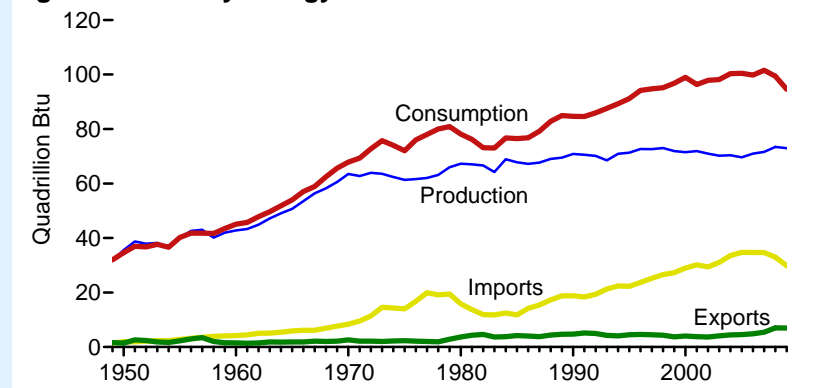


Energy Perspectives

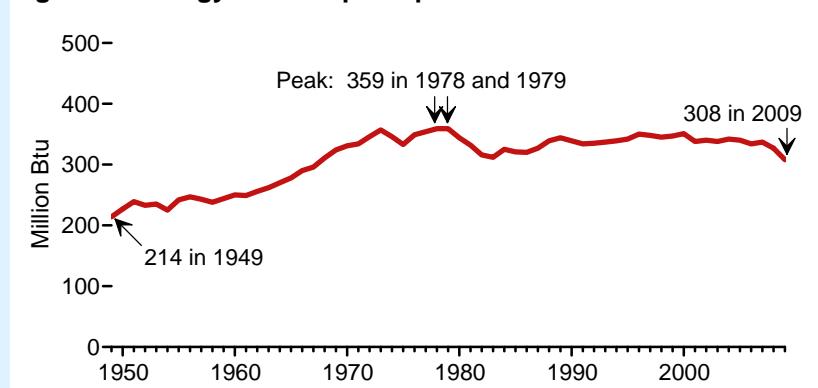
Overview

Figure 1. Primary Energy Overview



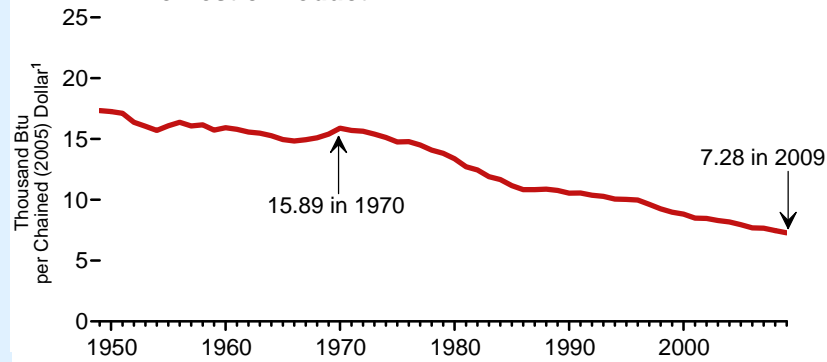
The United States was self-sufficient in energy until the late 1950s when energy consumption began to outpace domestic production. At that point, the Nation began to import more energy to meet its needs. In 2009, net imported energy accounted for 24 percent of all energy consumed.

Figure 2. Energy Consumption per Person



Energy use per person stood at 214 million British thermal units (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 until the 2008-2009 economic downturn. In 2009, 308 million Btu of energy were consumed per person, 44 percent above the 1949 rate.

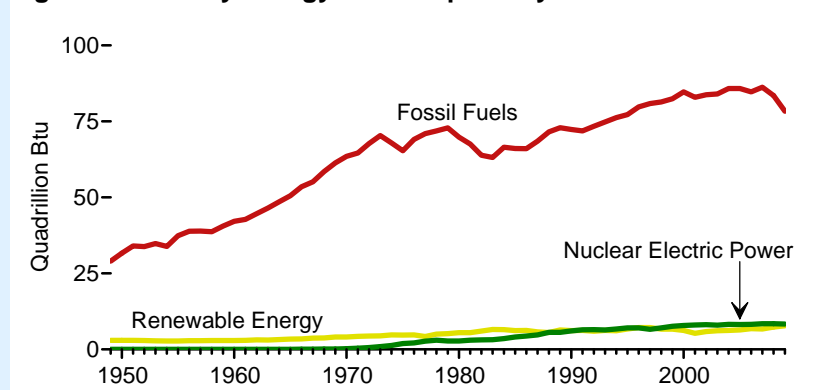
Figure 3. Energy Consumption per Real Dollar¹ of Gross Domestic Product



¹ See "Chained Dollars" in Glossary.

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 2009 was 54 percent below that of 1970.

Figure 4. Primary Energy Consumption by Source



Most energy consumed in the United States comes from fossil fuels. Renewable energy resources supplied a small but growing portion. In the late 1950s, nuclear fuel began to be used to generate electricity. From 1998 through 2009, nuclear electric power surpassed renewable energy.

Consumption by Source

Figure 5. Primary Energy Consumption by Source, 1775-2009

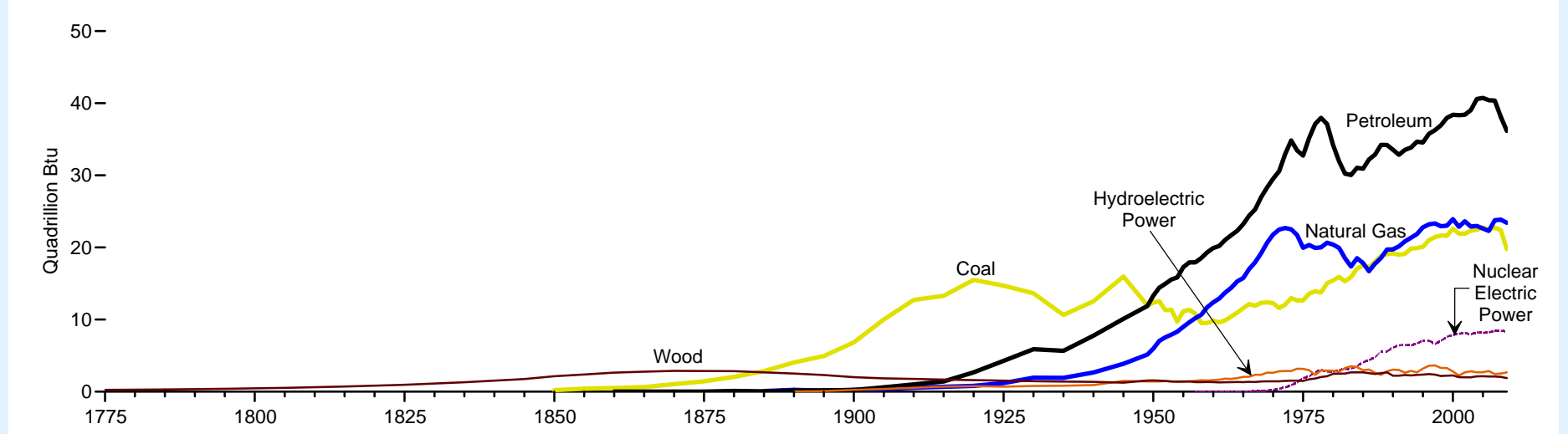
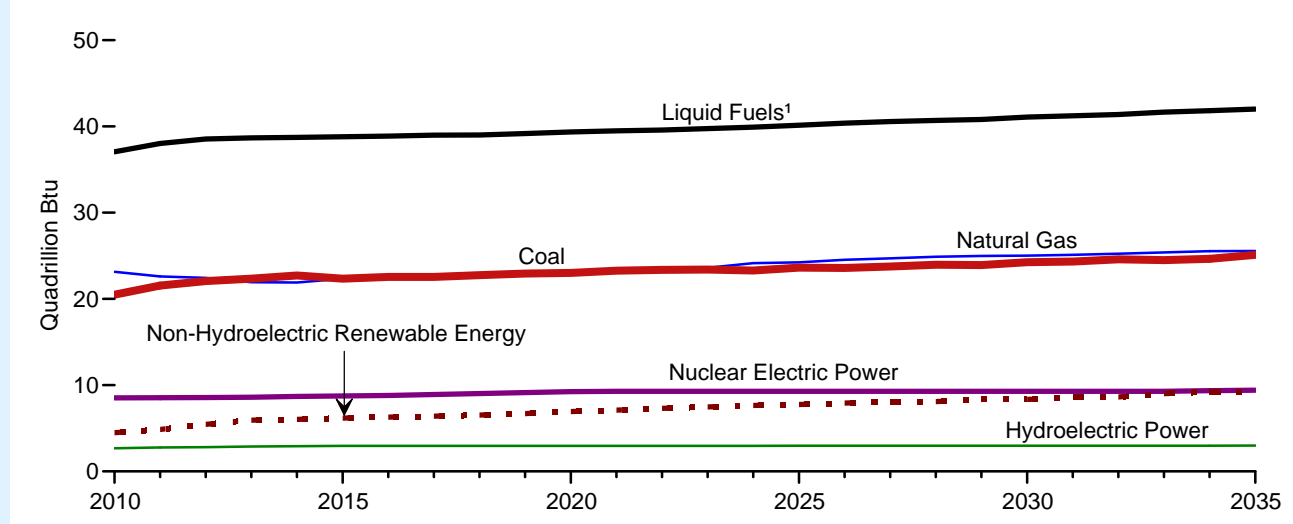


Figure 6. Energy Consumption Outlook From the Annual Energy Outlook Reference Case, 2010-2035



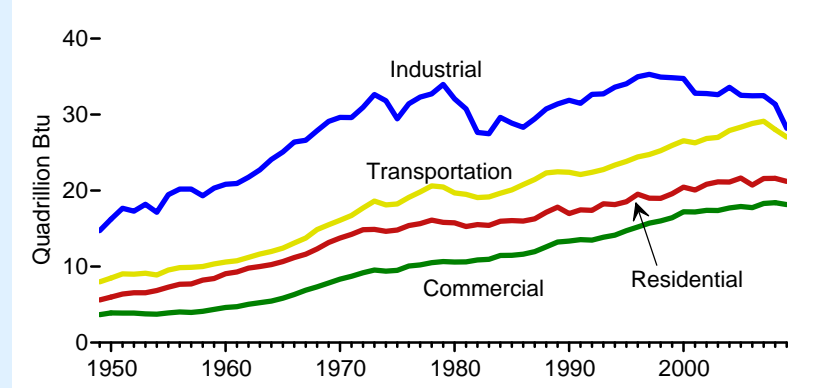
¹ Petroleum-derived fuels and non-petroleum-derived fuels, such as fuel ethanol, biodiesel, and coal-based synthetic liquids.

The Nation's energy history is one of large-scale change as new forms of energy develop. Wood served as the primary form of energy until about 1885, when it was surpassed by coal. Despite its tremendous and rapid expansion, coal was in turn overtaken by petroleum in the middle of the 20th century. In the second half of the 20th century, natural gas experienced rapid development, and coal began to expand again. Late in the century, still other forms of energy—hydroelectric power and nuclear electric power—were developed and supplied significant amounts of energy.

The reference case from the U.S. Energy Information Administration's *Annual Energy Outlook 2010*, which assumes current laws and regulations remain unchanged, projects that fossil fuels continue to provide most of the energy consumed in the United States over the next 25 years. The fossil-fuel share of overall energy use declines, however, as the role of renewable forms of energy grows. Non-hydroelectric renewable energy is projected to double by 2035.

