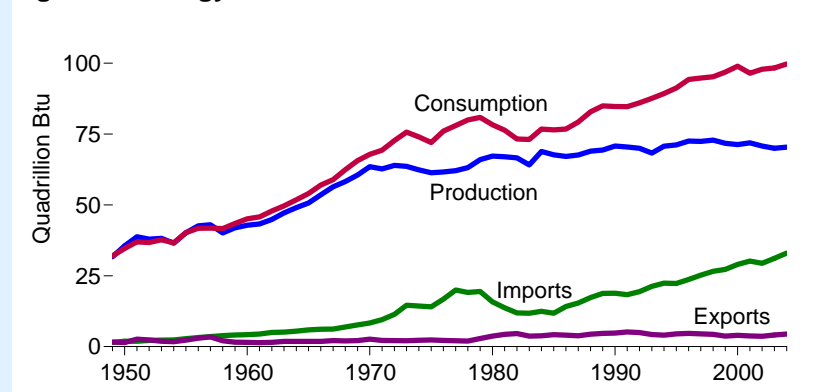


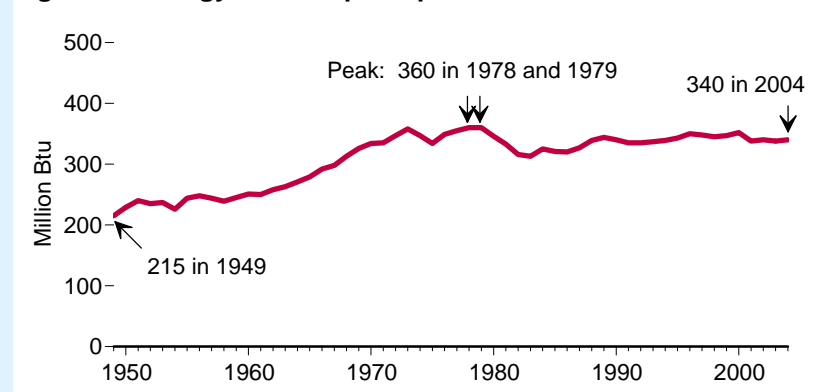
# Overview

**Figure 1. Energy Overview**



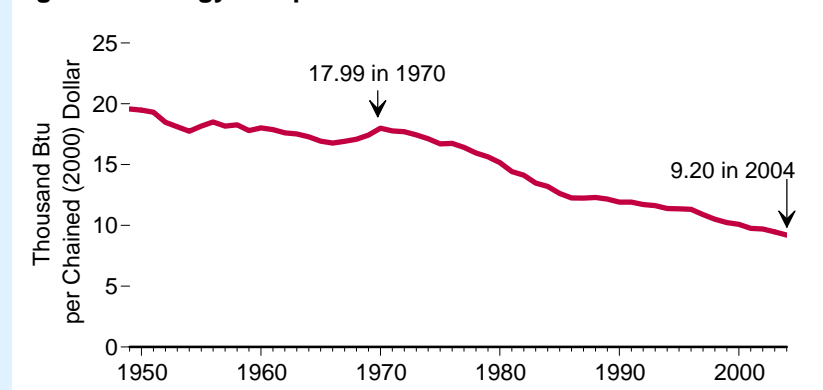
The United States was self-sufficient in energy until the late 1950s when energy consumption began to outpace domestic production. At that point, the Nation began to import more energy to fill the gap. In 2004, net imported energy accounted for 29 percent of all energy consumed.

**Figure 2. Energy Consumption per Person**



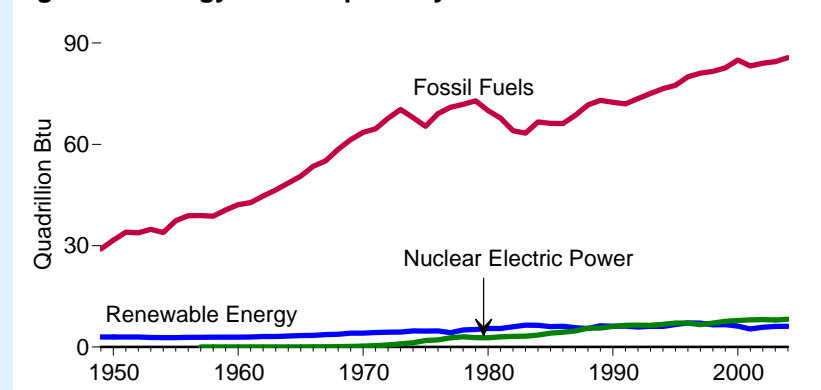
Energy use per person stood at 215 million Btu in 1949. The rate generally increased until the oil price shocks of the mid-1970s and early 1980s when the trend reversed for a few years. From 1988 on, the rate held fairly steady. In 2004, 340 million Btu of energy were consumed per person, 58 percent above the 1949 rate.

**Figure 3. Energy Use per Dollar of Gross Domestic Product**



After 1970, the amount of energy consumed to produce a dollar's worth of the Nation's output of goods and services trended down. The decline resulted from efficiency improvements and structural changes in the economy. The level in 2004 was 49 percent below that of 1970.

**Figure 4. Energy Consumption by Source**



Most energy consumed in the United States came from fossil fuels. Renewable energy resources supplied a relatively small but steady portion. In the late 1950s, nuclear fuel began to be used to generate electricity, and in most years since 1988, nuclear electric power surpassed renewable energy.

# Consumption by Source

Figure 5. Energy Consumption by Source, 1635-2004

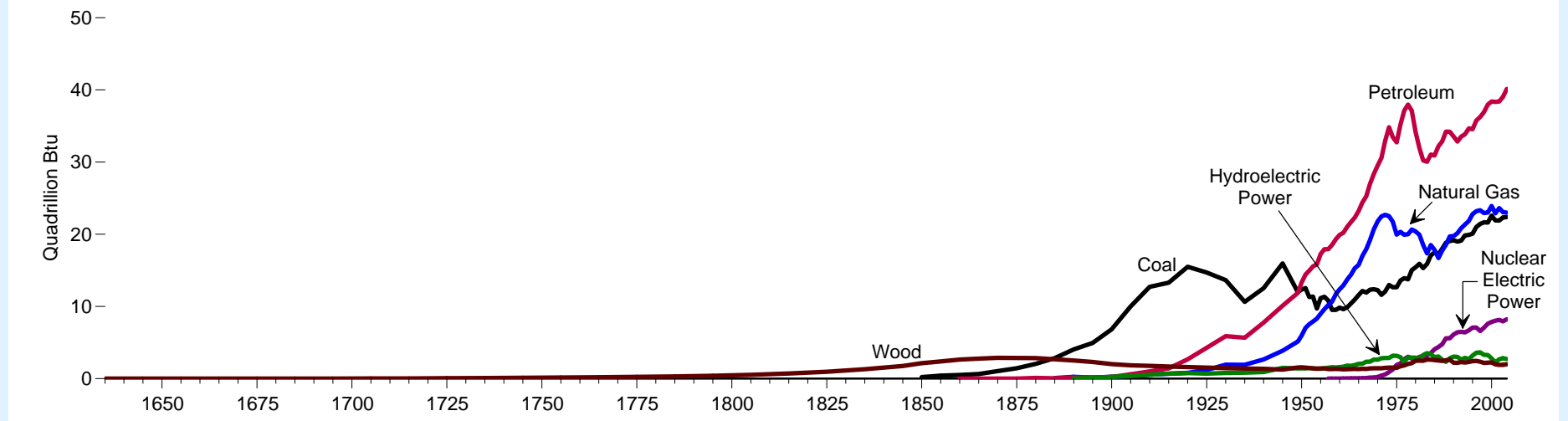
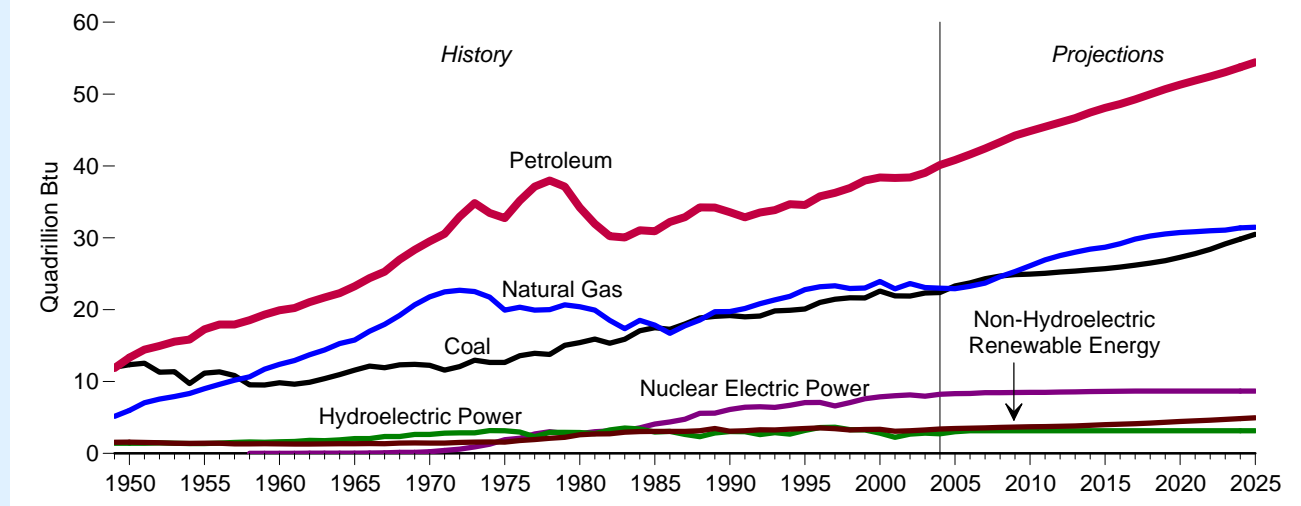


Figure 6. Energy Consumption History and Outlook, 1949-2025

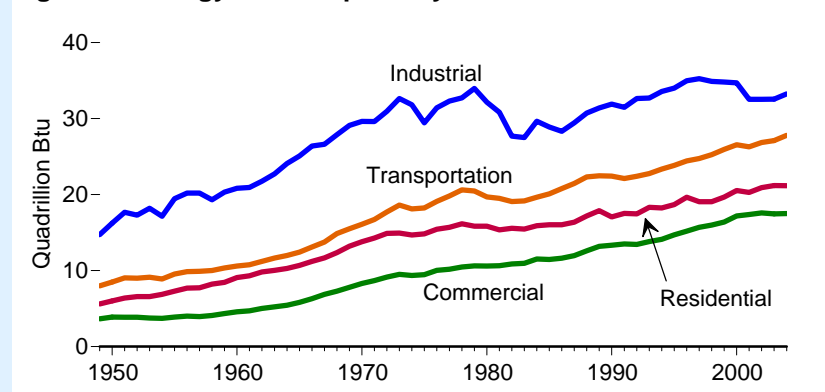


In the long view of American history, wood served as the preeminent form of energy for about half of the Nation's history. Around 1885, coal surpassed wood's usage. Despite its tremendous and rapid expansion, coal was, in turn, overtaken by petroleum in the middle of the 20th century. Natural gas, too, experienced rapid development into the second half of the 20th century, and coal began to expand again. Late in the 20th century still another form of energy, nuclear electric power, was developed and made significant contributions.

While the Nation's energy history is one of large-scale change as new forms of energy were developed, the outlook for the next couple of decades (assuming current laws, regulations, and policies) is for continued growth and reliance on the three major fossil fuels—petroleum, natural gas, and coal—modest expansion in renewable resources, and relatively flat generation from nuclear electric power.

