Topic 6.1

Renewable and Nonrenewable Resources

You Will Learn to:

- Describe differences between nonrenewable and renewable energy resources.

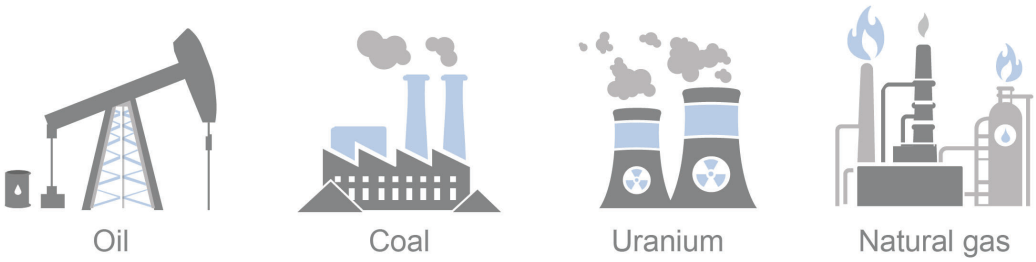
By the End of the Topic, You Should Be Able to Answer:

- In what ways do people use energy resources?
- What are nonrenewable energy resources?
- What are renewable energy resources?

Energy Types

Humans use energy resources for a variety of purposes, including heating homes, transportation, and cooking. To produce usable forms of energy for human activity, such as electricity and heat, energy resources need to be harnessed from the environment. Energy resources are categorized depending on how long it takes to naturally replace or replenish these resources before they can be harnessed again.

Nonrenewable Energy Resources



Nonrenewable energy sources, such as oil and coal, are considered finite because they are not easily replenished. Often, the energy transformation processes that replenish nonrenewable energy sources, such as the formation of fossils and rock, take millions of years. Consequently, consumption rates are much higher than the rate of formation.

Renewable Energy Resources

Renewable energy sources, such as wind and biomass, can be naturally replenished at a rate near or greater than the rate of consumption, which allows the resource to be reused without limits. Because renewable energy resources can be replenished relatively quickly, they are considered more sustainable than nonrenewable energy resources.

Things to Remember

- Nonrenewable energy sources, such as fossil fuels and nuclear energy, exist in fixed amounts because their energy transformation processes occur over long periods of time, making replacement difficult.
- Renewable energy resources can be naturally replenished at a rate near their rate of consumption, which allows the resource to be reused.

6.1 Vocabulary

Nonrenewable energy	Energy produced from a finite source that takes millions of years to replenish.
Renewable energy	Energy produced from a source that is replenished faster than it is consumed.

6.1 Check for Understanding

1. **Which of the following energy sources is considered most sustainable?**

   A. Oil

   B. Natural gas

   C. Coal

   D. Wind

2. **What is the difference between nonrenewable and renewable energy resources?**

   A. Nonrenewable energy resources are artificially replaced, while renewable energy resources are naturally replaced.

   B. Nonrenewable energy resources must be harnessed from the environment, while renewable energy resources are created by people.

   C. Nonrenewable energy resources have limits and cannot be easily replenished, while renewable energy resources can be easily replenished.

   D. Nonrenewable energy resources are used for industrial purposes and transportation, while renewable energy resources are only used to generate electricity.

3. **Which of the following is an example of a nonrenewable energy resource?**

   A. Nuclear power

   B. Wind energy

   C. Biomass

   D. Solar energy

Topic 6.2

Global Energy Consumption

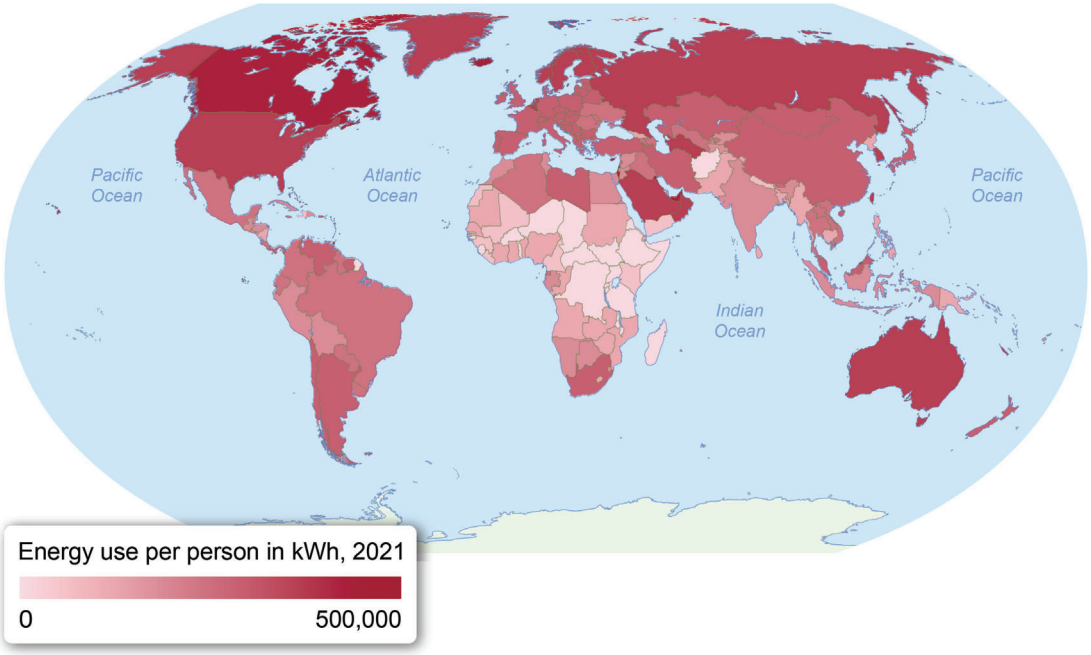
You Will Learn to:

- Identify trends in global energy consumption.

By the End of the Topic, You Should Be Able to Answer:

- What types of energy sources are used in developing and developed countries?
- What are the most widely used sources of energy around the world?
- What factors impact the amounts and types of energy consumed?

Development and Energy Consumption



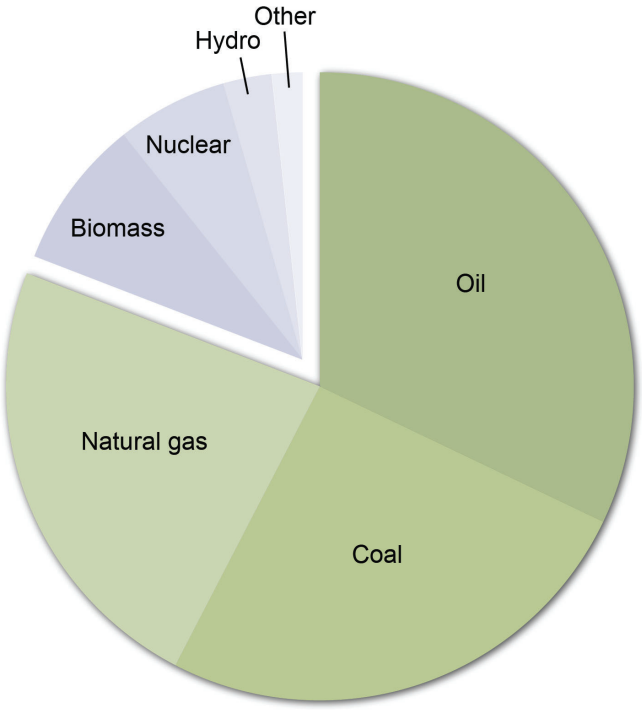
Nonrenewable and renewable energy resources are used around the world to power societies, but the distribution and consumption of energy resources vary by country. For example, the development status of a country greatly influences the amounts and types of energy the population consumes.

Developed countries have high percentages of people living in urban areas, which increases their access to technology, transportation, and other energy-intensive activities. This greater access results in a greater consumption of energy per person than in developing countries. Therefore, as countries move towards becoming developed and industrialized, their demand for energy increases.

In addition, the type of energy source consumed by a country varies and is based on:

- The distribution of an energy source by geographic location (see Topic 6.4).
- Government regulations on energy production and use.
- The cost of producing the energy.

Global Use of Fossil Fuels



Global energy use, 2018

As countries become more developed, their reliance on **fossil fuels** (hydrocarbons formed from the decomposition of plant and animal matter over millions of years), such as coal, natural gas, and crude oil, increases to meet the demands associated with industrialization. This is because fossil fuels have high energy densities and are relatively low-cost. In addition, fossil fuels are widely available, resulting in fossil fuels being the most widely used sources of energy throughout the world.

Things to Remember

- Developed and developing countries use different energy resources.
- As industrialization increases, the demand for energy increases.
- The use of energy sources varies depending on availability, cost, and governmental regulations.
- Fossil fuels are the most widely used source of energy globally because of their availability, low cost, and high energy density.
- The reliance on fossil fuels tends to increase as a developing country becomes more economically developed.

6.2 Vocabulary

Fossil fuels	Hydrocarbons formed from the decomposition of plant and animal matter over millions of years.

6.2 Check for Understanding

1. **Which describes why developed countries consume more energy per person than developing countries?**

   A. Developed countries have more people per square mile than developing countries.

   B. People in developed countries do more energy-intensive activities than people in developing countries.

   C. Developing countries have more governmental policies regulating energy use than developed countries.

   D. People in developing countries live in larger homes than people in developed countries.

2. **Which of the following best explains why industrialized countries rely on fossil fuels?**

   A. Fossil fuels do not require infrastructure to be widely used.

   B. Fossil fuels have high energy densities that can meet demand.

   C. Fossil fuels are found in specific geographic locations that are hard to access.

   D. Fossil fuels require minimal regulations to be used in consumer products.

3. **What is the most widely used energy source around the world?**

   A. Nuclear fuel

   B. Wind

   C. Fossil fuels

   D. Hydroelectric