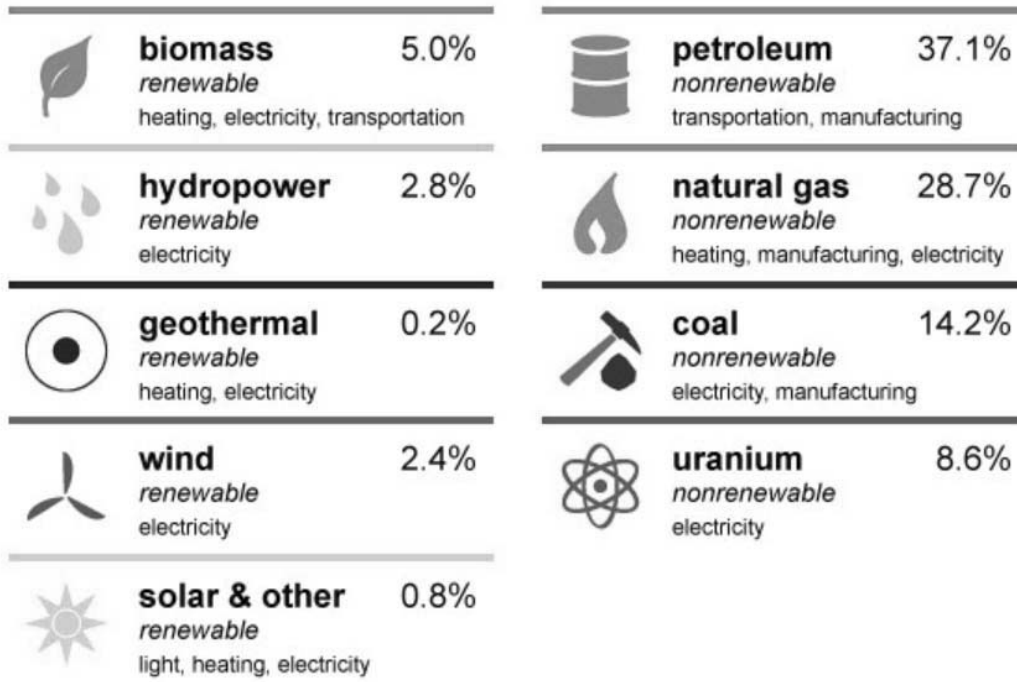


U.S. energy consumption by source, 2017



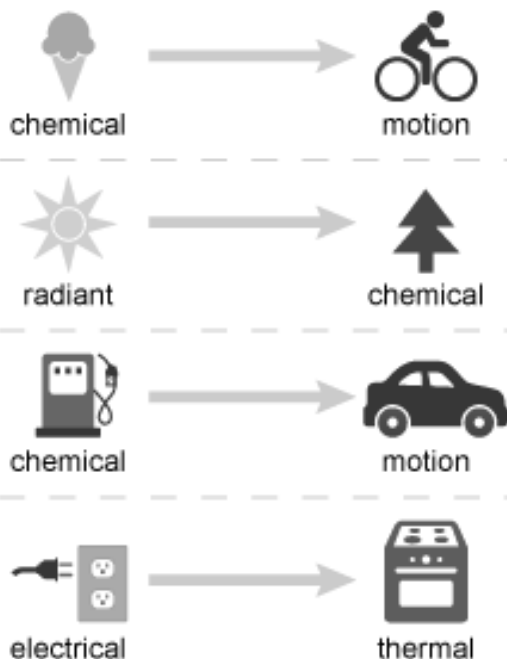
Energy is neither created nor destroyed

- To scientists, conservation of energy does not mean saving energy. Instead, the law of conservation of energy says that energy is neither created nor destroyed. When people use energy, it doesn't disappear. Energy changes from one form of energy into another form of energy.

Energy is neither created nor destroyed

- A car engine burns gasoline, converting the chemical energy in gasoline into mechanical energy.
- Solar photovoltaic cells change radiant energy into electrical energy.
- Energy changes form, but the total amount of energy in the universe stays the same.

