	1995	1996 P
North America	**595.9**	R **607.9**	**613.3**	**115.2**	**116.8**	**117.2**	**168.0**	R **171.4**	**173.9**	**895.5**	R **913.0**	**921.0**
Canada	31.6	34.2	34.3	15.5	16.4	16.4	61.2	63.0	64.6	108.3	113.6	115.3
Mexico	22.4	R 23.9	24.5	0.7	1.3	1.3	8.2	R 9.1	9.3	32.0	R 35.1	35.9
United States	541.6	549.5	554.2	99.1	99.1	99.5	98.6	R 99.3	99.9	755.0	764.0	769.5
Other	(s)	(s)	(s)	0.0	0.0	0.0	0.0	0.0	0.0	(s)	(s)	(s)
Central and South America	**47.0**	R **48.8**	**50.0**	**1.7**	**1.7**	**1.7**	**92.3**	**95.1**	**96.6**	**143.3**	R **147.9**	**150.6**
Argentina	10.0	10.6	10.6	1.0	1.0	1.0	7.0	8.0	8.0	18.0	19.6	19.6
Brazil	4.9	4.9	4.9	0.7	0.7	0.7	48.6	49.9	51.3	56.2	57.6	59.0
Colombia	2.6	2.8	2.8	0.0	0.0	0.0	7.7	8.0	8.0	10.4	10.8	10.8
Venezuela	8.8	R 9.0	9.3	0.0	0.0	0.0	10.7	10.7	10.7	19.5	19.7	20.0
Other	20.7	R 21.5	22.4	0.0	0.0	0.0	18.3	18.5	18.6	39.2	R 40.2	41.2
Western Europe	**320.0**	R **322.2**	**328.3**	**122.6**	R **122.4**	**123.4**	**141.2**	R **143.3**	**143.9**	**585.5**	R **590.8**	**599.7**
Austria	6.1	6.2	6.1	0.0	0.0	0.0	11.2	11.2	11.3	17.3	17.4	17.4
Finland	9.0	9.1	9.3	2.4	2.4	2.3	2.7	2.7	2.8	14.1	14.1	14.4
France	23.5	23.5	23.9	59.0	58.5	58.5	20.6	20.7	20.7	103.4	102.9	103.3
Germany	82.8	82.6	83.4	22.7	22.7	22.8	3.0	4.2	4.3	108.6	R 110.6	112.4
Italy	43.3	43.8	45.5	0.0	0.0	0.0	12.8	12.9	13.0	56.6	R 57.3	59.0
Netherlands	16.9	17.6	18.2	0.5	0.5	0.5	0.0	R 0.0	0.0	17.6	18.3	19.0
Norway	(s)	(s)	(s)	0.0	0.0	0.0	26.0	R 26.2	26.3	26.3	R 26.5	26.6
Spain	20.4	R 21.1	22.0	7.0	7.0	7.1	11.5	11.5	11.7	39.0	R 39.7	40.9
Sweden	8.5	R 7.9	7.3	10.0	R 10.0	10.1	15.9	R 16.1	15.7	34.4	R 34.0	33.2
Switzerland	0.9	R 0.9	1.1	3.0	3.1	3.1	10.4	10.4	10.4	14.3	14.3	14.6
Turkey	10.6	11.0	11.1	0.0	0.0	0.0	9.7	9.9	9.9	20.3	20.9	21.0
United Kingdom	52.9	R 52.7	53.1	11.9	12.0	12.8	1.4	R 1.4	1.4	66.3	R 66.2	67.4
Other	45.2	R 45.9	47.3	6.1	6.2	6.3	15.9	15.9	16.3	67.5	68.4	70.4
Eastern Europe and Former U.S.S.R.	**311.6**	R **312.6**	**308.9**	**45.3**	R **45.9**	**47.4**	**79.0**	R **80.0**	**80.2**	**435.9**	R **438.6**	**436.4**
Czech Republic	11.1	10.7	10.6	1.8	1.8	1.8	0.9	R 0.9	0.9	13.7	R 13.4	13.3
Kazakhstan	16.3	R 16.8	16.8	(s)	(s)	(s)	2.2	2.1	2.1	18.6	R 19.0	19.0
Poland	27.1	27.6	27.4	0.0	0.0	0.0	2.0	2.0	2.0	29.1	29.6	29.5
Romania	16.4	16.1	16.3	0.0	0.0	0.7	5.9	5.9	6.0	22.3	22.1	22.9
Russia	148.7	149.7	145.8	21.2	21.2	21.2	43.4	43.8	43.8	213.4	214.7	210.9
Ukraine	36.7	36.7	36.7	12.8	12.8	12.8	4.7	4.7	4.7	54.3	R 54.2	54.2
Other	55.3	R 55.1	55.2	9.5	R 10.1	10.9	19.8	R 20.5	20.6	84.4	85.6	86.7
Middle East	**73.9**	R **80.1**	**81.3**	**0.0**	**0.0**	**0.0**	**4.0**	**4.0**	**4.6**	**77.9**	R **84.2**	**85.9**
Iran	20.7	23.2	23.8	0.0	0.0	0.0	2.0	2.0	2.5	22.7	25.1	26.3
Saudi Arabia	20.6	R 21.0	20.9	0.0	0.0	0.0	0.0	0.0	0.0	20.6	R 21.0	20.9
Other	32.5	R 36.0	36.6	0.0	0.0	0.0	2.1	2.1	2.1	34.6	R 38.1	38.7
Africa	**69.6**	R **69.4**	**69.8**	**1.8**	R **1.8**	**1.8**	**20.4**	R **20.7**	**20.7**	**91.9**	R **92.0**	**92.4**
Egypt	12.9	R 13.1	13.3	0.0	0.0	0.0	2.7	2.7	2.7	15.6	R 15.9	16.0
South Africa	33.9	32.1	32.1	1.8	R 1.8	1.8	0.6	0.6	0.6	36.2	R 34.5	34.6
Other	22.9	R 24.2	24.3	0.0	0.0	0.0	17.1	R 17.4	17.4	40.1	R 41.6	41.8
Far East and Oceania	**466.7**	R **490.0**	**517.4**	**54.6**	**57.5**	**59.4**	**127.4**	R **131.4**	**136.0**	**650.6**	R **681.1**	**715.1**
Australia	29.1	R 30.6	31.5	0.0	0.0	0.0	7.0	R 7.1	7.1	36.1	R 37.7	38.6
China	137.1	142.0	154.0	1.2	2.1	2.1	44.6	46.0	48.0	182.9	190.1	204.1
India	65.0	68.6	70.4	2.0	2.0	2.0	20.4	20.9	21.3	87.5	91.6	93.8
Indonesia	12.5	R 14.7	16.6	0.0	0.0	0.0	3.3	R 3.3	3.4	15.9	R 18.3	20.3
Japan	134.1	R 138.0	141.7	38.5	40.5	41.4	21.0	21.1	21.2	194.0	R 200.0	204.7
South Korea	17.5	R 18.6	20.5	7.6	7.6	8.6	2.5	2.5	3.1	27.7	R 28.8	32.2
Taiwan	13.9	R 14.6	15.1	5.1	5.1	5.1	2.6	R 3.7	4.2	21.7	R 23.4	24.4
Thailand	11.5	R 12.5	14.8	0.0	0.0	0.0	2.5	2.6	2.7	13.9	R 15.1	17.5
Other	45.9	R 50.4	52.9	(s)	(s)	(s)	23.5	R 24.3	25.1	71.0	R 76.2	79.5
World	**1,884.7**	R **1,931.1**	**1,969.0**	**341.2**	R **346.2**	**350.9**	**632.3**	R **645.9**	**655.8**	**2,880.7**	R **2,947.7**	**3,001.1**

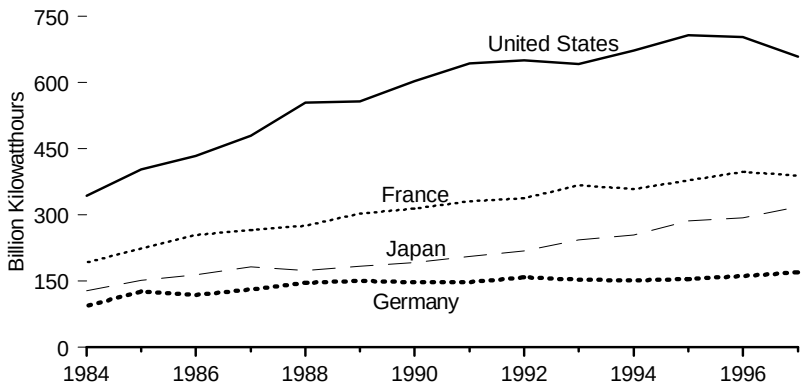
[1] Excludes pumped storage, except for the United States.
[2] Geothermal, biofuels, wind, photovoltaic, solar thermal capacity, hydrogen, sulfur, batteries, and chemicals are included in total.
R=Revised. P=Preliminary. (s)=Less than 0.5 million kilowatts.
Notes: • Capacity for all years is as of January 1. • Data include both electric utility and nonutility sources. • Totals may not equal sum of components due to independent rounding.
Web Page: http://www.eia.doe.gov/emeu/international/electric.html.
Sources: **United States:** Table 8.5 in this report. **All Other Data:** Energy Information Administration, *International Energy Annual 1996,* (February 1998), Table 6.4, and the International Energy Database, March 1998.

Figure 11.17 World Nuclear Electricity Gross Generation

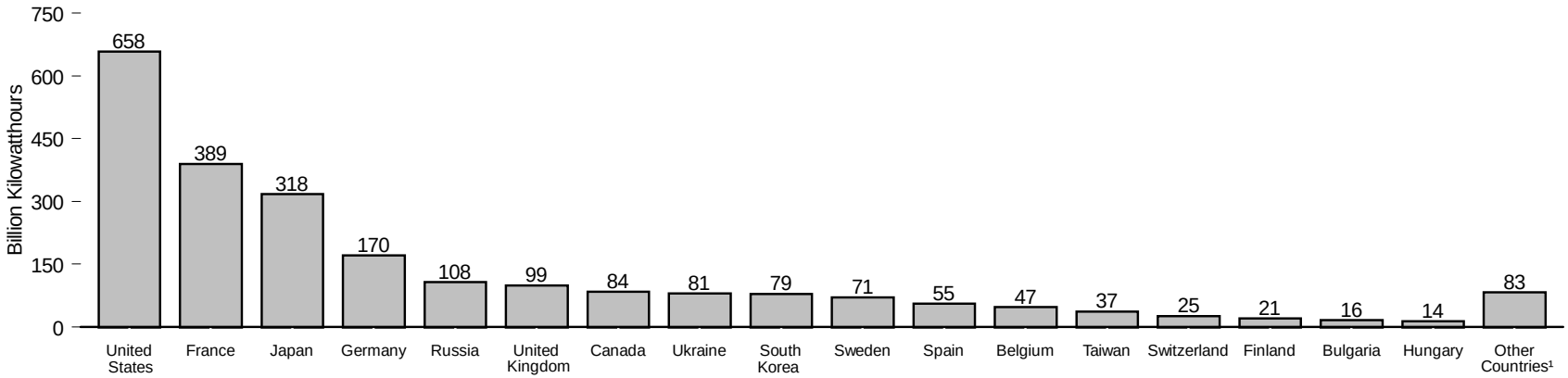
By Region, 1997



By Major Producers, 1984-1997



By Country, 1997



[1] "Other countries" are Argentina, Armenia, Brazil, China, Czech Republic, India, Kazakhstan, Lithuania, Mexico, Netherlands, Pakistan, Romania, South Africa, Slovakia, and Slovenia.

Note: Because vertical scales differ, graphs should not be compared.
Source: Table 11.17.

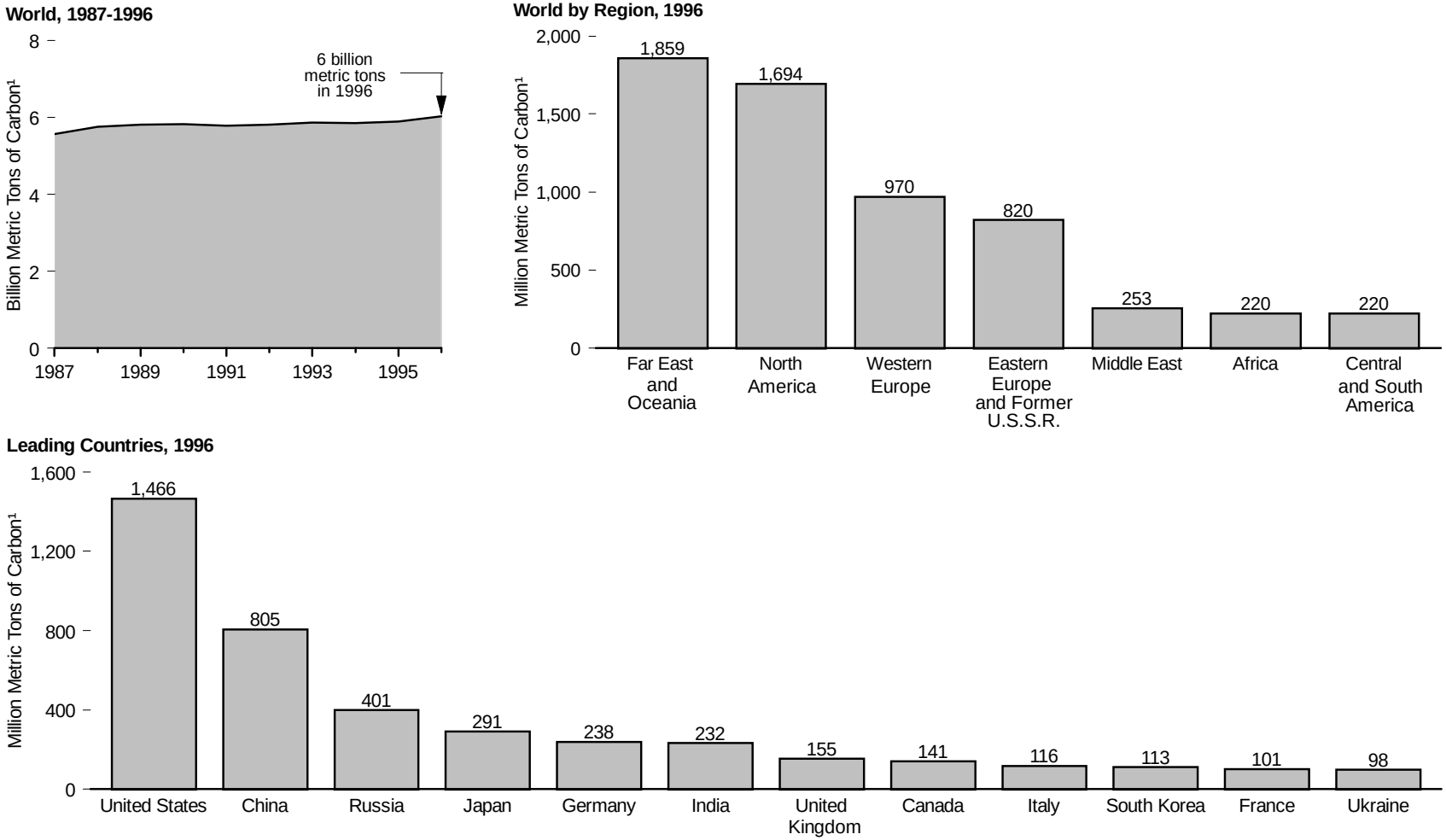
Table 11.17 World Nuclear Electricity Gross Generation, 1984-1997

(Billion Kilowatthours)

Region and Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
North, Central, and South America	**404.1**	**474.8**	**514.6**	**566.3**	**645.2**	**646.9**	**690.7**	**742.6**	**744.0**	**752.7**	**795.5**	**[E]825.6**	**[E]816.3**	**[E]763.9**
Argentina	4.5	5.8	5.7	5.2	5.1	5.0	7.4	7.7	7.1	7.7	8.2	7.1	7.4	8.0
Brazil	2.1	3.4	0.1	1.0	0.3	1.6	2.0	1.4	1.8	0.4	0.0	2.5	2.4	3.2
Canada	53.8	62.9	74.6	80.6	85.6	83.2	75.8	86.1	81.3	97.6	110.7	100.4	95.2	84.1
Mexico	—	—	—	—	—	—	2.1	4.2	3.9	4.9	4.2	7.9	7.9	10.4
United States [1]	343.8	402.7	434.1	479.5	554.1	557.0	603.4	643.0	650.0	642.0	672.4	[E]707.7	[E]703.3	[E]658.3
Western Europe	**485.4**	**582.8**	**631.5**	**648.3**	**688.1**	**[R]732.2**	**738.6**	**769.7**	**787.8**	**820.9**	**820.2**	**[E]835.7**	**[E]879.5**	**[E]886.5**
Belgium	27.7	34.5	38.6	41.9	43.1	41.2	42.7	42.9	43.5	41.9	40.6	41.4	43.3	47.4
Finland	18.5	18.8	18.8	19.4	19.3	18.8	18.9	19.2	19.0	19.6	19.1	18.9	19.5	20.9
France	191.2	224.0	254.3	265.5	274.9	302.5	314.1	331.4	337.6	366.7	359.1	377.6	397.0	[E]389.3
Germany [2]	92.6	125.8	118.9	130.2	145.2	[R]149.6	147.2	147.3	158.8	153.5	151.1	154.3	161.7	170.4
Italy [3]	6.9	7.0	8.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Netherlands	3.8	3.9	4.2	3.6	3.7	4.0	3.4	3.3	3.8	3.9	4.0	4.0	4.2	[E]3.1
Slovenia	NA	NA	NA	NA	NA	NA	NA	NA	[E]4.0	4.0	4.6	4.8	[E]4.6	5.4
Spain	23.1	28.0	37.5	[R]41.2	50.4	56.1	54.3	55.6	55.8	56.1	55.1	54.5	59.1	55.4
Sweden	51.3	58.6	69.9	67.2	69.4	65.6	68.2	76.8	63.5	61.4	72.8	69.9	76.2	[E]70.6
Switzerland	16.3	22.4	22.5	23.0	22.7	22.8	23.6	22.9	23.4	23.3	24.2	24.8	25.0	25.3
United Kingdom	54.1	59.7	58.2	56.2	59.4	71.6	66.1	70.4	78.5	90.4	89.5	[E]85.5	[E]88.8	[E]98.8
Eastern Europe [4] and Former U.S.S.R.	NA	NA	NA	NA	NA	NA	NA	NA	**[E]267.5**	**[E]259.0**	**[E]227.8**	**[E]234.9**	**[E]261.6**	**[E]246.8**
Armenia	—	—	—	—	—	—	—	—	—	—	—	NA	NA	1.4
Bulgaria	NA	NA	NA	NA	NA	NA	NA	NA	[E]12.2	14.0	14.9	17.2	18.7	[E]15.5
Czech Republic	—	NA	NA	NA	NA	NA	NA	NA	[E]12.9	[E]13.2	[E]12.7	[E]12.8	[E]13.5	NA
Hungary	NA	NA	NA	NA	NA	NA	NA	NA	[E]13.8	13.8	14.0	14.0	14.2	14.0
Kazakhstan	NA	NA	NA	NA	NA	NA	NA	NA	[E]0.5	[E]0.4	[E]0.4	[E]0.4	[E]0.1	NA
Lithuania	—	NA	NA	NA	NA	NA	NA	NA	[E]16.4	[E]12.9	[E]7.0	[E]9.7	[E]13.6	12.1
Romania	—	—	—	—	—	—	—	—	—	—	—	—	[E]1.0	3.9
Russia	NA	NA	NA	NA	NA	NA	NA	NA	[E]125.6	120.4	97.7	98.3	108.8	108.1
Slovakia	NA	NA	NA	NA	NA	NA	NA	NA	[E]11.7	[E]11.6	[E]12.7	[E]12.0	[E]11.8	11.0
Ukraine	NA	NA	NA	NA	NA	NA	NA	NA	[E]74.6	[E]72.7	68.4	70.4	80.0	80.8
Far East and Africa	**171.9**	**207.9**	**232.9**	**266.1**	**259.6**	**[R]275.1**	**293.2**	**313.0**	**325.1**	**[E]353.0**	**[E]377.0**	**[E]418.9**	**[E]438.9**	**[E]458.1**
China	—	—	—	—	—	—	—	—	—	[E]2.6	[E]14.2	[E]13.0	[E]14.3	NA
India	4.1	4.5	5.1	5.5	6.1	4.0	6.3	5.4	6.3	6.2	5.0	[E]8.0	8.3	[E]11.0
Japan	127.2	152.0	164.8	182.8	173.6	183.7	191.9	205.8	218.0	243.5	253.8	286.1	293.2	318.0
Pakistan	0.3	0.3	0.5	0.3	0.2	0.1	0.4	0.4	0.6	0.4	0.6	0.5	0.4	0.4
South Africa	4.2	5.9	9.3	6.6	11.1	11.7	8.9	9.7	9.9	7.7	10.3	11.9	[E]12.5	13.3
South Korea	11.8	16.5	26.1	37.8	38.7	[R]47.2	52.8	56.3	56.4	58.1	58.3	64.0	72.5	[E]78.9
Taiwan	24.3	28.7	26.9	33.1	29.9	28.3	32.9	35.3	33.8	34.3	34.8	35.3	37.8	[E]36.6
World [5]	**1,061.5**	**1,265.4**	**1,378.9**	**[R]1,480.7**	**1,592.8**	**1,654.2**	**1,722.5**	**1,825.2**	**[E]2,124.5**	**[E]2,185.6**	**[E]2,220.4**	**[E]2,315.1**	**[E]2,396.3**	**[E]2,355.3**

[1] See Note 2 at end of section.
[2] Through 1990, the data for Germany are for the former West Germany only. Beginning in 1991, the data for Germany are for the unified Germany, i.e., the former East Germany and West Germany.
[3] In 1987, Italy's citizens voted for a nuclear power moratorium, which shut down their nuclear power plants indefinitely.
[4] The gross generation estimates for 1992 through 1997 for Eastern European countries are calculated as 5 percent more than the annual net nuclear generation reported by the International Atomic Energy Agency and published annually in *Nuclear Power Reactors in the World.*
[5] Eastern European countries are included in the total figure beginning in 1992.
R=Revised. E=Estimated. NA=Not available. — = Not applicable.
Note: Totals may not equal sum of components due to independent rounding.
Source: Based on data from *Nucleonics Week,* a copyrighted publication of The McGraw-Hill Publishing Companies, Inc. Used with permission.