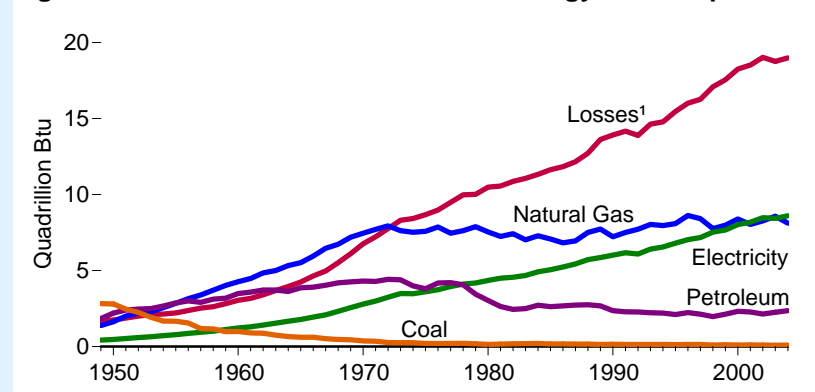
# Consumption by Sector

**Figure 7. Energy Consumption by End-Use Sector**



All four major economic sectors of the economy recorded tremendous growth in their use of energy. The industrial sector used the biggest share of total energy and showed the greatest volatility; in particular, steep drops occurred in the sector in 1975 and 1980-1983 largely in response to high oil prices.

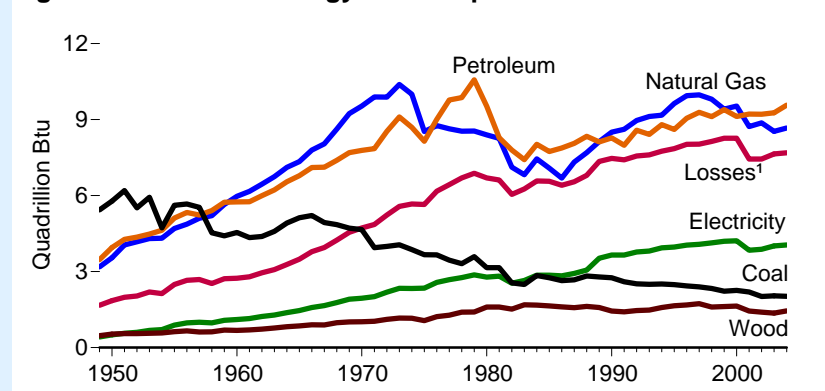
**Figure 8. Residential and Commercial Energy Consumption**



<sup>1</sup> Energy lost during generation, transmission, and distribution of electricity.

In the 1950s and 1960s, coal, which had been important to residential and commercial consumers, was gradually replaced by other forms of energy. Petroleum use peaked in the early 1970s. Natural gas grew fast until the early 1970s and then fluctuated around the 1970 level over the next three decades. Meanwhile, electricity's use (and related losses) expanded dramatically.

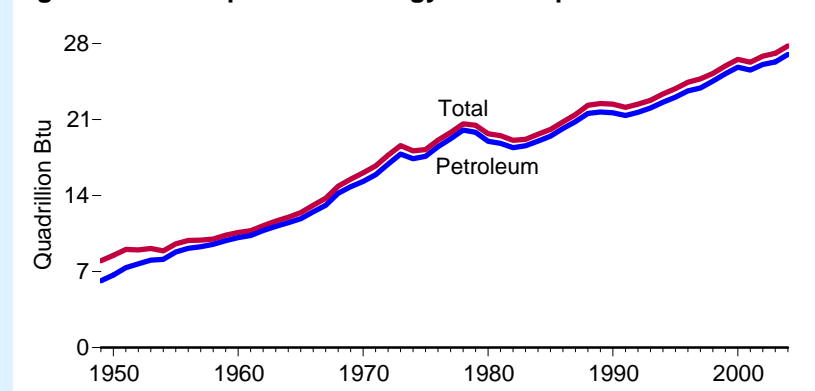
**Figure 9. Industrial Energy Consumption**



<sup>1</sup> Energy lost during generation, transmission, and distribution of electricity.

Coal, once the predominant form of energy in the industrial sector, gave way to natural gas and petroleum in the late 1950s. Both natural gas and petroleum use expanded rapidly until the early 1970s and then fluctuated widely over the following decades. Use of electricity and wood trended upward, but use of electricity grew at a faster rate than wood.

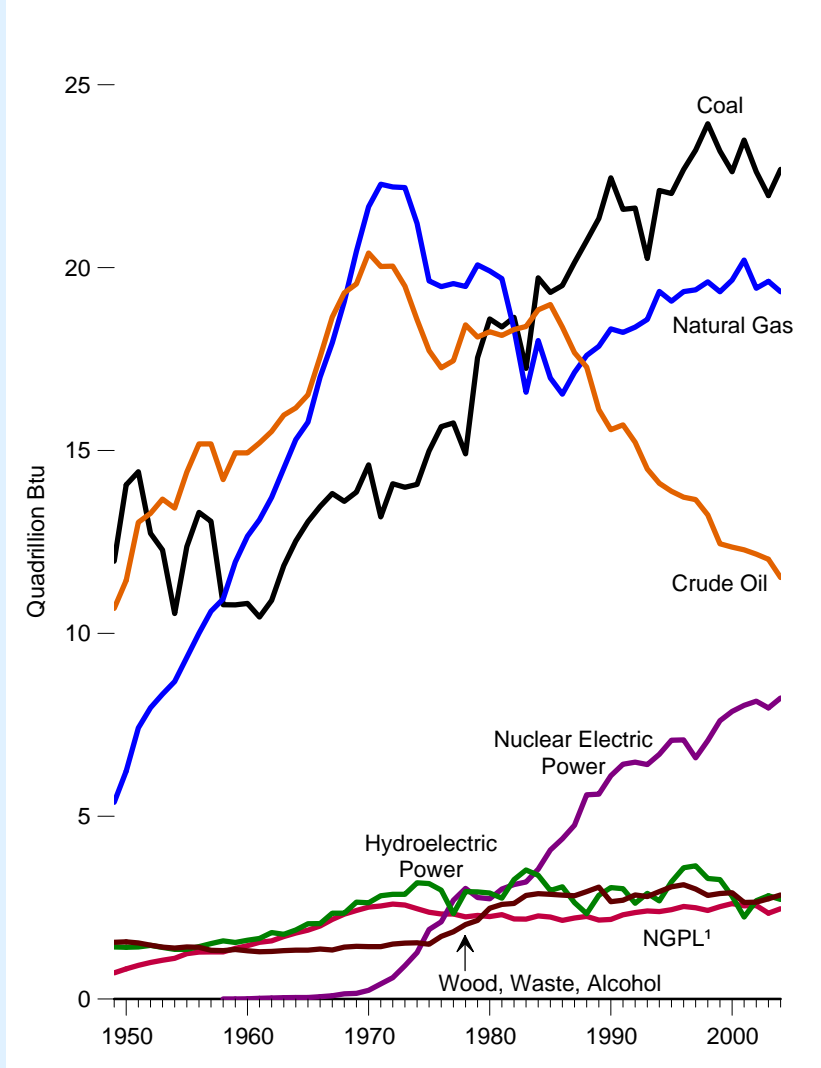
**Figure 10. Transportation Energy Consumption**



Transportation sector use of energy experienced tremendous growth overall, but registered noticeable pauses in 1974, 1979-1982, 1990 and 1991, and 2001. In 2004, petroleum accounted for 97 percent of the sector's energy, and motor gasoline accounted for two-thirds of all petroleum used in the sector.

# Production and Trade

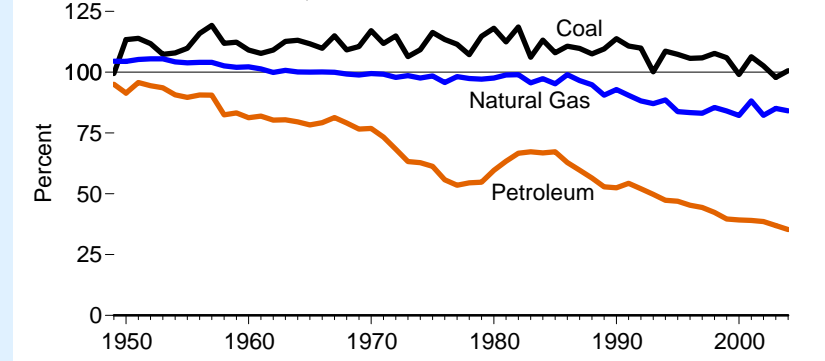
Figure 11. Energy Production by Major Source



<sup>1</sup> Natural gas plant liquids.

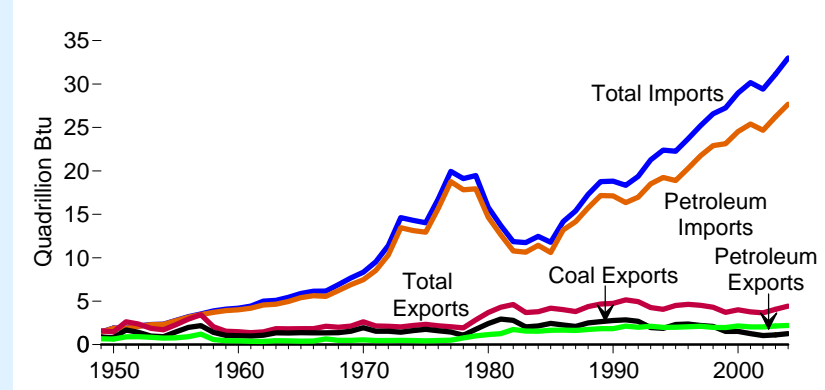
Most energy produced in the United States came from fossil fuels—coal, natural gas, and crude oil. Coal, the leading source at the middle of the 20th century, was surpassed by crude oil and natural gas for many years. In the mid-1980s, coal again became the leading energy source produced in the United States. By the 1970s, electricity produced from nuclear fuel began to make a significant contribution.

Figure 12. Production as Share of Consumption for Coal, Natural Gas, and Petroleum



The Nation almost always produced more than enough coal for its own requirements. For many years, the United States was also self-sufficient in natural gas, but after 1967, it produced less than it consumed each year. Petroleum production fell far short of domestic demands, requiring the reliance on imported supplies.

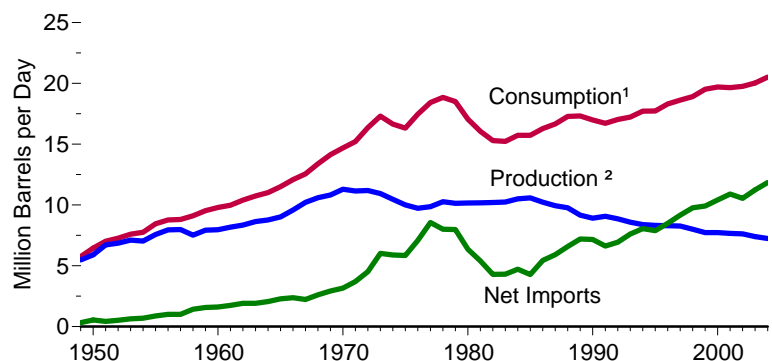
Figure 13. Energy Imports and Exports



Since the mid-1950s, the Nation imported more energy than it exported. In 2004, the United States imported 33 quadrillion Btu of energy and exported 4 quadrillion Btu. Most imported energy was in the form of petroleum; since 1986, natural gas imports expanded rapidly as well. Through 1992, most exported energy was in the form of coal; after that, petroleum exports often exceeded coal exports.

# Petroleum Overview and Crude Oil Production

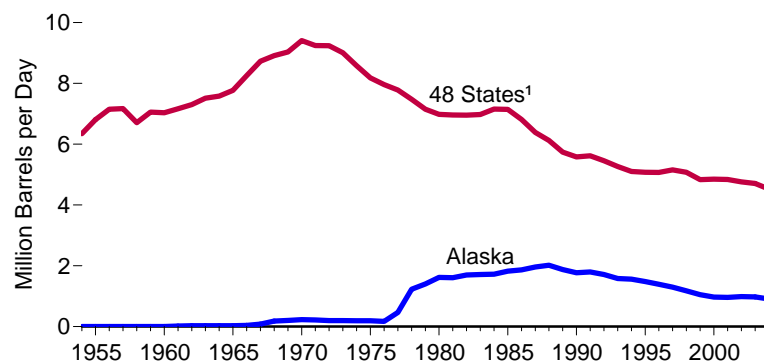
**Figure 14. Petroleum Overview**



<sup>1</sup> Petroleum products supplied used as an approximation for consumption.  
<sup>2</sup> Crude oil and natural gas plant liquids production.