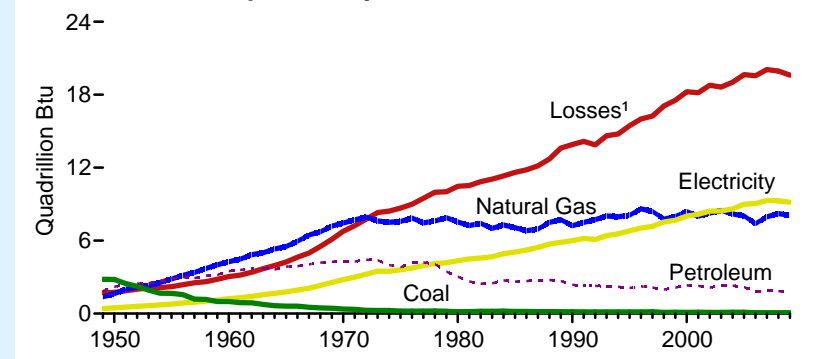
Consumption by Sector

Figure 7. Total 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, 1980-1982, 2001, 2008, and 2009 largely in response to high oil prices and economic slowdown.

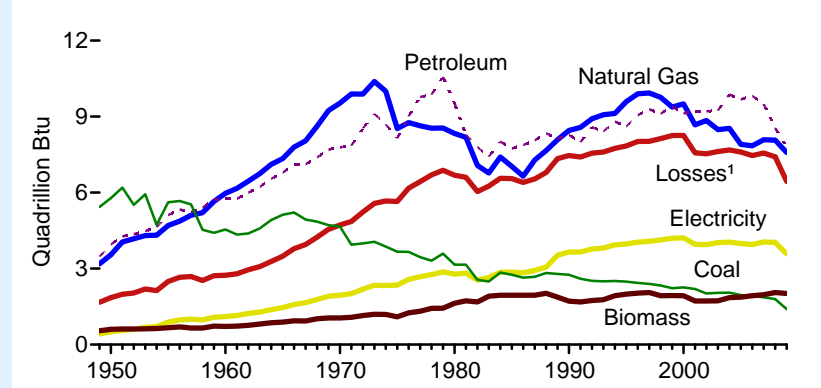
Figure 8. Residential and Commercial Total Energy Consumption, Major Sources



¹ 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 consumption peaked in the early 1970s. Natural gas consumption grew fast until the early 1970s, and then, with mild fluctuations, held fairly steady in the following years. Meanwhile, electricity use (and related losses) expanded dramatically.

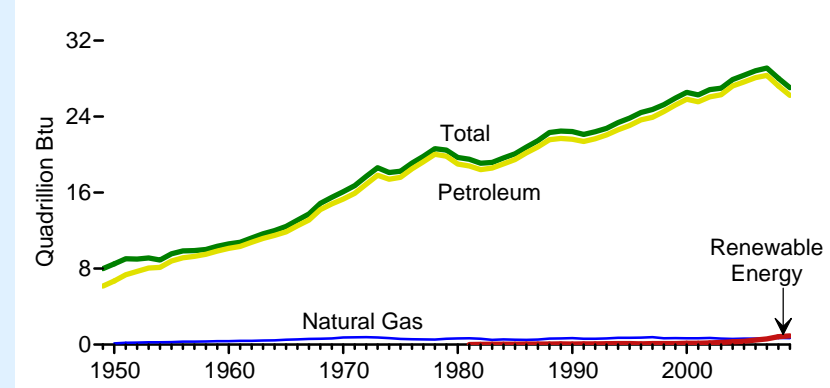
Figure 9. Industrial Total Energy Consumption, Major Sources



¹ 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 biomass trended upward.

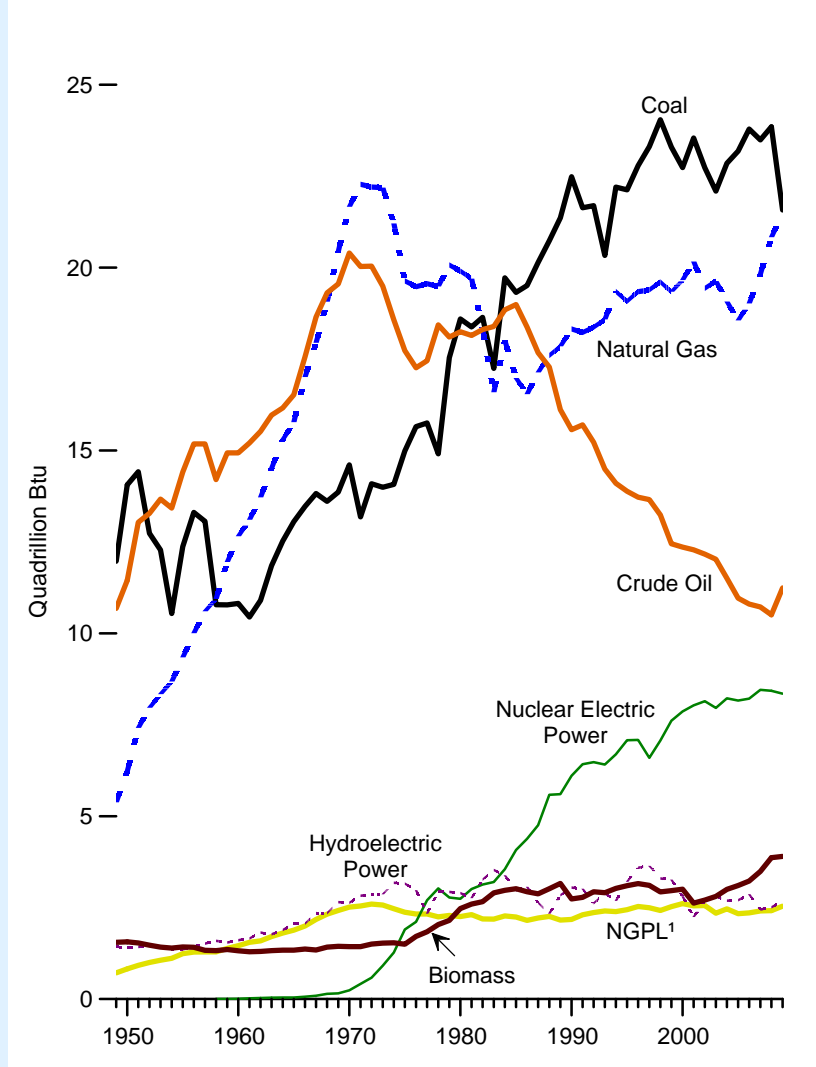
Figure 10. Transportation Total Energy Consumption



Transportation sector use of energy experienced tremendous growth overall; however, there were year-to-year declines, particularly in the early 1980s and in 2008 and 2009. Throughout the 1949-to-2009 period, petroleum supplied most of the demand for transportation energy; in 2009, petroleum accounted for 94 percent of the transportation sector's total use of energy. Natural gas and renewable energy accounted for the remainder.

Production and Trade

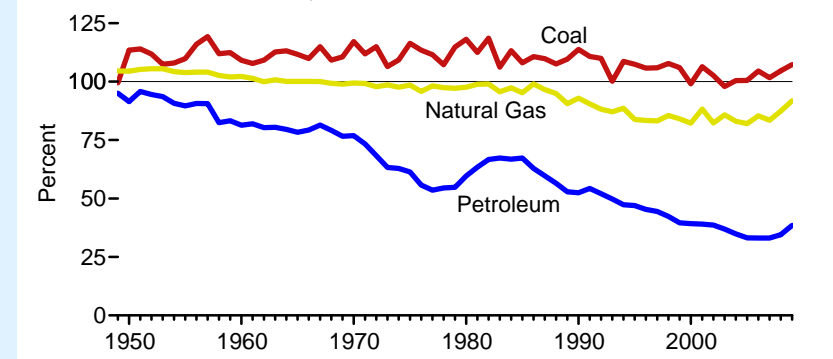
Figure 11. Primary Energy Production by Major Source



¹ Natural gas plant liquids.

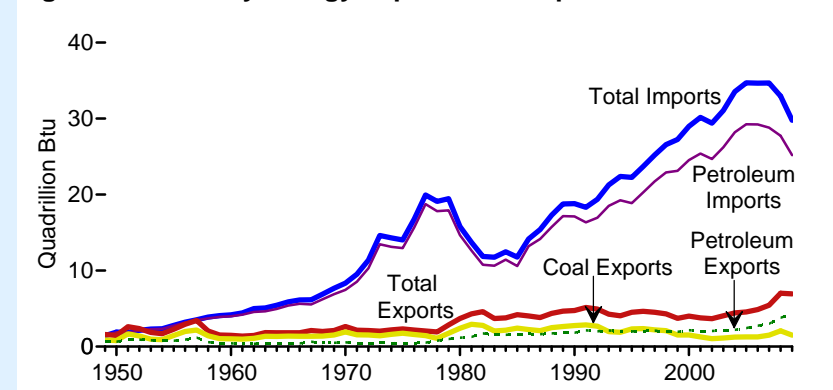
Most energy produced in the United States came from fossil fuels—coal, natural gas, and crude oil. Coal, the leading source at the middle of the 20th century, was surpassed by crude oil and then by natural gas. By the mid-1980s, coal again became the leading energy source produced in the United States,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

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



The United States 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 Nation to rely on imported supplies.

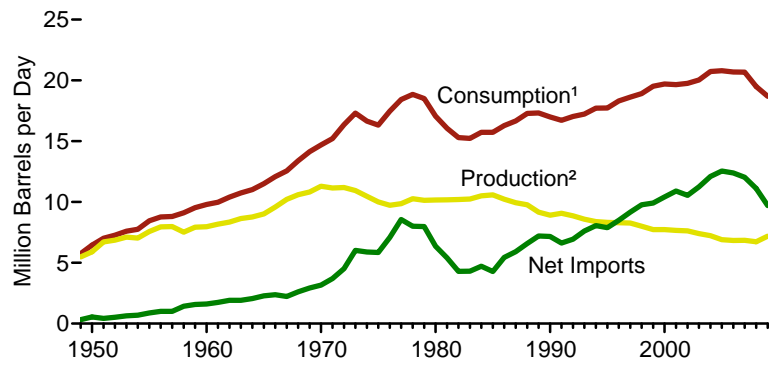
Figure 13. Primary Energy Imports and Exports



Since the mid-1950s, the Nation imported more energy than it exported. In 2009, the United States imported 30 quadrillion Btu of energy and exported 7 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

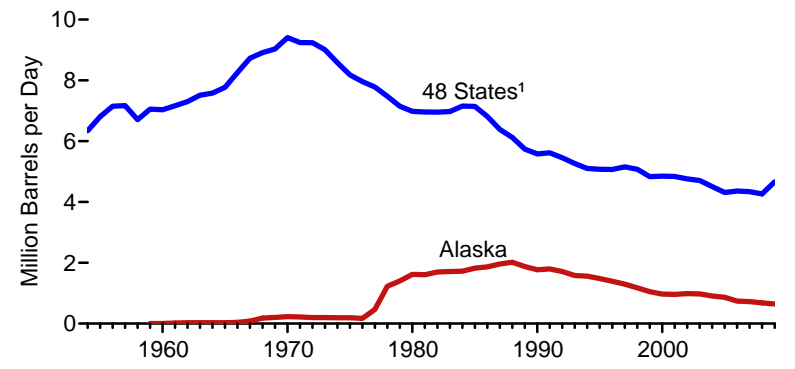
Figure 14. Petroleum Overview



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

When U.S. production of crude oil and natural gas plant liquids peaked at 11.3 million barrels per day in 1970, net imports stood at 3.2 million barrels per day. In 2009, production was 7.2 million barrels per day, and net imports were 9.7 million barrels per day.

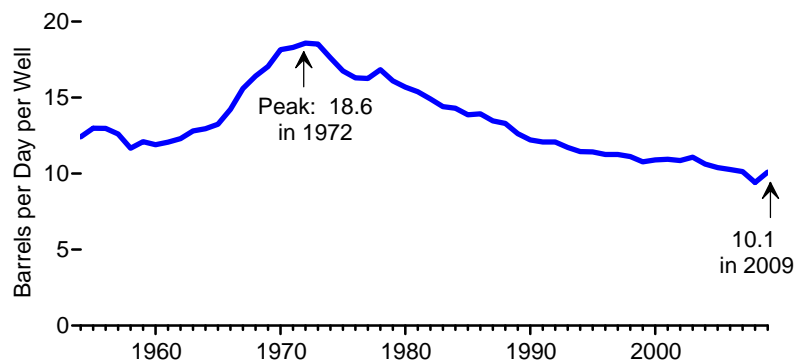
Figure 15. 48 States and Alaskan Crude Oil Production



¹ United States excluding Alaska and Hawaii.

