



Energy Works!



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Energy and Its Forms

What Is Energy?

Energy is the ability to make things move or change. Energy is all around you. Energy allows you to ride a bicycle. It moves trucks and cars along the road. It makes the Moon move around Earth. Energy melts ice. It makes volcanoes erupt. Energy makes plants grow and change.

You can see your friends and hear them speak because of energy. Energy lights homes and schools. It runs televisions and computers. Energy makes things happen.



You use energy to make a bicycle move.

Light Energy

There are different kinds of energy. They include light, heat, and sound energy. They include electrical, chemical, and mechanical energy.

Light energy is energy that you can see. It moves in waves and enters your eyes so that you can see things. Light energy can come from lamps, fires, or lit candles.

The Sun is the main source of light energy on Earth. Energy from the Sun comes to Earth as sunlight. Plants and animals, including people, depend on this source of energy.

Plants need light energy to grow.



Heat and Sound Energy

All matter is made up of atoms that move. **Heat energy** is the energy of moving atoms. Sunlight changes to heat energy that warms Earth's surface. Without this heat energy, all the water on Earth would be ice. Earth would be much too cold to support living things.

Sound energy is energy you can hear. Tap the top of a drum and the drumhead **vibrates**, or moves back and forth quickly. When things vibrate, sound moves as waves through the air. These waves go into your ears. Your brain interprets the vibrations as sound.

Sound energy moves to your ears in waves.



Crosscutting
Concept



Identify three different forms of energy you used today. How did you use each one?

Electrical, Chemical, and Mechanical Energy

Atoms contain particles that are charged. **Electrical energy** is the energy of these charged particles. It can move through wires. You use electrical energy to run lamps, TVs, and computers.

Chemical energy is the energy stored in matter. It is stored in food, batteries, and even inside you. Your body gets chemical energy from the food you eat.

Mechanical energy is the energy that an object has to do work. This type of energy has two parts. One part is the object's energy of motion. The other part is the object's stored energy.



Electrical energy runs many everyday devices.