When U.S. petroleum production peaked at 11.3 million barrels per day in 1970, net imports stood at 3.2 million barrels per day. By 1996, net imports exceeded production. In 2004, production was 7.2 million barrels per day and net imports were 11.9 million barrels per day.

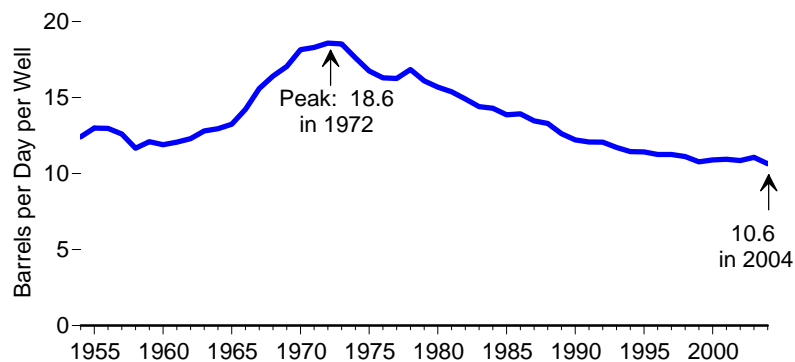
**Figure 15. 48 States and Alaskan Crude Oil Production**



<sup>1</sup> United States excluding Alaska and Hawaii.

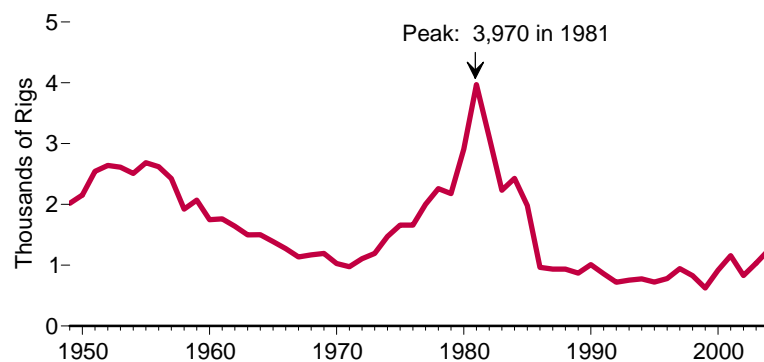
Crude oil production peaked in the 48 States at 9.4 million barrels per day in 1970. As production fell in the 48 States, Alaska's production came on line and helped supply U.S. needs. Alaskan production peaked at 2.0 million barrels per day in 1988, then fell to less than half the peak rate by 2000.

**Figure 16. Crude Oil Well Productivity**



The amount of crude oil produced per day per well rose sharply in the 1960s and reached a peak of 18.6 barrels per day per well in 1972. After that, declining productivity was recorded yearly except in 1978 and 2000-2003. The 2004 rate of 10.6 barrels per day per well was 43 percent below the peak and was the lowest level since EIA began reporting oil well productivity.

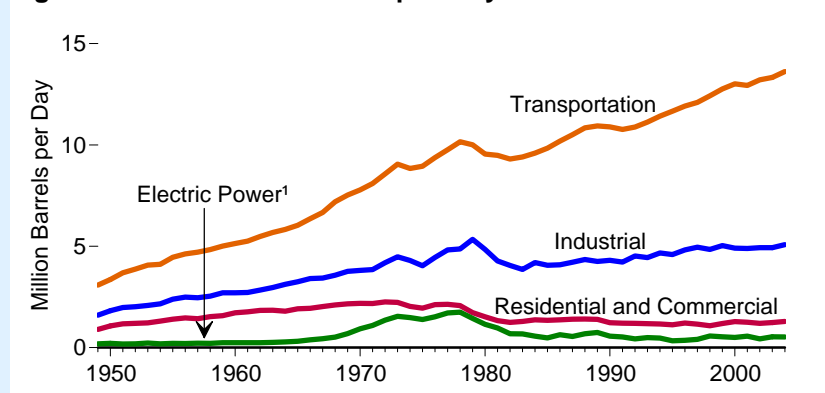
**Figure 17. Crude Oil and Natural Gas Rotary Rigs in Operation**



Rotary rig activity declined sharply from 1955 to 1971. After 1971, the number of rigs in operation began to climb again, and a peak of nearly 4 thousand rigs in operation was registered in 1981. In 2004, 1,192 rigs were in operation, nearly double the 1999 low of 625, but only 30 percent of the 1981 peak level.

# Petroleum Consumption and Prices

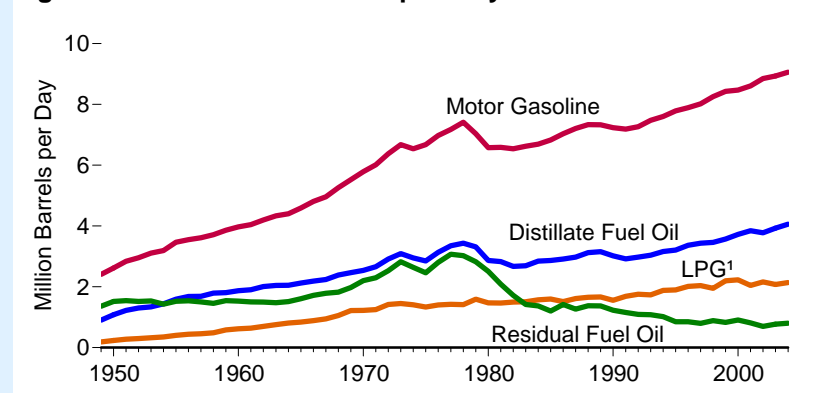
**Figure 18. Petroleum Consumption by Sector**



<sup>1</sup> Through 1988, electric utilities only; after 1988, includes independent power producers.

Transportation was the largest consuming sector of petroleum and the one showing the greatest expansion over the second half of the 20th century. In 2004, 14 million barrels per day of petroleum products were consumed for transportation purposes, accounting for 66 percent of all petroleum used.

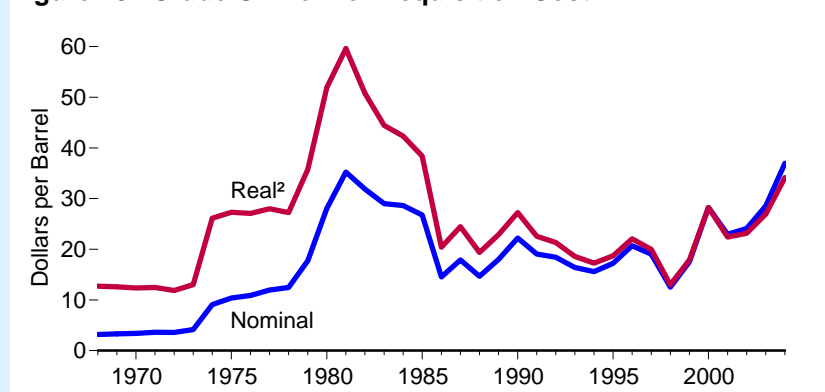
**Figure 19. Petroleum Consumption by Selected Product**



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

Motor gasoline was the single largest petroleum product consumed in the United States. Its consumption stood at 9.1 million barrels per day in 2004, 44 percent of all petroleum consumption. Distillate fuel oil and liquefied petroleum gases (LPG) were other important products. The use of residual fuel oil fell off sharply after 1977.

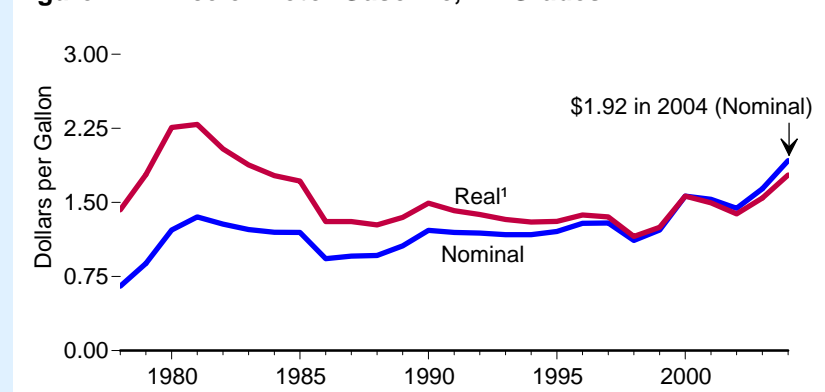
**Figure 20. Crude Oil Refiner Acquisition Cost<sup>1</sup>**



<sup>1</sup> Composite of domestic and imported crude oil. <sup>2</sup> In chained (2000) dollars, calculated by using gross domestic product implicit price deflator.

Unadjusted for inflation (nominal dollars), the refiner acquisition composite (domestic and foreign) cost of crude oil reached \$35.24 per barrel in 1981. Over the years that followed, the price fell dramatically to a low of \$12.52 per barrel in 1998 before rising again. The preliminary price reported for 2004 was \$36.97 per barrel, a new peak level and 30 percent higher than in 2003.

**Figure 21. Price of Motor Gasoline, All Grades**

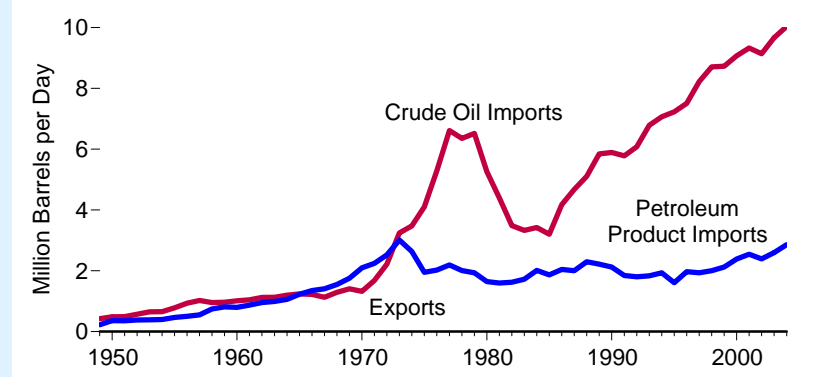


<sup>1</sup> In chained (2000) dollars, calculated by using gross domestic product implicit price deflator.

In nominal (unadjusted for inflation) dollars, Americans paid an average of 65¢ per gallon for motor gasoline in 1978. The 2004 average price of \$1.92 was 195 percent higher than the 1978 rate; adjusted for inflation, it was 24 percent higher.

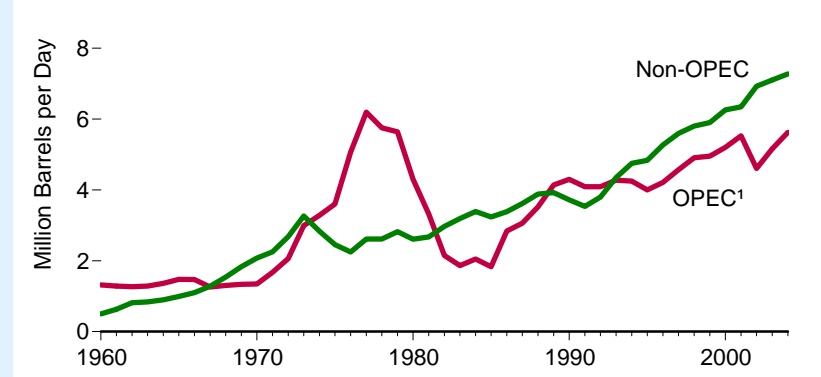
# Petroleum Trade

**Figure 22. Petroleum Trade**



U.S. crude oil imports grew rapidly from mid-century until the late 1970s but fell sharply from 1979 to 1985 due to conservation efforts and improved efficiency. After 1985, the upward trend resumed and reached a record-high level of 10.0 million barrels per day in 2004. Petroleum product imports were 2.9 million barrels per day in 2004. Exports totaled 1.0 million barrels per day, mainly in the form of petroleum coke and residual fuel oil.