Figure 11.18 World Carbon Dioxide Emissions



[1] Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

Note: Because vertical scales differ, graphs should not be compared.
Source: Table 11.18.

Table 11.18 World Carbon Dioxide Emissions, 1987-1996

(Million Metric Tons of Carbon [1])

Region and Country	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996[P]
North America	[R]**1,485**	[R]**1,557**	[R]**1,576**	[R]**1,554**	[R]**1,540**	[R]**1,570**	[R]**1,600**	[R]**1,627**	[R]**1,635**	**1,694**
Canada	120	[R]130	[R]134	[R]127	[R]124	[R]128	[R]127	[R]132	[R]137	141
Mexico	76	77	79	79	83	88	89	[R]90	[R]83	86
United States [2]	[R]1,288	[R]1,351	[R]1,363	[R]1,348	[R]1,333	[R]1,354	[R]1,384	[R]1,404	[R]1,415	1,466
Other	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)	(s)
Central and South America	**183**	**186**	**191**	**188**	[R]**193**	**199**	[R]**208**	**209**	[R]**208**	**220**
Argentina	29	30	30	27	28	31	[R]33	32	[R]33	35
Brazil	[R]57	58	60	58	[R]60	61	[R]65	[R]64	[R]64	71
Venezuela	[R]28	[R]28	[R]29	29	30	30	[R]31	[R]32	[R]31	31
Other	[R]68	70	73	[R]74	[R]75	77	[R]79	[R]81	[R]80	83
Western Europe	[R]**999**	[R]**987**	[R]**1,006**	[R]**1,013**	[R]**1,008**	[R]**971**	[R]**952**	[R]**943**	[R]**947**	**970**
Belgium	[R]32	[R]31	[R]33	[R]34	[R]35	[R]34	[R]33	[R]34	[R]34	36
France	[R]99	94	[R]102	[R]103	109	[R]104	[R]98	94	97	101
Germany [3]	282	279	269	267	[R]253	[R]242	[R]242	[R]236	[R]235	238
Italy	[R]110	[R]108	[R]113	113	[R]113	[R]113	108	[R]106	[R]116	116
Netherlands	56	[R]56	[R]56	[R]59	[R]61	[R]60	59	[R]59	[R]57	58
Spain	59	[R]59	[R]66	[R]62	65	[R]66	[R]62	64	[R]67	63
Turkey	30	[R]32	[R]32	[R]35	[R]37	37	39	[R]37	[R]40	43
United Kingdom	[R]164	[R]162	[R]166	[R]168	[R]167	[R]157	[R]157	[R]154	[R]146	155
Other	[R]167	[R]165	[R]169	[R]170	[R]168	[R]158	155	[R]158	[R]154	159
Eastern Europe and Former U.S.S.R.	[R]**1,284**	[R]**1,302**	[R]**1,268**	**1,251**	[R]**1,145**	[R]**1,100**	[R]**1,016**	[R]**900**	[R]**845**	**820**
Former Czechoslovakia	91	[R]89	[R]85	79	72	[R]65	—	—	—	—
Czech Republic	—	—	—	—	—	—	[R]46	[R]49	[R]47	47
Poland	119	[R]117	112	[R]90	[R]89	[R]89	[R]92	[R]86	[R]85	84
Romania	[R]53	[R]53	[R]55	49	36	33	33	32	34	34
Former U.S.S.R.	[R]969	[R]994	[R]970	[R]993	[R]912	—	—	—	—	—
Russia	—	—	—	—	—	[R]559	511	[R]451	[R]417	401
Ukraine	—	—	—	—	—	148	140	[R]118	[R]106	98
Other	[R]52	[R]50	[R]46	[R]41	36	[R]206	194	[R]164	[R]156	155
Middle East	[R]**180**	[R]**190**	[R]**198**	[R]**201**	[R]**215**	[R]**221**	[R]**231**	[R]**233**	[R]**242**	**253**
Iran	48	50	54	56	[R]62	64	65	[R]66	[R]70	73
Saudi Arabia	[R]54	[R]57	[R]56	[R]57	[R]62	[R]63	65	61	[R]67	70
Other	78	[R]83	89	89	91	95	102	106	[R]105	111
Africa	[R]**182**	[R]**188**	[R]**188**	[R]**196**	[R]**203**	[R]**207**	[R]**212**	[R]**218**	[R]**214**	**220**
South Africa	[R]85	[R]87	[R]80	[R]81	[R]84	[R]88	[R]90	[R]94	[R]94	96
Other	97	101	108	116	119	[R]119	122	[R]124	[R]120	124
Far East and Oceania	[R]**1,257**	[R]**1,343**	[R]**1,388**	[R]**1,428**	[R]**1,488**	[R]**1,551**	[R]**1,642**	[R]**1,725**	[R]**1,802**	**1,859**
Australia	[R]64	[R]67	[R]71	[R]74	[R]74	[R]78	[R]77	[R]77	[R]80	79
China	574	613	[R]620	[R]620	[R]649	672	[R]710	[R]759	[R]792	805
India	131	[R]139	146	155	161	[R]175	[R]184	[R]193	[R]224	232
Indonesia	31	33	37	39	41	[R]45	[R]51	[R]52	[R]57	61
Japan	[R]240	[R]257	[R]266	[R]274	[R]282	[R]287	[R]279	[R]296	[R]281	291
North Korea	43	44	[R]45	47	48	47	[R]48	[R]48	49	51
South Korea	[R]48	54	[R]56	[R]61	[R]70	[R]74	[R]96	[R]95	[R]102	113
Taiwan	25	[R]29	[R]32	[R]32	[R]34	[R]35	[R]42	[R]43	[R]47	51
Thailand	14	16	19	23	25	27	31	34	[R]42	44
Other	[R]87	92	[R]96	[R]103	[R]105	[R]111	[R]122	128	[R]128	133
World	[R]**5,570**	[R]**5,754**	[R]**5,816**	[R]**5,831**	[R]**5,792**	[R]**5,819**	[R]**5,862**	[R]**5,856**	[R]**5,894**	**6,036**

[1] Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

[2] Data, when converted to million metric tons of carbon dioxide gas, are less than the values shown for the United States in Table 12.1 because they do not include carbon dioxide emissions from geothermal, unmetered natural gas, cement production, other industrial sources, and U.S. Territories.

[3] Through 1990, this is East and West Germany. Beginning in 1991, this is unified Germany.

R=Revised. P=Preliminary. — = Not applicable. (s)=Less than 0.5 million metric tons.

Notes: • See Note 3 at end of section. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/emeu/international/environm.html.

Source: Energy Information Administration, *International Energy Annual 1996* (February 1998), Table H1.

International Energy Notes

1. World primary energy production comprises crude oil (including lease condensate), natural gas plant liquids, dry natural gas, coal, net electricity from hydroelectric power and nuclear electric power, and net electricity generated for distribution from geothermal, wind, solar and some biofuel energy. Data for the United States include biofuels. Crude oil production is measured at the wellhead and includes lease condensate. Natural gas plant liquids are products obtained from processing natural gas at natural gas processing plants, including natural gas plants, cycling plants, and fractionators. Dry natural gas production is that amount of natural gas produced that is available to be marketed and consumed as a gas. Coal (anthracitic, subanthracitic, bituminous, subbituminous, lignitic, and brown coal) production is the sum of sales, mine consumption, issues to miners, and issues to coking, briquetting, and other ancillary plants at mines. Coal production data include quantities extracted from surface and underground workings and normally exclude wastes removed at mines or associated preparation plants. The data on production of electricity from hydroelectric power, nuclear electric power, and electricity generated for distribution from geothermal, wind, solar, and biofuel energy include data on both electric utility and industrial production reported on a net basis, thus excluding electricity that is generally used by the electric power plant for its own operating purposes or electricity losses in the transformers that are considered integral parts of the station.

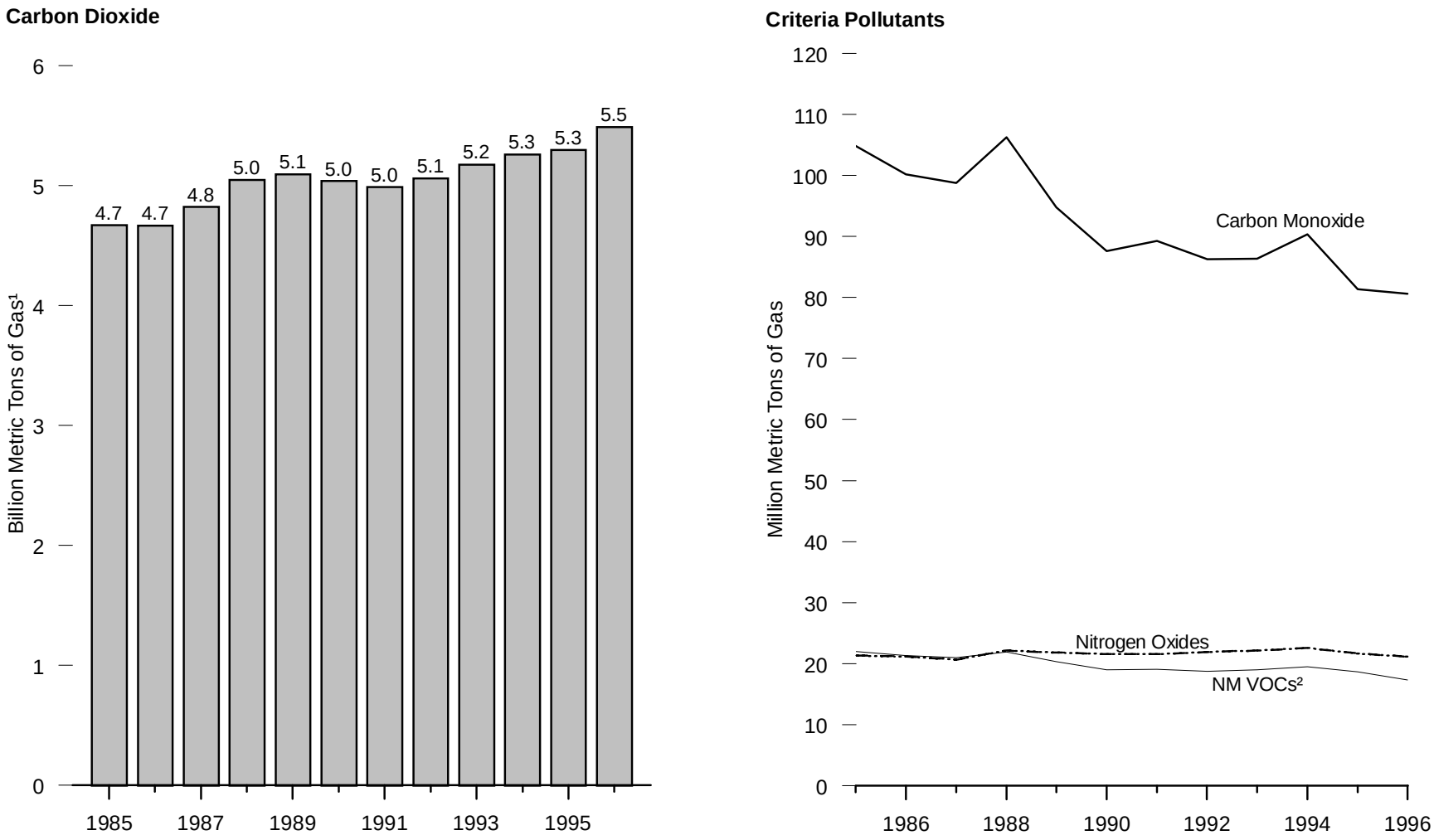
2. Nuclear electricity generation data in Table 11.17 are for gross output of electricity (measured at the generator terminals). Data on the gross generation of electricity in the United States are derived from data for net generation, which is gross output of electricity minus power plant use.

3. Data for carbon dioxide emissions include anthropogenic (human-caused) emissions from the consumption of petroleum, natural gas, and coal, and the flaring of natural gas. They do not include carbon dioxide emissions from cement production and other industrial sources. Hydrocarbon consumption and flaring statistics for each country have been reduced to account for the fraction of fuels not combusted and the fraction of sequestration of non-fuel uses of the hydrocarbons. Carbon dioxide emissions have been determined by applying carbon emission coefficients to the adjusted consumption and flaring data. Carbon emission coefficients are from Energy Information Administration, *Emissions of Greenhouse Gases in the United States 1996*, DOE/EIA-0573(96), October 1997, Table B1.

12 Environmental Indicators

Ferruginous hawk, National Environmental Research Park, Idaho National Engineering Laboratory. Source: U.S. Department of Energy.

Figure 12.1 Estimated Emissions of Greenhouse Gases, 1985-1996



[1] Carbon dioxide gas can be converted to units of carbon by dividing by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

[2] Nonmethane volatile organic compounds.

Source: Table 12.1.

Table 12.1 Estimated Emissions of Greenhouse Gases, 1985-1996

(Million Metric Tons of Gas)

Year	Carbon Dioxide [1]	Methane	Nitrous Oxide	Halocarbons and Minor Gases				Criteria Pollutants		
				CFC-11 CFC-12 CFC-113	HCFC-22	HFC-23 and PFCs	Methyl Chloroform	Carbon Monoxide	Nitrogen Oxides	Nonmethane VOCs
1985	R4,667.7	30.1	0.4	0.3	0.1	(s)	0.3	R104.9	R21.3	R22.0
1986	R4,666.3	29.5	0.4	0.3	0.1	(s)	0.3	R100.2	R21.2	R21.3
1987	R4,819.9	30.3	0.4	0.3	0.1	(s)	0.3	R98.8	R20.7	R21.0
1988	R5,044.7	30.8	0.4	0.3	0.1	(s)	0.3	R106.3	R22.2	R21.9
1989	R5,091.8	R31.3	0.4	0.3	0.1	(s)	0.3	R94.8	R21.8	R20.3
1990	R5,037.1	R31.6	0.4	0.2	0.1	(s)	0.3	R87.6	R21.6	R19.0
1991	R4,987.3	R31.6	0.5	0.2	0.1	(s)	0.2	R89.3	R21.6	R19.1
1992	R5,059.8	R31.7	0.5	0.2	0.1	(s)	0.2	R86.3	R21.9	R18.8
1993	R5,175.9	R30.8	0.5	R0.1	0.1	(s)	0.1	R86.4	R22.2	R19.0
1994	R5,256.1	R31.4	0.5	0.1	0.1	(s)	0.1	R90.4	R22.6	R19.5
1995	R5,296.9	R30.9	0.5	0.1	0.1	(s)	(s)	R81.4	R21.7	R18.7
1996P	5,484.9	30.9	0.4	0.1	0.1	(s)	(s)	80.6	21.2	17.3

[1] Carbon dioxide gas can be converted to units of carbon by dividing by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

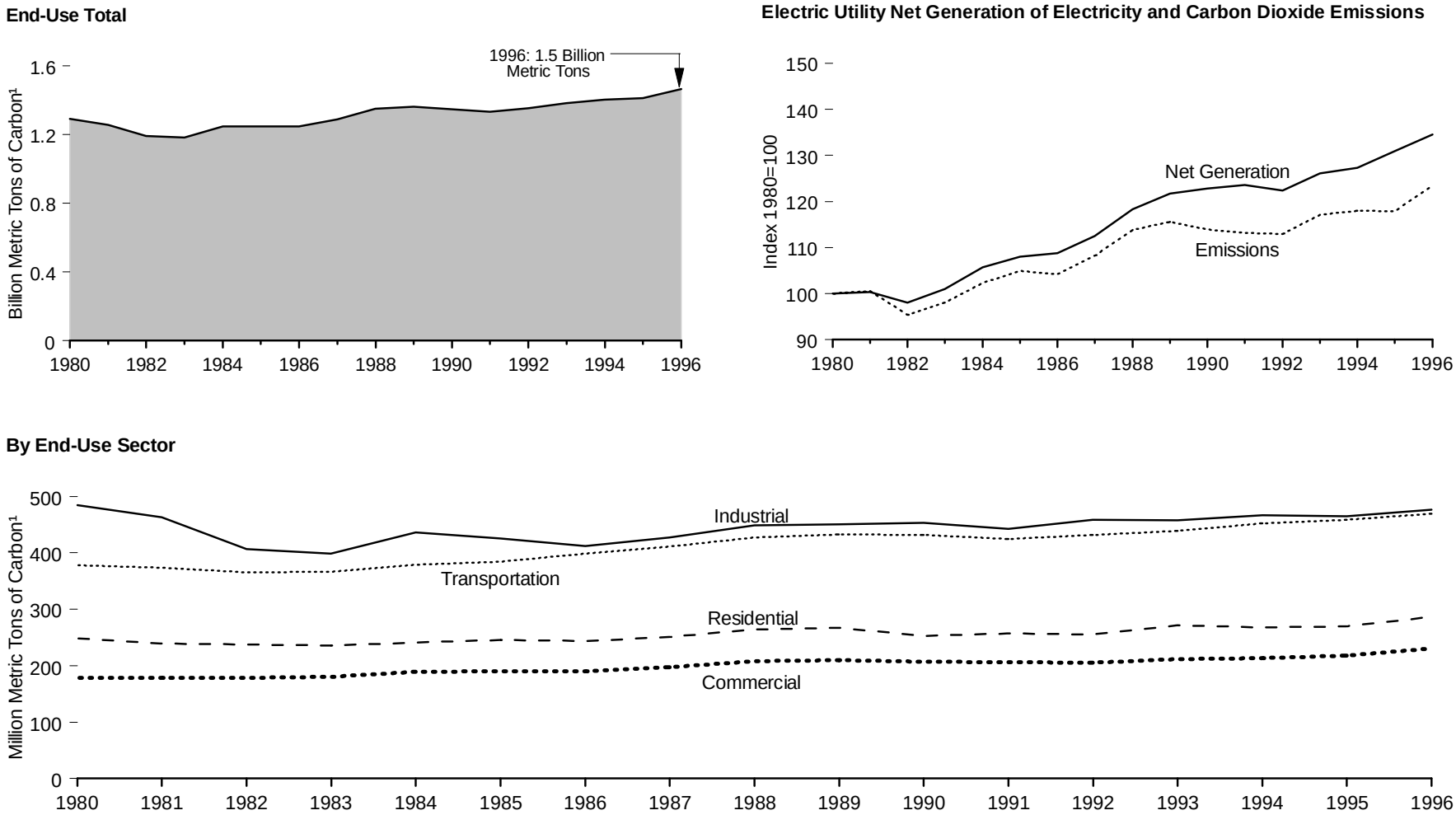
R=Revised. P=Preliminary. (s)=Less than 0.05 million metric tons.

Notes: • CFC = chlorofluorocarbons; HCFC = chlorodifluoromethane; HFC = hydrofluorocarbons; PFC = perfluorocarbon; and VOC = volatile organic compound. • Emissions are from anthropogenic sources. Anthropogenic means produced as the result of human activities, including emissions from agricultural activity and domestic livestock. Emissions from natural sources, such as wetlands and wild animals, are not included.

Web Page: http://www.eia.doe.gov/environment.html.

Sources: **Carbon Dioxide, Methane, Nitrous Oxide, and Halocarbons and Minor Gases:** • 1985-1988—Energy Information Administration (EIA), Office of Integrated Analysis and Forecasting estimates. • 1989 forward—EIA, *Emissions of Greenhouse Gases in the United States 1996* (October 1997), Table ES1. **Criteria Pollutants:** 1985 forward—Environmental Protection Agency, *National Air Pollutant Emissions Trends 1990-1996* (December 1997), Tables A-1, A-2, and A-3.

Figure 12.2 Carbon Dioxide Emissions From Energy Consumption by Sector, 1980-1996



[1] Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

Sources: Tables 8.1 and 12.2.

Table 12.2 Carbon Dioxide Emissions From Energy Consumption by Sector, 1980-1996

(Million Metric Tons of Carbon[1])

Year	Residential	Commercial	Industrial	Transportation	End-Use Total	Electric Utilities [2]
1980	248.4	R178.4	R484.4	378.1	R1,289.3	R418.7
1981	R240.0	R178.4	R463.5	374.1	R1,256.0	R420.9
1982	R237.7	R178.3	R407.4	365.6	R1,189.0	R399.6
1983	R236.2	R180.1	R399.0	366.9	R1,182.3	R410.8
1984	R241.3	R189.0	R436.1	379.0	R1,245.4	R428.4
1985	R246.0	R189.9	R426.1	384.4	R1,246.3	R439.6
1986	R244.2	R190.7	R412.5	399.1	R1,246.5	R436.2
1987	R251.2	R197.4	R427.3	411.1	R1,287.0	R453.4
1988	R265.0	R207.8	R448.6	427.5	R1,348.9	R476.6
1989	R267.6	R210.1	R450.4	432.7	R1,360.9	R484.0
1990	R253.1	R206.8	R453.8	432.1	R1,345.8	R477.0
1991	R257.2	R206.5	R442.4	424.5	R1,330.6	R473.7
1992	255.9	205.5	R458.8	431.4	R1,351.5	472.9
1993	271.6	R212.0	R458.2	R439.1	R1,380.9	R490.3
1994	R268.3	R213.8	R467.0	R452.2	R1,401.3	R494.0
1995	R269.7	R218.3	R464.9	R458.5	R1,411.4	R493.7
1996P	286.8	230.3	476.9	469.0	1,463.0	516.8

[1] Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

[2] Electric utility emissions are distributed across end-use sectors.