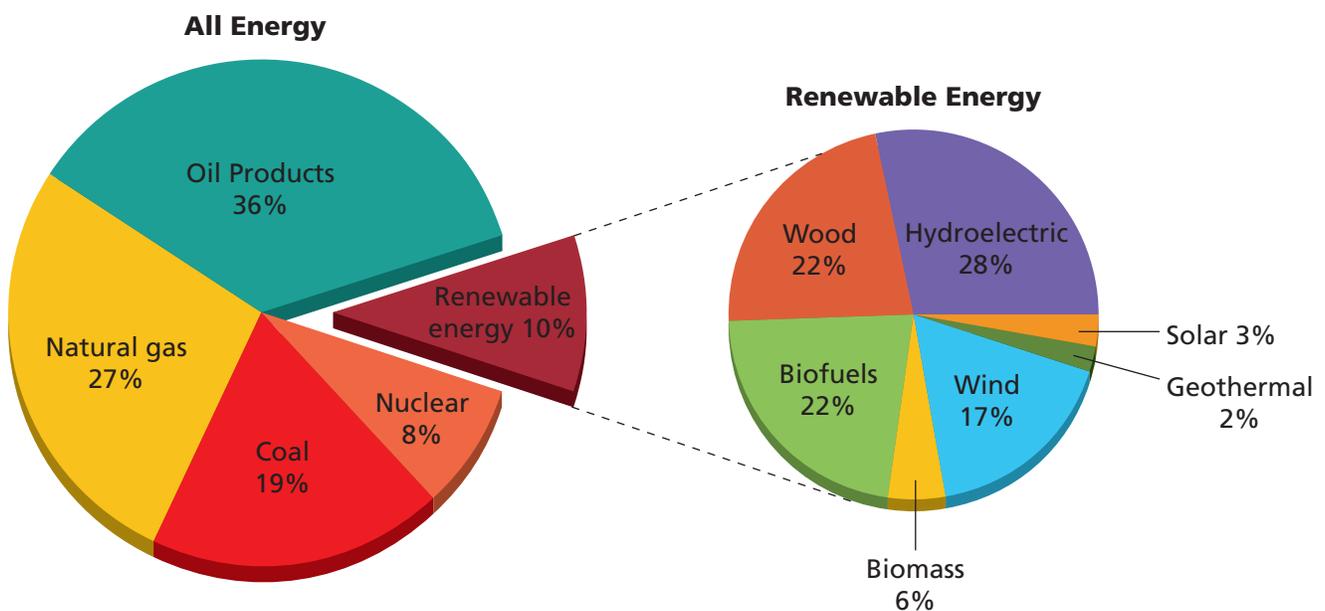
Science and Engineering Practices

Read a Graph!

The circle graph shows how people in the United States use energy. It shows energy from nonrenewable and renewable energy sources. Look at the graph. Use it to answer these questions. Use data from the graph to explain your answers.

1. From what source do we get most of our energy?
2. From what source do we get the least of our energy?
3. How does the total amount of renewable and nonrenewable energy we use compare?
4. More people get energy from solar and wind power each year. Predict how this pattern might cause this graph to change.