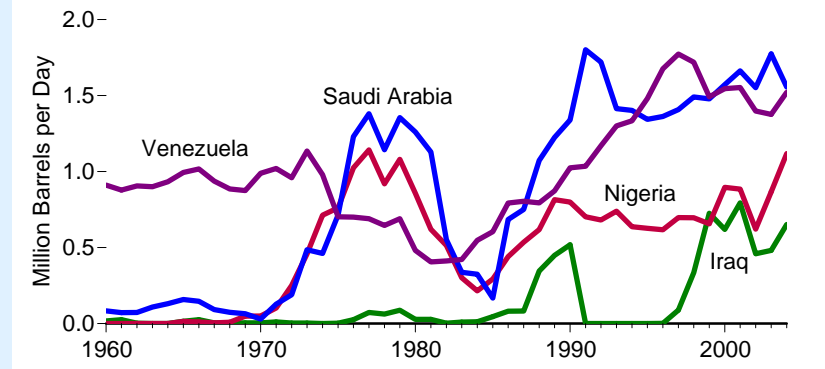
**Figure 23. Imports From OPEC and Non-OPEC Countries**



<sup>1</sup> Organization of the Petroleum Exporting Countries.

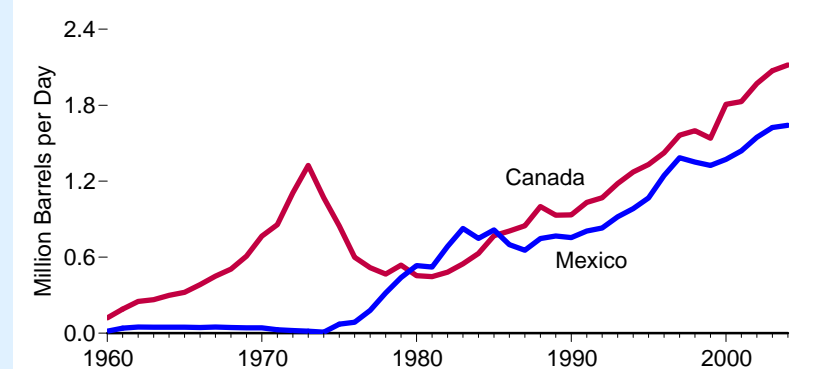
U.S. petroleum imports rose sharply in the 1970s, and reliance on petroleum from the Organization of the Petroleum Exporting Countries (OPEC) grew. In 1977, 70 percent of U.S. petroleum imports came from OPEC countries versus 44 percent in 2004. In every year after 1992, more petroleum came from non-OPEC countries than OPEC countries.

**Figure 24. Imports From Selected OPEC Countries**



Among OPEC countries, Saudi Arabia, Venezuela, and Nigeria—nations from three different continents—were key suppliers of petroleum to the American market. Each experienced wide fluctuation in the amount of petroleum it sold to the United States over the decades. In 2004, 0.7 million barrels per day of petroleum came into the United States from Iraq.

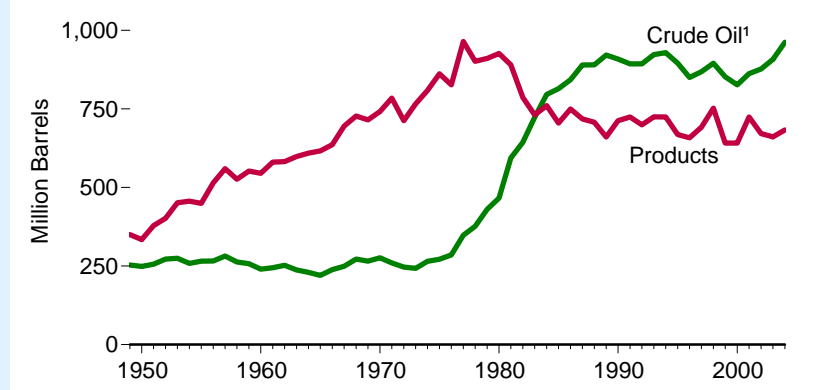
**Figure 25. Imports From Canada and Mexico**



Canada and Mexico, our national neighbors, supplied the largest quantities of petroleum from non-OPEC countries. In 2004, imports from Canada reached a new high of 2.1 million barrels per day. Imports from Mexico were insignificant until the mid-1970s when they began to play a key role in U.S. supplies. Canadian and Mexican petroleum together accounted for 29 percent of all U.S. imports in 2004.

# Petroleum Stocks

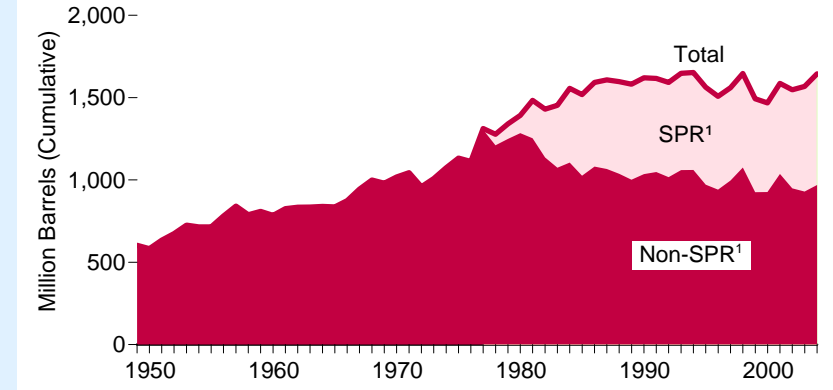
**Figure 26. Stocks of Crude Oil and Products**



<sup>1</sup> Includes crude oil stored in the Strategic Petroleum Reserve.

Through 1983, the Nation held most of its petroleum storage in the form of products, which were ready for the market. After that, most petroleum in storage was in the form of crude oil that still needed to be refined into usable end products. At the end of 2004, petroleum stocks totaled 1.6 billion barrels, 58 percent crude oil and 42 percent products.

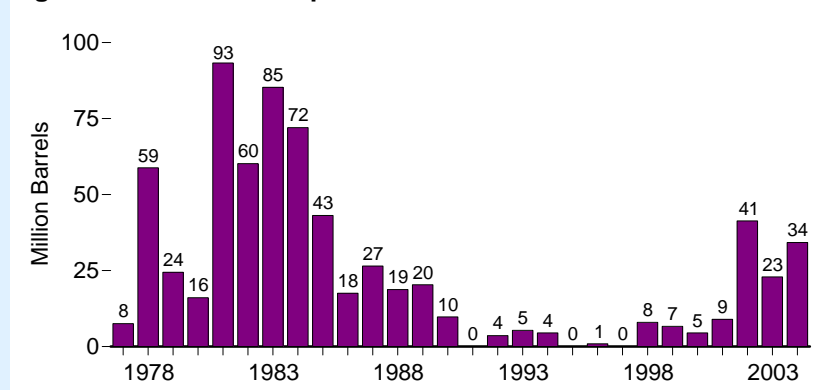
**Figure 27. Total Stocks and the Strategic Petroleum Reserve**



<sup>1</sup> Strategic Petroleum Reserve.

In 1977, the United States began filling the Strategic Petroleum Reserve (SPR), a national reserve of petroleum stocks in case of emergency. At the end of 2004, the SPR held 676 million barrels of crude oil, 41 percent of all U.S. petroleum stocks.

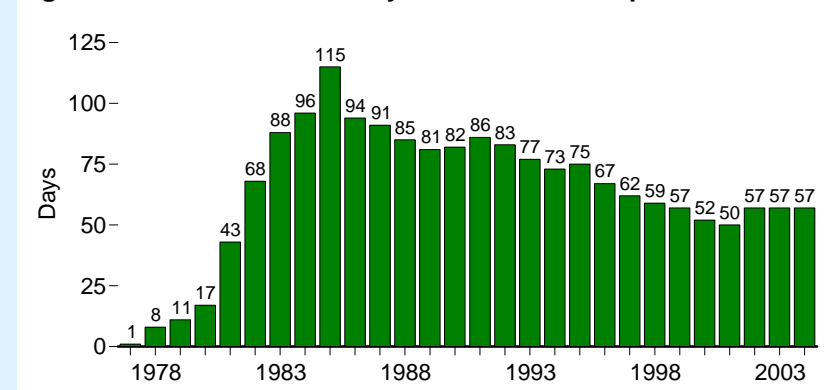
**Figure 28. Crude Oil Imports for the SPR<sup>1</sup>**



<sup>1</sup> Imported by the SPR and imported by others for the SPR.

Most crude oil in the SPR was imported, and most of it came in during the early 1980s. In fact, from 1991 through 1997, only 14 million barrels were imported for the reserve, and in 3 of those years, no oil at all was imported for the reserve. SPR imports picked up in 2002; of 125 million barrels added to the SPR over the last three years, 99 million were imported.

**Figure 29. SPR Stocks as Days' Worth of Net Imports**

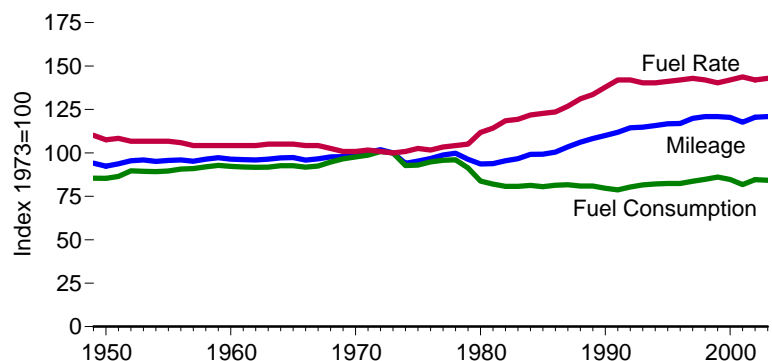


An important SPR measure is the number of days' worth of total net imports of petroleum that could be met by the reserve in an emergency. The peak level occurred in 1985 when the reserve could have supplied 115 days of petroleum net imports, at the 1985 level. The rate trended down through 2001, but rose to 57 days' worth in 2002 and remained at that level through 2004.



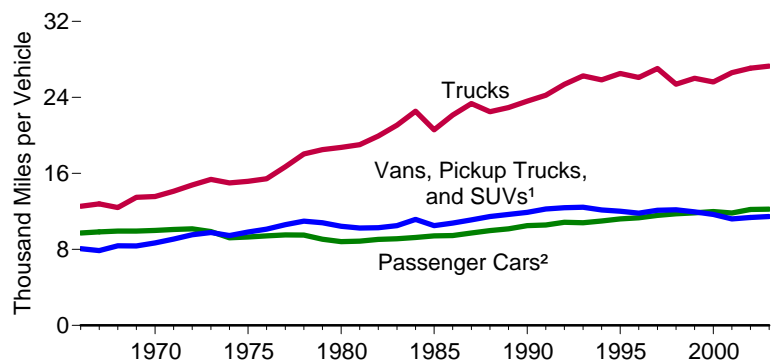
# Motor Vehicles

**Figure 30. Motor Vehicle Indicators**



The composite motor vehicle fuel rate (miles per gallon) rose 42 percent from 1973 to 1991 and then leveled off for the next 12 years. Mileage (miles per vehicle) grew steadily from 1980 to 1998, declined from 1999 through 2001, and then grew in 2002 and 2003. Fuel consumption (gallons per vehicle) fell 21 percent from 1973 to 1991 but then bounced back 9 percent from 1991 to 1999.

**Figure 32. Motor Vehicle Mileage**

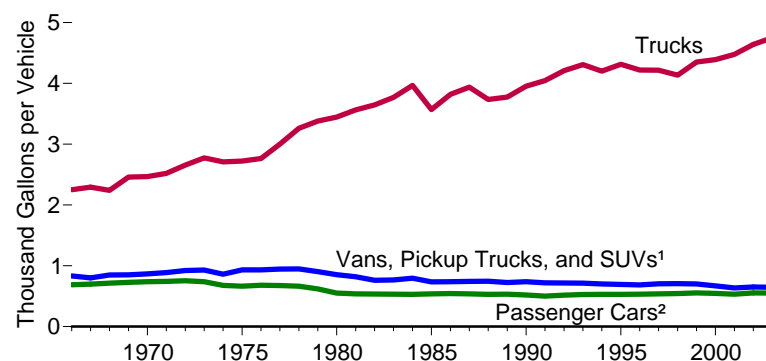


<sup>1</sup> Sport utility vehicle. <sup>2</sup> Motorcycles are included through 1989.