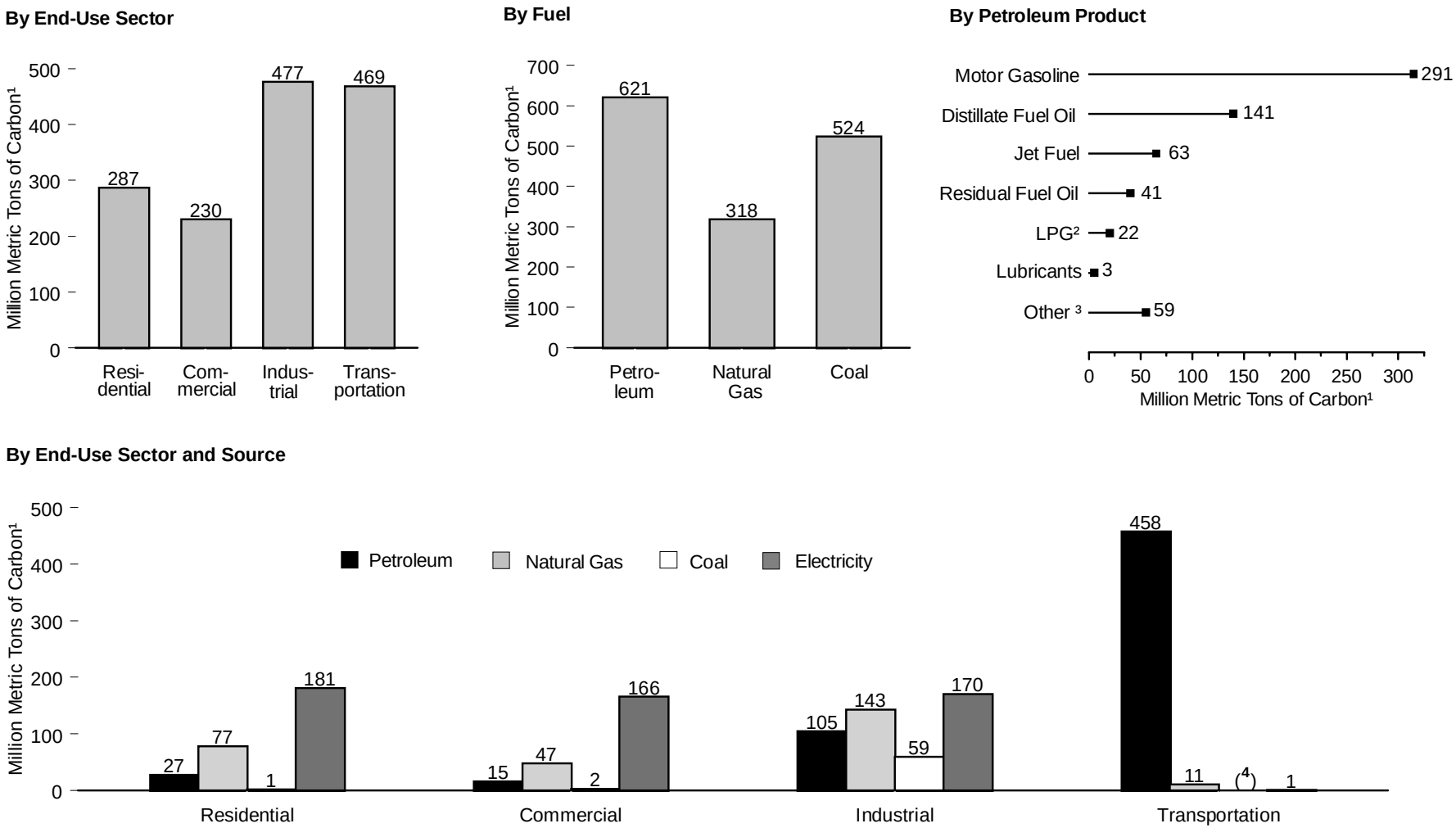
R=Revised. P=Preliminary.

Notes: • Includes energy from petroleum, natural gas, and coal. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/environment.html.

Sources: • 1980-1988—Energy Information Administration (EIA), Office of Integated Analysis and Forecasting (OIAF) estimates. • 1989 forward—EIA, *Emissions of Greenhouse Gases in the United States 1996* (October 1997), Table 6.

Figure 12.3 Carbon Dioxide Emissions From Energy Consumption by Sector by Energy Source, 1996



[1] Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.

[2] Liquefied petroleum gases.

[3] Aviation gasoline, kerosene, and other products.

[4] Coal used in the transportation sector is included in the industrial sector.

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

Source: Table 12.3.

Table 12.3 Carbon Dioxide Emissions From Energy Consumption by Sector by Energy Source, 1996

(Million Metric Tons of Carbon[1])

Energy Source	Residential	Commercial	Industrial	Transportation	End-Use Total	Electric Utilities	Total
Petroleum	27.3	15.3	104.8	457.9	605.3	15.5	620.8
Aviation Gasoline	—	—	—	0.7	0.7	—	0.7
Distillate Fuel	18.5	9.8	22.6	88.2	139.1	[2] 2.2	141.3
Jet Fuel	—	—	—	62.7	62.7	—	62.7
Kerosene	1.5	0.5	0.4	—	2.4	—	2.4
Liquefied Petroleum Gases	7.2	1.3	13.1	0.6	22.2	—	22.2
Lubricants	—	—	1.7	1.6	3.3	—	3.3
Motor Gasoline	—	0.5	3.8	286.7	291.0	—	291.0
Residual Fuel	—	3.3	7.9	17.3	28.5	[3] 12.9	41.4
Other	—	—	55.3	—	55.3	[4] 0.5	55.8
Natural Gas	77.4	47.4	142.8	10.5	278.1	40.3	318.4
Coal	1.4	2.1	59.3	([5])	62.8	460.9	523.7
Electricity	180.8	165.5	170.0	0.7	516.8	—	—
Total	286.8	230.3	476.9	469.0	1,462.9	[6] 516.8	1,462.9

[1] Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas.
[2] Light fuel oil.
[3] Heavy fuel oil.
[4] Petroleum coke.
[5] Included in the industrial sector.
[6] Electric utility emissions are distributed across end-use sectors. Electric utilities include independent power producers but exclude cogeneration facilities.

— = Not applicable.

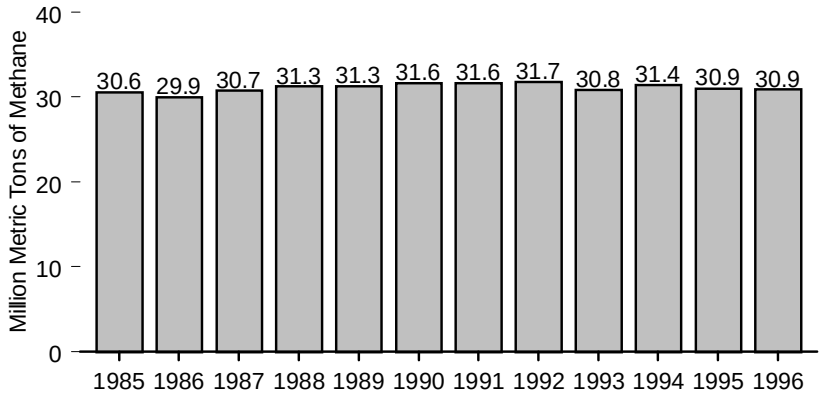
Note: Totals may not equal sum of components due to independent rounding. All values are considered preliminary.

Web Page: http://www.eia.doe.gov/environment.html.

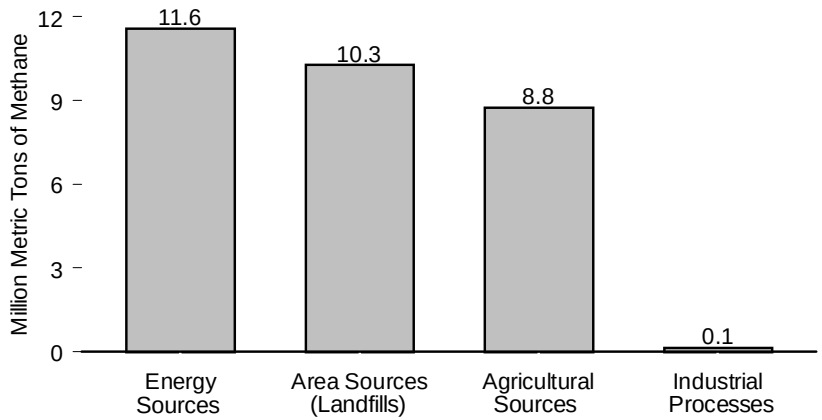
Source: Energy Information Administration, *Emissions of Greenhouse Gases in the United States 1996* (October 1997), Tables 5 and 8-12.

Figure 12.4 Methane Emissions

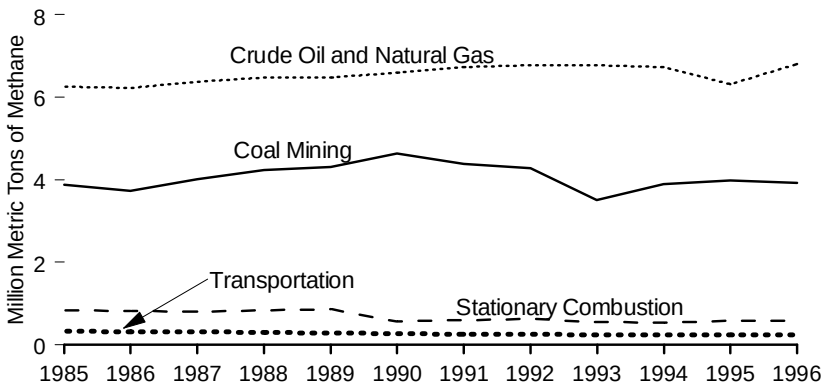
Total,[1] 1985-1996



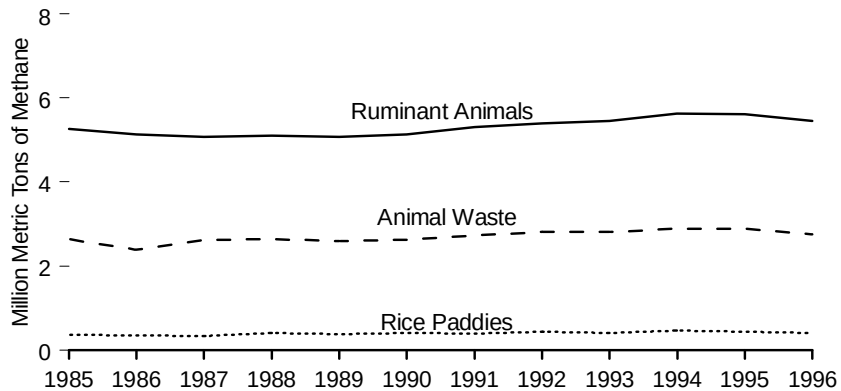
By Source, 1996



Energy Sources by Type, 1985-1996



Agricultural Sources by Type, 1985-1996



[1] Includes area source methane emissions from wastewater treatment.
Note: Because vertical scales differ, graphs should not be compared.

Source: Table 12.4.

Table 12.4 Methane Emissions, 1985-1996

(Million Metric Tons of Methane)

Year	Energy Sources					Area Sources	Agricultural Sources					Industrial Processes	Total [1]
	Crude Oil and Natural Gas	Coal Mining	Transportation	Stationary Combustion	Total	Landfills	Ruminant Animals	Animal Waste	Rice Paddies	Crop Residue Burning	Total		
1985	6.26	R3.88	0.33	R0.84	R11.31	R10.58	5.27	2.64	0.36	0.14	8.41	0.11	R30.55
1986	6.22	R3.73	0.32	R0.82	R11.09	R10.61	5.13	2.39	0.34	0.13	7.99	0.10	R29.94
1987	6.37	R4.01	0.31	R0.81	R11.50	R10.81	5.08	2.63	0.33	0.12	8.16	0.11	R30.73
1988	6.47	R4.24	0.30	R0.84	R11.85	R10.89	5.10	2.64	0.41	0.10	8.24	0.12	R31.26
1989	6.48	R4.31	0.29	R0.87	R11.95	R10.89	5.08	2.60	0.38	0.12	8.18	0.12	R31.29
1990	6.59	R4.63	0.27	R0.57	R12.07	R10.96	5.13	2.63	0.40	0.13	8.29	0.12	R31.59
1991	6.73	R4.38	0.26	R0.60	R11.97	R10.85	5.31	2.73	0.39	0.12	8.55	0.11	R31.63
1992	6.78	R4.28	0.26	R0.63	R11.96	R10.74	5.39	2.81	0.44	0.14	8.77	0.12	R31.74
1993	6.78	R3.50	R0.25	R0.55	R11.08	R10.68	5.46	2.81	0.40	0.11	8.79	0.12	R30.82
1994	R6.73	R3.90	0.24	R0.54	11.42	R10.57	5.62	2.88	0.46	0.15	9.11	0.13	R31.38
1995	R6.32	R3.98	R0.25	R0.59	R11.15	R10.45	R5.61	R2.88	0.43	0.12	R9.05	0.13	R30.93
1996P	6.80	3.93	0.25	0.59	11.57	10.28	5.46	2.76	0.40	0.14	8.75	0.13	30.90

[1] Includes area source methane emissions from wastewater treatment.

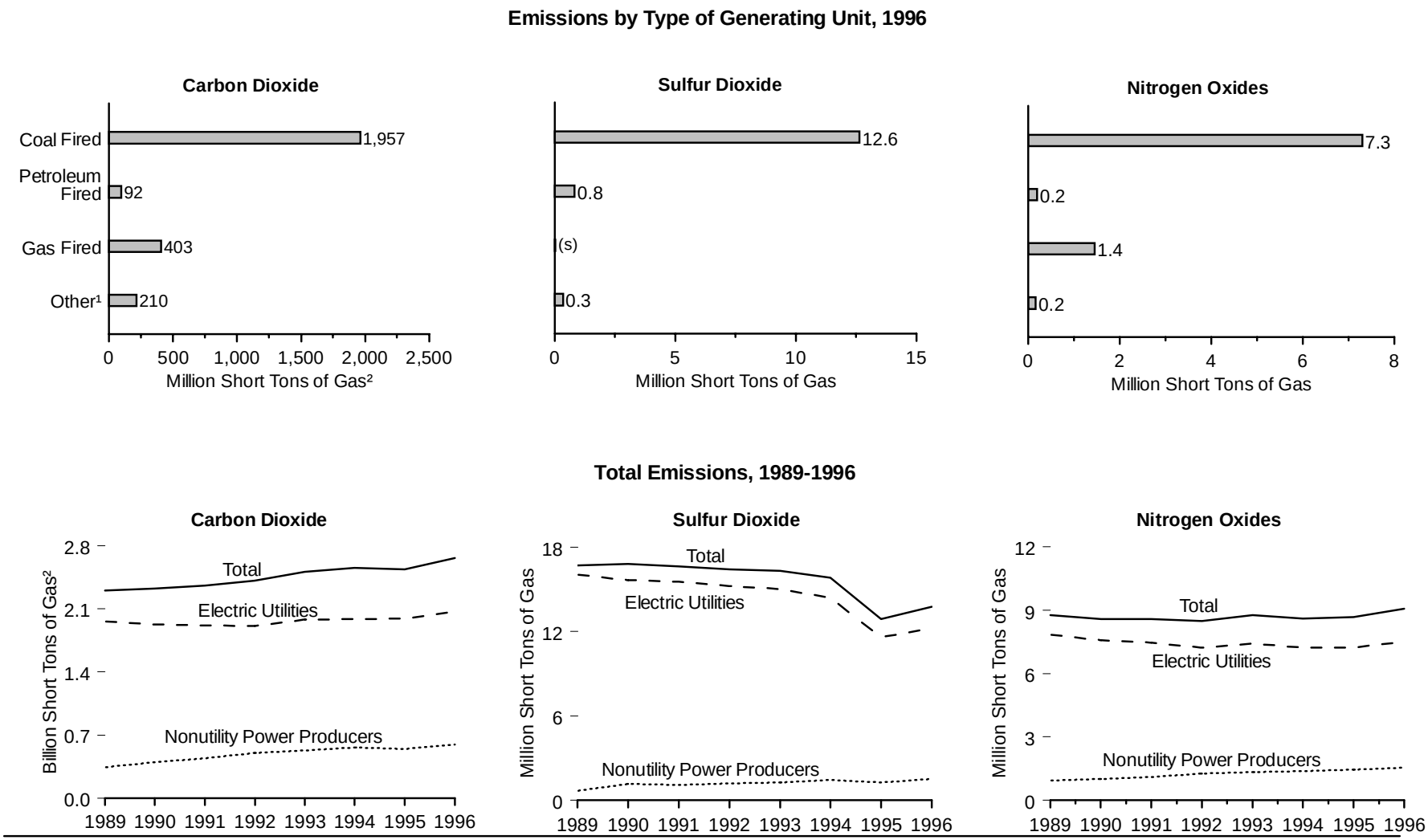
R=Revised. P=Preliminary.

Notes: • Emissions are from anthropogenic sources. Anthropogenic means produced as the result of human activities, including emissions from agricultural activity and domestic livestock. Emissions from natural sources, such as wetlands and wild animals, are not included. • Estimates of methane emissions are, in general, highly uncertain. The level of precision is probably on the order of 30 to 50 percent. For additional information, see "Appendix C, "Uncertainty in Emission Estimates" in the source report, page 110. • Ruminant animals, such as cattle, buffalo, sheep, goats, and camels, emit methane as a product of the digestive process. • Under certain conditions, methane may be produced via anaerobic decomposition of organic materials in landfills, animal wastes, and rice paddies. • Totals may not equal sum of components due to independent rounding.

Web Page: http://www.eia.doe.gov/environment.html.

Sources: • 1985-1988—Energy Information Administration (EIA), Office of Integrated Analysis and Forecasting estimates. • 1989 forward—EIA, *Emissions of Greenhouse Gases in the United States 1996* (October 1997), Table 16.

Figure 12.5 Emissions From Electric Generating Units



[1] Plants fired by light oil, methane, coal-oil mixture, propane gas, blast furnace gas, wood, and refuse.

[2] Carbon dioxide gas can be converted to units of carbon by dividing by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas. Short tons can be converted to metric tons by dividing by 1.102.

(s)=Less than 0.05 million short tons.

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

Source: Table 12.5.

Table 12.5 Emissions From Electric Generating Units, 1989-1996

(Thousand Short Tons of Gas)

Year	Coal Fired			Petroleum Fired			Gas Fired			Other [1]			Total		
	Carbon Dioxide [2]	Sulfur Dioxide	Nitrogen Oxides	Carbon Dioxide [2]	Sulfur Dioxide	Nitrogen Oxides	Carbon Dioxide [2]	Sulfur Dioxide	Nitrogen Oxides	Carbon Dioxide [2]	Sulfur Dioxide	Nitrogen Oxides	Carbon Dioxide [2]	Sulfur Dioxide	Nitrogen Oxides
								Electric Utilities							
1989	1,651,810	15,200	6,895	141,858	830	298	161,051	1	644	4,397	3	8	1,959,117	16,034	7,845
1990	1,655,343	14,975	6,726	106,652	671	222	158,227	1	614	4,834	5	9	1,925,056	15,651	7,570
1991	1,653,114	14,843	6,652	101,666	685	212	159,816	1	607	3,206	3	3	1,917,802	15,532	7,473
1992	1,668,404	14,647	6,519	81,026	573	160	160,296	1	547	4,509	4	7	1,914,235	15,226	7,234
1993	1,738,068	14,385	6,726	86,173	647	171	154,141	1	526	3,754	4	4	1,982,136	15,036	7,426
1994	1,737,512	13,844	6,520	79,299	556	149	168,314	1	562	2,758	2	3	1,987,883	14,403	7,233
1995	1,753,836	11,260	6,514	54,929	345	102	179,631	1	614	2,295	2	2	1,990,691	11,608	7,233
1996	1,851,874	11,831	6,869	60,589	396	110	154,484	1	538	2,552	2	2	2,069,500	12,230	7,519
								Nonutility Power Producers							
1989	72,360	548	282	14,884	90	36	142,974	1	531	114,944	27	89	345,162	665	938
1990	71,957	740	280	17,408	193	40	158,355	1	577	150,930	230	113	398,651	1,164	1,011
1991	83,461	661	323	18,704	160	44	174,315	1	617	164,794	281	116	441,274	1,102	1,100
1992	91,833	R668	367	23,510	254	56	204,158	1	704	R179,943	R288	R127	R499,444	R1,211	R1,254
1993	97,281	R709	395	27,304	266	62	219,859	1	749	R185,343	R296	R132	R529,787	R1,272	R1,337
1994	102,914	R797	R413	33,612	327	73	232,485	1	763	R194,879	R301	R133	R563,889	R1,425	R1,382
1995	R99,500	R689	R404	R29,287	R305	R65	R232,808	R1	R839	R185,514	R283	R136	R547,110	R1,278	R1,444
1996P	105,508	788	422	31,445	410	71	248,891	1	904	207,676	319	148	593,520	1,518	1,545
								Total							
1989	1,724,171	15,748	7,177	156,742	920	334	304,025	2	1,175	119,341	30	97	2,304,278	16,699	8,783
1990	1,727,300	15,714	7,006	124,060	864	262	316,583	2	1,191	155,764	235	122	2,323,707	16,815	8,581
1991	1,736,575	15,504	6,974	120,370	845	256	334,131	2	1,224	168,000	284	120	2,359,077	16,634	8,573
1992	1,760,237	R15,315	6,886	104,537	827	216	364,454	2	1,251	R184,451	R292	R135	R2,413,679	R16,436	R8,488
1993	1,835,349	R15,094	7,121	113,478	913	233	374,000	2	1,275	R189,097	R300	R135	R2,511,923	R16,308	R8,764
1994	1,840,426	R14,641	R6,932	112,911	882	222	400,799	2	1,325	R197,637	R303	R135	R2,551,772	R15,828	R8,615
1995	R1,853,336	R11,949	R6,918	R84,216	R650	R167	R412,439	R2	R1,453	R187,810	R285	R138	R2,537,801	R12,886	R8,677
1996P	1,957,383	12,619	7,291	92,034	806	181	403,374	2	1,442	210,228	321	150	2,663,019	13,749	9,064

[1] Plants fired by light oil, methane, coal-oil mixture, propane gas, blast furnace gas, wood, and refuse.

[2] Carbon dioxide gas can be converted to units of carbon by dividing by 3.667. One ton of carbon = 3.667 tons of carbon dioxide gas. Short tons can be converted to metric tons by dividing by 1.102.