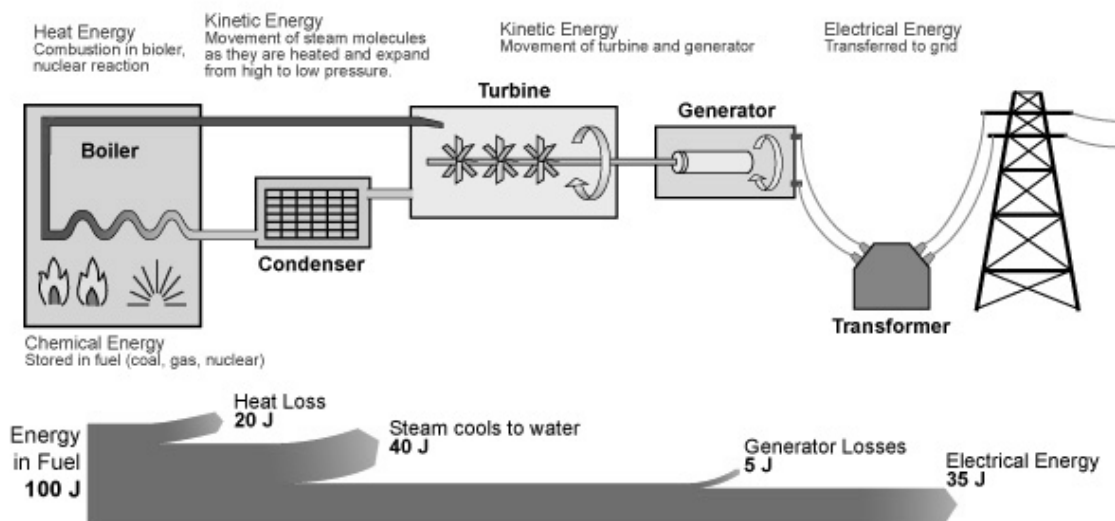
Energy transformations



Converting one form of energy into another

- **Energy efficiency** is the amount of useful energy obtained from a system. A perfectly energy-efficient machine would convert all of the energy put into the machine to useful work. In reality, converting one form of energy into another form of energy always involves a conversion into useable (or useful energy) and unusable (or unuseful) forms of energy.

Converting one form of energy into another



Use of Energy

- The United States is a highly developed and industrialized society. Americans use a lot of energy in homes, in businesses, and in industry. Americans also use energy for personal travel and for transporting goods. There are **five** energy consuming sectors:

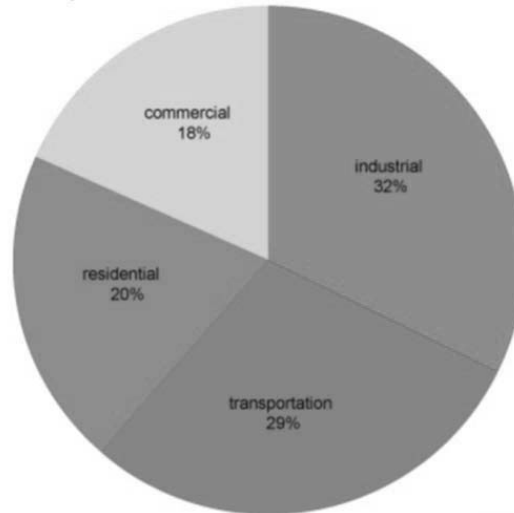
Use of Energy

- **The industrial sector** includes facilities and equipment used for manufacturing, agriculture, mining, and construction.
- **The transportation sector** includes vehicles that transport people or goods, such as cars, trucks, buses, motorcycles, trains, aircraft, boats, barges, and ships.
- **The residential sector** includes homes and apartments.
- **The commercial sector** includes offices, malls, stores, schools, hospitals, hotels, warehouses, restaurants, and places of worship and public assembly.
- **The electric power sector** consumes primary energy to generate most of the electricity the other four sectors consume.

Use of Energy

Shares of total U.S. energy consumption by end-use sectors,
2017

Total = 97.7 quadrillion British thermal units



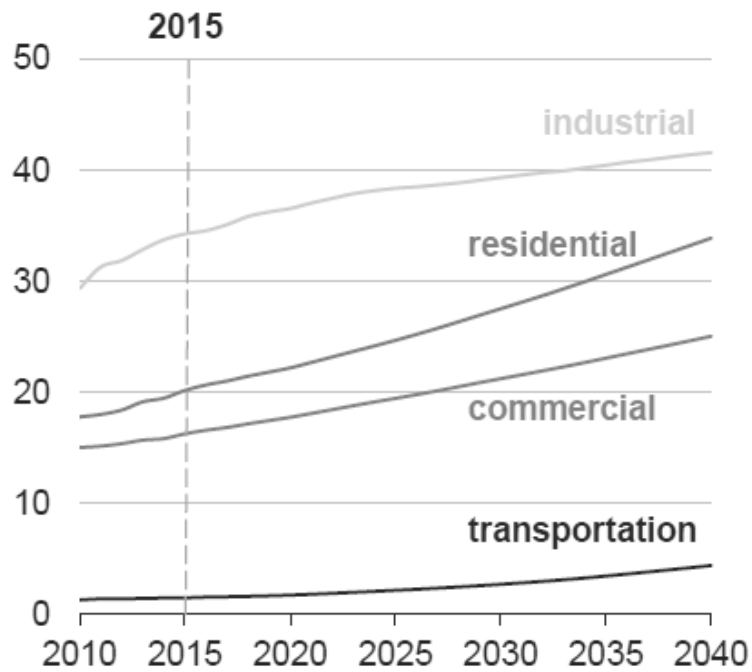
Note: Sum of individual percentages may not equal 100 because of independent rounding.
Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 2.1,
April 2018, preliminary data