Truck miles traveled per year greatly exceeded that of other vehicle types and grew sharply from 1966 to 2003, up 118 percent. In 2003, trucks averaged 27.3 thousand miles per vehicle per year, while passenger cars averaged 12.2 thousand miles per year and vans, pickup trucks, and sport utility vehicles averaged 11.5 thousand miles per year.

Note: Motor vehicles include passenger cars, motorcycles, vans, pickup trucks, sport utility vehicles, trucks, and buses.

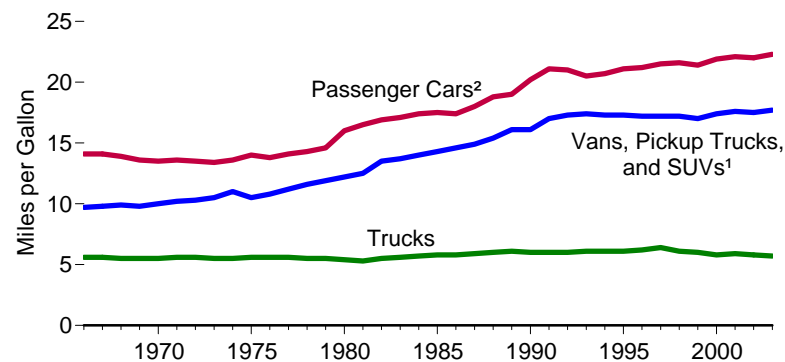
**Figure 31. Motor Vehicle Fuel Consumption**



<sup>1</sup> Sport utility vehicle. <sup>2</sup> Motorcycles are included through 1989.

From 1966 to 2003, fuel consumed per truck more than doubled, growing from 2.3 thousand gallons to 4.8 thousand gallons. Over the same period, fuel consumed per passenger car fell by 20 percent and fuel consumed by vans, pickup trucks, and sport utility vehicles fell by 22 percent.

**Figure 33. Motor Vehicle Fuel Rates**

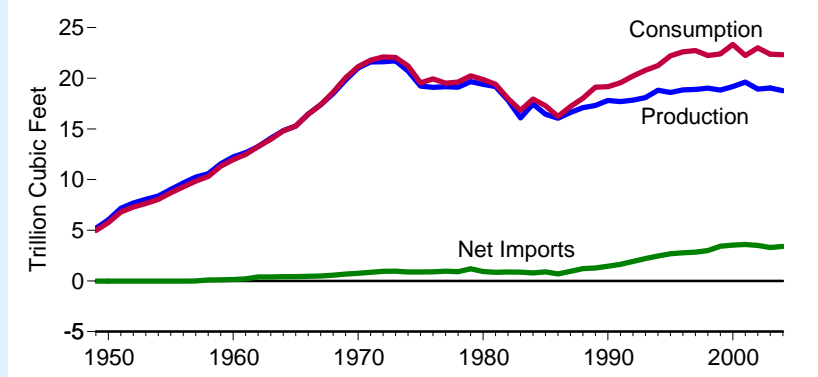


<sup>1</sup> Sport utility vehicle. <sup>2</sup> Motorcycles are included through 1989.

Fuel rates (miles per gallon) for passenger cars and vans, pickup trucks, and sport utility vehicles rose noticeably from the late 1970s through the early 1990s and again from 2000 through 2003. Truck fuel rates, which were much lower than other vehicle rates, remained generally flat throughout the period.

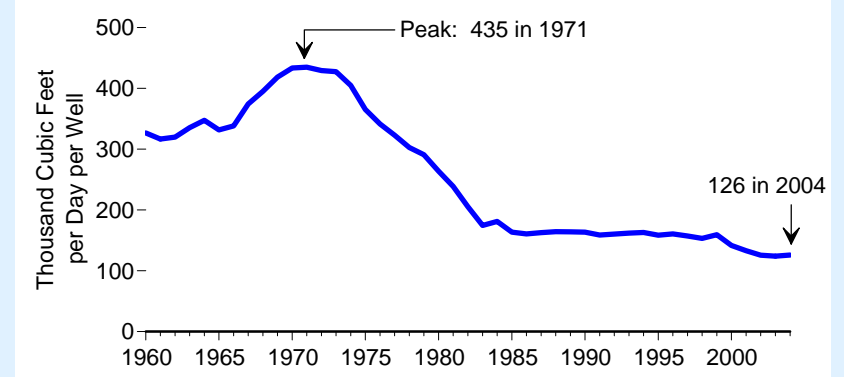
# Natural Gas

**Figure 34. Natural Gas Overview**



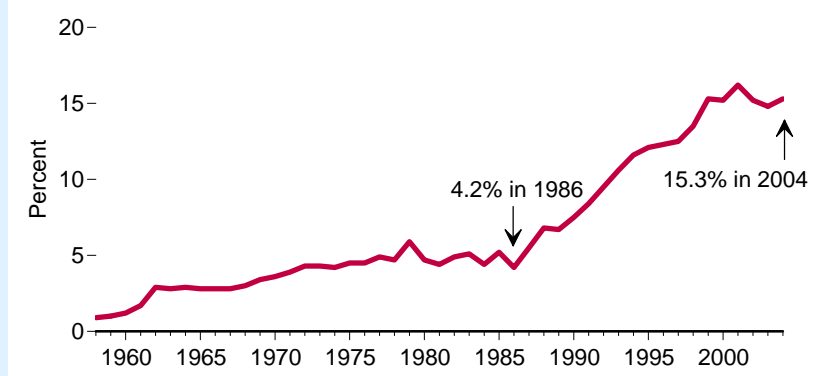
U.S. natural gas production and consumption were nearly in balance through 1986. When consumption began to outpace production, imports of natural gas rose to meet U.S. requirements for the fuel. In 2004, consumption stood at 22.3 trillion cubic feet (Tcf), production at 18.8 Tcf, and net imports at 3.4 Tcf.

**Figure 35. Natural Gas Well Average Productivity**



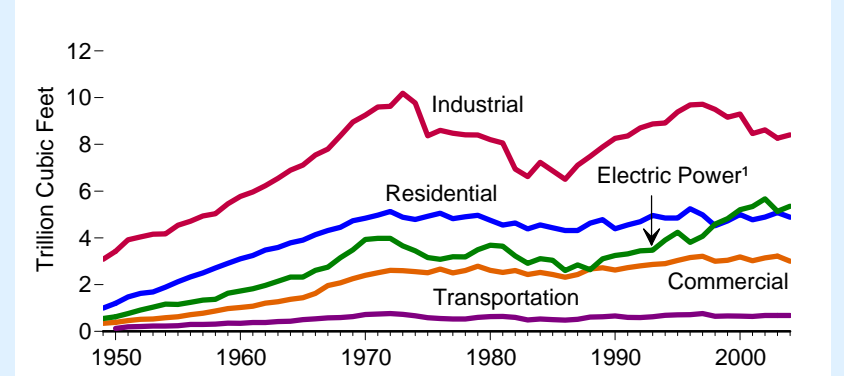
Gas well productivity, measured as gross withdrawals per day per well, grew rapidly in the late 1960s, peaked in 1971, and then fell sharply until the mid-1980s. Productivity remained nearly steady from 1985 through 1999, declined for three years, and then remained flat. The 2004 rate was 71 percent below the 1971 peak level.

**Figure 36. Net Imports as Share of Consumption**



Net imports of natural gas as a share of consumption was in the 4-to-6 percent range from 1970 through 1987. Then, during a period when consumption outpaced production, the share rose from 4.2 percent in 1986 to 16.2 percent in 2001. The share fell in 2002 and 2003, and then rose again in 2004 to 15.3 percent.

**Figure 37. Natural Gas Consumption by Sector**

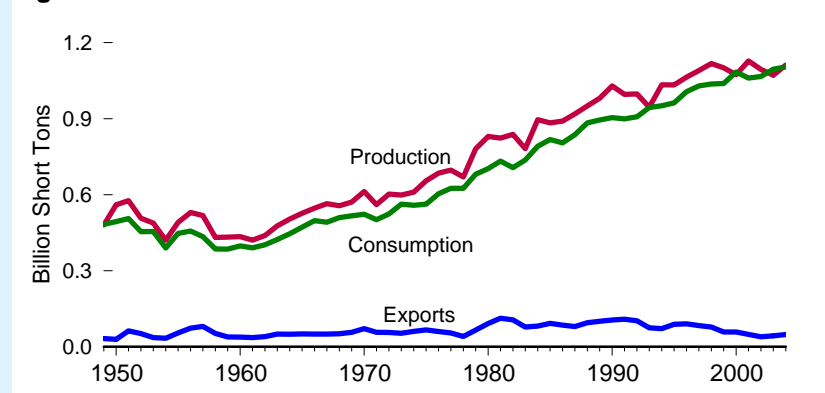


<sup>1</sup> Through 1988, electric utilities only; after 1988, includes independent power producers.

The industrial sector was both the largest consuming sector of natural gas and the sector with the greatest volatility due to variability in industrial output. In 2004, the industrial sector accounted for 38 percent of all natural gas consumption.

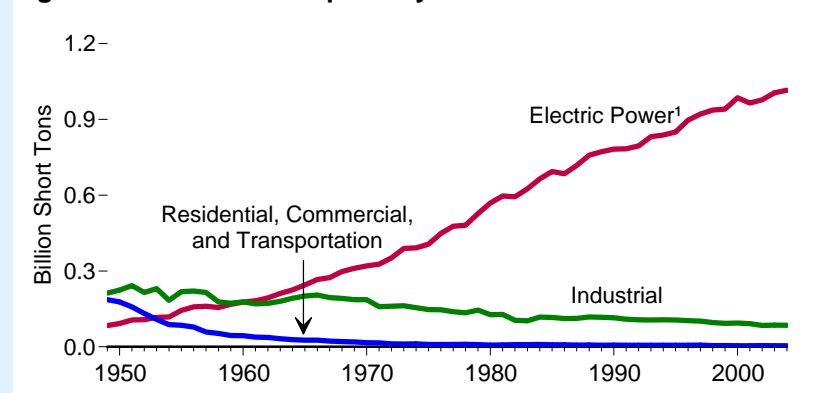
# Coal

**Figure 38. Coal Overview**



Unlike petroleum or natural gas, coal's domestic production nearly always exceeded U.S. consumption. In 2004, production was less than 1 percent higher than consumption. U.S. exports to other countries totaled 48 million short tons in 2004, well below the peak export level of 113 million short tons that occurred in 1981.

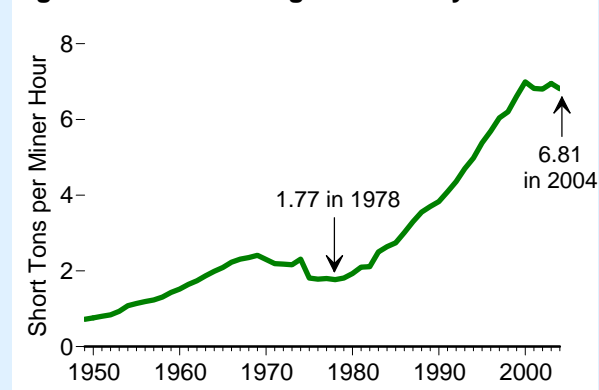
**Figure 39. Coal Consumption by Sector**



<sup>1</sup> Through 1988, electric utilities only; after 1988, includes independent power producers.

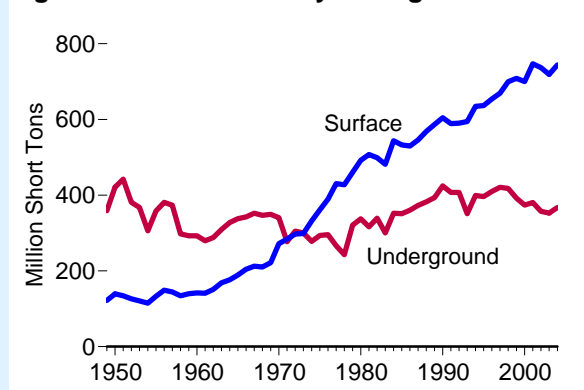
In the 1950s, most coal was consumed in the industrial sector, many homes were still heated by coal, and the transportation sector consumed coal in steam-driven trains and ships. By the 1960s, most coal was used for generating electricity and by 2004 the electric power sector accounted for 92 percent of all coal consumption.