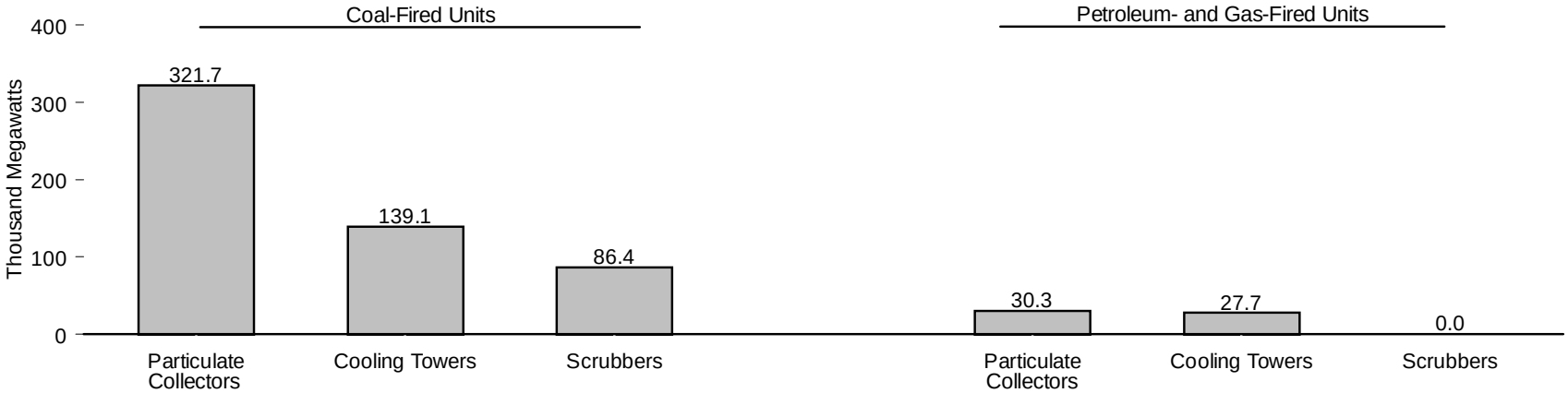
R=Revised. P=Preliminary.

Notes: • Historical data are revised to reflect changed emission factors for the calculation of carbon dioxide and sulfur dioxide and reductions from nitrogen oxides control technologies. See Technical Notes in the *Electric Power Annual 1992* Volume II (December 1996) for additional information. • Electric Utility emissions are based on fuel consumption data reported on Form EIA-767, "Steam-Electric Plant Operation and Design Report," for steam-electric generating units of 10 megawatts or larger and from data reported on Form EIA-759, "Monthly Power Plant Report" for steam-electric plants below 10 megawatts and for primemovers. Nonutility emissions are from data reported on Form EIA-867, "Annual Nonutility Power Producer Report," (1 megawatt and above).

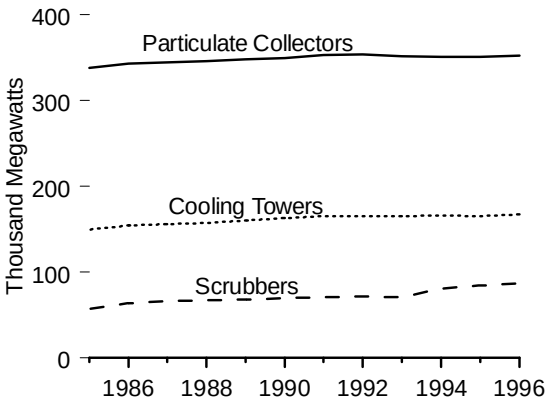
Sources: **Electric Utilities:** EIA, Form EIA-767, "Steam-Electric Plant Operation and Design Report," and Form EIA-759, "Monthly Power Plant Report." **Nonutilty Power Producers:** EIA, Form EIA-867, "Annual Nonutility Power Producer Report." **Total:** Sum of Electric Utilities and Nonutility Power Producers.

Figure 12.6 Installed Nameplate Capacity of Steam-Electric Generators for Electric Utility Plants With Environmental Equipment

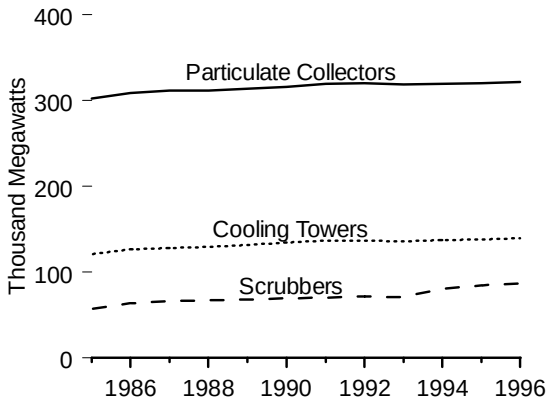
By Fuel and Equipment Type, 1996



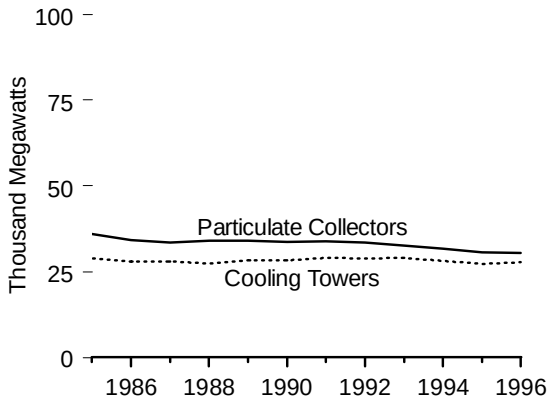
Total Equipment by Type, 1985-1996



Coal-Fired Units by Equipment Type, 1985-1996



Petroleum- and Gas-Fired Units by Equipment Type, 1985-1996



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

Source: Table 12.6.

Table 12.6 Installed Nameplate Capacity of Steam-Electric Generators for Electric Utility Plants With Environmental Equipment, 1985-1996

(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	302,056	120,591	56,955	304,706	36,054	28,895	65	62,371	338,110	149,486	57,020	367,078
1986	308,566	126,731	63,735	311,217	34,258	27,919	65	59,618	342,825	154,650	63,800	370,835
1987	311,043	127,875	65,688	312,885	33,431	27,912	65	58,783	344,474	155,786	65,753	371,668
1988	311,776	129,366	67,156	313,618	34,063	27,434	65	58,937	345,839	156,800	67,221	372,555
1989	313,708	131,697	67,506	315,549	33,975	28,386	65	59,736	347,655	160,087	67,534	375,257
1990	315,681	134,199	69,057	317,522	33,639	28,359	65	59,372	349,319	162,557	69,122	376,894
1991	319,127	136,270	70,294	319,189	33,864	29,067	260	59,773	352,990	165,337	70,554	378,963
1992	320,016	136,542	71,157	320,078	33,509	28,764	195	59,116	353,525	165,306	71,351	379,194
1993	318,830	136,028	70,890	318,893	32,620	28,922	0	58,580	351,451	164,951	70,890	377,473
1994	319,309	137,266	80,617	319,600	31,695	28,186	0	57,123	351,004	165,452	80,617	376,723
1995	320,268	137,825	84,260	320,467	30,513	27,187	0	54,942	350,780	165,012	84,260	375,408
1996	321,721	139,065	86,359	321,785	30,349	27,685	0	55,275	352,070	166,749	86,359	377,060

[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 (including light oil, methane, coal-oil mixture, propane gas, blast furnace gas, wood, and refuse); to incorporate reevaluation and resubmission of data by respondents to The Clean Air Act Amendments of 1990; and to reflect revisions to the methodology used to estimate emissions. • All data are preliminary and may be revised in future publications. • Data cover only plants with fossil-fueled steam-electric capacity of 100 megawatts or greater.

Web Page: http://www.eia.doe.gov/fuelelectric.html.

Sources: **Coal Fired and Petroleum and Gas Fired:** • 1985-1993—Energy Information Administration (EIA), Form EIA-767, "Steam-Electric Plant Operation and Design Report." • 1994—EIA, *Electric Power Annual 1994, Volume II* (November 1995), Tables 26 and 27. **Total:** • 1985 and 1989—EIA, Form EIA-767, "Steam-Electric Plant Operation and Design Report." • 1990 forward—EIA, *Electric Power Annual 1996, Volume II* (February 1998), Table 23.

Appendix A

Thermal Conversion Factors

Using Thermal Conversion Factors

The thermal conversion factors presented in the following seven tables can be used to estimate the heat content in British thermal units (Btu) of a given amount of energy measured in physical units, such as barrels or cubic feet. For example, 10 barrels of asphalt has a heat content of approximately 66.36 million Btu (10 barrels x 6.636 million Btu per 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." Usually, the previous year's factor is used as the preliminary value until data become available to calculate the factor appropriate to the year. The source of each factor is described in the section entitled "Thermal Conversion Factor Source Documentation," which follows Table A7 in this appendix.

Thermal conversion factors for hydrocarbon mixes are weighted averages of the thermal conversion factors for each hydrocarbon included in the mix. For example, in calculating the thermal conversion factor for a 60-40 butane-propane mixture, the thermal conversion factor for butane is weighted 1.5 times more heavily than the thermal conversion factor for propane.

More information about British thermal units (the standardized unit of measure for energy) can be found in the Glossary.

Table A1. Approximate Heat Content of Petroleum Products
(Million Btu per Barrel)

Energy Source	Heat Content
Asphalt	6.636
Aviation Gasoline	5.048
Butane	4.326
Butane-Propane Mixture (60 percent-40 percent)	4.130
Distillate Fuel Oil	5.825
Ethane	3.082
Ethane-Propane Mixture (70 percent-30 percent)	3.308
Isobutane	3.974
Jet Fuel, Kerosene-Type	5.670
Jet Fuel, Naphtha-Type	5.355
Kerosene	5.670
Lubricants	6.065
Motor Gasoline	5.253
Natural Gasoline	4.620
Pentanes Plus	4.620
Petrochemical Feedstocks	
Naphtha less than 401° F	5.248
Other Oils equal to or greater than 401° F	5.825
Still Gas	6.000
Petroleum Coke	6.024
Plant Condensate	5.418
Propane	3.836
Residual Fuel Oil	6.287
Road Oil	6.636
Special Naphthas	5.248
Still Gas	6.000
Unfinished Oils	5.825
Unfractionated Stream	5.418
Waxes	5.537
Miscellaneous	5.796

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

Table A2. Approximate Heat Content of Crude Oil, Crude Oil and Products, and Natural Gas Plant Liquids, 1949-1997

(Million Btu per Barrel)

Year	Crude Oil Only			Crude Oil and Products		Natural Gas Plant Liquids Production
	Production	Imports	Exports	Imports	Exports	
1949	5.800	5.952	5.800	6.059	5.692	4.544
1950	5.800	5.943	5.800	6.080	5.766	4.522
1951	5.800	5.938	5.800	6.075	5.762	4.495
1952	5.800	5.938	5.800	6.067	5.774	4.464
1953	5.800	5.924	5.800	6.052	5.742	4.450
1954	5.800	5.931	5.800	6.052	5.745	4.415
1955	5.800	5.924	5.800	6.040	5.768	4.406
1956	5.800	5.916	5.800	6.024	5.754	4.382
1957	5.800	5.918	5.800	6.023	5.780	4.369
1958	5.800	5.916	5.800	5.993	5.779	4.366
1959	5.800	5.916	5.800	6.020	5.829	4.311
1960	5.800	5.911	5.800	6.021	5.834	4.295
1961	5.800	5.900	5.800	5.991	5.832	4.283
1962	5.800	5.890	5.800	6.004	5.841	4.273
1963	5.800	5.894	5.800	6.002	5.840	4.264
1964	5.800	5.882	5.800	5.998	5.844	4.268
1965	5.800	5.872	5.800	5.997	5.743	4.264
1966	5.800	5.863	5.800	5.993	5.729	4.259
1967	5.800	5.838	5.800	5.999	5.777	4.232
1968	5.800	5.836	5.800	5.977	5.763	4.218
1969	5.800	5.825	5.800	5.974	5.714	4.170
1970	5.800	5.822	5.800	5.985	5.810	4.146
1971	5.800	5.824	5.800	5.961	5.775	4.117
1972	5.800	5.809	5.800	5.935	5.741	4.070
1973	5.800	5.817	5.800	5.897	5.752	4.049
1974	5.800	5.827	5.800	5.884	5.774	4.011
1975	5.800	5.821	5.800	5.858	5.748	3.984
1976	5.800	5.808	5.800	5.856	5.745	3.964
1977	5.800	5.810	5.800	5.834	5.797	3.941
1978	5.800	5.802	5.800	5.839	5.808	3.925
1979	5.800	5.810	5.800	5.810	5.832	3.955
1980	5.800	5.812	5.800	5.796	5.820	3.914
1981	5.800	5.818	5.800	5.775	5.821	3.930
1982	5.800	5.826	5.800	5.775	5.820	3.872
1983	5.800	5.825	5.800	5.774	5.800	3.839
1984	5.800	5.823	5.800	5.745	5.850	3.812
1985	5.800	5.832	5.800	5.736	5.814	3.815
1986	5.800	5.903	5.800	5.808	5.832	3.797
1987	5.800	5.901	5.800	5.820	5.858	3.804
1988	5.800	5.900	5.800	5.820	5.840	3.800
1989	5.800	5.906	5.800	5.833	5.857	3.826
1990	5.800	5.934	5.800	5.849	5.833	3.822
1991	5.800	5.948	5.800	5.873	5.823	3.807
1992	5.800	5.953	5.800	5.877	5.777	3.804
1993	5.800	5.954	5.800	5.883	5.779	3.801
1994	5.800	5.950	5.800	5.861	5.781	3.794
1995	5.800	5.924	5.800	5.849	5.751	3.796
1996	5.800	[R]5.935	5.800	5.843	5.745	3.777
1997[P]	5.800	5.956	5.800	5.867	5.734	3.771

R=Revised. P=Preliminary.
Note: Crude oil includes lease condensate.

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

Table A3. Approximate Heat Content of Petroleum Product Weighted Averages, 1949-1997

(Million Btu per Barrel)

Year	Consumption					Imports	Exports	Liquefied Petroleum Gases Consumption
	Residential and Commercial	Industrial	Transportation	Electric Utilities	Total			
1949	5.631	5.947	5.465	6.254	5.649	6.261	5.651	4.011
1950	5.626	5.940	5.461	6.254	5.649	6.263	5.751	4.011
1951	5.626	5.913	5.458	6.254	5.634	6.265	5.753	4.011
1952	5.621	5.905	5.442	6.254	5.621	6.261	5.768	4.011
1953	5.606	5.897	5.426	6.254	5.608	6.268	5.732	4.011
1954	5.603	5.883	5.412	6.254	5.595	6.252	5.738	4.011
1955	5.607	5.866	5.408	6.254	5.591	6.234	5.765	4.011
1956	5.601	5.856	5.406	6.254	5.585	6.225	5.744	4.011
1957	5.587	5.842	5.405	6.254	5.577	6.219	5.774	4.011
1958	5.582	5.832	5.393	6.254	5.567	6.091	5.778	4.011
1959	5.549	5.811	5.389	6.254	5.557	6.142	5.830	4.011
1960	5.570	5.800	5.388	6.267	5.555	6.161	5.835	4.011
1961	5.570	5.795	5.386	6.268	5.552	6.102	5.833	4.011
1962	5.555	5.784	5.386	6.267	5.545	6.138	5.842	4.011
1963	5.532	5.759	5.384	6.266	5.534	6.126	5.841	4.011
1964	5.517	5.728	5.388	6.267	5.528	6.129	5.845	4.011
1965	5.535	5.728	5.387	6.267	5.532	6.123	5.742	4.011
1966	5.523	5.722	5.388	6.266	5.532	6.112	5.728	4.011
1967	5.473	5.682	5.391	6.266	5.515	6.128	5.758	3.838
1968	5.450	5.646	5.394	6.263	5.504	6.095	5.762	3.818
1969	5.399	5.603	5.394	6.259	5.492	6.093	5.713	3.805
1970	5.404	5.604	5.393	6.252	5.503	6.088	5.811	3.779
1971	5.392	5.600	5.389	6.245	5.504	6.062	5.775	3.772
1972	5.368	5.564	5.388	6.233	5.500	6.045	5.741	3.760
1973	5.387	5.568	5.395	6.245	5.515	5.983	5.752	3.746
1974	5.377	5.538	5.394	6.238	5.504	5.959	5.773	3.730
1975	5.358	5.528	5.392	6.250	5.494	5.935	5.747	3.715
1976	5.383	5.538	5.395	6.251	5.504	5.980	5.743	3.711
1977	5.389	5.555	5.400	6.249	5.518	5.908	5.796	3.677
1978	5.382	5.553	5.404	6.251	5.519	5.955	5.814	3.669
1979	5.471	5.418	5.428	6.258	5.494	5.811	5.864	3.680
1980	5.468	5.376	5.440	6.254	5.479	5.748	5.841	3.674
1981	5.409	5.313	5.432	6.258	5.448	5.659	5.837	3.643
1982	5.392	5.263	5.422	6.258	5.415	5.664	5.829	3.615
1983	5.286	5.273	5.415	6.255	5.406	5.677	5.800	3.614
1984	5.384	5.223	5.422	6.251	5.395	5.613	5.867	3.599
1985	5.326	5.221	5.423	6.247	5.387	5.572	5.819	3.603
1986	5.357	5.286	5.427	6.257	5.418	5.624	5.839	3.640
1987	5.316	5.253	5.430	6.249	5.403	5.599	5.860	3.659
1988	5.320	5.248	5.434	6.250	5.410	5.618	5.842	3.652
1989	5.257	5.233	5.440	6.241	5.410	5.641	5.869	3.683
1990	5.208	5.272	5.445	6.247	5.411	5.614	5.838	3.625
1991	5.163	5.192	5.442	6.248	5.384	5.636	5.827	3.614
1992	5.169	5.188	5.445	6.243	5.378	5.623	5.774	3.624
1993	5.148	5.200	5.438	6.241	5.379	5.620	5.777	3.606
1994	5.154	5.171	5.442	6.231	5.371	5.538	5.779	3.635
1995	R5.126	R5.141	R5.444	6.210	5.358	5.511	5.746	3.623
1996	R5.114	R5.119	R5.446	R6.212	5.352	R5.495	5.738	3.613
1997P	5.111	5.132	5.442	6.212	5.354	5.493	5.726	3.613

R=Revised. P=Preliminary.

Note: Weighted averages of the products included in each category are calculated by using heat content values shown in Table A1.

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

Table A4. Approximate Heat Content of Natural Gas, 1949-1997

(Btu per Cubic Foot)

Year	Production		Consumption			Imports	Exports
	Dry	Marketed (Wet)	Sectors Other Than Electric Utilities	Electric Utilities	Total		
1949	1,035	1,120	1,035	1,035	1,035	—	1,035
1950	1,035	1,119	1,035	1,035	1,035	—	1,035
1951	1,035	1,114	1,035	1,035	1,035	—	1,035
1952	1,035	1,115	1,035	1,035	1,035	1,035	1,035
1953	1,035	1,116	1,035	1,035	1,035	1,035	1,035
1954	1,035	1,115	1,035	1,035	1,035	1,035	1,035
1955	1,035	1,120	1,035	1,035	1,035	1,035	1,035
1956	1,035	1,116	1,035	1,035	1,035	1,035	1,035
1957	1,035	1,113	1,035	1,035	1,035	1,035	1,035
1958	1,035	1,110	1,035	1,035	1,035	1,035	1,035
1959	1,035	1,109	1,035	1,035	1,035	1,035	1,035
1960	1,035	1,107	1,035	1,035	1,035	1,035	1,035
1961	1,035	1,108	1,035	1,035	1,035	1,035	1,035
1962	1,035	1,107	1,035	1,035	1,035	1,035	1,035
1963	1,031	1,103	1,031	1,031	1,031	1,031	1,031
1964	1,032	1,102	1,032	1,032	1,032	1,032	1,032
1965	1,032	1,101	1,032	1,032	1,032	1,032	1,032
1966	1,033	1,103	1,033	1,033	1,033	1,033	1,033
1967	1,032	1,105	1,032	1,032	1,032	1,032	1,032
1968	1,031	1,115	1,031	1,031	1,031	1,031	1,031
1969	1,031	1,103	1,031	1,031	1,031	1,031	1,031
1970	1,031	1,102	1,031	1,031	1,031	1,031	1,031
1971	1,031	1,103	1,031	1,031	1,031	1,031	1,031
1972	1,027	1,100	1,027	1,027	1,027	1,027	1,027
1973	1,021	1,093	1,020	1,024	1,021	1,026	1,023
1974	1,024	1,097	1,024	1,022	1,024	1,027	1,016
1975	1,021	1,095	1,020	1,026	1,021	1,026	1,014
1976	1,020	1,093	1,019	1,023	1,020	1,025	1,013
1977	1,021	1,093	1,019	1,029	1,021	1,026	1,013
1978	1,019	1,088	1,016	1,034	1,019	1,030	1,013
1979	1,021	1,092	1,018	1,035	1,021	1,037	1,013
1980	1,026	1,098	1,024	1,035	1,026	1,022	1,013
1981	1,027	1,103	1,025	1,035	1,027	1,014	1,011
1982	1,028	1,107	1,026	1,036	1,028	1,018	1,011
1983	1,031	1,115	1,031	1,030	1,031	1,024	1,010
1984	1,031	1,109	1,030	1,035	1,031	1,005	1,010
1985	1,032	1,112	1,031	1,038	1,032	1,002	1,011
1986	1,030	1,110	1,029	1,034	1,030	997	1,008
1987	1,031	1,112	1,031	1,032	1,031	999	1,011
1988	1,029	1,109	1,029	1,028	1,029	1,002	1,018
1989	1,031	1,107	1,031	1,030	1,031	1,004	1,019
1990	1,031	1,106	1,030	1,034	1,031	1,012	1,018
1991	1,030	1,108	1,031	1,024	1,030	1,014	1,022
1992	1,030	1,110	1,031	1,022	1,030	1,011	1,018
1993	1,027	1,106	1,028	1,022	1,027	1,020	1,016
1994	1,028	1,105	1,029	1,022	1,028	1,022	1,011
1995	1,027	1,106	1,027	1,025	1,027	1,021	1,011
1996	1,027	R1,109	1,027	R1,024	1,027	R1,022	1,011
1997P	1,027	1,109	1,027	1,024	1,027	1,022	1,011

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

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

Table A5. Approximate Heat Content of Coal and Coal Coke, 1949-1997

(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	21.822	23.137	26.799	22.457	20.929	21.331	25.000	26.202	24.800
1991	21.681	23.114	26.799	22.460	20.755	21.146	25.000	26.188	24.800
1992	21.646	23.105	26.799	22.250	20.787	21.143	25.000	26.161	24.800
1993	21.388	22.994	26.800	22.123	20.639	20.983	25.000	26.335	24.800
1994	21.352	23.112	26.800	22.068	20.673	21.010	25.000	26.329	24.800
1995	21.277	23.118	26.800	21.950	20.495	20.845	25.000	26.180	24.800
1996	R21.287	R23.011	26.800	R22.105	R20.525	R20.856	25.000	R26.174	24.800
1997P	21.287	23.011	26.800	22.105	20.525	20.856	25.000	26.174	24.800

[1] Includes transportation.
R=Revised. P=Preliminary.