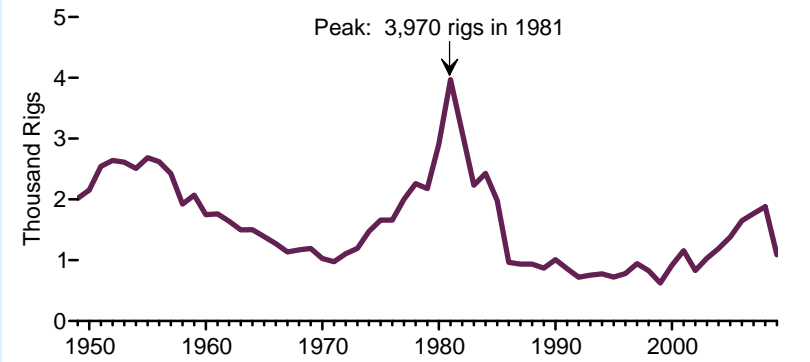
Crude oil production peaked in the 48 States at 9.4 million barrels per day in 1970. As production fell in the 48 States, Alaska's production came on-line and helped supply U.S. needs. Alaskan production peaked at 2.0 million barrels per day in 1988; in 2009, Alaska's production stood at 32 percent of its peak level, or 0.6 million barrels per day.

Figure 16. Crude Oil Well Productivity



Crude oil well productivity rose sharply in the 1960s and reached a peak of 18.6 barrels per day per well in 1972. After 1972, productivity trended downward to a 55-year low. The 2008 rate of 9.4 barrels per day per well was 51 percent of the 1972 peak. In 2009, productivity rose to 10.1 barrels per day per well.

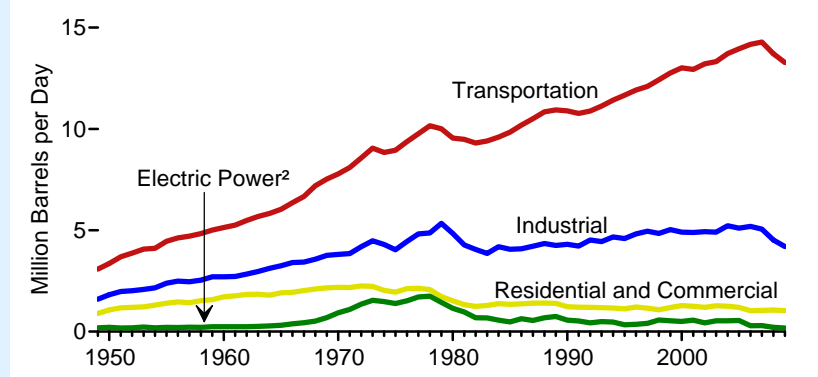
Figure 17. Crude Oil and Natural Gas Rotary Rigs in Operation



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 2009, 1,089 rigs were in operation, a 42 percent drop from 2008 and only 27 percent of the peak level in 1981.

Petroleum Consumption and Prices

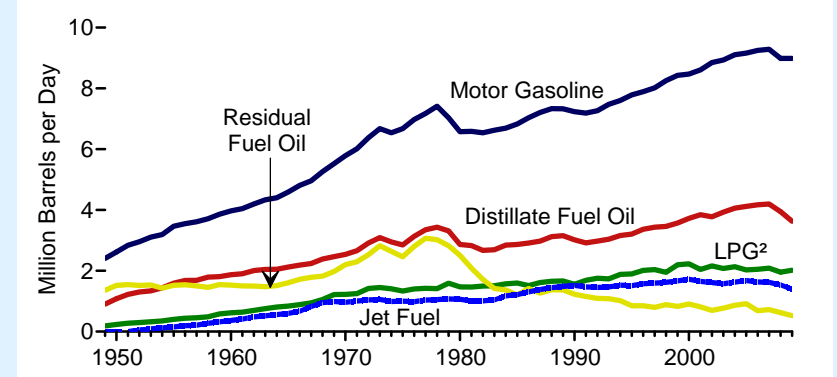
Figure 18. Petroleum Consumption¹ by Sector



¹ Petroleum products supplied is used as an approximation for consumption.
² Through 1988, electric utilities only; after 1988, also includes independent power producers.

Transportation was the largest consuming sector of petroleum and the one showing the greatest expansion. In 2009, 13.3 million barrels per day of petroleum products were consumed for transportation purposes, accounting for 71 percent of all petroleum used.

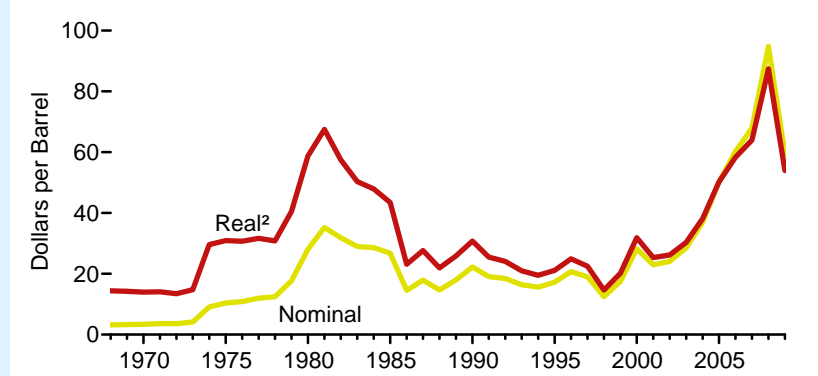
Figure 19. Petroleum Consumption¹ by Selected Product



¹ Petroleum products supplied is used as an approximation for consumption.
² Liquefied petroleum gases.

Motor gasoline was the single largest petroleum product consumed in the United States. Its consumption stood at 9.0 million barrels per day in 2009, 48 percent of all petroleum consumption. Distillate fuel oil, liquefied petroleum gases (LPG), and jet fuel were other important products. The use of residual fuel oil fell off sharply after 1977.

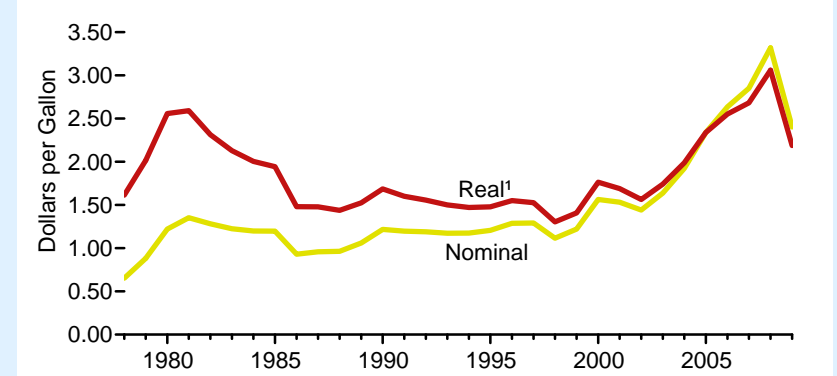
Figure 20. Crude Oil Refiner Acquisition Cost¹



¹ Composite of domestic and imported crude oil.
² In chained (2005) dollars, calculated by using gross domestic product implicit price deflator. See "Chained Dollars" in Glossary.

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 nominal price reported for 2009 was \$59.27 per barrel, a decrease of 37 percent over the 2008 price.

Figure 21. Retail Price of Motor Gasoline, All Grades

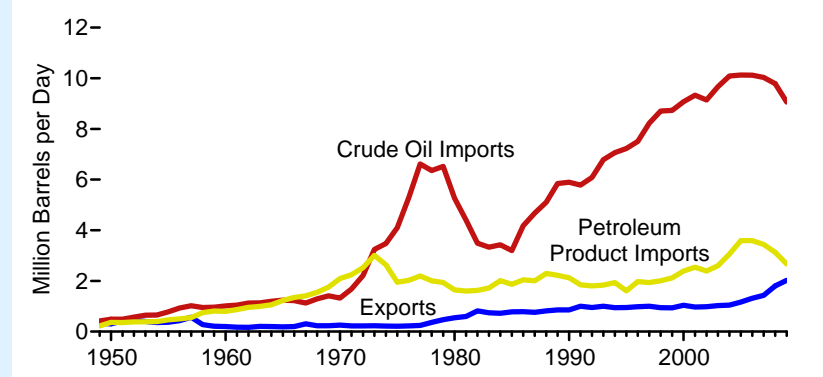


¹ In chained (2005) dollars, calculated by using gross domestic product implicit price deflator. See "Chained Dollars" in Glossary.

In nominal (unadjusted for inflation) dollars, Americans paid an average of 65¢ per gallon for motor gasoline in 1978. The 2009 average price of \$2.40 was more than five times the 1978 rate; adjusted for inflation, it was 36 percent higher.

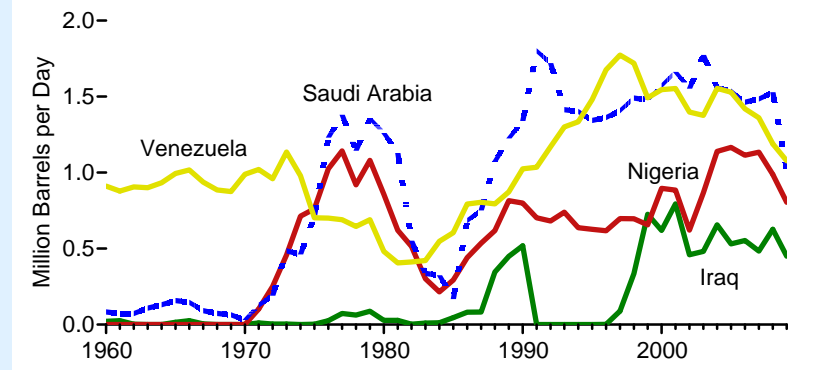
Petroleum Trade

Figure 22. Petroleum Trade



U.S. crude oil imports grew rapidly from mid-20th century until the late 1970s, but fell sharply from 1979 to 1985. The trend resumed upward from 1985 through 2004, then remained flat through 2007, before dropping in 2008 and 2009. In 2009, crude oil imports were 9.1 million barrels per day; petroleum product imports were 2.7 million barrels per day; and, exports were 2.0 million barrels per day, mainly in the form of distillate and residual fuel oils.

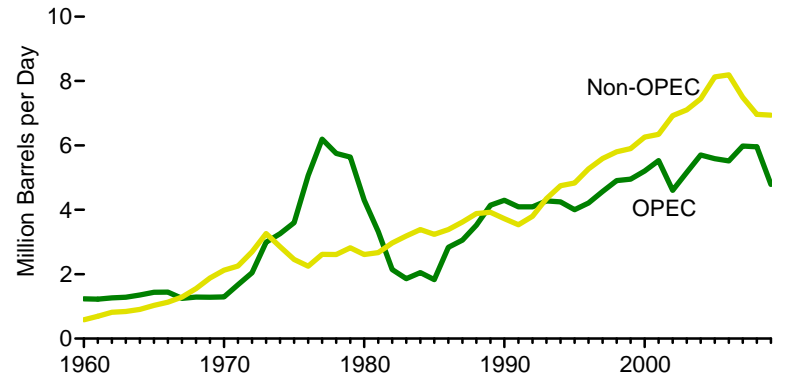
Figure 24. Petroleum Imports From Selected OPEC Countries



Note: OPEC = Organization of the Petroleum Exporting Countries.

Among OPEC countries, Saudi Arabia, Venezuela, and Nigeria—nations from three different continents—were key suppliers of petroleum to the U.S. market. Each experienced wide fluctuation in the amount of petroleum it sold to the United States over the decades. In 2009, 0.4 million barrels per day of petroleum came into the United States from Iraq.