**Figure 40. Coal Mining Productivity**



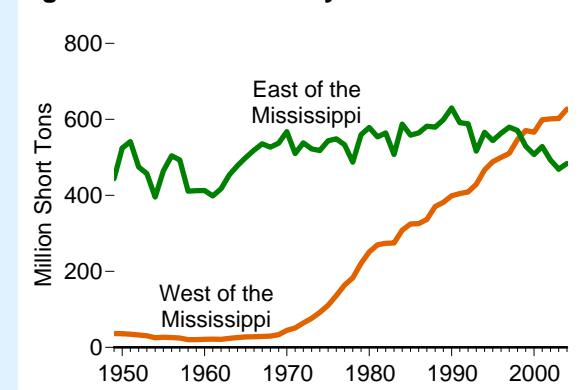
Improved mining technology and the shift toward more surface-mined coal promoted dramatic improvement in productivity from the Nation's mines from 1978 through 2000.

**Figure 41. Production by Mining Method**



In 1949, one-fourth of U.S. coal came from surface mines; by 1971, more than one-half was surfaced-mined; and in 2004, two-thirds came from above-ground mines.

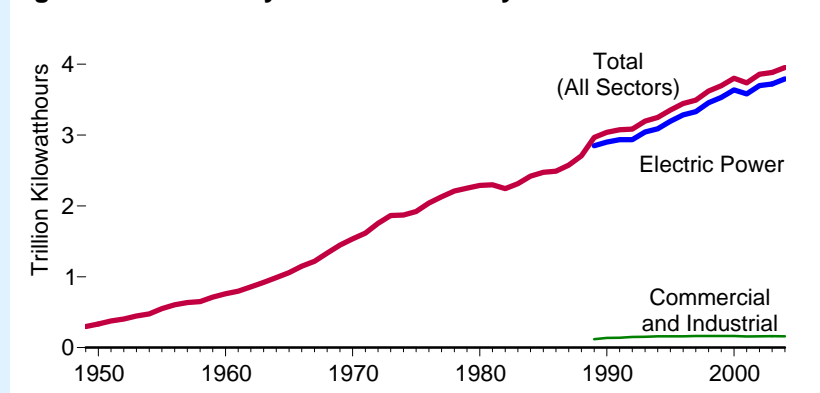
**Figure 42. Production by Location**



Western coal production expanded tremendously after 1969 and surpassed Eastern production beginning in 1999.

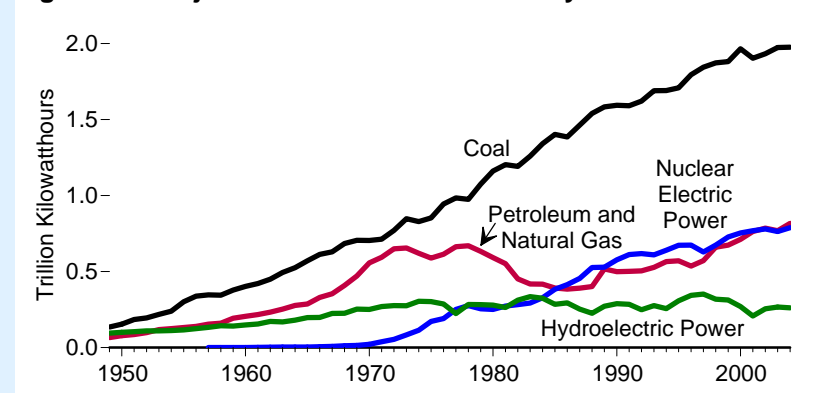
# Electricity Net Generation and Useful Thermal Output

**Figure 43. Electricity Net Generation by Sector**



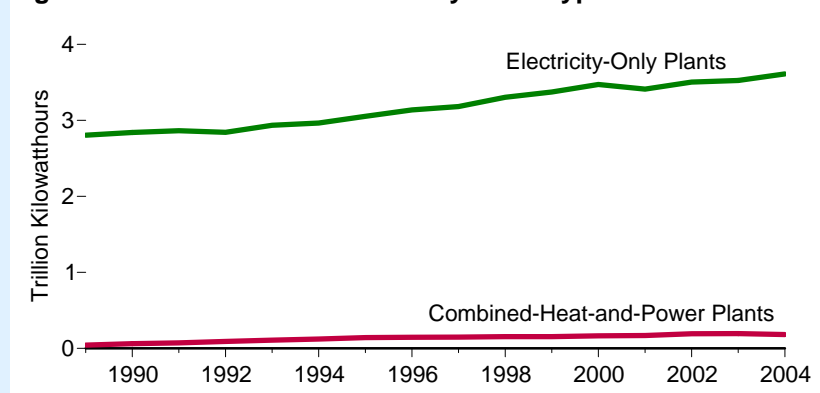
Total electric power net generation grew from 0.3 trillion kilowatthours in 1949 to 4.0 trillion kilowatthours in 2004, failing to increase in only two years (1982 and 2001) over the entire span. Most generation was in the electric power sector, but some occurred directly in the commercial and industrial sectors.

**Figure 44. Major Sources of Total Electricity Net Generation**



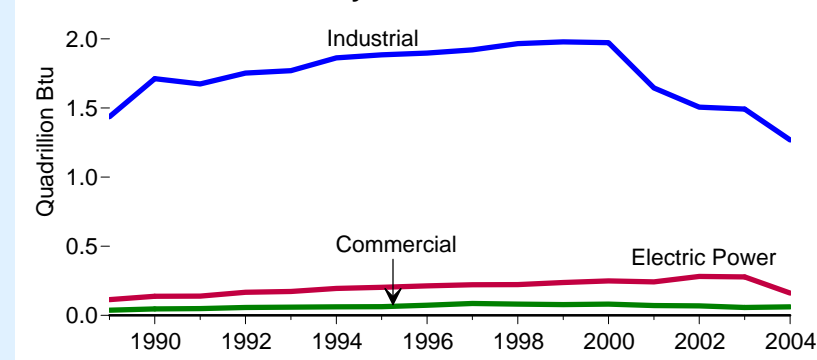
Most electricity net generation came from coal. In 2004, fossil fuels (coal, petroleum, and natural gas) accounted for 71 percent of all net generation, while nuclear electric power contributed 20 percent, and renewable energy resources 9 percent. Over three-fourths of the net generation from renewable energy resources was derived from hydroelectric power.

**Figure 45. Electric Power Sector by Plant Type**



Most generating facilities exist to produce only electricity but some function as combined-heat-and-power (CHP) plants that produce both electricity and heat from a single heat source. Rather than being wasted, the heat from a CHP plant is used for processes and applications other than electrical generation.

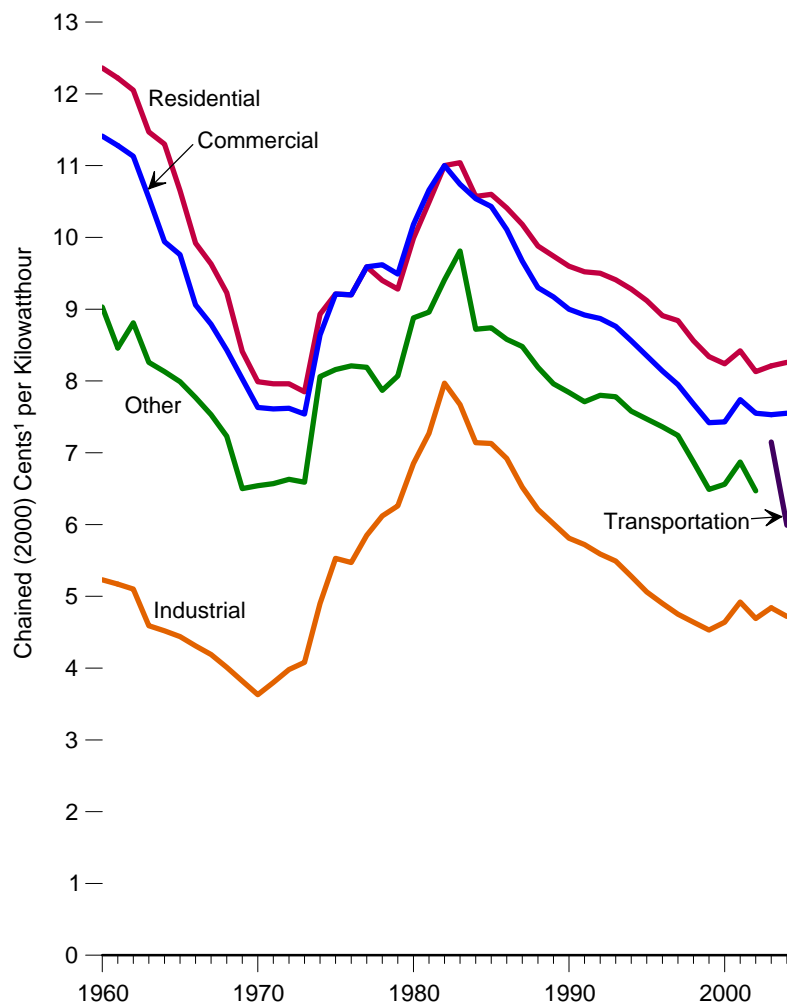
**Figure 46. Useful Thermal Output at Combined-Heat-and-Power Plants by Sector**



The non-electrical output at a combined-heat-and-power (CHP) plant is called useful thermal output. Useful thermal output is thermal energy that is available from the plant for use in industrial or commercial processes or heating or cooling applications. In 2004, 1.3 quadrillion Btu of useful thermal output was created by the industrial sector, and much smaller amounts by the electric power and commercial sectors.

# Electricity Sales, Prices, and Trade

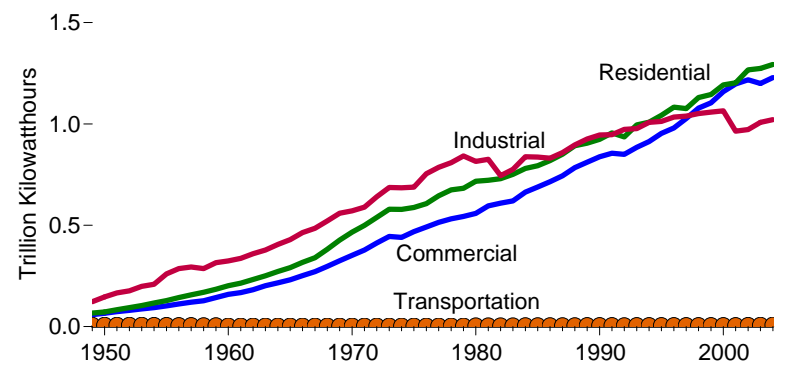
**Figure 47. Average Real Retail Prices of Electricity by Sector**



<sup>1</sup> In chained (2000) dollars, calculated by using domestic product implicit price deflators.

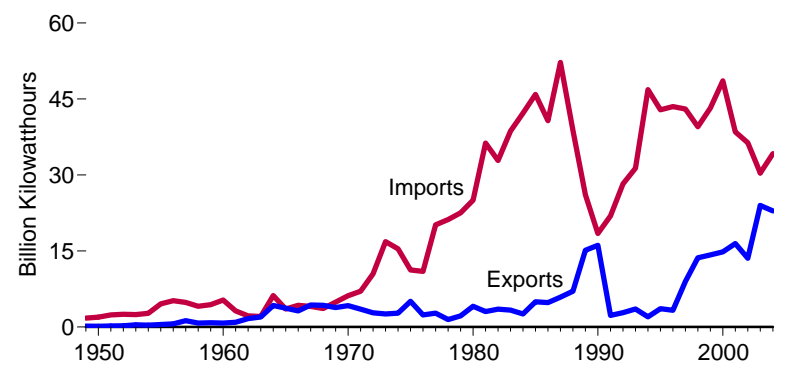
Over the decades, industrial consumers paid the lowest rates for electricity; residential customers usually paid the highest prices. In 2004, all sectors paid lower rates than they had in 1960, when adjusted for inflation.