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

Table A6. Approximate Heat Content of Coal by Type, 1949-1997

(Million Btu per Short Ton)

	Bituminous Coal [1] and Lignite								Anthracite				
		Consumption								Consumption			
Year	Production	Residential and Commercial	Coke Plants	Other Industry [2]	Electric Utilities	Total	Imports	Exports	Production	Sectors Other Than Electric Utilities	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	21.678	22.635	26.800	22.448	20.761	21.146	25.000	26.192	22.573	25.268	15.858	21.410	25.400
1992	21.643	22.768	26.800	22.242	20.792	21.142	25.000	26.165	22.572	24.617	16.944	21.423	25.400
1993	21.383	22.749	26.800	22.111	20.644	20.983	25.000	26.341	22.573	24.096	16.534	21.262	25.400
1994	21.347	22.683	26.800	22.046	20.681	21.011	25.000	26.335	22.572	25.037	14.680	20.828	25.400
1995	21.271	22.767	26.800	21.931	20.502	20.845	25.000	26.187	22.572	24.696	14.572	20.808	25.400
1996	R21.281	R22.649	26.800	R22.087	R20.532	R20.857	25.000	R26.181	R22.573	R24.638	R14.360	R20.652	25.400
1997P	21.281	22.649	26.800	22.087	20.532	20.857	25.000	26.181	22.573	24.638	14.360	20.652	25.400

[1] Includes subbituminous coal.
[2] Includes transportation.

R=Revised data. P=Preliminary data.
Source: See "Thermal Conversion Factor Source Documentation," which follows Table A7.

Table A7. Approximate Heat Rates for Electricity, 1949-1997

(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	10,440	10,843	21,303	3,412
1985	10,447	10,813	21,263	3,412
1986	10,446	10,799	21,263	3,412
1987	10,419	10,776	21,263	3,412
1988	10,324	10,743	21,096	3,412
1989	R10,432	10,724	21,096	3,412
1990	R10,399	10,680	21,096	3,412
1991	R10,425	10,740	20,997	3,412
1992	R10,340	10,678	20,914	3,412
1993	R10,309	10,682	20,914	3,412
1994	R10,309	10,676	20,914	3,412
1995	R10,304	10,658	20,914	3,412
1996	R10,338	10,623	20,960	3,412
1997P	10,338	10,623	20,960	3,412

[1] Used as the thermal conversion factor for hydroelectric power generation and for wood and waste, wind, photovoltaic, and solar thermal energy consumed at electric utilities.

R=Revised data. P=Preliminary data. — = Not applicable.
Source: See "Thermal Conversion Factor Source Documentation," which follows this table.

Thermal Conversion Factor Source Documentation

Approximate Heat Content of Petroleum and Natural Gas Plant Liquids

Asphalt. The Energy Information Administration (EIA) adopted the thermal conversion factor of 6.636 million British thermal units (Btu) per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956.*

Aviation Gasoline. EIA adopted the thermal conversion factor of 5.048 million Btu per barrel as adopted by the Bureau of Mines from the Texas Eastern Transmission Corporation publication *Competition and Growth in American Energy Markets 1947-1985,* a 1968 release of historical and projected statistics.

Butane. EIA adopted the Bureau of Mines thermal conversion factor of 4.326 million Btu per barrel as published in the *California Oil World and Petroleum Industry,* First Issue, April 1942.

Butane-Propane Mixture. EIA adopted the Bureau of Mines calculation of 4.130 million Btu per barrel based on an assumed mixture of 60 percent butane and 40 percent propane. See **Butane** and **Propane.**

Crude Oil, Exports. Assumed by EIA to be 5.800 million Btu per barrel or equal to the thermal conversion factor for crude oil produced in the United States. See **Crude Oil and Lease Condensate, Production.**

Crude Oil, Imports. Calculated annually by EIA by weighting the thermal conversion factor of each type of crude oil imported by the quantity imported. Thermal conversion factors for each type were calculated on a foreign country basis, by determining the average American Petroleum Institute (API) gravity of crude imported from each foreign country from Form ERA-60 in 1977 and converting average API gravity to average Btu content by using National Bureau of Standards, Miscellaneous Publication No. 97, *Thermal Properties of Petroleum Products,* 1933.

Crude Oil and Lease Condensate, Production. EIA adopted the thermal conversion factor of 5.800 million Btu per barrel as reported in a Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950. "

Crude Oil and Petroleum Products, Exports. Calculated annually by EIA as the average of the thermal conversion factors for each petroleum product exported and crude oil exported weighted by the quantity of each petroleum product and crude oil exported. See **Petroleum Products, Exports** and **Crude Oil, Exports.**

Crude Oil and Petroleum Products, Imports. Calculated annually by EIA as the average of the thermal conversion factors for each petroleum product and each crude oil imported weighted by the quantity of each petroleum product and each type of crude oil imported. See **Crude Oil, Imports** and **Petroleum Products, Imports.**

Distillate Fuel Oil. EIA adopted the Bureau of Mines thermal conversion factor of 5.825 million Btu per barrel as reported in a Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950."

Ethane. EIA adopted the Bureau of Mines thermal conversion factor of 3.082 million Btu per barrel as published in the *California Oil World and Petroleum Industry,* First Issue, April 1942.

Ethane-Propane Mixture. EIA calculation of 3.308 million Btu per barrel based on an assumed mixture of 70 percent ethane and 30 percent propane. See **Ethane and Propane.**

Isobutane. EIA adopted the Bureau of Mines thermal conversion factor of 3.974 million Btu per barrel as published in the *California Oil World and Petroleum Industry,* First Issue, April 1942.

Jet Fuel, Kerosene Type. EIA adopted the Bureau of Mines thermal conversion factor of 5.670 million Btu per barrel for "Jet Fuel, Commercial" as published by the Texas Eastern Transmission Corporation in the report *Competition and Growth in American Energy Markets 1947-1985,* a 1968 release of historical and projected statistics.

Jet Fuel, Naphtha Type. EIA adopted the Bureau of Mines thermal conversion factor of 5.355 million Btu per barrel for "Jet Fuel, Military" as published by the Texas Eastern Transmission Corporation in the report *Competition and Growth in American Energy Markets 1947-1985,* a 1968 release of historical and projected statistics.

Kerosene. EIA adopted the Bureau of Mines thermal conversion factor of 5.670 million Btu per barrel as reported in a Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950."

Lubricants. EIA adopted the thermal conversion factor of 6.065 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956.*

Miscellaneous Products. EIA adopted the thermal conversion factor of 5.796 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956.*

Motor Gasoline. EIA adopted the Bureau of Mines thermal conversion factor of 5.253 million Btu per barrel for "Gasoline, Motor Fuel" as published by the Texas Eastern Transmission Corporation in the report *Competition and Growth in American Energy Markets 1947-1985,* a 1968 release of historical and projected statistics.

Natural Gas Plant Liquids, Production. Calculated annually by EIA as the average of the thermal conversion factors of each natural gas plant liquid produced, weighted by the quantity of each natural gas plant liquid produced.

Natural Gasoline. EIA adopted the thermal conversion factor of 4.620 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

Pentanes Plus. EIA assumed the thermal conversion factor to be 4.620 million Btu or equal to that for natural gasoline. See **Natural Gasoline.**

Petrochemical Feedstocks, Naphtha less than 401^0 F. Assumed by EIA to be 5.248 million Btu per barrel, equal to the thermal conversion factor for special naphthas. See **Special Naphthas**.

Petrochemical Feedstocks, Other Oils equal to or greater than 401^0 F. Assumed by EIA to be 5.825 million Btu per barrel, equal to the thermal conversion factor for distillate fuel oil. See **Distillate Fuel Oil.**

Petrochemical Feedstocks, Still Gas. Assumed by EIA to be 6.000 million Btu per barrel, equal to the thermal conversion factor for still gas. See **Still Gas.**

Petroleum Coke. EIA adopted the thermal conversion factor of 6.024 million Btu per barrel as reported in Btu per short ton in the Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950." The Bureau of Mines calculated this factor by dividing 30,120,000 Btu per short ton, as given in the referenced Bureau of Mines internal memorandum, by 5.0 barrels per short ton, as given in the Bureau of Mines Form 6-1300-M and successor EIA forms.

Petroleum Products, Total Consumption. Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed, weighted by the quantity of each petroleum product consumed.

Petroleum Products, Consumption by Electric Utilities. Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed at electric utilities, weighted by the quantity of each petroleum product consumed at electric utilities. The quantity of petroleum products consumed is estimated in the State Energy Data System as documented in EIA's *State Energy Data Report.*

Petroleum Products, Consumption by Industrial Users. Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed in the industrial sector, weighted by the estimated quantity of each petroleum product consumed in the industrial sector. The quantity of petroleum products consumed is estimated in the State Energy Data System as documented in EIA's *State Energy Data Report.*

Petroleum Products, Consumption by Residential and Commercial Users. Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed by the residential and commercial sector, weighted by the estimated quantity of each petroleum product consumed in the residential and commercial sector. The quantity of

petroleum products consumed is estimated in the State Energy Data System as docurnented in EIA's *State Energy Data Report.*

Petroleum Products, Consumption by Transportation Users. Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed in the transportation sector, weighted by the estimated quantity of each petroleum product consumed in the transportation sector. The quantity of petroleum products consumed is estimated in the State Energy Data System as documented in EIA's *State Energy Data Report.*

Petroleum Products, Exports. Calculated annually by EIA as the average of the thermal conversion factors for each petroleum product, weighted by the quantity of each petroleum product exported.

Petroleum Products, Imports. Calculated annually by EIA as the average of the thermal conversion factors for each petroleum product imported, weighted by the quantity of each petroleum product imported.

Plant Condensate. Estimated to be 5.418 million Btu per barrel by EIA from data provided by McClanahan Consultants, Inc., Houston, Texas.

Propane. EIA adopted the Bureau of Mines thermal conversion factor of 3.836 million Btu per barrel as published in the *California Oil World and Petroleum Industry,* First Issue, April 1942.

Residual Fuel Oil. EIA adopted the thermal conversion factor of 6.287 million Btu per barrel as reported in the Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950."

Road Oil. EIA adopted the Bureau of Mines thermal conversion factor of 6.636 million Btu per barrel, which was assumed to be equal to that of asphalt (see **Asphalt)** and was first published by the Bureau of Mines in the *Petroleum Statement, Annual, 1970.*

Special Naphthas. EIA adopted the Bureau of Mines thermal conversion factor of 5.248 million Btu per barrel, which was assumed to be equal to that of the total gasoline (aviation and motor) factor and was first published in the *Petroleum Statement, Annual, 1970.*

Still Gas. EIA adopted the Bureau of Mines estimated thermal conversion factor of 6.000 million Btu per barrel, first published in the *Petroleum Statement, Annual, 1970.*

Unfinished Oil. EIA assumed the thermal conversion factor to be 5.825 million Btu per barrel or equal to that for distillate fuel oil (see **Distillate Fuel Oil)** and first published it in EIA's *Annual Report to Congress, Volume 3, 1977.*

Unfractionated Stream. EIA assumed the thermal conversion factor to be 5.418 million Btu per barrel or equal to that for plant condensate (see **Plant Condensate)** and first published it in EIA's *Annual Report to Congress, Volume 2, 1981.*

Wax. EIA adopted the thermal conversion factor of 5.537 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956.*

Approximate Heat Content of Natural Gas

Natural Gas, Total Consumption. • 1949-1962: EIA adopted the thermal conversion factor of 1,035 Btu per cubic foot as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956.* • *1963*-1979: EIA adopted the thermal conversion factor calculated annually by the American Gas Association (AGA) and published in *Gas Facts,* an AGA annual publication. • 1980 forward: Calculated annually by EIA by dividing the total heat content of natural gas consumed by the total quantity of natural gas consumed.

Natural Gas, Exports. • 1949-1972: Assumed by EIA to be equal to the thermal conversion factor for the consumption of dry natural gas. (See Natural Gas, Total Consumption). • 1973 forward: Calculated annually by EIA by dividing the heat content of exported natural gas by the quantity of natural gas exported, both reported on Form FPC-14.

Natural Gas Imports. • 1949-1972: Assumed by EIA to be equal to the thermal conversion factor for the consumption of dry natural gas. See **Natural Gas, Total Consumption**. • 1973 forward: Calculated annually by EIA by dividing the heat content of imported natural gas by the quantity of natural gas imported, both reported on Form FPC-14.

Natural Gas, Production (Dry). Assumed by EIA to be equal to the thermal conversion factor for the consumption of dry natural gas. See **Natural Gas, Total Consumption**.

Natural Gas, Production (Wet). Calculated annually by EIA by adding the heat content of natural gas, dry production, and the total heat content of natural gas plant liquids production and dividing this sum by the total quantity of marketed (wet) natural gas production.

Approximate Heat Content of Coal and Coal Coke

Anthracite, Total Consumption. Calculated annually by EIA by dividing the sum of the heat content of anthracite consumed by electric utilities and all other sectors combined by the total quanitity of anthracite consumed.

Anthracite, Consumption by Electric Utilities. • 1949-1972: Assumed by EIA that all anthracite consumed at electric utilities was recovered from culm banks and river dredging and estimated to have an average heat content of 17.500 million Btu per short ton. • 1973 forward: Calculated annually by EIA by dividing the heat content of anthracite receipts at electric utilities by the quantity of anthracite received at electric utilities, as reported on Form FERC-423 and predecessor forms.

Anthracite, Consumption by Sectors Other Than Electric Utilities. Calculated annually by EIA by dividing the heat content of anthracite production less the heat content of the anthracite consumed at electric utilities, net exports, and shipments to U.S. Armed Forces overseas by the quantity of anthracite consumed by sectors other than electric utilities, less the quantity of anthracite stock changes, losses, and "unaccounted for."

Anthracite, Imports and Exports. EIA assumed the anthracite imports and exports to be freshly mined anthracite having an estimated heat content of 25.400 million Btu per short ton.

Anthracite, Production. Calculated annually by EIA by dividing the sum of the heat content of freshly mined anthracite (estimated to have an average heat content of 25.400 million Btu per short ton) and the heat content of anthracite recovered from culm banks and river dredging (estimated to have an average heat content of 17.500 million Btu per short ton) by the total quantity of anthracite produced.

Bituminous Coal and Lignite, Total Consumption. Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite consumed by electric utilities, coal coke plats, other industrial plants, and by the residential and commercial sector and the transportation sector by the sum of their respective tonnages.

Bituminous Coal and Lignite, Consumption by Coke Plants. Estimated by EIA to be 26.800 million Btu per short ton based on input-output analysis of coal carbonization.

Bituminous Coal and Lignite, Consumption by Electric Utilities. •1949-1972: EIA adopted the average thermal conversion factor of the Bureau of Mines, which used the National Coal Association average thermal conversion factor for electric utilities calculated from Form FPC-1 and published in *Steam Electric Plant Factors*, a National Coal Association annual report. • 1973 forward: Calculated annually by EIA by dividing the total heat content of bituminous coal and lignite received at electric utilities by the total quantity received at electric utilities. Heat contents and receipts are from Form FERC-423 and predecessor Forms.

Bituminous Coal and Lignite, Consumption by Other Industrial Users • 1949-1973: Calculated annually by EIA through regression analysis measuring the difference between the average Btu value of coal consumed by other industrial users and that of coal consumed at electric utilities in the 1974-1983 period. • 1974 forward: Calculated annually by EIA by assuming that the bituminous coal and lignite delivered to other industrial users from each coal-producing area (reported on Form EIA-6 and predecessor Bureau of Mines Form 6-1419-Q) contained a heat value equal to that of bituminous coal and lignite received at electric utilites 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 forward.

Bituminous Coal and Lignite, Consumption by Residential and Commercial Users. • 1949-1973: Calculated annually by EIA through regression analysis measuring the difference between the average Btu value of coal consumed by residental and commercial users and that of coal consumed by electric utilities in the 1974-1983 period. • 1974 forward: Calculated annually by EIA by assuming that the bituminous coal and lignite

delivered to residential and commercial users from each coal-producing area (reported on Form EIA-6 and predecessor Bureau of Mines Form 6-1419-Q) contained a heat value equal to that of bituminous coal and lignite received at electric utilities from each of the same coal-producing areas (reported on Form FERC-423). The average Btu value of coal by coal-producing area was applied to the volume of deliveries to residential and commercial users from each coal-producing area, and the sum total of the heat value was divided by the total volume of deliveries. Coal-producing areas are the Bureau of Mines coal-producing districts for 1974 through 1989 and coal-producing States for 1990 forward.

Bituminous Coal and Lignite, Consumption by Transportation Users. Assumed by EIA to be equal to the Btu conversion factor for **Bituminous Coal and Lignite, Consumption by Other Industrial Users.**

Bituminous Coal and Lignite, Exports. • 1949-1972: Assumed by EIA to be all metallurgical coal and to have an average thermal content of 27.000 million Btu per short ton. • 1973 forward: Calculated annually by EIA by dividing the sum of the heat content of exported metallurgical coal (estimated to average 27.000 million Btu per short ton) and the heat content of exported steam coal (estimated to have an average thermal content of 25.000 million Btu per short ton) by the total quantity of bituminous coal and lignite exported.

Bituminous Coal and Lignite, Imports. EIA estimated the average thermal conversion factor to be 25.000 million Btu per short ton.

Bituminous Coal and Lignite, Production. Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite consumption, net exports, stock changes, and unaccounted for by the sum of their respective tonnages. Consumers' stock changes by sectors were assumed to have the same conversion factor as that for the consumption sector. Producers' stock changes and unaccounted for were assumed to have the same conversion factor as that for consumption by all users.

Coal, Total Consumption. Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite and anthracite consumption by the sum of their respective tonnages.

Coal, Consumption by Electric Utilities. Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite and anthracite received at electric utilities by the sum of their respective tonnages received.

Coal, Consumption by Sectors Other Than Electric Utilities. Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite and anthracite consumed by sectors other than electric utilities by the sum of their respective tonnages.

Coal, Exports. Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite and anthracite exported by the sum of their respective tonnages.

Coal, Imports. Calculated annually by EIA by dividing the sum of the heat content of bituminous coal and lignite and anthracite imported by the sum of their respective tonnages.

Coal, Production. Calculated annually by EIA by dividing the sum of the total heat content of bituminous coal and lignite and anthracite produced by the sum of their respective tonnages.

Coal Coke, Imports and Exports. EIA adopted the Bureau of Mines estimate of 24.800 million Btu per short ton.

Approximate Heat Rates for Electricity

Fossil-Fueled Steam-Electric Plant Generation. There is no generally accepted practice for measuring the thermal conversion rates for power plants that generate electricity from hydroelectric, wood and waste, wind, photovoltaic, or solar thermal energy sources. Therefore, EIA used data from Form EIA-767, "Steam-Electric Power Operation and Design Report," to calculate a rate factor that is equal to the prevailing annual average heat rate factor for fossil-fueled steam-electric power plants in the United States. By using that factor, it is possible to evaluate fossil fuel requirements for replacing those sources during periods of interruption, such as droughts. The heat content of a kilowatthour of electricity produced, regardless of the generation process, is 3,412 Btu. • 1949-1955: The weighted annual average heat rate for fossil-fueled steam-electric power plants in the United States, as published by EIA in *Thermal-Electric Plant Construction Cost and Annual Production Expenses–1981* and *Steam-Electric Plant Construction Cost and Annual Production Expenses–1978.* • 1956-1991: 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 1991*, Table 9. • 1992 forward: Unpublished factors calculated on the basis of data from Form EIA-676, "Steam-Electric Plant Operation and Design Report."

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, "Power System Statement." • 1982 forward: Estimated annually by EIA on the basis of an informal survey of relevant plants.

Nuclear Steam-Electric Plant Generation. • 1957-1991: 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, "Annual Report of Major Electric Utilities, Licensees, and Others;" Form EIA-412, "Annual Report of Public Electric Utilities;" 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. 1983-1991: *Electric Plant Cost and Power Production Expenses 1991*, Table 13. 1992 forward: Calculated annually by EIA by dividing the total heat content of the steam leaving the nuclear generating units to generate electricity by the total (net) electricity generated by nuclear generating units. The heat content and electricity generation data are reported in Nuclear Regulatory Commission, *Licensed Operating Reactors—Status Summary Report*.

Appendix B

Data presented in the *Annual Energy Review* and in other Energy Information Administration publications are expressed predominately in units that historically have been used in the United States, such as British thermal units, barrels, cubic feet, and short tons. However, because U.S. commerce involves other nations, most of which use metric units of measure, the U.S. Government is committed to the transition to the metric system, as stated in the Metric Conversion Act of 1975 (Public Law 94-168), amended by the Omnibus Trade and Competitiveness Act of 1988 (Public Law 100-418), and Executive Order 12770 of July 25, 1991.

The metric conversion factors presented in Table B1 can be used to calculate the metric-unit equivalents of values expressed in U.S. customary units. For example, 500 short tons is the equivalent of 453.6 metric tons (500 short tons x 0.9071847 metric tons/short ton = 453.6 metric tons).

In the metric system of weights and measures, the names of multiples and subdivisions of any unit may be derived by combining the name of the unit with prefixes, such as deka, hecto, and kilo, meaning, respectively, 10, 100, 1,000, and deci, centi, and milli, meaning, respectively, one-tenth, one-hundredth, and one-thousandth. Common metric prefixes can be found in Table B2.

The conversion factors presented in Table B3 can be used to calculate equivalents in various physical units commonly used in energy analyses. For example, 10 barrels is the equivalent of 420 U.S. gallons (10 barrels x 42 gallons/barrel = 420 gallons).