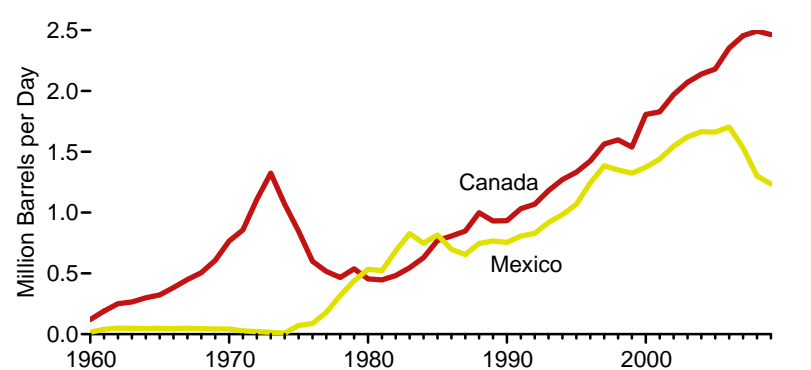
Figure 23. Petroleum Imports From OPEC and Non-OPEC



Note: OPEC = 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 2009, 41 percent of U.S. petroleum imports came from OPEC countries, down from 70 percent in 1977. After 1992, more petroleum came into the United States from non-OPEC countries than from OPEC countries.

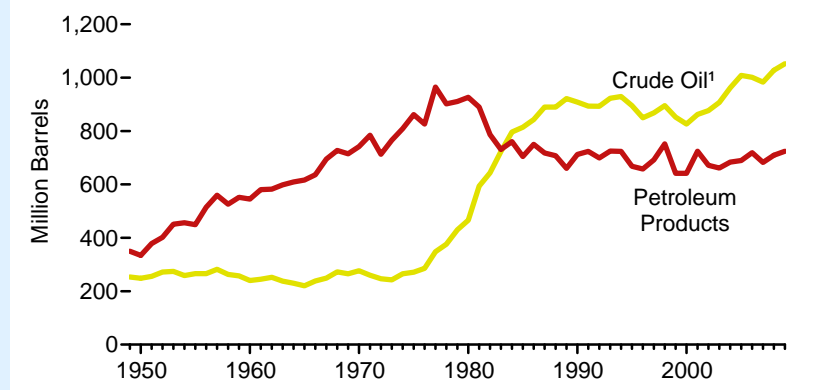
Figure 25. Petroleum Imports From Canada and Mexico



Canada and Mexico were the largest non-OPEC suppliers of petroleum to the United States. In 2009, imports from Canada reached a new high of 2.5 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 32 percent of all U.S. imports in 2009.

Petroleum Stocks

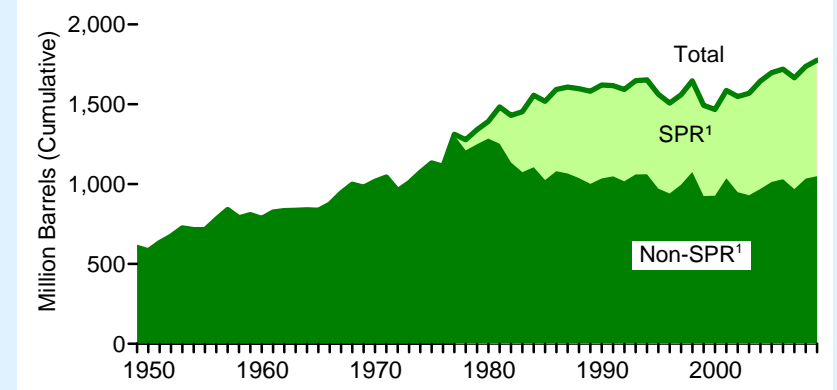
Figure 26. Stocks of Crude Oil and Petroleum Products



¹ Includes crude oil and lease condensate 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 1983, most petroleum in storage was in the form of crude oil (including that held by the government in the Strategic Petroleum Reserve) that still needed to be refined into usable end products. At the end of 2009, petroleum stocks totaled 1.8 billion barrels, 59 percent crude oil and 41 percent products.

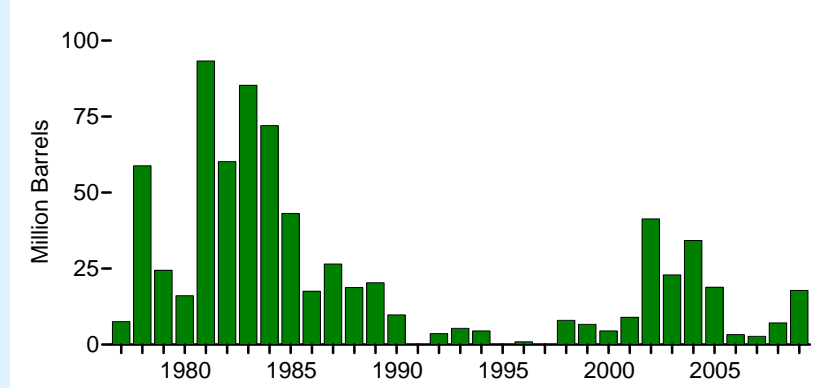
Figure 27. Total Petroleum Stocks and the SPR¹



¹ 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 2009, the SPR held 727 million barrels of crude oil, 41 percent of all U.S. petroleum stocks.

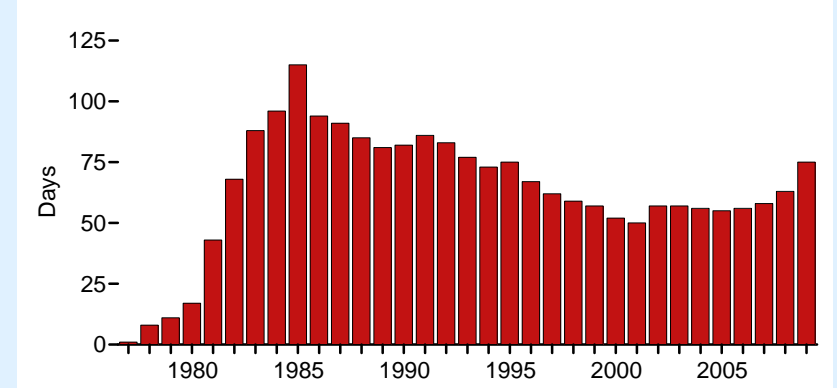
Figure 28. Crude Oil Imports for the SPR¹



¹ Imported by the Strategic Petroleum Reserve (SPR) and imported by others for the SPR.

Most crude oil in the SPR was imported and 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 again after 1997, and stored another 176 million barrels from 1998 through 2009.

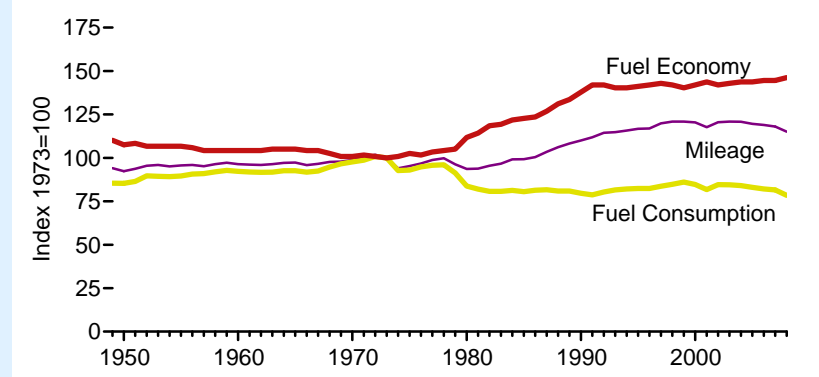
Figure 29. SPR Stocks as Days of Petroleum Net Imports



Stocks are often measured by the number of days of total net imports of petroleum that could be met by the reserve in an emergency. The peak level occurred in 1985 when the Strategic Petroleum Reserve (SPR) could have supplied 115 days of petroleum net imports, at the 1985 level. The rate trended down for many years, falling to 50 days in 2001. In 2009, SPR held 75 days of net imports.

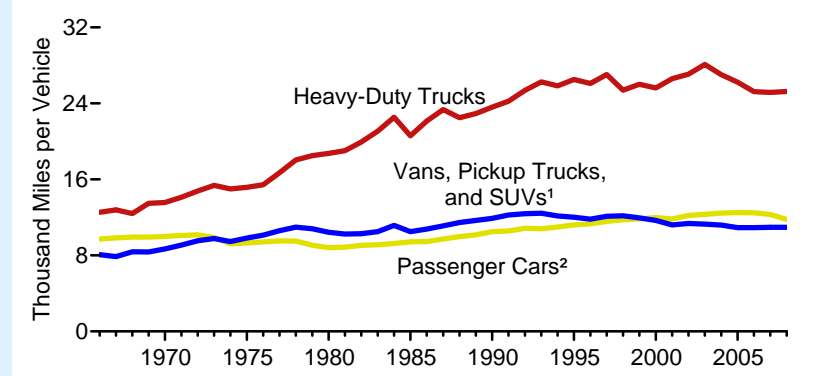
Motor Vehicles

Figure 30. Motor Vehicle Indicators



The composite motor vehicle fuel economy (miles per gallon) rose 42 percent from 1973 to 1991 and then varied little in subsequent years. Mileage (miles per vehicle) grew steadily from 1980 to 1998, and then remained near 12 thousand miles per vehicle per year through 2007. Fuel consumption (gallons per vehicle) fell 21 percent from 1973 to 1991, regained 9 percent from 1991 to 1999, and then trended down through 2008.

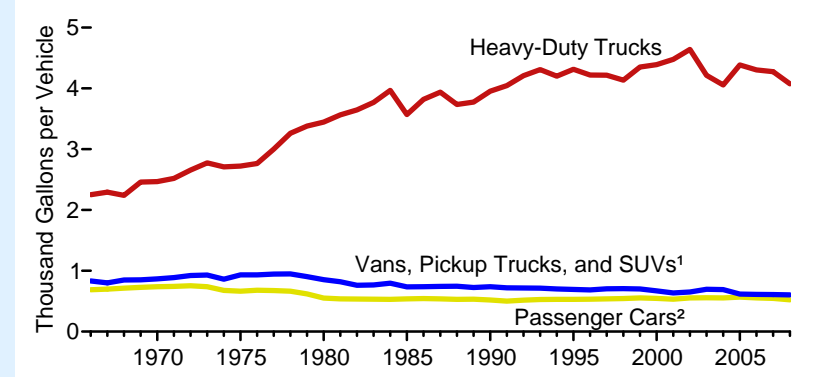
Figure 32. Motor Vehicle Mileage



¹ Sport utility vehicles. ² Motorcycles are included through 1989.

Heavy-duty truck miles traveled per year, which greatly exceeded other vehicle categories, grew by 124 percent from 1966 to 2003, decreased 10 percent from 2003 to 2008, and averaged 25.3 thousand miles per vehicle in 2008. Passenger cars averaged 11.8 thousand miles per vehicle in 2008. Vans, pickup trucks, and sport utility vehicles averaged 11.0 thousand miles per vehicle in 2008.

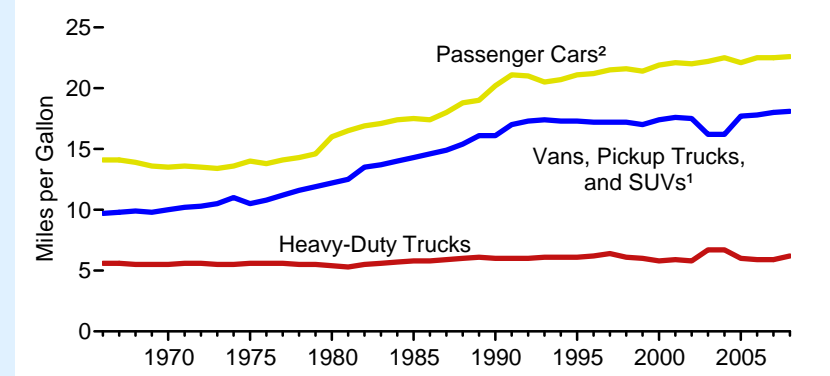
Figure 31. Motor Vehicle Fuel Consumption



¹ Sport utility vehicles. ² Motorcycles are included through 1989.

