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Energy in Brief

What are the major sources and users of energy in the United States?

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The major energy sources consumed in the United States are petroleum (oil), natural gas, coal, nuclear, and renewable energy. The major users are residential and commercial buildings, industry, transportation, and electric power generators. The pattern of fuel use varies widely by sector. For example, oil provides 93% of the energy used for transportation, but only about 1% of the energy used to generate electric power. Understanding the relationships between the different energy sources and their uses provides insights into many important energy issues.

How can we compare different fuels?

Primary energy includes petroleum, natural gas, coal, nuclear fuel, and renewable energy. Electricity is a secondary energy source that is generated from these primary forms of energy.

Primary energy sources are commonly measured in different units: barrels (= 42 gallons) of oil, cubic feet of natural gas, tons of coal. To compare across fuels, we need to use a common unit of measure. The United States uses Btu, or British thermal units, which measure fuel use by the energy content of each fuel source.

Total U.S. energy use in 2012 was about 95 quadrillion ($=10^{15}$, or one thousand trillion) Btu. One quadrillion Btu, often referred to as a "quad," therefore represents about 1% of total U.S. energy use.

In physical energy terms, 1 quad represents 172 million barrels of oil (about 9 days of U.S. petroleum use), 51 million tons of coal (about 6% of total U.S. coal consumption in 2012), or about 1 trillion cubic feet of dry natural gas (equal to 4% of total U.S. natural gas use in 2012).

The number of quads used in 2012 from each primary energy source is shown in the pie chart on the right. Petroleum accounts for the largest share of U.S. primary energy consumption, followed by natural gas, coal, renewable energy (including hydropower, solar, geothermal, wind, and biomass), and nuclear electric power.

Which primary energy sources are used in each sector?

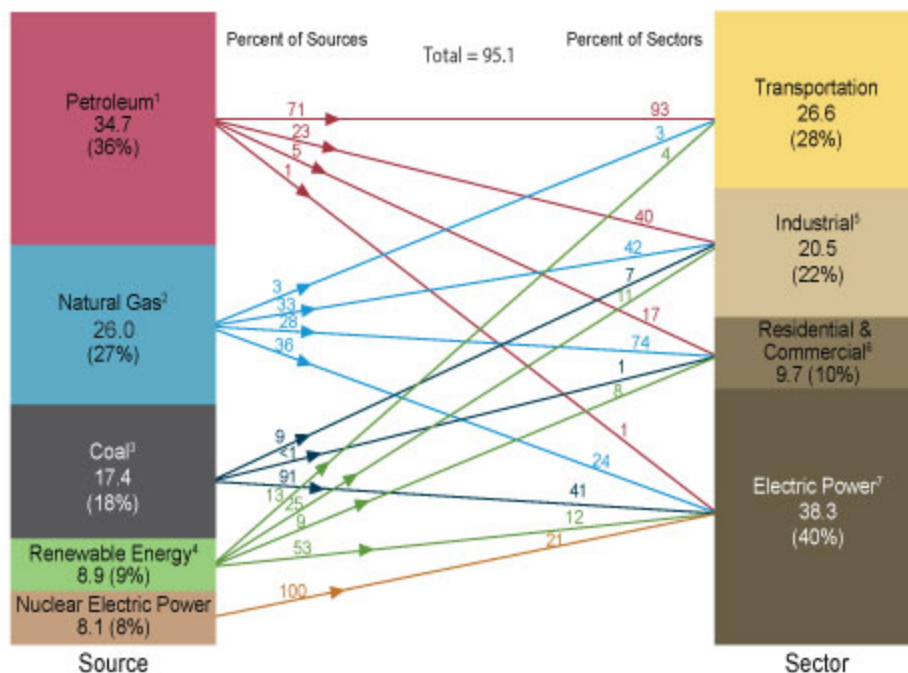
Primary energy is used in residential and commercial buildings (including homes, businesses, schools, and churches), in transportation, and by industry. Primary energy is also used to generate electricity. The bar chart shows the amount of primary energy used in each of these sectors. As you can see, electric power generation is the largest user of primary energy, followed by transportation.

The electric power sector uses primary energy to generate electricity, which makes electricity a secondary, rather than a primary, energy source. Nearly all electricity is used in buildings and by industry. This means that the total amounts of energy used by residential and commercial buildings, industry, and transportation are actually higher than the amounts shown on the graphics when electricity is included.

The lines in the figure below connecting the primary energy sources on the left with the demand sectors on the right summarize the links between energy sources and sectors in the United States. For example, because all nuclear energy is used in the electric power sector to generate electricity, and nuclear represents 21% of the primary energy used by that sector, the line between nuclear energy and the electric power sector shows 100% on the nuclear (supply source) side and 21% on the electric power (demand sector) side.