Table B1. Metric Conversion Factors

U.S. Unit	*multiplied by*	Conversion Factor	*equals*	Metric Unit
Mass				
short tons (2,000 lb)	x	0.907 184 7	=	metric tons (t)
long tons	x	1.016 047	=	metric tons (t)
pounds (lb)	x	0.453 592 37[a]	=	kilograms (kg)
pounds uranium oxide (lb U_3O_8)	x	0.384 647[b]	=	kilograms uranium (kgU)
ounces, avoirdupois (avdp oz)	x	28.349 52	=	grams (g)
Length				
miles (mi)	x	1.609 344[a]	=	kilometers (km)
yards (yd)	x	0.914 4[a]	=	meters (m)
feet (ft)	x	0.304 8[a]	=	meters (m)
inches (in)	x	2.54[a]	=	centimeters (cm)
Energy				
British Thermal Units (Btu)	x	1,055.055 852 62[a,c]	=	joules (J)
calories (cal)	x	4.186 8[a]	=	joules (J)
kilowatthours (kWh)	x	3.6[a]	=	megajoules (MJ)

U.S. Unit	*multiplied by*	Conversion Factor	*equals*	Metric Unit
Volume				
barrels of oil (bbl)	x	0.158 987 3	=	cubic meters (m^3)
cubic yards (yd^3)	x	0.764 555	=	cubic meters (m^3)
cubic feet (ft^3)	x	0.028 316 85	=	cubic meters (m^3)
U.S. gallons (gal)	x	3.785 412	=	liters (L)
ounces, fluid (fl oz)	x	29.573 53	=	milliliters (mL)
cubic inches (in^3)	x	16.387 06	=	milliliters (mL)
Area				
acres	x	0.404 69	=	hectares (ha)
square miles (mi^2)	x	2.589 988	=	square kilometers (km^2)
square yards (yd^2)	x	0.836 127 4	=	square meters (m^2)
square feet (ft^2)	x	0.092 903 04[a]	=	square meters (m^2)
square inches (in^2)	x	6.451 6[a]	=	square centimeters (cm^2)
Temperature				
degrees Fahrenheit (°F)	x	5/9 (after subtracting 32)[a,d]	=	degrees Celsius (°C)

[a]Exact conversion.
[b]Calculated by the Energy Information Administration.
[c]The Btu used in this table is the International Table Btu adopted by the Fifth International Conference on Properties of Steam, London, 1956.
[d]To convert degrees Celsius (°C) to degrees Fahrenheit (°F) exactly, multiply by 9/5, then add 32.
Notes: • Spaces have been inserted after every third digit to the right of the decimal for ease of reading. • Most metric units shown belong to the International System of Units (SI), and the liter, hectare, and metric ton are accepted for use with the SI units. For more information about the SI units, contact Dr. Barry Taylor at Building 221, Room B160, National Institute of Standards and Technology, Gaithersburg, MD 20899, or on telephone number 301–975–4220.
Sources: General Services Administration, Federal Standard 376B, *Preferred Metric Units for General Use by the Federal Government* (Washington, DC, January 27, 1993), pp. 9–11, 13, and 16. National Institute of Standards and Technology, Special Publications 330, 811, and 814. American National Standards Institute/Institute of Electrical and Electronic Engineers, ANSI/IEEE Std. 268–1992, pp. 28 and 29.

Table B2. Metric Prefixes

Unit Multiple	Prefix	Symbol	Unit Multiple	Prefix	Symbol
10^{1}	deka	da	10^{-1}	deci	d
10^{2}	hecto	h	10^{-2}	centi	c
10^{3}	kilo	k	10^{-3}	milli	m
10^{6}	mega	M	10^{-6}	micro	µ
10^{9}	giga	G	10^{-9}	nano	n
10^{12}	tera	T	10^{-12}	pico	p
10^{15}	peta	P	10^{-15}	femto	f
10^{18}	exa	E	10^{-18}	atto	a
10^{21}	zetta	Z	10^{-21}	zepto	z
10^{24}	yotta	Y	10^{-24}	yocto	y

Source: U.S. Department of Commerce, National Institute of Standards and Technology, *The International System of Units (SI),* NIST Special Publication 330, 1991 Edition (Washington, DC, August 1991), p. 10.

Table B3. Other Physical Conversion Factors

Energy Source	Original Unit	*multiplied by*	Conversion Factor	*equals*	Final Unit
Petroleum	barrels (bbl)	x	42[a]	=	U.S. gallons (gal)
Coal	short tons	x	2,000[a]	=	pounds (lb)
	long tons	x	2,240[a]	=	pounds (lb)
	metric tons (t)	x	1,000[a]	=	kilograms (kg)
Wood	cords (cd)	x	1.25[b]	=	short tons
	cords (cd)	x	128[a]	=	cubic feet (ft^3)

[a]Exact conversion.

[b]Calculated by the Energy Information Administration.

Source: U.S. Department of Commerce, National Institute of Standards and Technology, *Specifications, Tolerances and Other Technical Requirements for Weighing and Measuring Devices*, NIST Handbook 44, 1994 Edition (Washington, DC, October 1993), pp. B-10, C-17, and C-21.

Appendix C

Carbon Dioxide Emission Factors for Coal

Table C1 presents U.S. average carbon dioxide emission factors for coal by sector. The factors measure the emissions produced during the combustion of coal and were derived by the Energy Information Administration (EIA) from 5,426 sample analyses in EIA's Coal Analysis File. The factors are ratios of the carbon dioxide emitted to the heat content of the coal burned, assuming complete combustion. Factors vary according to the rank and geographic origin of the coal. Sectoral factors reflect the rank and origin of the coal consumed in the sector. Factors differ among sectors and within a sector over time for several reasons:

1. A higher average emission factor in the residential and commercial sector can be attributed to the steady consumption of bituminous coal and anthracite (presumably for home heating).

2. Virtually all of the coal consumed by coke plants comes from only a few States in the Appalachian Coal Basin (West Virginia, Virginia, and eastern Kentucky). Hence, the emission factors for this sector have remained fairly constant.

3. Other industrial users of coal (not coke plants) increased consumption of low-rank, high-emission western coals, which has contributed to a rise in their average emission factor.

4. Electric utilities, which account for most U.S. coal consumption, have shifted over time away from high-rank, low-emission bituminous coal to low-rank, high–emission subbutiminous coal and lignite as reflected in a gradually rising weighted-average carbon dioxide emission factor.

Table C1. Average Carbon Dioxide Emission Factors for Coal by Sector, 1980-1996
(Pounds of Carbon Dioxide per Million Btu)

Year	Residential and Commercial	Industrial		Electric Utilities	U.S. Average[b]
		Coke Plants[a]	Other Coal		
1980	210.6	205.8	205.9	206.7	206.5
1981	212.0	205.8	205.9	206.9	206.7
1982	210.4	205.7	206.0	207.0	206.9
1983	209.2	205.5	205.9	207.1	207.0
1984	209.5	205.6	206.2	207.1	207.0
1985	209.3	205.6	206.4	207.3	207.1
1986	209.2	205.4	206.5	207.3	207.1
1987	209.4	205.2	206.4	207.3	207.2
1988	209.1	205.3	206.4	207.6	207.3
1989	209.7	205.3	206.6	207.5	207.3
1990	209.5	206.2	206.8	207.6	207.4
1991	210.2	206.2	206.9	207.7	207.5
1992	211.2	206.2	207.1	207.7	207.6
1993	209.9	206.2	207.0	207.8	207.7
1994	209.8	206.3	207.2	207.9	207.8
1995	210.2	206.4	207.2	208.1	207.9
1996	209.5	206.5	207.0	208.1	208.0

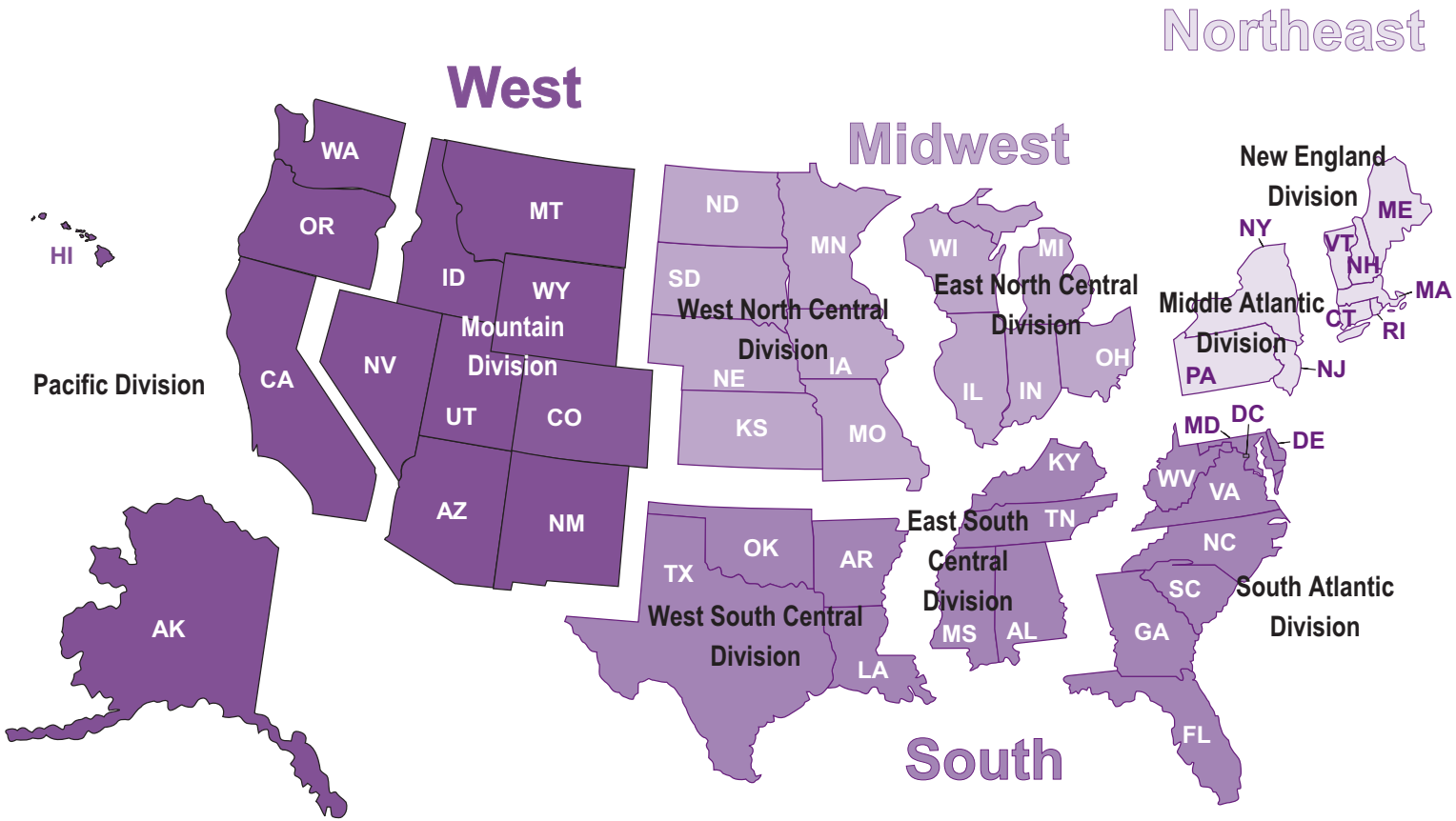
[a]No allowances have been made for carbon related non-energy coal chemical by products from the coal carbonization process.

[b]Weighted average. The weights used are consumption values by sector.
Source: Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate fuels.

Appendix D

U.S. Census Regions and Divisions

Figure D1. U.S. Census Regions and Divisions



Note: Map not to scale.
Source: Adapted from U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States, 1997* (Washington, DC, November 1997), Figure 1.

Glossary

Account of Others (natural gas): Natural gas deliveries for the account of others are deliveries to customers by transporters that do not own the natural gas but deliver it for others for a fee. Included are quantities covered by long-term contracts and quantities involved in short-term or spot market sales.

Additions to Property: The current year's expenditures on property, plant, and equipment. The amount is predicated upon each reporting company's accounting practices. That is, accounting practices with regard to capitalization of certain items may differ across companies, and, therefore, this figure is a function of each reporting company's policy.

Alcohol: The family name of a group of organic chemical compounds composed of carbon, hydrogen, and oxygen. The series of molecules vary in chain length and are composed of a hydrocarbon plus a hydroxyl group: 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.

Anthracite Culm: Waste from Pennsylvania anthracite preparation plants, consisting of coarse rock fragments containing as much as 30 prcent small-sized coal; sometimes defined as including very fine coal particles called silt. Its heat value ranges from 8 to 17 million Btu per short ton.

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.

Asphalt: A dark-brown-to-black cement-like material containing bitumens as the predominant constituents. It is obtained by petroleum processing. The definition includes crude asphalt as well as the following finished products: cements, fluxes, the asphalt content of emulsions (exclusive of water), and petroleum distillates blended with asphalt to make cutback asphalts.

ASTM: The American Society for Testing and Materials.

Aviation Gasoline Blending Components: Naphthas that are used for blending or compounding into finished aviation gasoline (e.g., straight-run gasoline, alkylate, and 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, wood waste, wood liquors, peat, railroad ties, wood sludge, spent sulfite liquors, agricultural waste, straw, tires, fish oils, tall

oil, sludge waste, waste alcohol, municipal solid waste, landfill gases, other waste, and ethanol blended into motor gasoline.

Biomass: Materials that are biological in origin, including organic material (both living and dead) from above and below ground, for example, trees, crops, grasses, tree litter, roots, and animals and animal waste.

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 a given period of time to the electrical energy that could have been produced at continuous full-power operation during the same period.

Chained Dollars: A measure used to express real prices. Real prices are those that have been adjusted to remove the effect of changes in the purchasing power of the dollar; they usually reflect buying power relative to a reference year. Prior to 1996, real prices were expressed in constant dollars, a measure based on the weights of goods and services in a single year, usually a recent year. In 1996, the U.S. Department of Commerce introduced the chained-dollar measure. The new measure is based on the average weights of goods and services in successive pairs of years. It is "chained" because the second year in each pair, with its weights, becomes the first year of the next pair. The advantage of using the chained-dollar measure is that it is more closely related to any given period covered and is therefore subject to less distortion over time.

CIF: See **Cost, Insurance, Freight.**

City Gate: A point or measuring station at which a distribution gas utility receives gas from a natural gas pipeline company or transmission system.

Class A Electric Utility: An electric utility having annual electric operating revenues of $2.5 million or more. (Use of this term ceased on December 31, 1983.)

Class B Electric Utility: An electric utility having annual electric operating revenues of $1.0 million or more but less than $2.5 million. (Use of this term ceased on December 31, 1983.)

Coal: A black or brownish-black solid, combustible substance formed by the partial decomposition of vegetable matter without access to air. The rank of coal, which includes anthracite, bituminous coal, subbituminous coal, and lignite, is based on fixed carbon, volatile matter, and heating value. Coal rank indicates the progressive alteration, or coalification, from lignite to anthracite. Lignite contains approximately 9 to 17 million Btu per ton. The heat contents of subbituminous and bituminous coal range from 16 to 24 million Btu per ton, and from 19 to 30 million Btu per ton, respectively. Anthracite contains approximately 22 to 28 million Btu per ton.

Coalbed Methane: Methane that is produced from coalbeds in the same manner as natural gas produced from other strata. Methane is the principal component of natural gas.

Coal Coke: A hard, porous product made from baking bituminous coal in ovens at temperatures as high as 2,000° F. It is used both as a fuel and as a reducing agent in smelting iron ore in a blast furnace.

Cogenerator: A generating facility that produces electricity and another form of useful thermal energy (such as heat or steam) used for industrial,

commercial, heating, and cooling purposes. See **Nonutility Power Producer.**

Commercial Building: A building with more than 50 percent of its floor-space used for commercial activities. Commercial buildings include, but are not limited to, stores, offices, schools, churches, gymnasiums, libraries, museums, hospitals, clinics, warehouses, and jails. Government buildings are included, except buildings on military bases or reservations.

Commercial Sector: The commercial sector, as defined economically, consists of business establishments that are not engaged in transportation or in manufacturing or other types of industrial activity (agriculture, mining, or construction). Commercial establishments include hotels, motels, restaurants, wholesale businesses, retail stores, laundries, and other service enterprises; religious and nonprofit organizations; health, social, and educational institutions; and Federal, State, and local governments. Street lights, pumps, bridges, and public services are also included if the establishment operating them is considered commercial. Standard Industrial Classification (SIC) codes used to classify an establishment as commercial are 50 through 87, 89, and 91 through 97.

Completion: The installation of permanent equipment for the production of oil or gas. If a well is equipped to produce only oil or gas from one zone or reservoir, the definition of a well (classified as an oil well or gas well) and the definition of a completion are identical. However, if a well is equipped to produce oil and/or gas separately from more than one reservoir, a well is not synonymous with a completion.

Constant Dollars: See **Chained Dollars.**

Conversion Factor: A number that translates units of one system into corresponding values of another system. Conversion factors can be used to translate physical units of measure for various fuels into Btu equivalents.

Cost, Insurance, Freight (CIF): A type of sale in which the buyer of the product agrees to pay a unit price that includes the f.o.b. value of the product at the point of origin, plus all costs of insurance and transportation. This type of transaction differs from a "delivered" purchase in that the buyer accepts the quantity as determined at the loading port (as certified by the Bill of 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.

Criteria Polluntant: A pollutant determined to be hazardous to human health and regulated under the Environmental Protection Agency's (EPA) National Ambient Air Quality Standards. The 1970 amendments to the Clean Air Act require EPA to describe the health and welfare impacts of a pollutant as the "criteria" for inclusion in the regulatory regime.

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.

Culm: See **Anthacite Culm**.

Current Dollars: See **Nominal Dollars.**

Degree-Days, Cooling (CDD): The number of degrees per day that the daily average temperature is above 65° F. The daily average temperature is the mean of the maximum and minimum temperatures for a 24-hour period.

Degree-Days, Heating (HDD): The number of degrees per day that the daily average temperature is below 65° F. The daily average temperature is the mean of the maximum and minimum temperatures for a 24-hour period.

Degree-Days, Population-Weighted: Heating or cooling degree-days weighted by the population of the area in which the degree-days are recorded. To compute State population-weighted degree-days, each State is divided into from one to nine climatically homogeneous divisions, which are assigned weights based on the ratio of the population of the division to the total population of the State. Degree-day readings for each division are multiplied by the corresponding population weight for each division and those products are then summed to arrive at the State population-weighted degree-day figure. To compute national population-weighted degree-days, the Nation is divided into nine Census regions, each comprising from three to eight States, which are assigned weights based on the ratio of the population of the region to the total population of the Nation. Degree-day readings for each region are multiplied by the corresponding population weight for each region and those products are then summed to arrive at the national population-weighted degree-day figure.

Demonstrated Reserve Base (coal): A collective term for the sum of coal in both measured and indicated resource categories of reliability, representing 100 percent of the in-place coal in those categories as of a certain date. Includes beds of bituminous coal and anthracite 28 or more inches thick and beds of subbituminous coal 60 or more inches thick that can occur at depths of up to 1,000 feet. Includes beds of lignite 60 or more inches thick that can be surface mined. Includes also thinner and/or deeper beds that currently are being mined or for which there is evidence that they could be mined commercially at a given time. Represents that portion of the identified coal resource from which reserves are calculated.

Design Electrical Rating, Net: The nominal net electrical output of a nuclear unit as specified by the electric utility for the purpose of plant design.

Development Well: A well drilled within the proved area of an oil or gas reservoir to the depth of a stratigraphic horizon known to be productive.

Distillate Fuel Oil: A general classification for one of the petroleum fractions produced in conventional distillation operations. Included are products known as No. 1, No. 2, and No. 4 fuel oils and No. 1, No. 2, and No. 4 diesel fuels. It is used primarily for space heating, on- and off-highway diesel engine fuel (including railroad engine fuel and fuel for agricultural machinery), and electric power generation.

Distillation Unit (atmospheric): The primary distillation unit that processes crude oil (including mixtures of other hydrocarbons) at approximately atmospheric conditions. It includes a pipe still for vaporizing the crude oil and a fractionation tower for separating the vaporized hydrocarbon components in the crude oil into fractions with different boiling ranges. This is done by continuously vaporizing and condensing the components to separate higher boiling point material. The selected boiling ranges are set by the processing scheme, the properties of the crude oil, and the product specifications.

District Heat: Steam or hot water from an outside source used as an energy source in a building. The steam or hot water is produced in a central plant and piped into the building. The district heat may be purchased from a utility or provided by a physical plant in a separate building that is part of the same facility (for example, a hospital complex or university).

Dry Hole: An exploratory or development well found to be incapable of producing either oil or gas in sufficient quantities to justify completion as an oil or gas well.

Dry Natural Gas Production (as a decrement from gas reserves): The volume of natural gas withdrawn from reservoirs during the report year less (1) the volume returned to such reservoirs in cycling, repressuring of oil reservoirs, and conservation operations; (2) shrinkage resulting from the removal of lease condensate and plant liquids; and (3) nonhydrocarbon gases, where they occur in sufficient quantity to render the gas unmarketable. Volumes of gas withdrawn from gas storage reservoirs and native gas that has been transferred to the storage category are not considered in production. This is not the same as marketed production, since the latter also excludes vented and flared gas but contains liquids.

Dry Natural Gas Production (as an increment to gas supply): Gross withdrawals from production reservoirs less gas used in reservoir repressuring, amounts vented and flared, nonhydrocarbons removed, and various natural gas constituents, such as ethane, propane, and butane, removed at natural gas processing plants. The parameters for measurement are 60° F and 14.73 pounds standard per square inch absolute.

Eastern Europe and Former U.S.S.R: Includes Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Czech Republic, Estonia, Former Czechoslovakia, Former U.S.S.R, Georgia, Hungary, Kazakstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Solvakia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan.

Electrical System Energy Losses: The amount of energy lost during generation, transmission, and distribution of electricity, including plant and unaccounted-for uses.

Electricity Generation: The process of producing electric energy or transforming other forms of energy into electric energy. Also, the amount of electric energy produced or expressed in watthours (Wh).

Electricity Generation, Gross: The total amount of electric energy produced by a generating facility, as measured at the generator terminals.

Electricity Generation, Net: Gross generation minus plant use. The energy required for pumping at a pumped-storage hydroelectric plant is regarded as plant use and must be deducted from the gross generation.

Electricity Production: Net electricity (gross electricity output measured at generator terminals minus power plant use).

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: The electric utility sector consists of privately and publicly owned establishments that generate, transmit, distribute, or sell electricity primarily for use by the public and that meet the definition of an electric utility. Nonutility power producers are not included in the electric utility sector.

Eliminations: Revenues and expenses resulting from transactions between segments. Consolidated company accounts do not include intersegment revenues and expenses. Therefore, such intersegment transactions must be eliminated.

End-Use Sectors: The residential, commercial, industrial, and transportation sectors of the economy.