Average fuel consumption rates for heavy-duty trucks greatly exceeded those for other vehicle and trended upward over time—doubling from 2.3 thousand gallons per truck in 1966 to 4.6 thousand gallons per truck in 2002. Average fuel consumption rates for passenger cars, and vans, pickup trucks, and sport utility vehicles were much lower and generally trended downward.

Figure 33. Motor Vehicle Fuel Economy



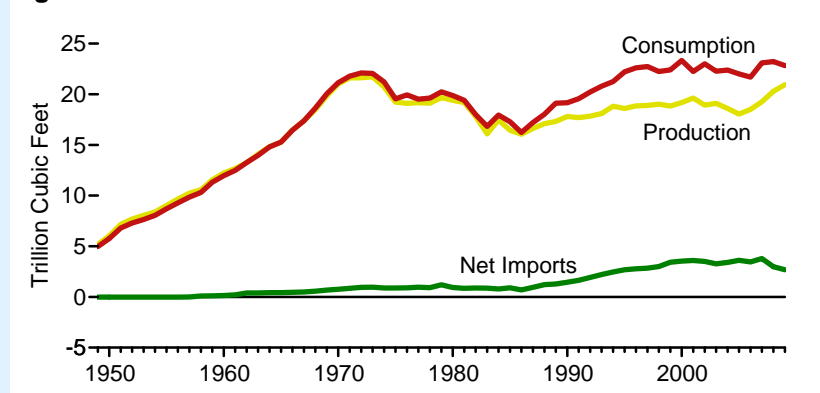
¹ Sport utility vehicles. ² Motorcycles are included through 1989.

The fuel economy (miles per gallon), of passenger cars and vans, pickup trucks, and sport utility vehicles (SUVs), improved noticeably from the mid-1970s through 2008, with the exception of 2002 and 2003, when the fuel economy of vans, pickup trucks, and SUVs fell. The fuel economy of heavy-duty trucks was much lower than for other vehicles, largely due to their greater size and weight, and showed far less change over time.

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

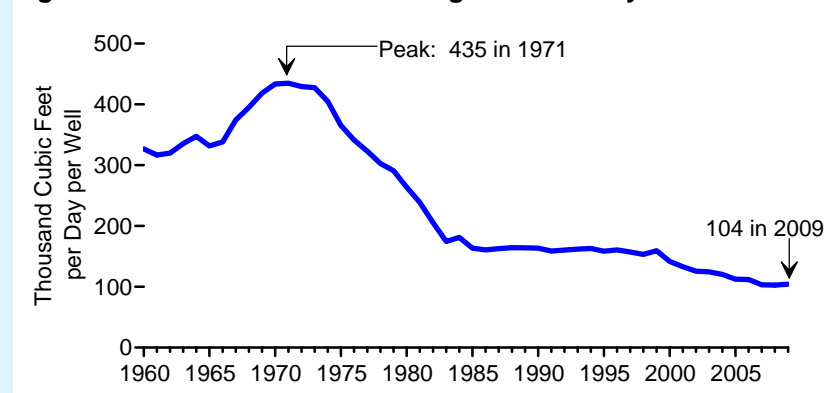
Natural Gas

Figure 34. Natural Gas Overview



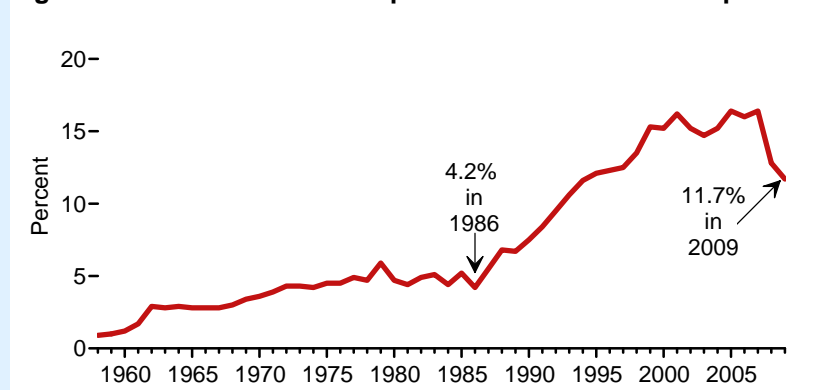
U.S. natural gas production and consumption were nearly in balance through 1986. After that, consumption began to outpace production, and imports of natural gas rose to meet U.S. demand. Production increased from 2006 through 2009. In 2009, production stood at 21.0 trillion cubic feet (Tcf), net imports at 2.7 Tcf, and consumption at 22.8 Tcf.

Figure 35. Natural Gas Well Average Productivity



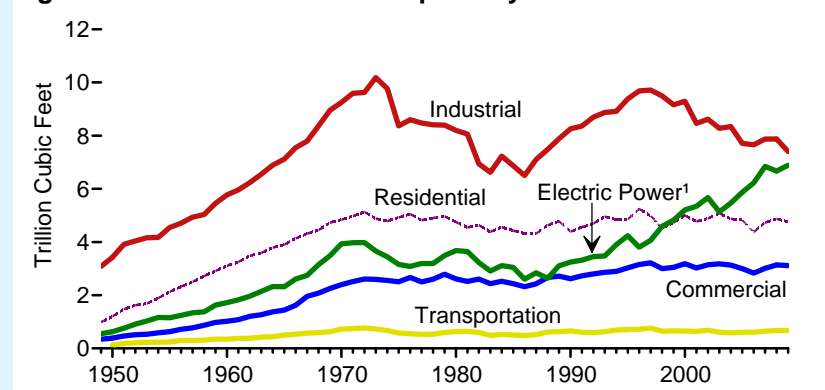
Natural gas well productivity, measured as gross withdrawals per day per well, grew rapidly in the late 1960s, peaked in 1971, and then fell sharply until the mid-1980s. Productivity remained fairly steady from 1985 through 1999, fell annually through 2008, and turned up slightly in 2009.

Figure 36. Natural Gas Net Imports as Share of Consumption



Net imports of natural gas as a share of consumption remained below 6 percent through 1987. Then, during a period when consumption outpaced production, the share rose to a peak of 16.4 percent in 2005 and again in 2007. In 2009, the share was 11.7 percent.

Figure 37. Natural Gas Consumption by Sector

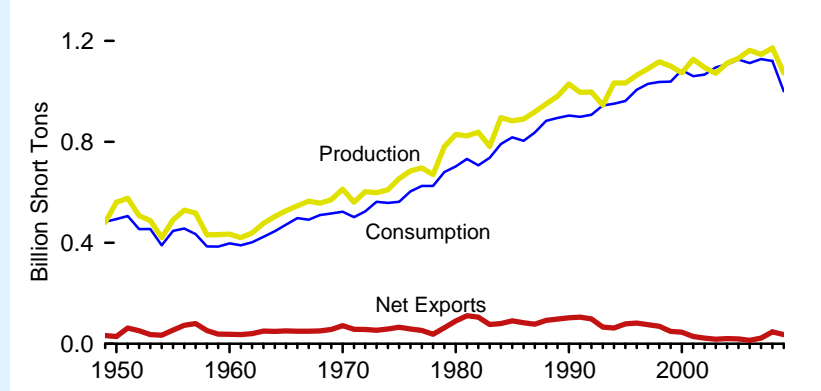


¹ Through 1988, electric utilities only; after 1988, also includes independent power producers.

Throughout the 1949-to-2009 period, the industrial sector consumed more energy than any other sector and accounted for 32 percent of all natural gas consumption in 2009. Big fluctuations in the level of consumption were due to variability in industrial output. Energy consumption by the electric power sector grew substantially over the same period and, in 2009, accounted for 30 percent of all natural gas consumption.

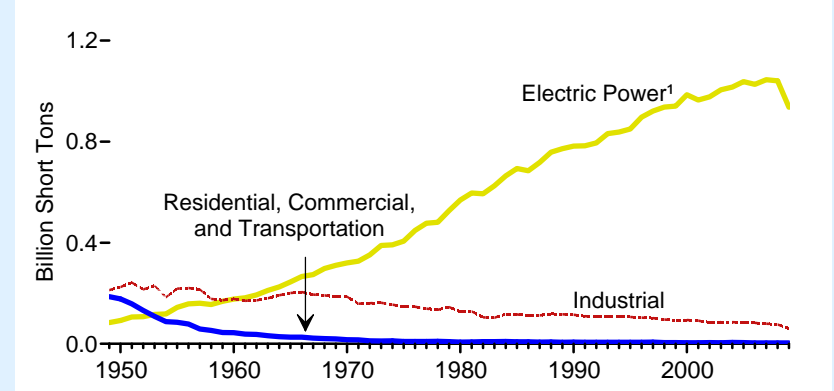
Coal

Figure 38. Coal Overview



Historically, U.S. coal production usually surpassed U.S. coal consumption. In 2004 and 2005, however, production and consumption were in balance at 1.11 billion short tons in 2004 and 1.13 billion short tons in 2005. In 2006 through 2009, production again slightly exceeded consumption. Net exports, which peaked at 111 million short tons in 1981, stood at 36 million short tons in 2009.

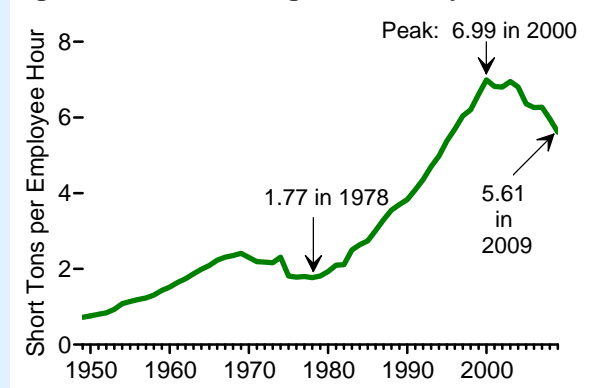
Figure 39. Coal Consumption by Sector



¹ Through 1988, electric utilities only; after 1988, also includes independent power producers.

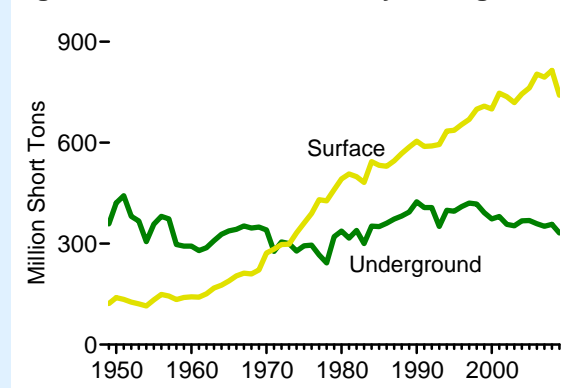
In the 1950s, most coal was consumed in the industrial sector, many homes were still heated by coal, and the transportation sector consumed coal in steam-driven trains and ships. By the 1960s, most coal was used for generating electricity. In 2009, the electric power sector accounted for 94 percent of all coal consumption, on a tonnage basis.

Figure 40. Coal Mining Productivity



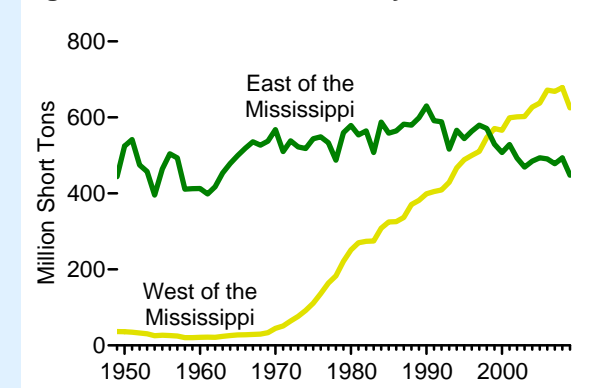
Improved mining technology and the shift toward more surface-mined coal promoted dramatic improvement in productivity from the Nation's mines from 1978 through 2000, but productivity declined in most years since then.