**Figure 48. Retail Sales by Sector**



Enormous growth occurred in the amount of electricity sold to the three major sectors—residential, commercial, and industrial. Industrial sector sales showed the greatest volatility. Sales to residences exceeded sales to the industrial sector since the early 1990s, and sales to commercial sites surpassed industrial sales since the late 1990s.

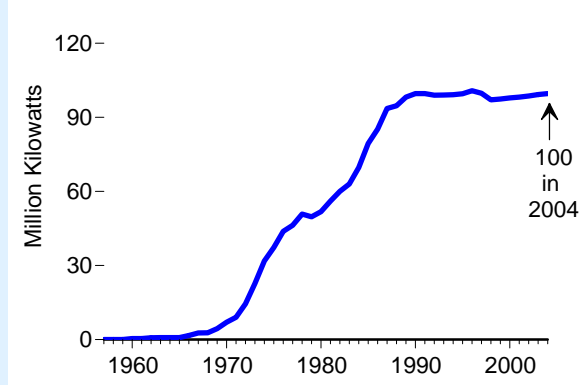
**Figure 49. Electricity Trade**



Except for a few years in the 1960s when imported and exported electricity were nearly equal, the United States imported more electricity than it exported. Most electricity trade occurred with Canada, with smaller exchanges between the United States and Mexico. In 2004, net imported electricity was just 0.3 percent of all electricity used in the United States.

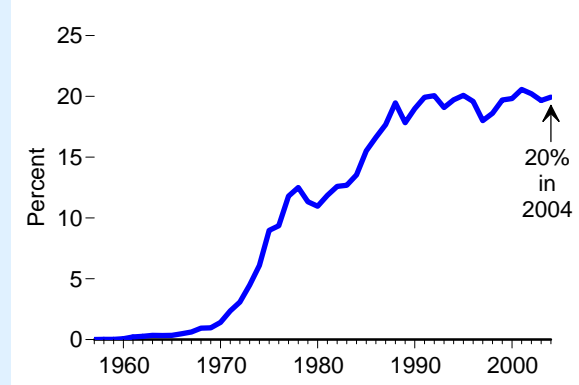
# Nuclear Electric Power

**Figure 50. Nuclear Net Summer Capacity**



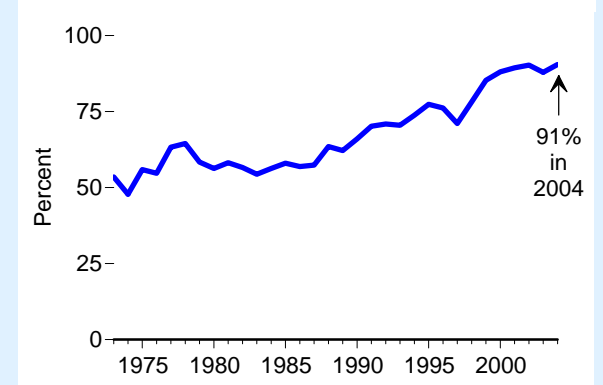
The U.S. nuclear industry's first commercial plant opened in Shippingport, Pennsylvania, in 1957. Nuclear capacity expanded sharply in the 1970s and 1980s. Total net capacity stood at 100 million kilowatts in 2004.

**Figure 51. Nuclear Share of Electricity**



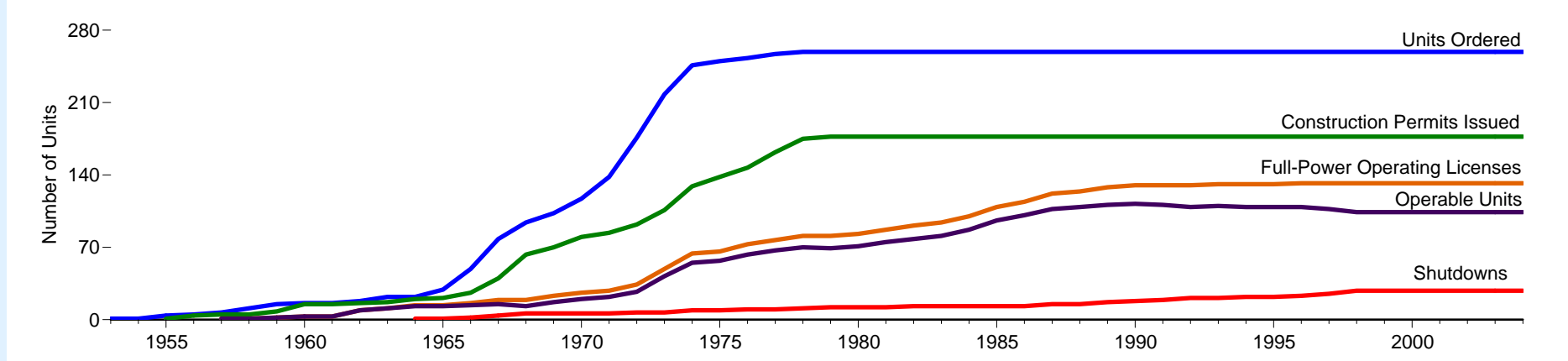
Over the latter part of the last century, nuclear electric power played a key role in meeting the Nation's rapidly growing electricity requirement. In 2004, 20 percent of U.S. total electricity net generation came from nuclear electric power.

**Figure 52. Capacity Factor**



Capacity factors measure actual power generation as a share of maximum possible output. Factors for the industry, which were in the 50-to-60 percent range through the 1980s, generally improved in later years and stood at 91 percent in 2004.

**Figure 53. Operable Units and Cumulative Orders, Permits, Licenses, and Shutdowns, 1953-2004**

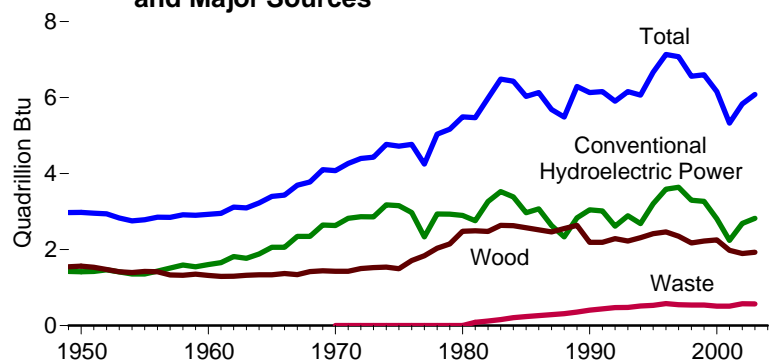


A total of 259 nuclear electric power units were ordered since the industry got its start in the United States in the 1950s. The last new orders were placed in 1978. Of the 259 orders, 177 advanced to the issuance of construction permits and, of those, 132 eventually gained full-power operating licenses.

Out of the 132 units that were granted full-power operating licenses, over time, 28 were permanently shut down. The largest number of units ever operable in the United States was 112 in 1990. From 1998 through 2004, 104 units were operable.

# Renewable Energy

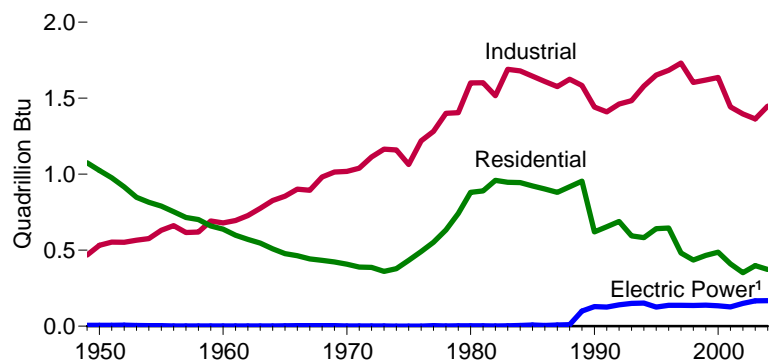
**Figure 54. Renewable Energy Total Consumption and Major Sources**



Note: Wood includes wood, black liquor, and other wood waste.

Total renewable energy consumption generally followed the pattern of hydroelectric power output, which was the largest component of the total for most of the years shown. In 2004, for example, hydroelectric power accounted for 45 percent of the total. Wood was the next largest source of renewable energy, followed by waste, geothermal, alcohol fuels, wind, and solar.

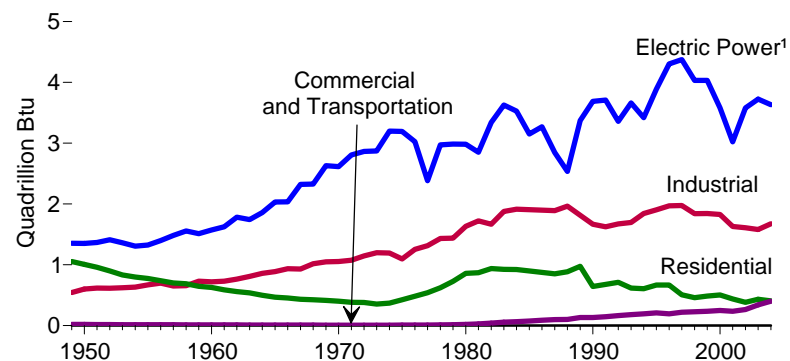
**Figure 56. Wood Consumption by Major Sectors**



<sup>1</sup> Through 1988, electric utilities only; after 1988, includes independent power producers.

In recent decades, the industrial sector was the largest consuming sector of wood as an energy source. Residential use of wood recovered sharply from 1974 through 1982, but then generally resumed its previous downward trend.

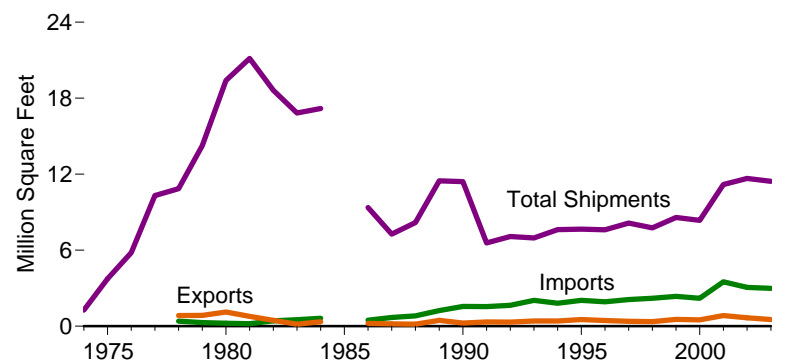
**Figure 55. Renewable Energy Consumption by Sector**



<sup>1</sup> Through 1988, electric utilities only; after 1988, includes independent power producers.

Most renewable energy was consumed by the electric power sector to generate electricity. After 1958, the industrial sector was the second largest consuming sector of renewable energy. Residential sector usage of renewable energy was the third largest consuming sector.

**Figure 57. Solar Collector Shipments and Trade**

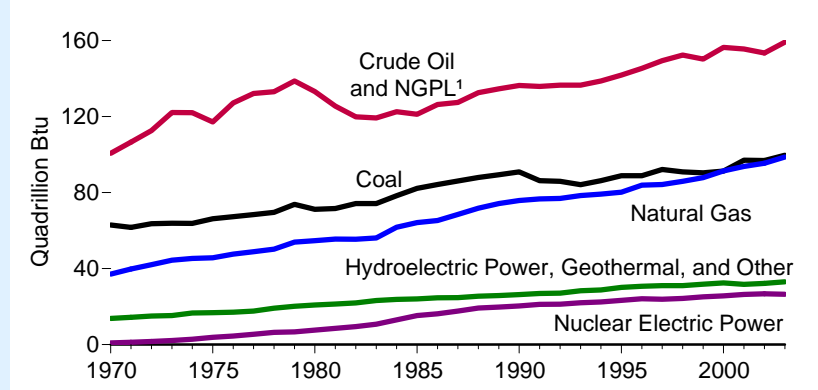


Notes: • Data were not collected for 1985. • Shipments include all domestically manufactured collectors plus imports.

Shipments of solar collectors grew strongly in the 1970s and reached a peak of 21 million square feet in 1981. Uneven performance was recorded over the next decade, followed by a mild upward trend during the 1990s and a bump up in 2001.