Energy: The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy). Energy has several forms, some of which are easily convertible and can be changed to another form useful for work. Most of the world's convertible energy comes from fossil fuels that are burned to produce heat that is then used as a transfer medium to mechanical or other means in order to accomplish tasks. Electrical energy is usually measured in kilowatthours, while heat energy is usually measured in British thermal units.

Energy Consumption: The use of energy as a source of heat or power or as an input in the manufacturing process.

Energy Consumption, End-Use: The sum of fossil fuel consumption by the four end-use sectors (residential, commercial, industrial, and transportation) plus electric utility sales to those sectors and generation of hydroelectric power by nonelectric utilities. Net end-use energy consumption excludes electrical system energy losses. Total end-use energy consumption includes electrical system energy losses.

Energy Consumption, Total: The sum of fossil fuels and renewable energy consumed by the five sectors (residential, commercial, industrial, transportation, and electric utility) plus coal coke net imports, nuclear electric power, and hydroelectric pumped storage.

Energy Expenditures: The money spent directly by consumers to purchase energy. Expenditures equal the amount of energy used by the consumer times the price per unit paid by the consumer.

Energy Source: A substance, such as petroleum, natural gas, or coal, that supplies heat or power. In Energy Information Administration (EIA) reports, electricity and renewable forms of energy, such as biomass, geothermal, wind, and solar, are considered to be energy sources.

Energy-Weighted Industrial Output: The weighted sum of real output for all two-digit Standard Industrial Classification (SIC) manufacturing industries, plus agriculture, construction, and mining. The weight for each industry is the ratio of the quantity of end-use energy consumption to the value of real output. The base year for those weights is either 1981 or 1982, depending on data availability.

Ethane: A normally gaseous straight-chain hydrocarbon (C_2H_6). It is a colorless, paraffinic gas that boils at a temperature of -127.48° 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 1998 began on October 1, 1997 and ends on September 30, 1998.

Flared Natural Gas: Natural gas burned in flares on the base site or at gas processing plants.

f.o.b.: See **Free on Board.**

Former U.S.S.R.: See **U.S.S.R.**

Footage Drilled: Total footage for wells in various categories, as reported for any specified period, includes (1) the deepest total depth (length of well bores) of all wells drilled from the surface, (2) the total of all bypassed footage drilled in connection with reported wells, and (3) all new footage drilled for directional sidetrack wells. Footage reported for directional sidetrack wells does not include footage in the common bore, which is reported as footage for the original well. In the case of old wells drilled deeper, the reported footage is that which was drilled below the total depth of the old well.

Forward Costs: The operating and capital costs still to be incurred in the production of uranium from estimated reserves; such costs are used in assigning the uranium reserves to cost categories. Those costs include labor, materials, power and fuel, royalties, payroll and production taxes, insurance, and applicable general and administrative costs. They exclude expenditures prior to reserve estimates, for example, for property acquisition, exploration, mine development, and mill construction from the forward cost determinations, as well as income taxes, profit, and the cost of money. Forward costs are neither the full costs of production nor the market price at which the uranium will be sold.

Fossil Fuel: Any naturally occurring organic fuel formed in the Earth's crust, such as petroleum, coal, and natural gas.

Fossil Fuel Steam-Electric Power Plant: An electricity generation plant in which the prime mover is a turbine rotated by high-pressure steam produced in a boiler by heat from burning fossil fuels.

Free Alongside Ship (f.a.s.): The value of a commodity at the port of exportation, generally including the purchase price, plus all charges incurred in placing the commodity alongside the carrier at the port of exportation.

Free on Board (f.o.b.): A transaction whereby the seller makes the product available within an agreed-on period at a given port at a given price. It is the responsibility of the buyer to arrange for the transportation and insurance.

Fuel Ethanol: An anhydrous, denatured aliphatic alcohol (C_2H_5OH) intended for motor gasoline blending. See **Oxygenates.**

Full-Power Operation: Operation of a nuclear generating unit at 100 percent of its design capacity. Full-power operation precedes commercial operation.

Gasohol: A blend of finished motor gasoline (leaded or unleaded) and alcohol (generally ethanol but sometimes methanol) limited to 10 percent by volume of alcohol. Gasohol is included in finished leaded and unleaded motor gasoline.

Gas-Turbine Electric Power Plant: A plant in which the prime mover is a gas turbine. A gas turbine typically consists of an axial-flow air compressor and one or more combustion chambers where liquid or gaseous fuel is burned. The hot gases expand to drive the generator and then are used to run the compressor.

Gas Well: A well completed for the production of natural gas from one or more gas zones or reservoirs. (Wells producing both crude oil and natural gas are classified as oil wells.)

Gas Well Productivity: Derived annually by dividing gross natural gas withdrawals from gas wells by the number of producing gas wells on December 31 and then dividing the quotient by the number of days in the year.

Geothermal Energy: Energy from the internal heat of the Earth, which may be residual heat, friction heat, or a result of radioactive decay. The heat is found in rocks and fluids at various depths and can be extracted by drilling and/or pumping.

Geothermal Energy (as used at electric utilities): Hot water or steam, extracted from geothermal reservoirs in the Earth's crust, and supplied to steam turbines at electric utilities that drive generators to produce electricity.

Gross Domestic Product (GDP): The total value of goods and services produced by labor and property located in the United States. As long as the labor and property are located in the United States, the supplier (that is, the workers and, for property, the owners) may be either U.S. residents or residents of foreign countries.

Gross Domestic Product (GDP) Implicit Price Deflator: A measure used to convert nominal prices to real prices. See **Chained Dollars.**

Gross Electricity Generation: See **Electricity Generation, Gross.**

Gross Input to Atmospheric Crude Oil Distillation Units: Total input to atmospheric crude oil distillation units. Includes all crude oil, lease condensate, natural gas plant liquids, unfinished oils, liquefied refinery gases, slop oils, and other liquid hydrocarbons produced from tar sands, gilsonite, and oil shale.

Heat Content of a Quantity of Fuel, Gross: The total amount of heat released when a fuel is burned. Coal, crude oil, and natural gas all include chemical compounds of carbon and hydrogen. When those fuels are burned, the carbon and hydrogen combine with oxygen in the air to produce carbon dioxide and water. Some of the energy released in burning goes into transforming the water into steam and is usually lost. The amount of heat spent in transforming the water into steam is counted as part of gross heat content but is not counted as part of net content. Also referred to as the higher heating value. Btu conversion factors typically used by EIA represent gross heat content.

Heat Content of a Quantity of Fuel, Net: The amount of usable heat energy released when a fuel is burned under conditions similar to those in which it is normally used. Also referred to as the lower heating value. Btu conversion factors typically used by the Energy Information Administration (EIA) represent gross heat content.

Heavy Oil: The fuel oils remaining after the lighter oils have been distilled off during the refining process. Except for start-up and flame stabilization, virtually all petroleum used in steam-electric power plants is heavy oil.

Household: A family, an individual, or a group of up to nine unrelated persons occupying the same housing unit. Occupy means the housing unit was the person's usual or permanent place of residence. The household includes babies, lodgers, boarders, employed persons who live in the housing unit, and persons who usually live in the household but are away traveling or in a hospital. The household does not include persons who are normally members of the household but who are away from home as college students or members of the armed forces. The household does not include persons temporarily visiting with the household if they have a place of residence elsewhere, persons who take their meals with the household but usually lodge or sleep elsewhere, domestic employees or other persons employed by the household who do not sleep in the same housing unit, or persons who are former members of the household, but have since become inmates of correctional or penal institutions, mental institutions, homes for the aged or needy, homes or hospitals for the chronically ill or handicapped, nursing homes, convents or monasteries, or other places in which residents may remain for long periods of time. By definition, the number of households is the same as the number of occupied housing units.

Housing Unit: A structure or part of a structure where a household lives. It has access from the outside of the building either directly or through a common hall. Housing units do not include group quarters, such as prisons or nursing homes, where 10 or more unrelated persons live. Hotel and motel rooms are considered housing units if occupied as the usual or permanent place of residence.

Hydrocarbon: An organic chemical compound of hydrogen and carbon in the gaseous, liquid, or solid phase. The molecular structure of hydrocarbon compounds varies from the simplest (methane, a constituent of natural gas) to the very heavy and very complex.

Hydroelectric Power: The production of electricity from the kinetic energy of falling water.

Hydroelectric Power Plant: A plant in which the turbine generators are driven by falling water.

Implicit Price Deflator: See **Gross Domestic Product (GDP) Implicit Price Deflator.**

Imports: Receipts of goods into the 50 States and the District of Columbia from foreign countries and from Puerto Rico, the Virgin Islands, and other U.S. possessions and territories.

Independent Power Producer: Wholesale electricity producers (other than qualifying facilities under the Public Utilities Regulatory Policies Act of 1978) that are unaffiliated with franchised utilities in the area in which the independent power producers are selling power and that lack significant marketing power. Unlike traditional electric utilities, independent power producers do not possess transmission facilities that are essential to their customers and do not sell power in any retail service territory where they have a franchise. See **Nonutility Power Producer.**

Indicated Resources, Coal: Coal for which estimates of the rank, quality, and quantity are based partly on sample analyses and measurements and partly on reasonable geologic projections. Indicated resources are computed partly from specified measurements and partly from projection of visible data for a reasonable distance on the basis of geologic evidence. The points of observation are 1/2 to 1-1/2 miles apart. Indicated coal is projected to extend as a 1/2-mile-wide belt that lies more than 1/4 mile from the outcrop or points of observation or measurement.

Industrial Sector: The industrial sector comprises manufacturing industries which make up the largest part of the sector, along with mining, construction, agriculture, fisheries, and forestry. Establishments in this sector range from steel mills, to small farms, to companies assembling electronic components. The SIC codes used to classify establishments as industrial are 1 through 39.

Internal Combustion Electric Power Plant: A power plant in which the prime mover is an internal combustion engine. Diesel or gas-fired engines are the principal types used in electric power plants. The plant is usually operated during periods of high demand for electricity.

International Bunkers: Storage compartments, found on vessels and aircraft engaged in international commerce, where fuel to be used by the vessel or aircraft is stored.

Jet Fuel: The term includes kerosene-type jet fuel and naphtha-type jet fuel. Kerosene-type jet fuel is a kerosene-quality product used primarily for commercial turbojet and turboprop aircraft engines. Naphtha-type jet fuel is a fuel in the heavy naphthas range used primarily for military turbojet and turboprop aircraft engines.

Kerosene: A petroleum distillate that has a maximum distillation temperature of 401° F at the 10-percent recovery point, a final boiling point of 572° F, and a minimum flash point of 100° F. Included are the two grades designated in ASTM D3699 (No. 1-K and No. 2-K) and all grades of kerosene called range or stove oil. Kerosene is used in space heaters, cook stoves, and water heaters; it is suitable for use as an illuminant when burned in wick lamps.

Lease and Plant Fuel: Natural gas used in well, field, and lease operations (such as gas used in drilling operations, heaters, dehydrators, and field compressors), and used as fuel in natural gas processing plants.

Lease Condensate: A natural gas liquid recovered from gas well gas (associated and non-associated) in lease separators or natural gas field facilities. Lease condensate consists primarily of pentanes and heavier hydrocarbons.

Light Oil: Lighter fuel oils distilled off during the refining process. Virtually all petroleum used in internal combustion and gas-turbine engines is light oil.

Lignite: A brownish-black coal of low rank with a high content of moisture and volatile matter. Often referred to as brown coal. It is used almost exclusively for electric power generation. It conforms to ASTM Specification D388-84 for lignite.

Line-Miles of Seismic Exploration: The distance along the Earth's surface that is covered by seismic surveying.

Liquefied Natural Gas (LNG): Natural gas (primarily methane) that has been liquefied by reducing its temperature to -260° F at atmospheric pressure.

Liquefied Petroleum Gases (LPG): Ethane, ethylene, propane, propylene, normal butane, butylene, and isobutane produced at refineries or natural gas processing plants, including plants that fractionate new natural gas plant liquids.

Liquefied Refinery Gases (LRG): Liquefied petroleum gases fractionated from refinery or still gases. Through compression and/or refrigeration, they are retained in the liquid state. The reported categories are ethane/ethylene, propane/propylene, normal butane/butylene, and isobutane. Excludes still gas.

Low-Power Testing: The period of time between a nuclear generating unit's initial fuel loading date and the issuance of its operating (full-power) license. The maximum level of operation during that period is 5 percent of the unit's design thermal rating.

Lubricants: Substances used to reduce friction between bearing surfaces or as process materials either incorporated into other materials used as processing aids in the manufacturing of other products or as carriers of other materials. Petroleum lubricants may be produced either from distillates or residues. Other substances may be added to impart or improve

certain required properties. Excluded are byproducts of lubricating oil refining, such as aromatic extracts derived from solvent extraction or tars derived from deasphalting. Lubricants include all grades of lubricating oils from spindle oil to cylinder oil and those used in greases. Lubricant categories include paraffinic and naphthenic.

Main Cooking Fuel: Fuel most often used for cooking.

Main Heating Equipment: Equipment used primarily for heating ambient air in a housing unit.

Main Heating Fuel: Fuel that powers the main heating equipment.

Major Electric Utility: A utility that, in the last 3 consecutive calendar years, had sales or transmission services exceeding one of the following: (1) 1 million megawatthours of total annual sales; (2) 100 megawatthours of annual sales for resale; (3) 500 megawatthours of annual gross interchange out; or (4) 500 megawatthours of wheeling (deliveries plus losses) for others.

Major Sources: The energy sources or fuels for which consumption and expenditure data were collected on the Commercial Buildings Energy Consumption Survey. Those fuels or energy sources (for the 1989 survey forward) are as follows: electricity, fuel oil, natural gas, and district heat.

Manufacturing Establishment: An economic unit at a single physical location where the mechanical or chemical transformation of materials or substances into new products is performed. Those operations are generally conducted in facilities described as plants, factories, or mills and characteristically use power-driven machines and material-handling equipment. In addition, the assembly of components of manufactured products is considered manufacturing, as is the blending of materials, such as lubricating oil, plastics, resins, or liquors. Manufacturing establishments are covered by SIC codes 20 through 39.

Manufacturing Sector: The universe of manufacturing establishments within the 50 States and the District of Columbia.

Measured Resources, Coal: Coal resources for which estimates of the rank, quality, and quantity have been computed, within a margin of error of less than 20 percent, from sample analyses and measurements from closely spaced and geologically well known sample sites. Measured resources are computed from dimensions revealed in outcrops, trenches, mine workings, and drill holes. The points of observation and measurement are so closely spaced and the thickness and extent of coals are so well defined that the tonnage is judged to be accurate within 20 percent. Although the spacing of the point of observation necessary to demonstrate continuity of the coal differs from region to region, according to the character of the coalbeds, the points of observation are no greater than 1/2 mile apart. Measured coal is projected to extend as a belt 1/4 mile wide from the outcrop or points of observation or measurement.

Metallurgical Coal: Coal that meets the requirements for making coke. It must be low in ash and sulfur and form a coke that is capable of supporting the charge of iron ore and limestone in a blast furnace. A blend of two or more bituminous coals is usually required to make coke.

Methanol: A light, volatile alcohol (CH_3OH) eligible for motor gasoline blending. See **Oxygenates.**

Miscellaneous Petroleum Products: All finished petroleum products not classified elsewhere, for example, petrolatum, lube refining byproducts (aromatic extracts and tars), absorption oils, ram-jet fuel, petroleum rocket fuels, synthetic natural gas feedstocks, and specialty oils.

Motor Gasoline: A complex mixture of relatively volatile hydrocarbons, with or without small quantities of additives, obtained by blending appropriate refinery streams to form a fuel suitable for use in spark-ignition engines. Motor gasoline includes both leaded and unleaded grades of finished motor gasoline, blending components, and gasohol.

Motor Gasoline Blending Components: Naphthas that will be used for blending or compounding into finished motor gasoline (e.g., straight-run gasoline, alkylate, reformate, benzene, toluene, and xylene). Excluded are oxygenates (alcohols and ethers), butane, and pentanes plus.

Motor Gasoline, Finished: A complex mixture of relatively volatile hydrocarbons, with or without small quantities of additives, that has been blended to form a fuel suitable for use in spark-ignition engines. Motor gasoline, as given in ASTM Specification D439 or Federal Specification VV-G-1690B, includes a range in distillation temperatures from 122° to 158° F at the 10-percent recovery point and from 365° to 374° F at the 90-percent recovery point. Motor gasoline includes reformulated motor

gasoline, oxygenated motor gasoline (Environmental Protection Agency [EPA] approved), and other finished motor gasoline. Blendstock is excluded until blending has been completed.

• *Reformulated Motor Gasoline*: Motor gasoline, formulated for use in motor vehicles, the composition and properties of which are certified as "reformulated motor gasoline" by the EPA.

• *Oxygenated Motor Gasoline (EPA Approved):* Motor gasoline, formulated for use in motor vehicles, that is intended for use in the EPA carbon monoxide nonattainment program. Reformulated motor gasoline is excluded.

• *Other Finished:* Motor gasoline that is not included in the reformulated or oxygenated categories.

Motor Gasoline, Finished Gasohol: A blend of finished motor gasoline (leaded or unleaded) and alcohol (generally ethanol, but sometimes methanol) in which 10 percent or more of the product is alcohol.

Motor Gasoline, Finished Leaded: Motor gasoline that contains more than 0.05 gram of lead per gallon or more than 0.005 gram of phosphorus per gallon. Premium and regular grades are included, depending on the octane rating. Includes leaded gasohol. Blendstock is excluded until blending has been completed. Alcohol that is to be used in the blending of gasohol is also excluded.

Motor Gasoline, Finished Leaded Premium: Motor gasoline having an antiknock index, calculated as (R+M)/2, greater than 90 and containing more than 0.05 gram of lead per gallon or more than 0.005 gram of phosphorus per gallon.

Motor Gasoline, Finished Leaded Regular: Motor gasoline having an antiknock index, calculated as (R+M)/2, greater than or equal to 87 and less than or equal to 90 and containing more than 0.05 gram of lead or 0.005 gram of phosphorus per gallon.

Motor Gasoline, Finished Unleaded: Motor gasoline containing not more than 0.05 gram of lead per gallon and not more than 0.005 gram of phosphorus per gallon. Premium and regular grades are included, depending on the octane rating. Includes unleaded gasohol. Blendstock is excluded until blending has been completed. Alcohol that is to be used in the blending of gasohol is also excluded.

Motor Gasoline, Finished Unleaded Midgrade: Motor gasoline having an antiknock index, calculated as (R+M)/2, greater than or equal to 88 and less than or equal to 90 and containing not more than 0.05 gram of phosphorus per gallon.

Motor Gasoline, Finished Unleaded Premium: Motor gasoline having an antiknock index, calculated as (R+M)/2, greater than 90 and containing not more than 0.05 gram of lead or 0.005 gram of phosphorus per gallon.

Motor Gasoline, Finished Unleaded Regular: Motor gasoline having an antiknock index, calculated as (R+M)/2, of 87 and containing not more than 0.05 gram of lead per gallon and not more than 0.005 gram of phosphorus per gallon.

Motor Gasoline, Leaded: Motor gasoline that contains more than 0.05 gram of lead per gallon or more than 0.005 gram of phosphorus per gallon. Premium and regular grades are included.

Motor Gasoline Retail Prices: Motor gasoline prices calculated each month by the Bureau of Labor Statistics (BLS) in conjunction with the construction of the Consumer Price Index (CPI). Those prices are collected in 85 urban areas selected to represent all urban consumers—about 80 percent of the total U.S. population. The service stations are selected initially, and on a replacement basis, in such a way that they represent the purchasing habits of the CPI population. Service stations in the current sample include those providing all types of service (i.e., full-, mini-, and self-service).

Motor Gasoline, Total: Includes finished leaded motor gasoline (premium and regular), finished unleaded motor gasoline (premium, midgrade, and regular), motor gasoline blending components, and gasohol.

Motor Gasoline, Unleaded: Gasoline that contains not more than 0.05 gram of lead per gallon and not more than 0.005 gram of phosphorus per gallon. Premium and regular grades are included, depending on the octane rating.

MTBE (Methyl Tertiary Butyl Ether): An ether, $(CH_3)_3COCH_3$, intended for motor gasoline blending. See **Oxygenates.**

Naphtha: A generic term applied to a petroleum fraction with an approximate boiling range between 122° and 400° F.

Native Gas: The total volume of natural gas indigenous to the storage reservoir at the time the storage started.

Natural Gas: A mixture of hydrocarbons (principally methane) and small quantities of various nonhydrocarbons existing in the gaseous phase or in solution with crude oil in underground reservoirs.

Natural Gas, Dry: The marketable portion of natural gas production, which is obtained by subtracting extraction losses, including natural gas liquids removed at natural gas processing plants, from total production.

Natural Gas Gross Withdrawals: Full well stream volume of produced natural gas, excluding condensate separated at the lease.

Natural Gas Liquids (NGL): Those hydrocarbons in natural gas that are separated as liquids from the gas. Natural gas liquids include natural gas plant liquids (primarily ethane, propane, butane, and isobutane), and lease condensate (primarily pentanes produced from natural gas at lease separators and field facilities.)

Natural Gas Marketed Production: Gross withdrawals of natural gas from production reservoirs, less gas used for reservoir repressuring; nonhydrocarbon gases removed in treating and processing operations; and quantities vented and flared.

Natural Gas Plant Liquids (NGPL): Natural gas liquids recovered from natural gas in processing plants and, in some situations, from natural gas field facilities, as well as those extracted by fractionators. Natural gas plant liquids are defined according to the published specifications of the Gas Processors Association and the American Society for Testing and Materials as follows: ethane, propane, normal butane, isobutane, pentanes plus, and other products from natural gas processing plants (i.e., products meeting the standards for finished petroleum products produced at natural gas processing plants, such as finished motor gasoline, finished aviation gasoline, special naphthas, kerosene, distillate fuel oil, and miscellaneous products).

Natural Gas Wellhead Price: The wellhead price of natural gas is calculated by dividing the total reported value at the wellhead by the total quantity produced as reported by the appropriate agencies of individual producing States and the U.S. Minerals Management Service. The price includes all costs prior to shipment from the lease, including gathering and compression costs, in addition to State production, severance, and similar charges.

Natural Gas, Wet: Natural gas prior to the extraction of liquids and other miscellaneous products.