Figure 41. Coal Production by Mining Method



In 1949, one-fourth of U.S. coal came from surface mines; by 1971, more than one-half was surface-mined; and in 2009, 69 percent came from above-ground mines.

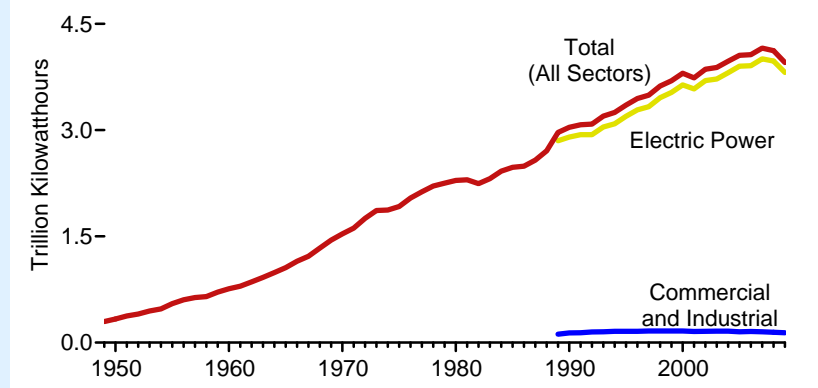
Figure 42. Coal Production by Location



Western coal production expanded tremendously after 1969 and surpassed Eastern production beginning in 1999. In 2009, an estimated 58 percent of U.S. coal came from West of the Mississippi.

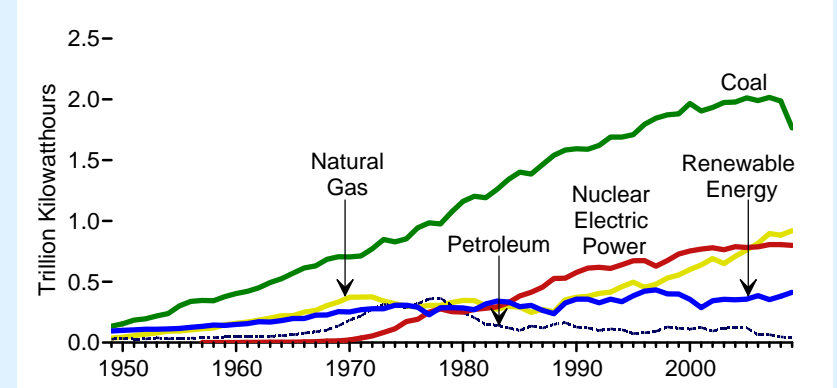
Electricity Net Generation, Electric Net Summer Capacity Change, and Useful Thermal Output

Figure 43. Electricity Net Generation by Sector



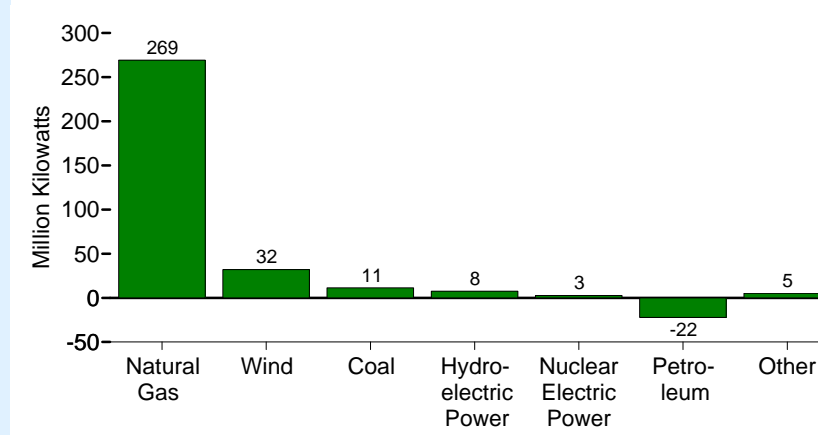
Total electricity net generation in all sectors grew from 0.3 trillion kilowatthours in 1949 to 4.1 trillion kilowatthours in 2009, failing to increase in only 4 years (1982, 2001, 2008, and 2009) over the entire span. Most generation was in the electric power sector, but some occurred in the commercial and industrial sectors.

Figure 44. Total Electricity Net Generation by Source



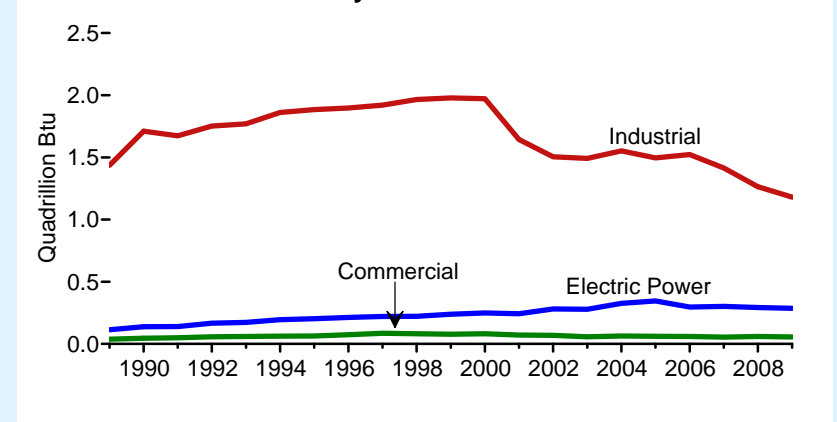
Most electricity net generation came from coal. In 2009, fossil fuels (coal, petroleum, and natural gas) accounted for 69 percent of all net generation, while nuclear electric power contributed 20 percent, and renewable energy resources 10 percent. In 2009, 66 percent of the net generation from renewable energy resources was derived from conventional hydroelectric power.

Figure 45. Electric Net Summer Capacity Change by Source, 1989-2009



From 1989 through 2009, natural gas-fired electric net summer capacity increased dramatically. Coal, hydroelectric power, and nuclear electric power capacity also increased over the 20-year period. In contrast, petroleum capacity was lower in 2009 than in 1989. Among non-hydroelectric renewable energy sources, wind capacity increased the most. In the "Other" category, wood, waste, and solar capacity registered small increases, whereas geothermal capacity posted a slight decline.

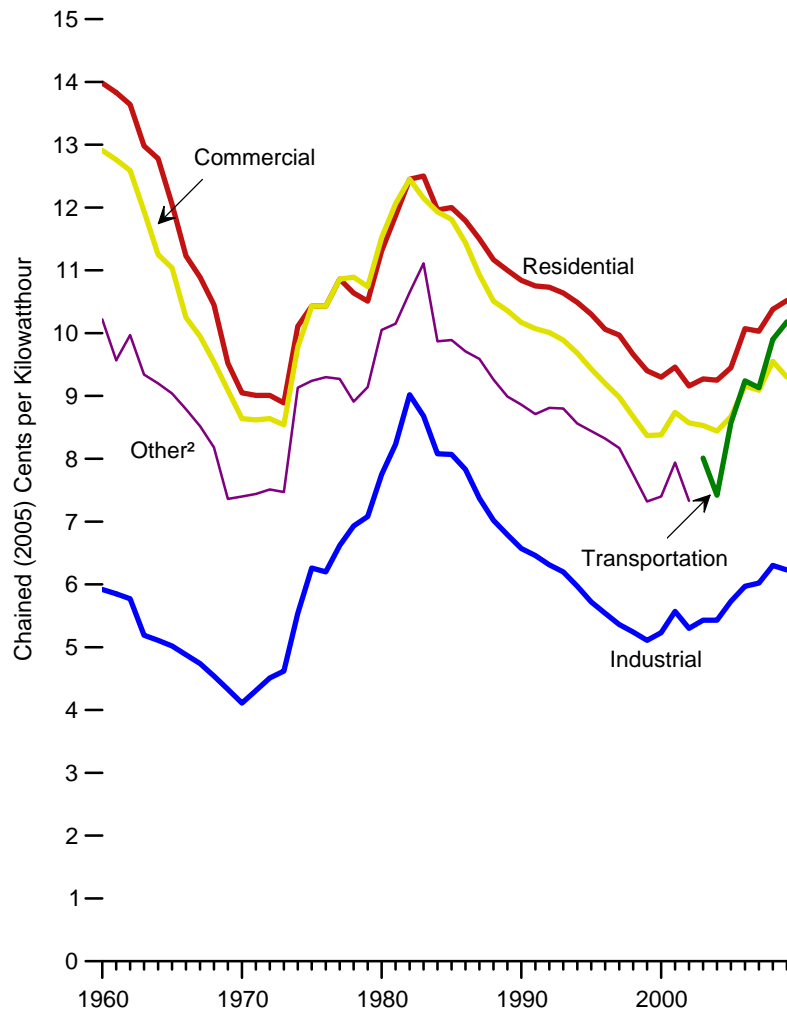
Figure 46. Useful Thermal Output at Combined-Heat-and-Power Plants by Sector



The non-electrical output at a 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 2009, the industrial sector generated 1.2 quadrillion Btu of useful thermal output; the electric power and commercial sectors generated much smaller quantities.

Electricity Prices, Sales, and Trade

Figure 47. Average Real¹ Retail Prices of Electricity by Sector

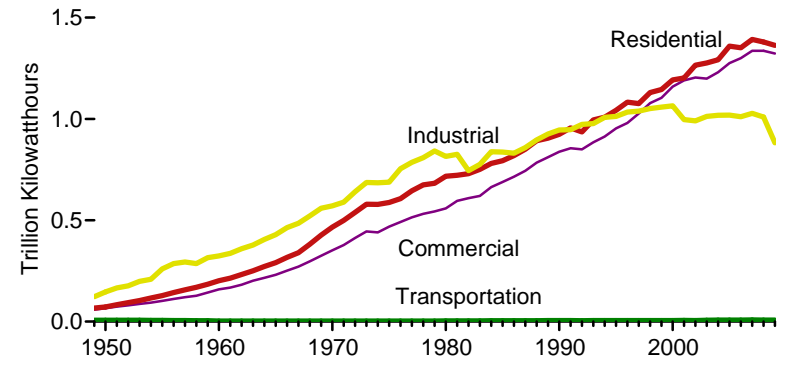


¹ In chained (2005) dollars, calculated by using gross domestic product implicit price deflators. See "Chained Dollars" in Glossary.

² In addition to transportation, "Other" includes public street and highway lighting agriculture and irrigation, and other uses.

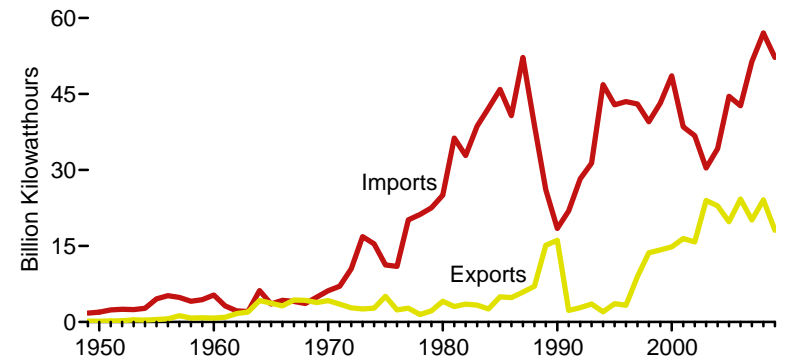
Over the decades, industrial consumers paid the lowest rates for electricity; residential customers usually paid the highest prices. Inflation-adjusted prices rose in all sectors in 2005, 2006, and 2008 but remained well below the peak price levels of the mid-1980s.