Primary energy consumption by source and sector, 2012

quadrillion BTU



Endnotes:

- ¹ Does not include biofuels that have been blended with petroleum—biofuels are included in "Renewable Energy."
- ² Excludes supplemental gaseous fuels.
- ³ Includes less than 0.1 quadrillion Btu of coal coke net exports.
- ⁴ Conventional hydroelectric power, geothermal, solar/PV, wind, and biomass.
- ⁵ Includes industrial combined-heat-and-power (CHP) and industrial electricity-only plants.
- ⁶ Includes commercial combined-heat-and-power (CHP) and commercial electricity-only plants.
- ⁷ Electricity-only and combined-heat-and-power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public. Includes 0.2 quadrillion Btu of electricity net imports not shown under "Source."

Note: Primary energy in the form that it is first accounted for in a statistical energy balance, before any transformation to secondary or tertiary forms of energy (for example, coal is used to generate electricity).

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

Source: U.S. Energy Information Administration, *Monthly Energy Review* (April 2013), Tables 1.3, 2.1-2.5, preliminary 2012 data.

The mix of primary energy sources varies widely across demand sectors. Energy policies designed to influence the use of a particular primary fuel for environmental, economic, or energy security reasons often focus on sectors that are major users of that fuel.

For example, because 71% of petroleum is used in the transportation sector, where it provides 93% of the total energy used, policies to reduce oil consumption have tended to focus on the transportation sector. These policies usually seek to increase fuel efficiency or promote alternative fuels. Ninety-one percent of coal, but only 1% of oil, is used to generate electricity, suggesting that policies affecting electricity generation are likely to have a much larger impact on coal use than oil use.

Some primary energy sources, such as nuclear and coal, are entirely or predominately used in one sector. Others, like natural gas and renewables, are more evenly distributed across sectors. Similarly, while transportation is almost entirely dependent on one fuel (oil), electric power uses a variety of fuels.

Do sources and uses of energy change?

Linkages between fuels and sectors can and do change over time, but the change tends to occur slowly. For example, coal was once used extensively as a fuel for heating homes and commercial buildings, but that use has dwindled to almost nothing in the United States over the past half-century. Although renewable energy is still relatively small as a share of total primary energy in the transportation and electric power sectors, its role has been growing.

Learn More

- [Adding and comparing energy sources](#)
- [Annual Energy Review \(annual statistics\)](#)
- [Monthly Energy Review \(monthly statistics\)](#)
- [Energy Explained](#)



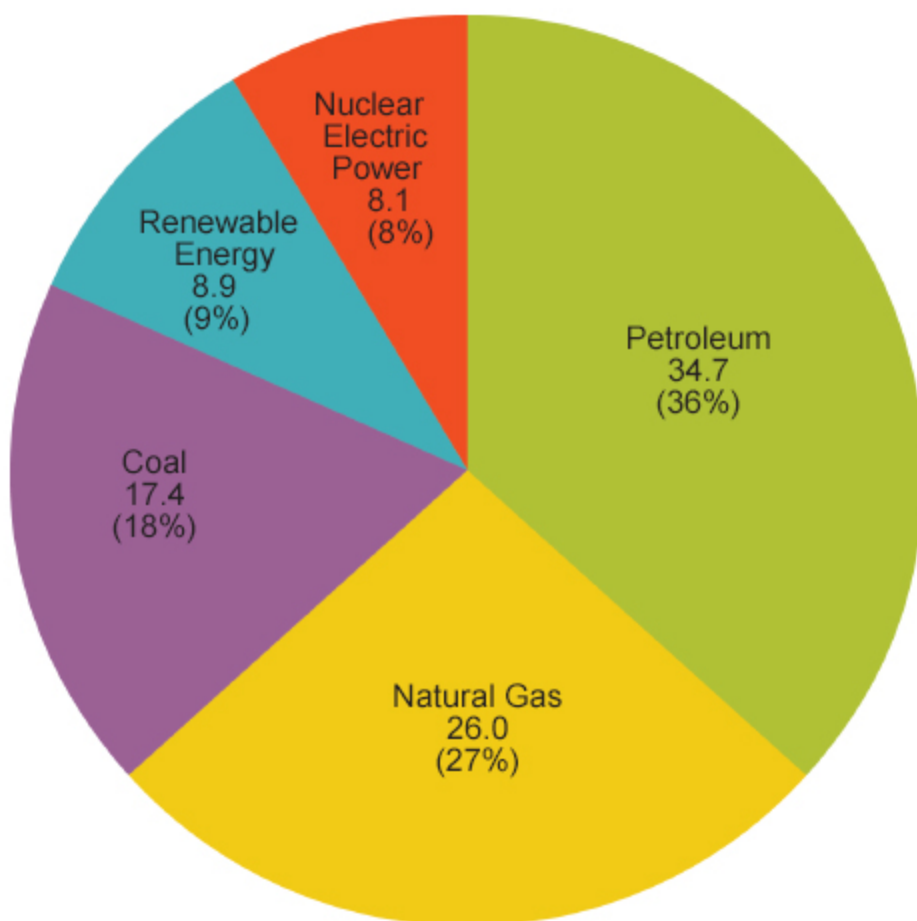
Did you know?