Use of Energy

- Each sector consumes primary energy. The industrial, transportation, residential, and commercial sectors also use most of the electricity (a secondary energy source) the electric power sector produces. These sectors are called end-use sectors because they purchase or produce energy for their own consumption and not for resale.

World electricity use by sector quadrillion Btu



Nonrenewable energy sources

- [Coal](#)
- [Natural gas](#)
- [Nuclear](#)
- [Oil and petroleum products](#)
 - [Gasoline](#)
 - [Diesel fuel](#)

Renewable energy sources

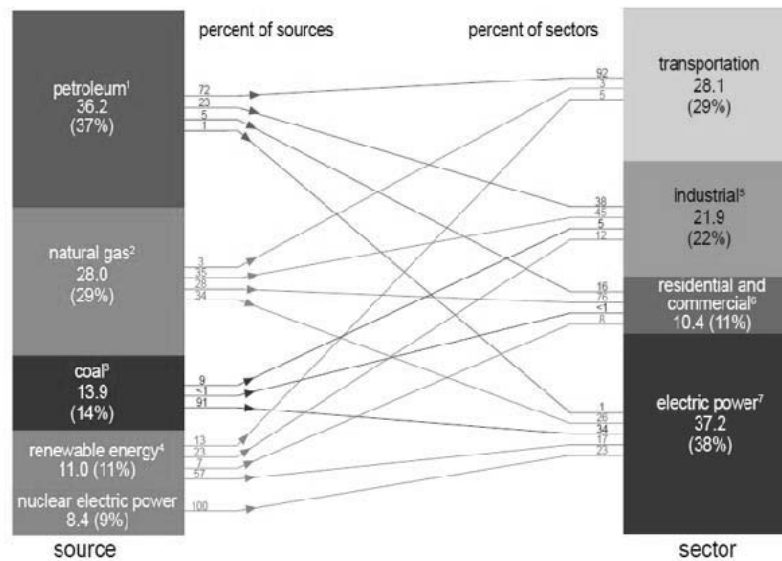
- [Biodiesel](#)
- [Biomass](#)
- [Ethanol](#)
- [Geothermal](#)
- [Hydropower](#)
- [Solar](#)
- [Wind](#)

Secondary energy sources

- [Electricity](#)

U.S. primary energy consumption by source and sector, 2017

Total = 97.7 quadrillion British thermal units (Btu)



¹ Does not include biofuels that have been blended with petroleum—biofuels are included in "Renewable Energy."
² Excludes supplemental gaseous fuels.
³ Includes 0.03 quadrillion Btu of coal water wet imports.
⁴ Conventional hydroelectric power, geothermal, solar, 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 0.17 quadrillion Btu of electricity net imports not shown under "source."

Notes: • Primary energy is energy in the form that it is accounted for in a statistical energy balance, before any transformation to secondary or tertiary forms of energy occurs (for example, coal is used to generate electricity). • The source total may not equal the sector total because of differences in the heat contents of total end-use, and electric power sector consumption of natural gas. • Data are preliminary. • Values are derived from source data prior to rounding. • Sum of components may not equal total due to independent rounding.
 Sources: U.S. Energy Information Administration, Monthly Energy Review (April 2018), Tables 1.3, 1.4a, 1.4b, and 2.1-2.6.



Energy Conversion

- The Law of conservation of energy even tells us that the only thing that takes place with energy is the transformation from one form to another. This means that we can convert electrical energy into heat energy and light energy, solar energy can be converted to chemical energy, potential energy can be converted into kinetic energy, Gravitational potential energy can be converted into kinetic energy

Energy Conversion

- Energy Conversion is defined as the process where there is a change in energy from one form to another such as the conversion of nuclear energy into heat energy, the conversion of light energy into heat, thermal energy into work .