Figure 48. Electricity Retail Sales by Sector



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

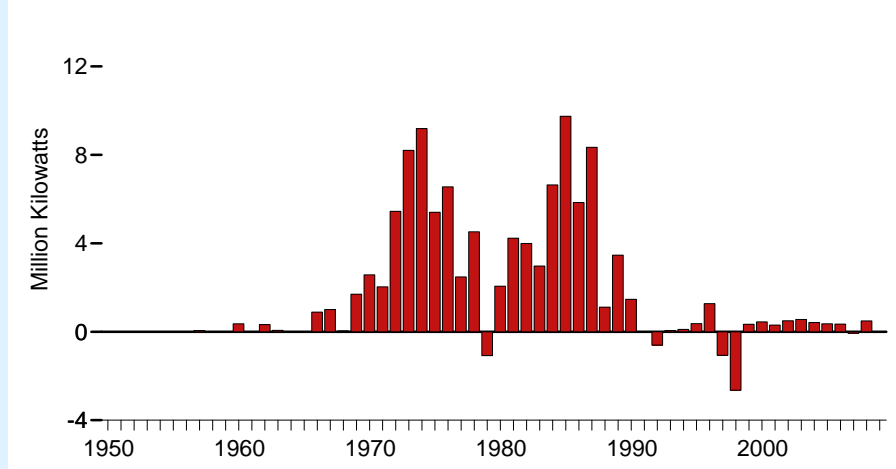
Figure 49. Electricity Trade



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; very small exchanges occurred between the United States and Mexico. Nonetheless, in 2009, net imported electricity was less than 0.9 percent of all electricity used in the United States.

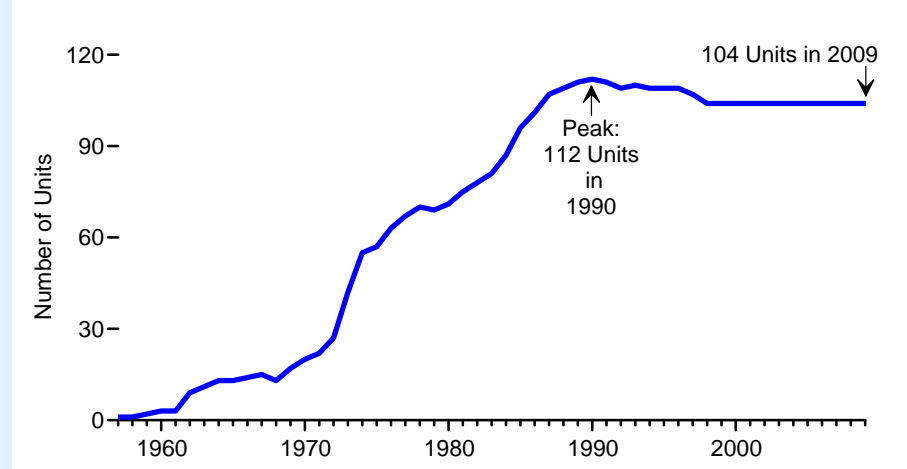
Nuclear Electric Power

Figure 50. Nuclear Net Summer Capacity Change, 1950-2009



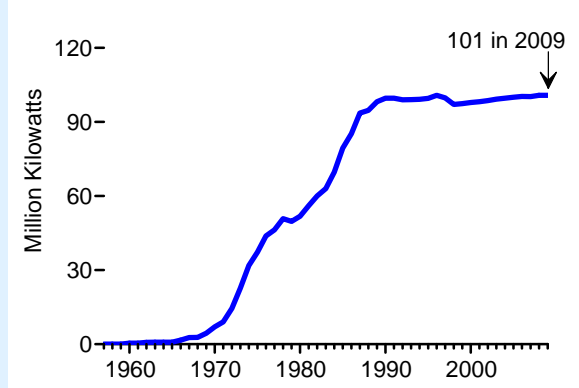
Capacity change reflects capacity additions, retirements, and other changes (such as generator re-ratings). In the nuclear power industry, capacity additions follow the issuing of full-power operating licenses. Year-to-year capacity additions were the greatest in the 1970s and 1980s. In fact, nuclear power capacity was added almost every year from the 1950s through 1990, when growth leveled off.

Figure 51. Nuclear Operable Units



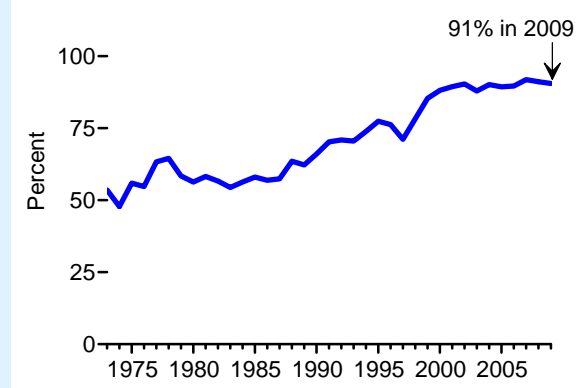
Out of the 132 nuclear units that were granted full-power operating licenses, or equivalent permission, over time, 28 were permanently shut down. The largest number of units ever operable in the United States was 112 in 1990. From 1998 through 2009, 104 units were operable.

Figure 52. Nuclear Net Summer Capacity



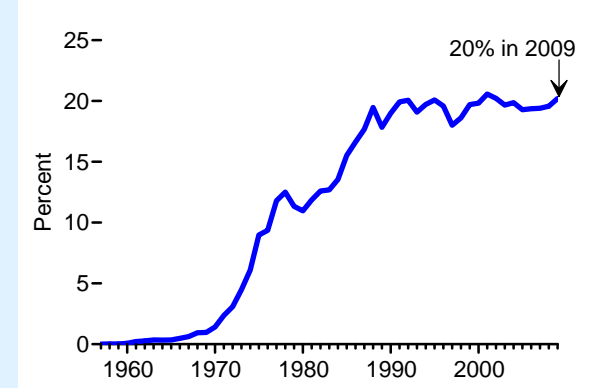
The U.S. nuclear industry's first commercial plant opened in Shippingport, Pennsylvania, in 1957. Nuclear net summer capacity expanded sharply in the 1970s and 1980s. Total net summer capacity stood at 101 million kilowatts in 2009.

Figure 53. Nuclear Capacity Factor



Nuclear capacity factors measure actual nuclear 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 2009.

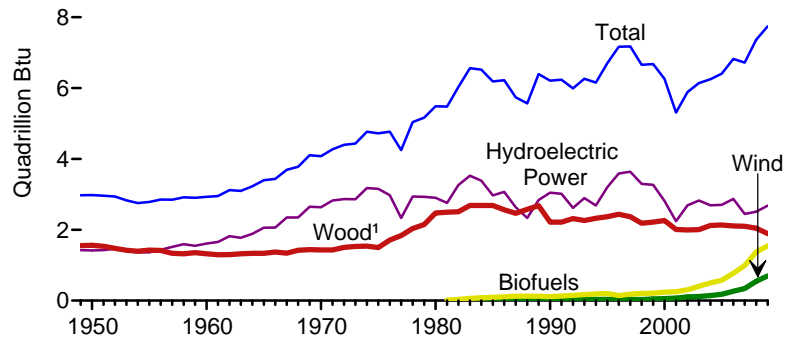
Figure 54. Nuclear Share of Net Generation



Over the latter part of the last century, nuclear electric power began to play a key role in meeting the Nation's rapidly growing electricity requirements. In 2009, 20 percent of U.S. total electricity net generation came from nuclear electric power.

Renewable Energy

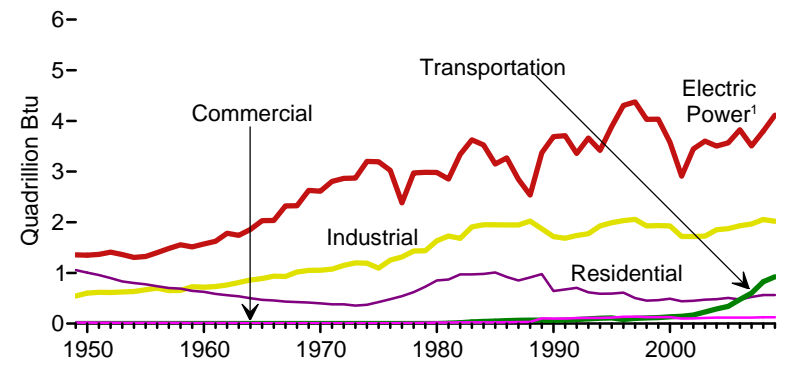
Figure 55. Renewable Energy Total Consumption and Major Sources



¹ Wood and wood-derived fuels.

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 2009, hydroelectric power accounted for 35 percent of the total. Wood was the next largest source of renewable energy, followed by biofuels and wind.

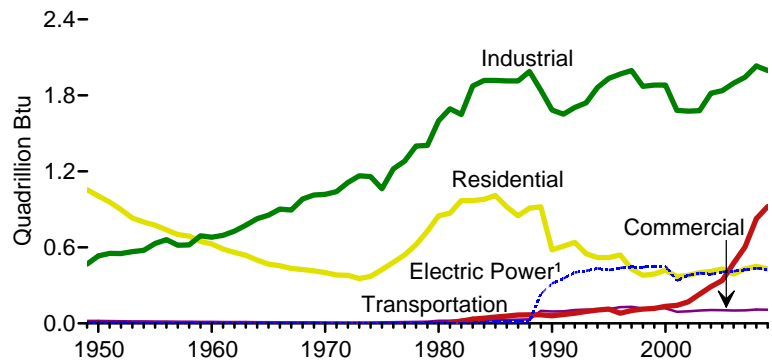
Figure 56. Renewable Energy Consumption by Sector



¹ Through 1988, electric utilities only; after 1988, also 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; the residential sector was the third largest consuming sector of renewable energy until it was exceeded by the transportation sector in 2006.

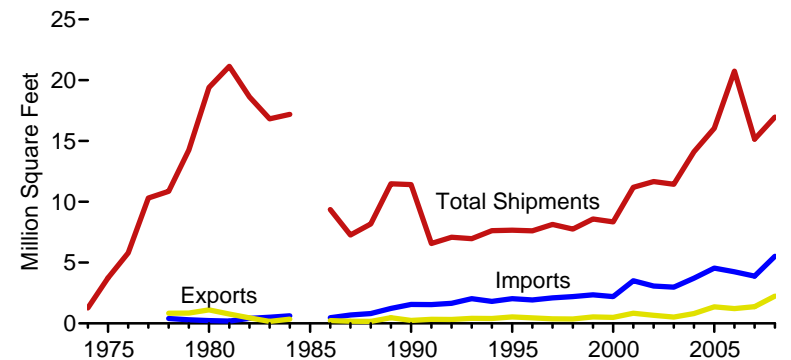
Figure 57. Biomass Consumption by Sector



¹ Through 1988, electric utilities only; after 1988, also includes independent power producers.

After 1959, the industrial sector consumed the most biomass (wood, waste, fuel ethanol, and biodiesel). Residential use of biomass (wood) fell through 1973, expanded from 1974 through 1985, and then trended downward again. Transportation consumption of biomass (fuel ethanol and biodiesel) expanded after 1996 and, by 2006, exceeded the consumption of biomass (wood and waste) in both the electric power and residential sectors.

Figure 58. Solar Thermal Collector Shipments and Trade

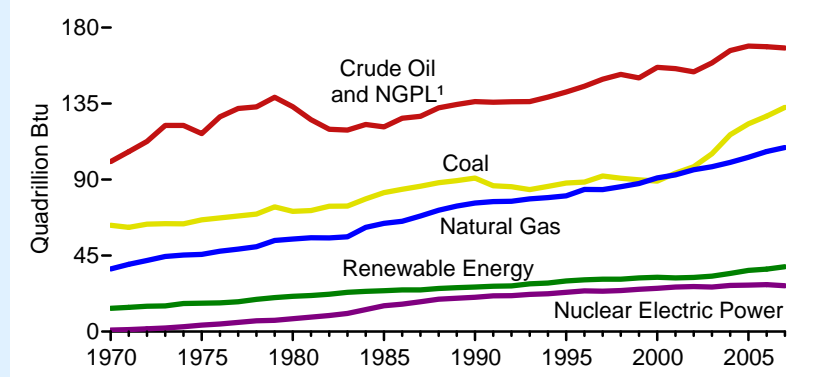


Notes: • Data were not collected for 1985. • Shipments include all domestically manufactured collectors plus imports.