Energy Used in the U.S. by Source in 2013



Careers

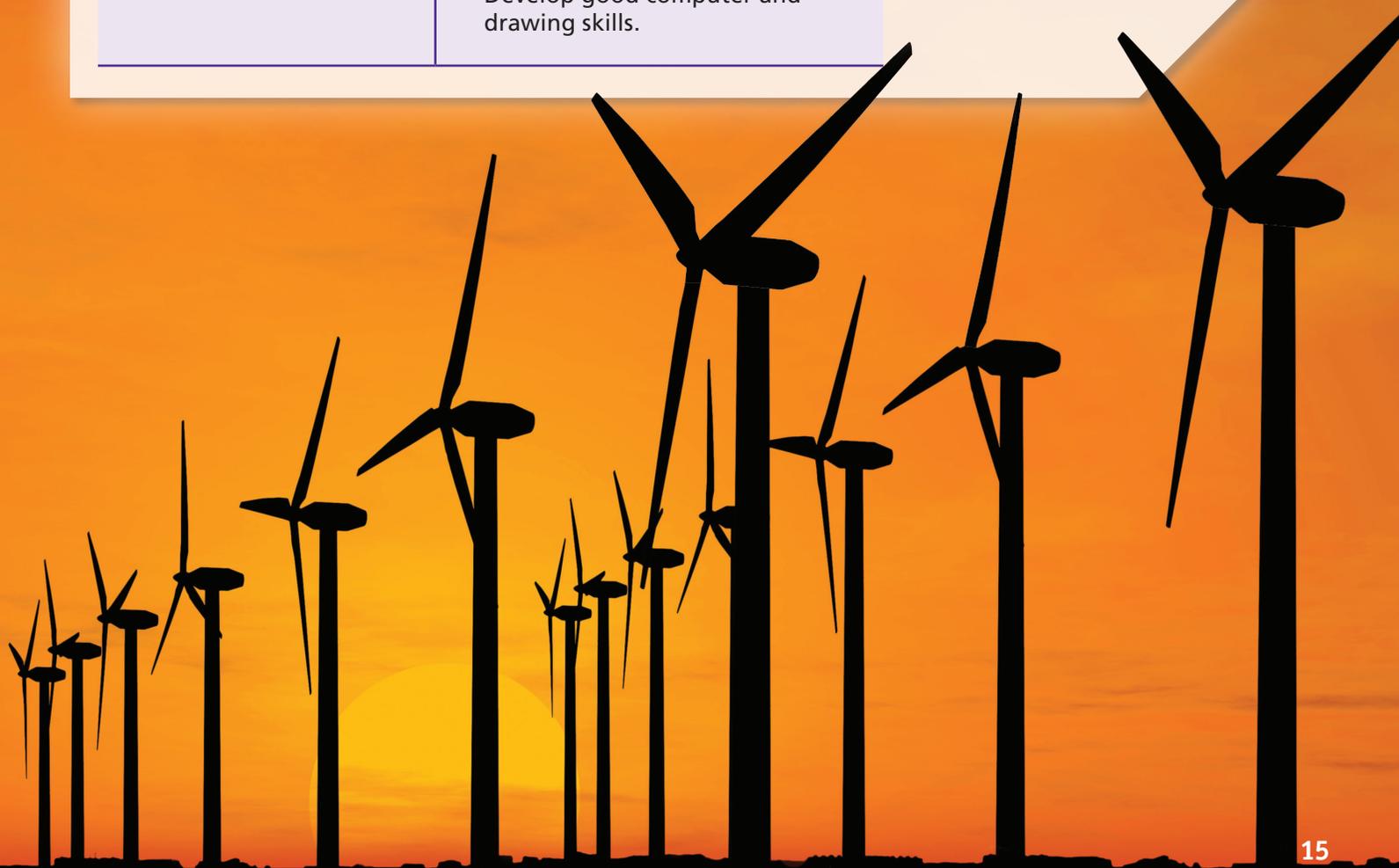
Electrical Engineer

Electrical engineers turn ideas about electrical energy into things people can use. They study how energy moves through matter and changes form. They design and improve wind turbines and solar panels.

Would I like this career?	You might like this career if <ul style="list-style-type: none">• you like to design new things.• you like to understand how technology works.
What would I do?	<ul style="list-style-type: none">• You would study different forms and uses of energy.• You would research how electrical energy is made.
How can I prepare for this career?	<ul style="list-style-type: none">• Study science, math, and engineering.• Develop good computer and drawing skills.



This electrical engineer helps improve solar panels.



Glossary

alternative energy	energy sources that can be used instead of fossil fuels; renewable energy Alternative energy sources, such as solar energy, can be renewed.	light energy	a form of energy that you can see and that moves in waves When you turn on a lamp, it gives off light energy .
biomass	material from plants and animals used to make energy Wood is biomass that is burned to get energy.	mechanical energy	the energy that an object has to do work An object's mechanical energy is the sum of its kinetic and its potential energy.
chemical energy	the energy stored in matter Chemical energy is stored in food.	natural gas	a fossil fuel used for cooking and heating Natural gas is a nonrenewable energy source, like other fossil fuels.
coal	a fossil fuel burned to make electricity Chemical energy is stored in coal and other fossil fuels.	nonrenewable energy	energy from a source that cannot be replaced Coal and oil are sources of nonrenewable energy .
electrical energy	the energy of charged particles You use electrical energy to run a TV or fan.	oil	a fossil fuel used to make gasoline Oil forms from living things that died millions of years ago.
energy	the ability to makes things move or change You use energy when you push a box and make it move.	potential energy	the energy that is stored A stretched rubber band has potential energy .
fossil fuel	a fuel formed from animals and plants that died a long time ago Natural gas and oil are examples of fossil fuels .	renewable energy	energy that comes from a source that can be replaced; alternative energy Wind energy is an example of renewable energy .
fuel	something containing stored energy that is released when burned Fuels include wood and coal.	solar energy	energy that comes from the Sun Solar panels make it possible for households to use solar energy .
geothermal energy	the energy that comes from heat energy inside Earth Geothermal energy is produced by using Earth's heat to boil water and make electricity.	sound energy	a form of energy that you can hear and that moves in waves when objects vibrate You hear sound energy when you clap your hands.
heat energy	the energy of moving atoms Heat energy from the Sun makes Earth warm enough to support life.	vibrate	to move back and forth very quickly A drum vibrates when you hit it.
hydroelectric energy	the energy in moving water used to make electricity River water is controlled to get hydroelectric energy .	wind energy	energy that comes from the wind Wind turbines use wind energy to produce electricity.
kinetic energy	the energy of motion Moving cars have kinetic energy .		

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