NERC: See **North American Electric Reliability Council.**

Net Electricity Generation: See **Electricity Generation, Net.**

Net Income: Operating income plus earnings from unconsolidated affiliates; gains from disposition of property, plant, and equipment; minority interest income; and foreign currency translation effects less income taxes, extraordinary items, and the cumulative effect of accounting changes.

Net Ownership Interest: The sum of net working interest and royalty interest. Net ownership interest applies to both production and reserves.

Net Property Investment: The original cost of property, plant, and equipment (PP&E), less accumulated depreciation.

Net Summer Capability: The steady hourly output that generating equipment is expected to supply to system load, exclusive of auxiliary power, as demonstrated by testing at the time of summer peak demand.

Net Working Interest: A company's working interest, not including any basic royalty or overriding royalty interests.

Nominal Dollars: A measure used to express nominal prices.

Nominal Price: The price paid for goods or services at the time of the transaction. Nominal prices are those that have not been adjusted to remove the effect of changes in the purchasing power of the dollar; they reflect buying power in the year in which the transaction occurred.

Nonhydrocarbon Gases: Typical nonhydrocarbon gases that may be present in reservoir natural gas are carbon dioxide, helium, hydrogen sulfide, and nitrogen.

Nonmetropolitan: Refers to buildings not located within Metropolitan Statistical Areas as defined in the 1980 Census.

Nontraceables: Those revenues, costs, assays, and liabilities that cannot be directly attributed to a type of business by use of a reasonable allocation method developed on the basis of operating-level utilities.

Nonutility Power Producer: A corporation, person, agency, authority, or other legal entity or instrumentality that owns electric generating capacity and is not an electric utility. Nonutility power producers include qualifying cogenerators, qualifying small power producers, and other nonutility generators (including independent power producers) without a designated, franchised service area that do not file forms listed in the *Code of Federal Regulations*, Title 18, Part 141. See **Cogenerator; Independent Power Producer;** and **Small Power Producer.**

North American Electric Reliability Council (NERC): A council formed in 1968 by the electric utility industry to promote the reliability and adequacy of bulk power supply in the electric utility systems of North America. The NERC consists of ten regional reliability councils and encompasses essentially all the power systems of the contiguous United States and Canada. The NERC regions are as follows: (1) Alaskan System Coordination Council (ASCC); (2) East Central Area Reliability Coordination Agreement (ECAR); (3) Electric Reliability Council of Texas (ERCOT); (4) Mid-America Interpol Network (MAIN); (5) Mid-Atlantic Area Council (MAAC); (6) Mid-Continent Area Power Pool (MAPP); (7) Northeast Power Coordinating Council (NPCC); (8) Southeastern Electric Reliability Council (SERC); (9) Southwest Power Pool (SPP); and (10) Western Systems Coordinating Council (WSCC).

Nuclear Electric Power: Electricity generated by an electric power plant whose turbines are driven by steam generated in a reactor by heat from the fissioning of nuclear fuel.

Nuclear Electric Power Plant: A single-unit or multi-unit facility in which heat produced in one or more reactors by the fissioning of nuclear fuel is used to drive one or more steam turbines.

Nuclear Reactor: An apparatus in which the nuclear fission chain can be initiated, maintained, and controlled so that energy is released at a specific rate. The reactor includes fissionable material (fuel), such as uranium or plutonium; fertile material; moderating material (unless it is a fast reactor); a heavy-walled pressure vessel; shielding to protect personnel; provision for heat removal; and control elements and instrumentation.

Offshore: That geographic area that lies seaward of the coastline. In general, the coastline is the line of ordinary low water along with that portion of the coast that is in direct contact with the open sea or the line marking the seaward limit of inland water.

Oil: See **Crude Oil (Including Lease Condensate).**

Oil Well: A well completed for the production of crude oil from one or more oil zones or reservoirs. Wells producing both crude oil and natural gas are classified as oil wells.

Operable (nuclear): A U.S. nuclear generating unit is considered operable after it completes low-power testing and is issued a full-power operating license by the Nuclear Regulatory Commission. A foreign nuclear generating unit is considered operable once it has generated electricity to the grid.

Operable Refineries: Refineries that were in one of the following three categories at the beginning of a given year: in operation; not in operation and not under active repair, but capable of being placed into operation within 30 days; or not in operation, but under active repair that could be completed within 90 days.

Operating Income: Operating revenues less operating expenses. Excludes items of other revenue and expense, such as equity in earnings of unconsolidated affiliates, dividends, interest income and expense, income taxes, extraordinary items, and cumulative effect of accounting changes.

Organization for Economic Cooperation and Development (OECD): Current members are Australia, Austria, Belgium, Canada, Czech Republic, Denmark and its territories (Faroe Islands and Greenland), Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, South Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States and its territories (Guam, Puerto Rico, and Virgin Islands).

Organization of Petroleum Exporting Countries (OPEC): Countries that have organized for the purpose of negotiating with oil companies on matters of oil production, prices, and future concession rights. Current members are

Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab, United Emirates, and Venezuela.

Other Hydrocarbons (petroleum): Other materials processed at refineries. Includes coal tar derivatives, hydrogen, gilsonite, and natural gas received by the refinery for reforming into hydrogen.

Oxygenated Motor Gasoline: See **Motor Gasoline, Finished.**

Oxygenates: Any substance which, when added to motor gasoline, increases the amount of oxygen in that motor gasoline blend. Through a series of waivers and interpretive rules, the Environmental Protection Agency (EPA) has determined the allowable limits for oxygenates in unleaded gasoline. The "Substantially Similar" Interpretive Rules (56 FR [February 11, 1991]) allows blends of aliphatic alcohols other than methanol and aliphatic ethers, provided the oxygen content does not exceed 2.7 percent by weight. The "Substantially Similar" Interpretive Rules also provide for blends of methanol up to 0.3 percent by volume exclusive of other oxygenates, and butanol or alcohols of a higher molecular weight up to 2.75 percent by weight. Individual waivers pertaining to the use of oxygenates in unleaded motor gasoline have been issued by the EPA. They include the following:

• *Fuel Ethanol:* Blends of up to 10 percent by volume anhydrous ethanol (200 proof).

• *Methanol:* Blends of methanol and gasoline-grade tertiary butyl alcohol (GTBA) such that the total oxygen content does not exceed 3.5 percent by weight and the ratio of methanol to GTBA is less than or equal to 1. It is also specified that this blended fuel must meet ASTM volatility specifications. Blends of up to 5.0 percent by volume methanol with a minimum of 2.5 percent by volume cosolvent alcohols having carbon number of 4 or less (i.e., ethanol, propanol, butanol, and/or GTBA). The total oxygen must not exceed 3.7 percent by weight, and the blend must meet ASTM volatility specfications as well as phase separation and alcohol purity specifications.

• *MTBE (Methyl tertiary butyl ether):* Blends up to 15.0 percent by volume MTBE that must meet the ASTM D4814 specifications. Blenders must take precautions that the blends are not used as base gasolines for other oxygenated blends.

Pentanes Plus: A mixture of hydrocarbons, mostly pentanes and heavier, extracted from natural gas. Includes isopentane, natural gasoline, and plant condensate.

Petrochemical Feedstocks: Chemical feedstocks derived from petroleum principally for the manufacture of chemicals, synthetic rubber, and a variety of plastics. The categories reported are naphthas less than 401° F endpoint and other oils equal to or greater than 401° F endpoint.

Petroleum: A generic term applied to oil and oil products in all forms, such as crude oil, lease condensate, unfinished oils, petroleum products, natural gas plant liquids, and nonhydrocarbon compounds blended into finished petroleum products.

Petroleum Coke: A residue that is the final product of the condensation process in cracking. The product is either marketable petroleum coke or catalyst petroleum coke.

Petroleum Coke, Catalyst: The carbonaceous residue that is deposited on and deactivates the catalyst used in many catalytic operations (e.g., catalytic cracking). Carbon is deposited on the catalyst, thus deactivating the catalyst. The catalyst is reactivated by burning off the carbon, which is used as a fuel in the refining process. That carbon or coke is not recoverable in a concentrated form.

Petroleum Coke, Marketable: Those grades of coke produced in delayed or fluid cokers that may be recovered as relatively pure carbon. Marketable petroleum coke may be sold as is or may be 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: Energy radiated by the sun as electromagnetic waves (electromagnetic radiation) that is converted into electricity by means of solar (photovoltaic) cells or concentrating (focusing) collectors.

Photovoltaic Module: A group of photovoltaic cells. (Cells are solid-state devices that produce electricity when exposed to sunlight.) The electricity is used primarily in applications requiring remote power, such as radio communication, cathodic protection, and navigational aids.

Pipeline, Natural Gas: A continuous pipe conduit, complete with such equipment as valves, compressor stations, communications systems, and meters, for transporting natural gas and/or supplemental gaseous fuels from one point to another, usually from a point in or beyond the producing field or processing plant to another pipeline or to points of utilization. Also refers to a company operating such facilities.

Pipeline, Petroleum: Crude oil and product pipelines (including interstate, intrastate, and intracompany pipelines) used to transport crude oil and petroleum products, respectively, within the 50 States and the District of Columbia.

Plant Condensate: One of the natural gas liquids, mostly pentanes and heavier hydrocarbons, recovered and separated as liquids at gas inlet separators or scrubbers in processing plants.

Process Fuel: All energy consumed in the acquisition, processing, and transportation of energy. Quantifiable process fuel includes three categories: natural gas lease and plant operations, natural gas pipeline operations, and oil refinery operations.

Processing Gain: The amount by which total volume of refinery output is greater than the volume of input for a given period of time. The processing gain arises when crude oil and other hydrocarbons are processed into products that are, on average, less dense than the input.

Processing Loss: The amount by which total volume of refinery output is less than input for a given period of time. The processing loss arises when crude oil and other hydrocarbons are processed into products that are, on average, more dense than the input.

Processing Plant (natural gas): A surface installation designed to separate and recover natural gas liquids from a stream of produced natural gas through the processes of condensation, absorption, refrigeration, or other methods, and to control the quality of natural gas marketed or returned to oil or gas reservoirs for pressure maintenance, repressuring, or cycling.

Propane: A normally gaseous straight-chain hydrocarbon (C_3H_8). It is a colorless paraffinic gas that boils at a temperature of -43.67° F. It is extracted from natural gas or refinery gas streams. It includes all products designated in ASTM Specification D1835 and Gas Processors Association Specifications for commercial propane and HD-5 propane.

Propylene: An olefinic hydrocarbon (C_3H_6) recovered from refinery or petrochemical processes.

Proved Reserves, Crude Oil: The estimated quantities of all liquids defined as crude oil that geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.

Proved Reserves, Lease Condensate: The volumes of lease condensate expected to be recovered in future years in conjunction with the production

of proved reserves of natural gas based on the recovery efficiency of lease and/or field separation facilities installed.

Proved Reserves, Natural Gas: The estimated quantities of natural gas that analysis of geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.

Proved Reserves, Natural Gas Liquids: Those volumes of natural gas liquids (including lease condensate) demonstrated with reasonable certainty to be separable in the future from proved natural gas reserves, under existing economic and operating conditions.

Real Price: A price that has been adjusted to remove the effect of changes in the purchasing power of the dollar. Real prices, which are expressed in chained dollars in this report, reflect buying power relative to a reference year. See **Chained Dollars.**

Refiner Acquisition Cost of Crude Oil: The cost of crude oil to the refiner, including transportation and fees. The composite cost is the weighted average of domestic and imported crude oil costs.

Refinery Input: The raw materials and intermediate materials processed at refineries to produce finished petroleum products. They include crude oil, products of natural gas processing plants, unfinished oils, other hydrocarbons and alcohol, motor gasoline and aviation gasoline blending components, and finished petroleum products.

Refinery Output: The total amount of petroleum products produced at a refinery. Includes petroleum consumed by the refinery.

Refinery (petroleum): An installation that manufactures finished petroleum products from crude oil, unfinished oils, natural gas liquids, other hydrocarbons, and alcohol.

Renewable Energy: Energy obtained from sources that are essentially inexhaustible (unlike, for example, the fossil fuels, of which there is a finite supply). Renewable sources of energy include conventional hydroelectric power, wood, waste, geothermal, wind, photovoltaic, and solar thermal energy.

Reservoir Repressuring: The injection of a pressurized fluid (such as air, gas, or water) into oil and gas reservoir formations to effect greater ultimate recovery.

Residential Sector: The residential sector is considered to consist of all private residences, whether occupied or vacant, owned or rented, including single-family homes, multifamily housing units, and mobile homes. Secondary homes, such as summer homes, are also included. Institutional housing, such as school dormitories, hospitals, and military barracks, generally are not included in the residential sector; they are included in the commercial sector. The Standard Industrial Classification (SIC) code used to classify an establishment as residential is 88 (Household).

Residential Vehicles: Motorized vehicles used by U.S. households for personal transportation. Excluded are motorcycles, mopeds, large trucks, and buses. Included are automobiles, station wagons, passenger vans, cargo vans, motor homes, pickup trucks, and jeeps or similar vehicles. In order to be included, vehicles must be: (1) owned by members of the household, or (2) company cars not owned by household members but regularly available to household members for their personal use and ordinarily kept at home, or (3) rented or leased for 1 month or more.

Residual Fuel Oil: The heavier oils that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in refinery operations and that conform to ASTM Specifications D396 and D975. Included are No. 5, a residual fuel oil of medium viscosity; Navy Special, for use in steam-powered vessels in government service and in shore power plants; and No. 6, which includes Bunker C fuel oil and is used for commercial and industrial heating, electricity generation, and to power ships. Imports of residual fuel oil include imported crude oil burned as fuel.

Road Oil: Any heavy petroleum oil, including residual asphaltic oil, used as a dust palliative and surface treatment on roads and highways. It is generally produced in six grades, from 0, the most liquid, to 5, the most viscous.

Rotary Rig: A machine used for drilling wells that employs a rotating tube attached to a bit for boring holes through rock.

Royalty Interest: An interest in a mineral property provided through a royalty contract.

Short Ton (coal): A unit of weight equal to 2,000 pounds.

SIC: See **Standard Industrial Classification.**

Small Power Producer: Under the Public Utility Regulatory Policies Act, a small power production facility (small power producer) generates electricity by using waste or renewable energy (biomass, conventional hydroelectric, wind, solar, and geothermal) as a primary energy source. Fossil fuels can be used, but renewable resources must provide at least 75 percent of the total energy input. See **Nonutility Power Producer.**

Solar Collector: Equipment that actively concentrates thermal energy from the sun. The energy is usually used for space heating, for water heating, or for heating swimming pools. Either air or liquid is the working fluid.

Solar Energy: The radiant energy of the sun that can be converted into other forms of energy, such as heat or electricity.

Solar Thermal Collector: A device designed to receive solar radiation and convert it into thermal energy. Normally, a solar thermal collector includes a frame, glazing, and an absorber, together with appropriate insulation. The heat collected by the solar thermal collector may be used immediately or stored for later use.

Solar Thermal Collector, High-Temperature: A collector that generally operates at temperatures above 180° F.

Solar Thermal Collector, Low-Temperature: A collector that generally operates at temperatures below 110° F. Typically, it has no glazing or insulation and is made of plastic or rubber, although some are made of metal.

Solar Thermal Collector, Medium-Temperature: A collector that generally operates at temperatures of 140° to 180° F but can also operate at temperatures as low as 110° F. Typically, it has one or two glazings, a metal frame, a metal absorption panel with integral flow channels or attached tubing (liquid collector) or with integral ducting (air collector) and insulation on the sides and back of the panel.

Solar Thermal Collector, Special: An evacuated tube collector or a concentrating (focusing) collector. Special collectors operate in the temperature range from just above ambient temperature (low concentration for pool heating) to several hundred degrees Fahrenheit (high concentration for air conditioning and specialized industrial processes).

Space Heating: The use of mechanical equipment (including wood stoves and active solar heating devices) to heat all, or part, of a building to at least 50° F.

Special Naphthas: All finished products within the naphtha boiling range that are used as paint thinners, cleaners, or solvents. Those products are refined to a specified flash point. Special naphthas include all commercial hexane and cleaning solvents conforming to ASTM Specifications D1836 and D484, respectively. Naphthas to be blended or marketed as motor gasoline or aviation gasoline, or that are to be used as petrochemical and synthetic natural gas (SNG) feedstocks, are excluded.

Spot Market Price: A transaction price concluded "on the spot," that is, on a one-time, prompt basis; usually the transaction involves only one specific quantity of product. This contrasts with a term contract sale price, which obligates the seller to deliver a product at an agreed frequency and price over an extended period.

Standard Industrial Classification (SIC): A set of codes developed by the Office of Management and Budget which categorizes industries according to groups with similar economic activities.

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.

Tall Oil: The oily mixture of rosin acids, fatty acids, and other materials obtained by acid treatment of the alkaline liquors from the digesting (pulping) of pine wood.

Transportation Sector: The transportation sector consists of private and public vehicles that move people and commodities. Included are automobiles, trucks, buses, motorcycles, railroads, and railways (including streetcars), aircraft, ships, barges, and natural gas pipelines. The SIC codes used to classify establishments as belonging to the transportation sector are 40 through 49.

Unaccounted-for Crude Oil: Represents the arithmetic difference between the calculated supply and the calculated disposition of crude oil. The calculated supply is the sum of crude oil production and imports, less changes in crude oil stocks. The calculated disposition of crude oil is the sum of crude oil input to refineries, crude oil exports, crude oil burned as fuel, and crude oil losses.

Unaccounted-for Natural Gas: Quantities lost, the net result of flow data metered at varying temperature and pressure conditions and converted to a standard temperature and pressure base; metering inaccuracies; differences between the billing cycle and calendar period timeframes; the effect of variations in company accounting and billing practices; and imbalances from the merger of data reporting systems which vary in scope, format, definitions, and type of respondents.

Underground Storage: The storage of natural gas in underground reservoirs at locations other than those from which it was produced.

Undiscovered Recoverable Reserves (crude oil and natural gas): Those economic resources of crude oil and natural gas, yet undiscovered, that are estimated to exist in favorable geologic settings.

Unfinished Oils: All oils requiring further refinery processing, except those requiring only mechanical blending. Includes naphthas and lighter oils, kerosene and light gas oils, heavy gas oils, and residuum.

Unfractionated Streams: Mixtures of unsegregated natural gas liquid components, excluding those in plant condensate. This product is extracted from natural gas.

United States: Unless otherwise noted, United States in this publication means the 50 States and the District of Columbia. U.S. exports include shipments to U.S. territories, and imports include receipts from U.S. territories.

Uranium: A heavy, naturally radioactive, metallic element (atomic number 92). Its two principally occurring isotopes are uranium-235 and uranium-238. Uranium-235 is indispensable to the nuclear industry, because it is the only isotope existing in nature to any appreciable extent that is fissionable by thermal neutrons. Uranium-238 is also important, because it absorbs neutrons to produce a radioactive isotope that subsequently decays to plutonium-239, an isotope that also is fissionable by thermal neutrons.

Uranium Ore: Rock containing uranium mineralization (typically 1 to 4 pounds of U_3O_8 per ton or 0.05 percent to 0.2 percent U_3O_8) that can be mined economically.

Uranium Oxide: Uranium concentrate or yellowcake. See **Yellowcake**.

Uranium Resources: Uranium resource estimates are divided into three separate categories reflecting different levels of confidence in the quantities estimated: reasonable assured resources, estimated additional resources, and speculative resources. Reasonably assured resources refers to uranium in known mineral deposits of such size, grade, and configuration that it could be recovered within the given cost ranges with currently proven mining and processing technology. Estimated additional resources refers to uranium in addition to reasonably assured resources that is expected, mostly on the basis of direct geological evidence, to occur in extensions of well-explored deposits and in deposits in which geological continuity has been well established, as well as in deposits believed to exist in well-defined geologic trends or areas of mineralization with known deposits. Deposits in this category can be discovered and delineated and the uranium subsequently recovered, all within the given cost range. Speculative resources refers to uranium in addition to estimated additional resources that are thought to exist, mostly on the basis of indirect evidence and geological extrapolations.

U.S.S.R.: The Union of Soviet Socialist Republics consisted of 15 constituent republics: Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. As a political entity, the U.S.S.R. ceased to exist as of December 31, 1991.

Vented Natural Gas: Gas released into the air on the base site or at processing plants.

Vessel: Tankers used to transport crude oil and petroleum products. Vessel categories are as follows: Ultra Large Crude Carrier (ULCC), Very Large Crude Carrier (VLCC), Other Tanker, and Specialty Ships (LPG/LNG).

Waxes: Solid or semisolid materials derived from petroleum distillates or residues. Waxes are light-colored, more or less translucent crystalline masses, slightly greasy to the touch, consisting of a mixture of solid hydrocarbons in which the paraffin series predominates. Included are all marketable waxes, whether crude scale or fully refined. Waxes are used primarily as industrial coating for surface protection.

Western Europe: Includes Austria, Belgium, Bosnia, and Herzegovina, Croatia, Denmark, East Germany, Faroe Islands, Finland, Former Yugoslavia, France, Germany, Gibraltar, Greece, Iceland, Ireland, Italy, Luxembourg, Macedonia (The Former Yugoslav Republic of), Malta, Netherlands, Norway, Portugal, Serbia and Montenegro, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, West Germany.

Well: A hole drilled in the Earth for the purpose of finding or producing crude oil or natural gas; or providing services related to the production of crude oil or natural gas. Wells are classified as oil wells, gas wells, dry holes, stratigraphic test wells, or service wells. The latter two types of wells are counted for Federal Reporting System data reporting. Oil wells, gas wells, and dry holes are classified as exploratory wells or development wells. Exploratory wells are subclassified as new-pool wildcats, deeper-pool tests, shallow-pool tests, and outpost (extension) tests. Well classifications reflect the status of wells after drilling has been completed.

Wellhead Price: The value of crude oil or natural gas at the mouth of the well.

Well Servicing Unit: Truck-mounted equipment generally used for downhole services after a well is drilled. Services include well completions and recompletions, maintenance, repairs, workovers, and well plugging and abandonments. Jobs range from minor operations, such as pulling the rods and rod pumps out of an oil well, to major workovers, such as milling out and repairing collapsed casing. Well depth and characteristics determine the type of equipment used.

Wind Energy: The kinetic energy of wind converted into mechanical energy by wind turbines (i.e., blades rotating from a hub) that drive generators to produce electricity.

Wood and Waste: Wood energy, garbage, bagasse, sewerage gas, and other industrial, agricultural, and urban refuse used to generate electricity.

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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