Shipments of solar thermal collectors grew strongly in the 1970s and reached a peak of 21 million square feet in 1981. Uneven performance marked the next decade, followed by a mild upward trend during the 1990s. Shipments rose from 2000 to 2002 and 2004 through 2006 before declining in 2007 and rising again in 2008. Imports reached a record level of 5.5 million square feet in 2008.

International Energy

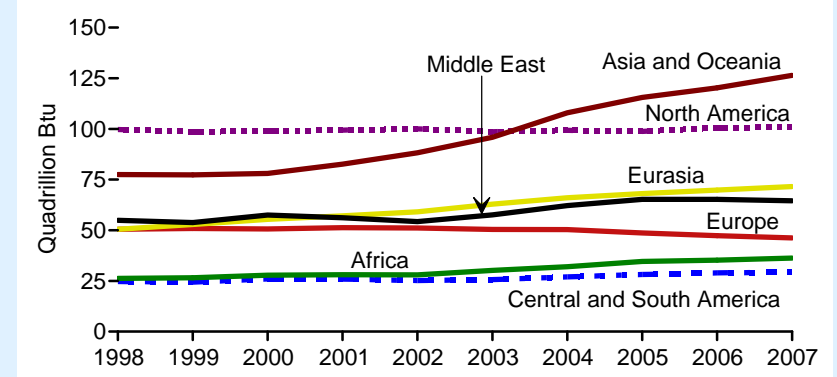
Figure 59. World Primary Energy Production by Source



¹ Natural gas plant liquids.

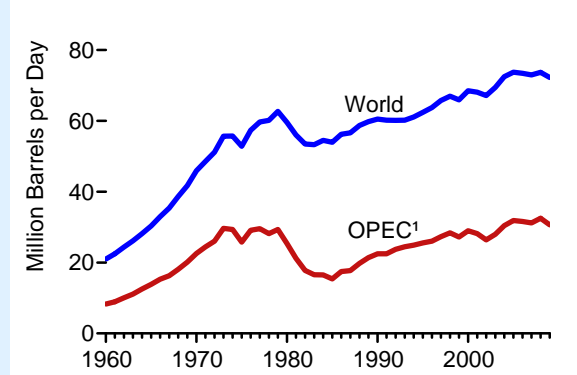
Although crude oil and natural gas plant liquids consistently accounted for the largest share of world primary energy production throughout the 1970-to-2007 period, all major energy sources exhibited growth. In 2007, the fossil fuels (crude oil, natural gas plant liquids, natural gas, and coal) accounted for 86 percent of all energy produced worldwide, renewable energy 8 percent, and nuclear electric power 6 percent.

Figure 60. World Primary Energy Production by Region



Twenty-one percent of the 475 quadrillion Btu of energy produced worldwide in 2007 came from North America. The largest regional energy producer was Asia and Oceania with 27 percent of the world total in 2007.

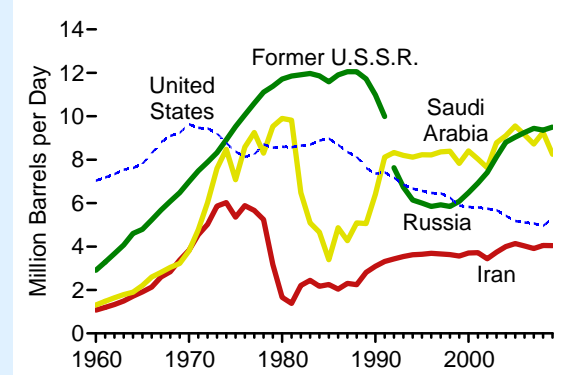
Figure 61. World Crude Oil Production



¹ Organization of the Petroleum Exporting Countries.

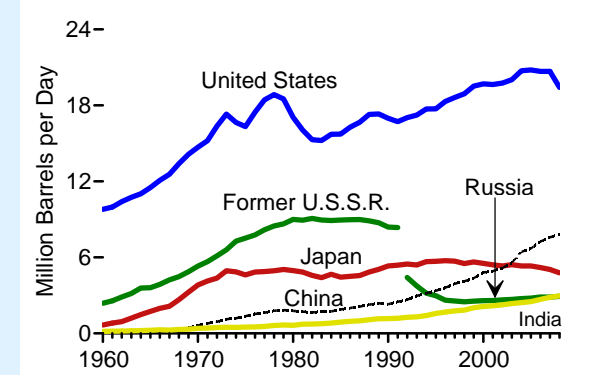
World crude oil production totaled 72 million barrels per day in 2009, down 2 percent from the level in 2008. OPEC's share of the world total in 2009 was 42 percent, compared to the peak level of 53 percent in 1973.

Figure 62. 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 was the top producer until 2006, when Russia's production exceeded Saudi Arabia's. U.S. production peaked in 1970 but still ranked third in 2009.

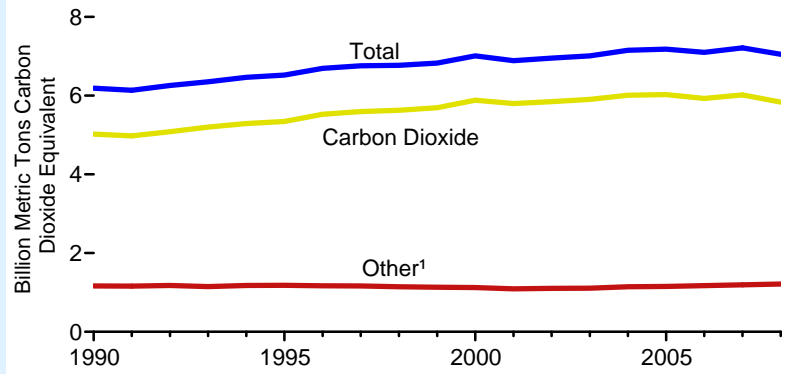
Figure 63. Leading Petroleum Consumers



The United States accounted for 23 percent of world petroleum consumption in 2008. China and Japan, the next two leading consumers, together accounted for 15 percent. Russia, Germany, and India were the next largest consumers of petroleum in 2008.

Emissions

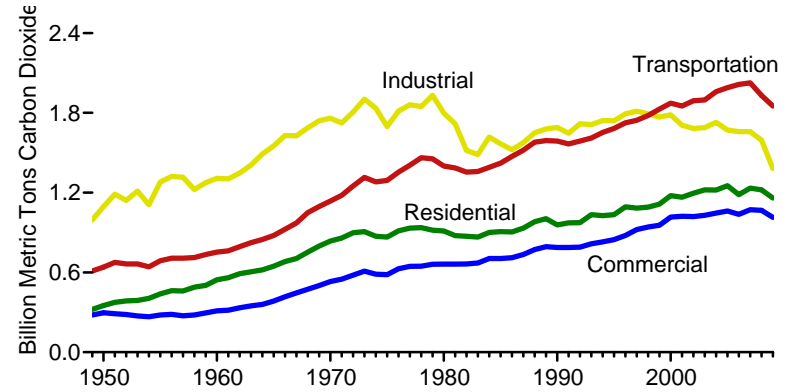
Figure 64. Greenhouse Gas Emissions, Based on Global Warming Potential



¹ Methane, nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

The combustion of fossil fuels—coal, petroleum, and natural gas—to release their energy creates emissions of carbon dioxide, the most significant greenhouse gas. Total carbon dioxide emissions stood at 6 billion metric tons of gas in 2008, 16 percent higher than the 1990 level.

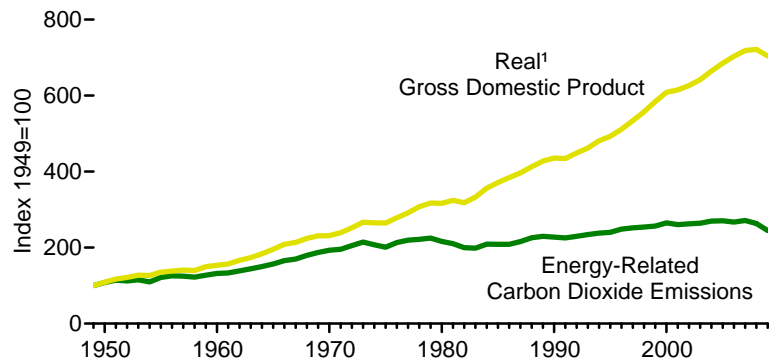
Figure 65. Carbon Dioxide Emissions From Energy Use



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

Carbon dioxide emitted by the industrial sector fell by 23 percent from 1980 to 2009. By 1999, transportation sector carbon dioxide emissions exceeded industrial sector emissions. Of the major sectors, the commercial sector generated the least carbon dioxide, but recorded the largest growth (53 percent) since 1980.

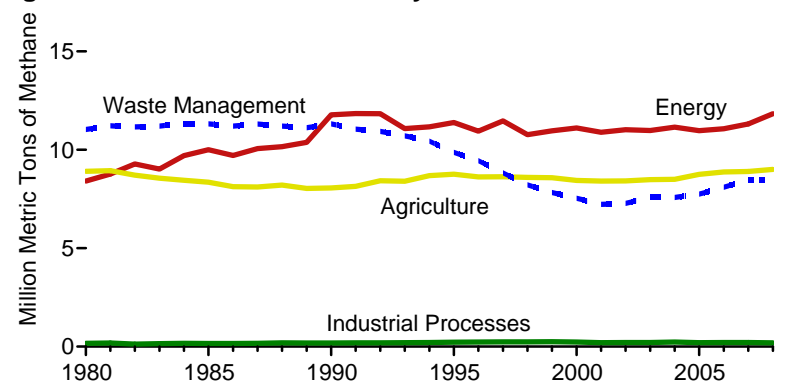
Figure 66. GDP Growth and Carbon Dioxide Emissions



¹ Based on chained (2005) dollars. See “Chained Dollars” in Glossary.

The increase in energy-related carbon dioxide emissions from 1949 through the mid 1970s correlated strongly with an increase in energy consumption, which in turned appeared to be linked to economic growth. After the mid 1970s, however, energy-related carbon dioxide emissions increased more slowly than inflation-adjusted gross domestic product. In 2009, during an economic downturn, emissions decreased 7 percent from the 2008 level.

Figure 67. Methane Emissions by Source



In 2008, methane emissions accounted for 10 percent of total U.S. greenhouse gas emissions, weighted by global warming potential (see “Global Warming Potential” in Glossary). Most methane emissions came from energy, waste management, and agricultural sources. The production, processing, and distribution of natural gas accounted for 60 percent of the energy-related methane emissions in 2008.

Figure Sources

Data for *Energy Perspectives, 1949-2009*, figures and text are derived from the following *Annual Energy Review 2009* 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. U.S. Energy Information Administration, *Annual Energy Outlook 2010* (May 2010), Main Reference Case Tables, Table 1, "Total Energy Supply and Disposition Summary."
7. Table 2.1a.
8. Tables 2.1b and 2.1c.
9. Table 2.1d.
10. Table 2.1e.
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-d.
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 8.11a.
46. Tables 8.3b and 8.3c.
47. Table 8.10.
48. Table 8.9.
49. Table 8.1.
50. Table 8.11a.
51. Table 9.1.
52. Table 9.2.
53. Table 9.2.
54. Table 9.2.
55. Table 10.1.
56. Tables 10.2a–10.2c.
57. Tables 10.2a–10.2c.
58. Table 10.6.
59. Table 11.1.
60. Table 11.2.
61. Table 11.5.
62. Table 11.5.
63. Table 11.10.
64. Table 12.1.
65. Table 12.3.
66. Tables 1.5 and 12.2.
67. Tables 12.1 and 12.5.