The electric power sector has seen large changes in its fuel mix. A little over 50 years ago, nuclear energy played no role in electric power generation, but in 2012, nuclear energy accounted for 21% of the energy used to generate U.S. electric power. Oil's share of energy for electric generation declined to 1% in 2012 since peaking at 18% in 1973.

Primary energy use by source, 2012

quadrillion Btu and percent of total¹

Total U.S. = 95.1 quadrillion Btu

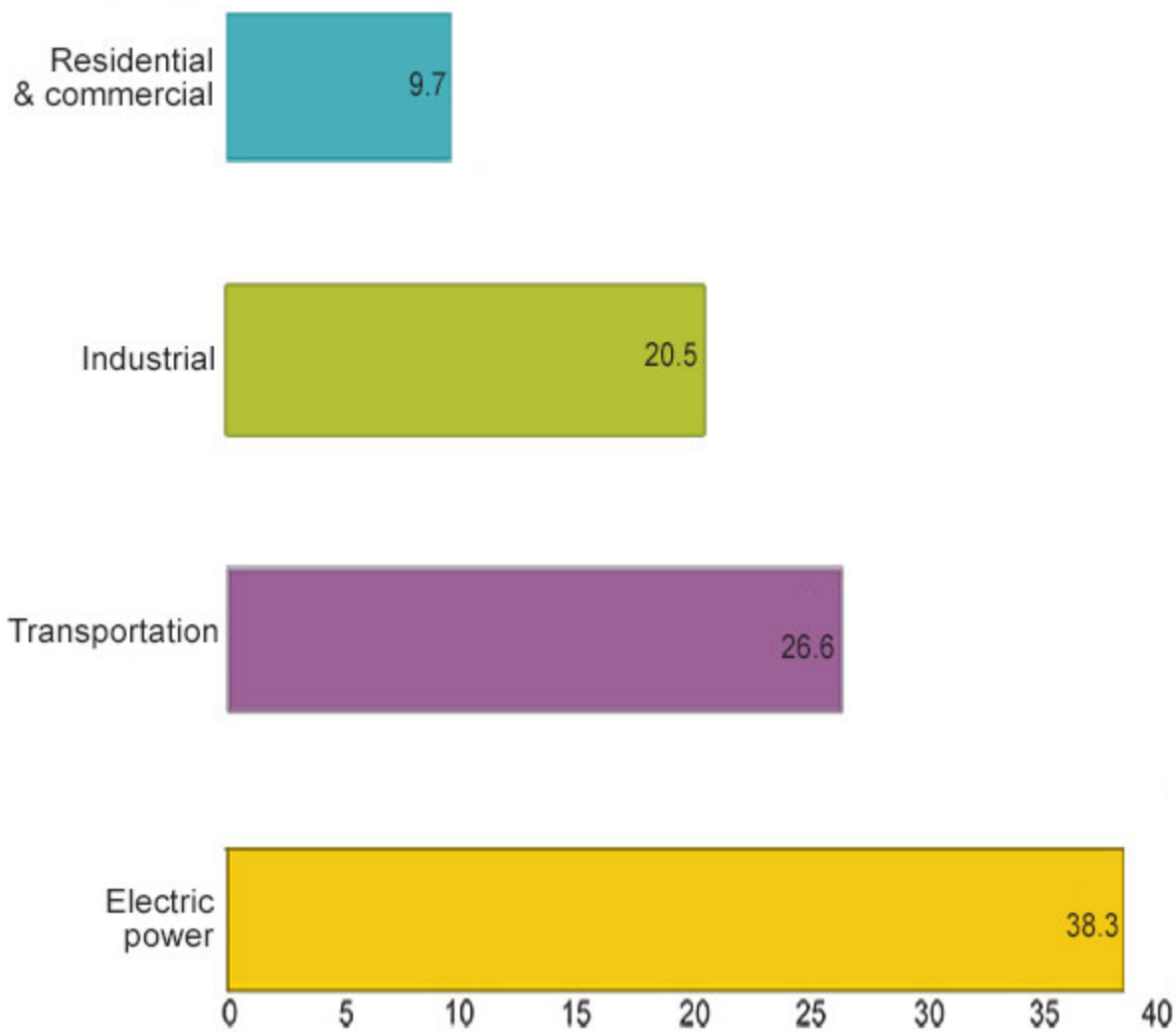


¹Does not add to 100 due to independent rounding.

Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 1.3 (April 2013), preliminary 2012 data.

Primary energy use by sector, 2012

quadrillion Btu



Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 2.1 (April 2013), preliminary 2012 data.