# International Energy

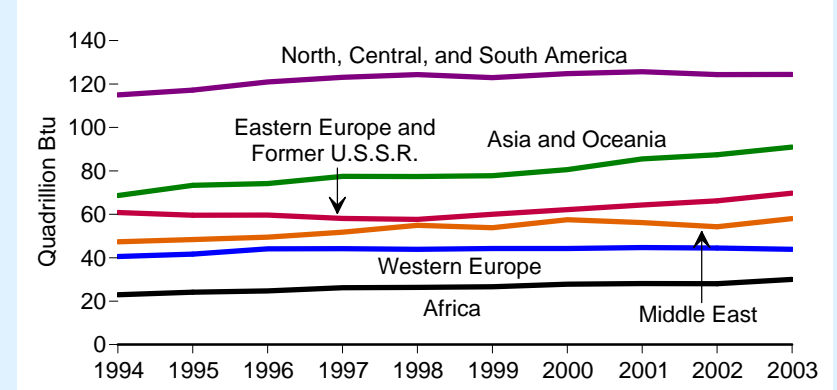
**Figure 58. World Primary Energy Production By Source**



<sup>1</sup> Natural gas plant liquids.

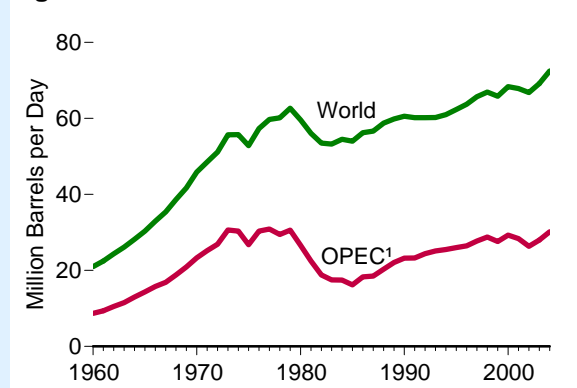
From 1970 to 2003, world primary energy production grew by 94 percent, reaching 417 quadrillion Btu in 2003. Growth occurred in all types of energy. In 2003, fossil fuels accounted for 86 percent of all energy produced worldwide, renewable energy 8 percent, and nuclear electric power 6 percent.

**Figure 59. World Primary Energy Production by Region**



Thirty percent of the 417 quadrillion Btu of energy produced worldwide in 2003 came from North, Central, and South America. The second largest regional energy producer was Asia and Oceania with 22 percent of the world total in 2003.

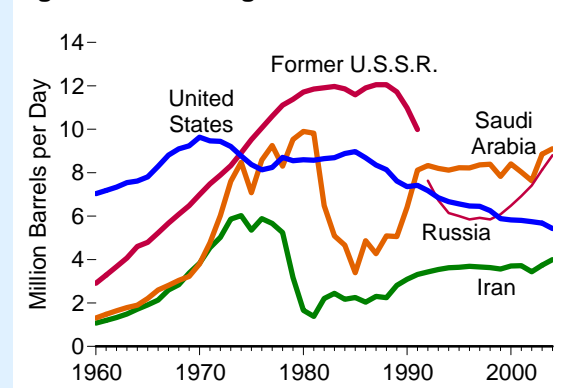
**Figure 60. World Crude Oil Production**



<sup>1</sup> Organization of the Petroleum Exporting Countries.

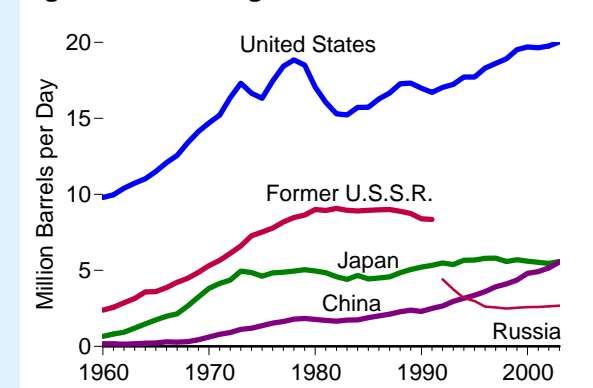
World crude oil production totaled 72 million barrels per day in 2004, up 5 percent over the previous year. OPEC's share of the world total in 2004 was 42 percent, compared to the peak level of 55 percent in 1973.

**Figure 61. Leading Crude Oil Producers**



From 1974 through 1991, the Former U.S.S.R. was the world's leading crude oil producer. After 1991, Saudi Arabia became the top producer, followed closely by Russia since 2002. U.S. production peaked in 1970.

**Figure 62. Leading Petroleum Consumers**

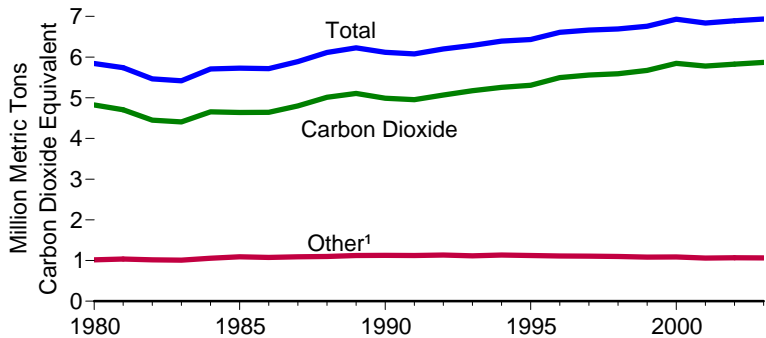


The United States accounted for 25 percent of world consumption of petroleum in 2003. Japan and China, the next two leading consumers, together accounted for 14 percent.



# Emissions

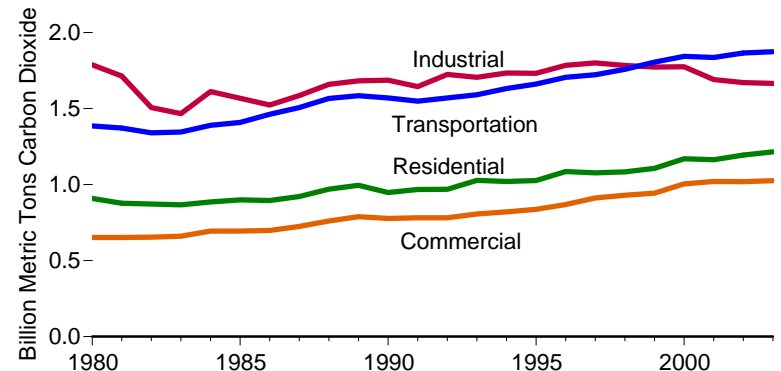
**Figure 63. Greenhouse Gas Emissions, Based on Global Warming**



<sup>1</sup> Methane, nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>).

The combustion of fossil fuels—coal, petroleum, and natural gas—to release their energy creates carbon dioxide emissions, the most significant greenhouse gas. Total carbon dioxide emissions reached 5.9 billion metric tons of gas in 2003, 18 percent higher than the 1990 level.

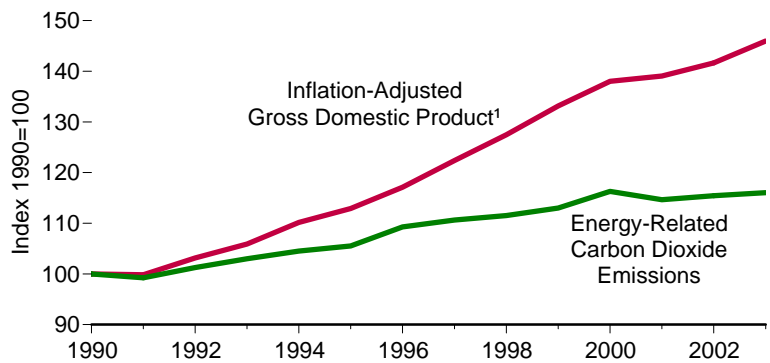
**Figure 64. Carbon Dioxide Emissions From Energy Use**



Note: Electric power sector emissions are distributed to the end-use sectors.

In 1999, transportation sector carbon dioxide emissions overtook industrial sector emissions. Of the major sectors, the commercial sector generated the lowest quantities of carbon dioxide emissions but recorded the greatest growth since 1980.

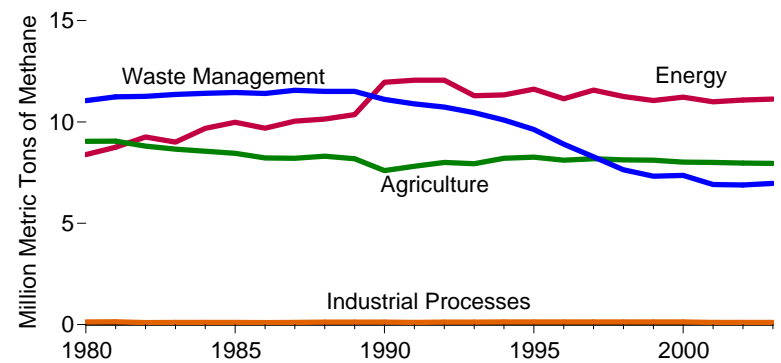
**Figure 65. GDP Growth and Carbon Dioxide Emissions**



<sup>1</sup> Based on chained (2000) dollars.

While gross domestic product (GDP) grew by 46 percent from 1990 to 2003, energy-related carbon dioxide emissions grew by 16 percent. It was primarily the use of less energy per unit of economic output, rather than the use of low-carbon fuels, that held the carbon dioxide emissions growth rate well below the inflation-adjusted gross domestic product growth rate.

**Figure 66. Methane Emissions by Source**



In 2003, methane emissions accounted for 9 percent of total U.S. greenhouse gas emissions, weighted by global warming potential. Most methane emissions came from energy, agricultural activities, and waste management. The production, processing, and distribution of natural gas accounted for 60 percent of all energy-related methane emissions in 2003.

## Figure Sources

Data for “Energy Perspectives” figures and text are derived from the following *Annual Energy Review 2004* tables and additional sources:

1. Table 1.1.
2. Table 1.5.
3. Table 1.5.
4. Table 1.3.
5. Tables 1.3, 10.1, and E1.
6. Historical data: Table 1.3. Projections: Energy Information Administration (EIA), *Annual Energy Outlook 2005* (February 2005), Figure 3.
7. Table 2.1a.
8. Tables 2.1b and 2.1c.
9. Table 2.1d.
10. Tables 2.1e and 5.14c.
11. Table 1.2.
12. Tables 5.1, 6.1, and 7.1.
13. Table 1.4.
14. Table 5.1.
15. Table 5.2.
16. Table 5.2.
17. Table 4.4.
18. Tables 5.13a, 5.13b, 5.13c, and 5.13d.
19. Table 5.11.
20. Table 5.21.
21. Table 5.24.
22. Tables 5.3 and 5.5.
23. Table 5.4.
24. Table 5.4.
25. Table 5.4.
26. Table 5.16.
27. Table 5.16.
28. Table 5.17.
29. Table 5.17.
30. Table 2.8.
31. Table 2.8.
32. Table 2.8.
33. Table 2.8.
34. Table 6.1.
35. Table 6.4.
36. Table 6.3.
37. Table 6.5.
38. Table 7.1.
39. Table 7.3.
40. Table 7.6.
41. Table 7.2.
42. Table 7.2.
43. Tables 8.2a, 8.2b, and 8.2d.
44. Table 8.2a.
45. Table 8.2c.
46. Tables 8.3b and 8.3c.
47. Table 8.10.
48. Table 8.9.
49. Table 8.1.
50. Table 9.2.
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52. Table 9.2.
53. Table 9.1.
54. Table 10.1.
55. Tables 10.2a and 10.2b.
56. Tables 10.2a and 10.2b.
57. Table 10.3.
58. Table 11.1.
59. Table 11.2.
60. Table 11.5.
61. Table 11.5.
62. Table 11.10.
63. Table 12.1.
64. Table 12.2.
65. Tables 1.5 and 12.2, and EIA, *Emissions of Greenhouse Gases in the United States 2003* (December 2004).
66. Tables 12.1 and 12.5, and EIA, *Emissions of Greenhouse Gases in the United States 2003* (December 2004), page 33.