



# Alternative Energy Resources

Energy Resource	Advantages	Disadvantages



# What are some renewable energy resources?

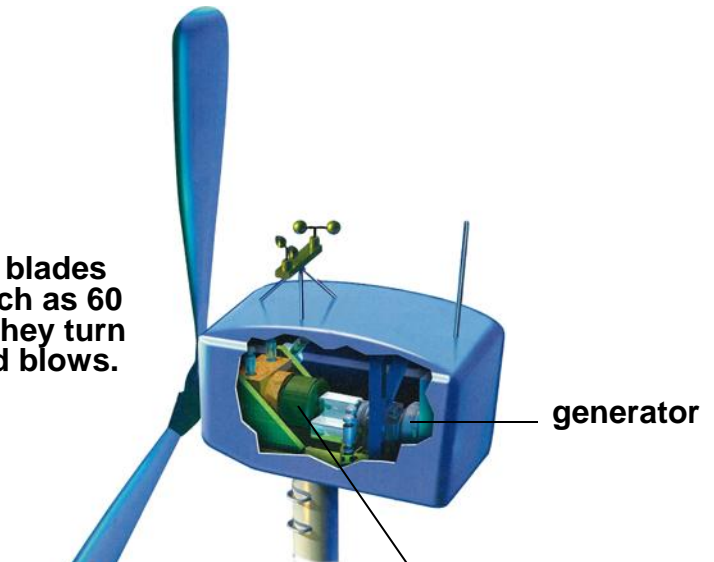
- A **nonrenewable resource** cannot be replaced in a reasonable amount of time. Fossil fuels such as coal, oil, and natural gas are nonrenewable energy resources.
- A **renewable resource** can be replaced in a reasonable amount of time. Renewable energy resources include:
  - Wind energy
  - Solar energy (energy from the sun)
  - Energy from moving water
  - Geothermal energy (energy from the heat inside Earth)
  - Biofuels (fuels from living materials)



# What is wind energy?

- Wind energy has been used for many years. Traditional windmills grind grain and lift water from underground.
- Newer wind turbines generate electricity.

Wind turbine blades may be as much as 60 meters long. They turn when the wind blows.



A gearbox makes the generator spin when the blades turn. The faster the generator spins, the more electricity it makes.





## Advantages of Wind Turbines

- Do not cause pollution
- Wind supply will not run out

## Disadvantages of Wind Turbines

- Only work in places where there is enough wind
- Wind does not blow all the time
- Birds can be killed by flying into turbines



**1. Evaluate** Would your area be a good place for wind turbines? Why or why not?



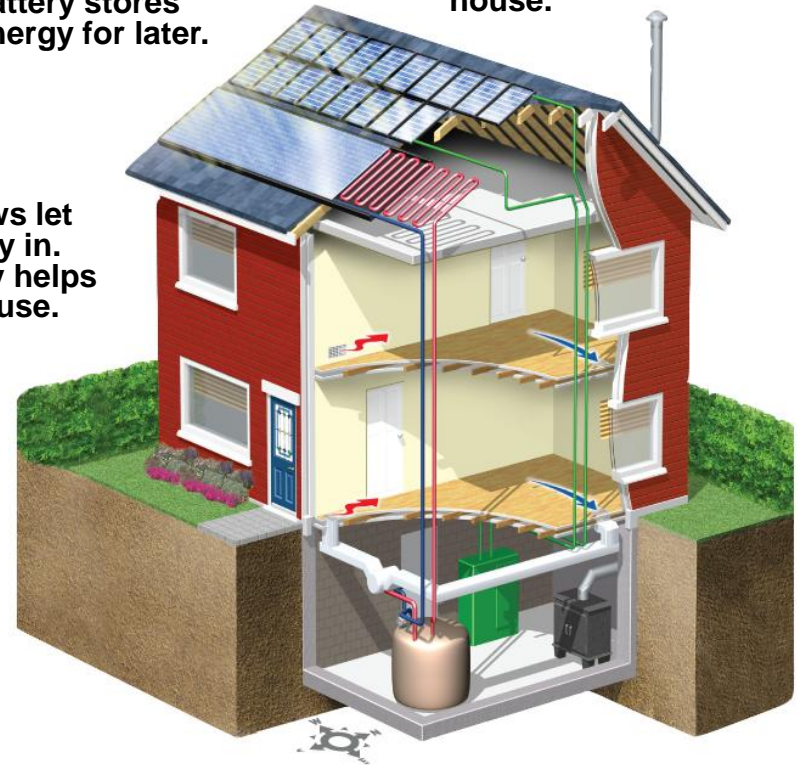
# What is solar energy?

- **Solar energy** is energy from sunlight.
- Solar cells use sunlight to produce electricity. Large solar cells can generate electricity for buildings.
- In solar power plants, mirrors focus the sun's rays to heat water in tanks. The water boils to make steam. The steam then is used to generate electricity.

Solar cells on the roof generate electric current. A battery stores energy for later.

A solar collector on the roof heats water. The water flows to the tank. The water heats pipes that heat the air in the house.

The windows let solar energy in. This energy helps heat the house.



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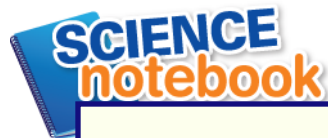


## Advantages of Solar Energy

- Supply will not run out
- Causes no pollution

## Disadvantages of Solar Energy

- Not available at night or on cloudy days
- Expensive to make systems for generating electricity
- Making solar cells creates wastes



**2. Infer** Why is it important for a house with solar panels to have a battery?



# How can moving water generate energy?

- Moving water can turn water wheels. These wheels can power factories, saws, and other machines.
- Moving water can also generate electricity. Power plants that use moving water are called **hydroelectric** plants.
- As water flows through a dam, it spins parts of generators. The generators make electricity.

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## Advantages of Hydroelectric Power Plants

- No fuel needed
- No pollution or waste

## Disadvantages of Hydroelectric Power Plants

- Can be built only where there is moving water
- Need space for a lake to form behind a dam
- Can damage habitats for plants and animals



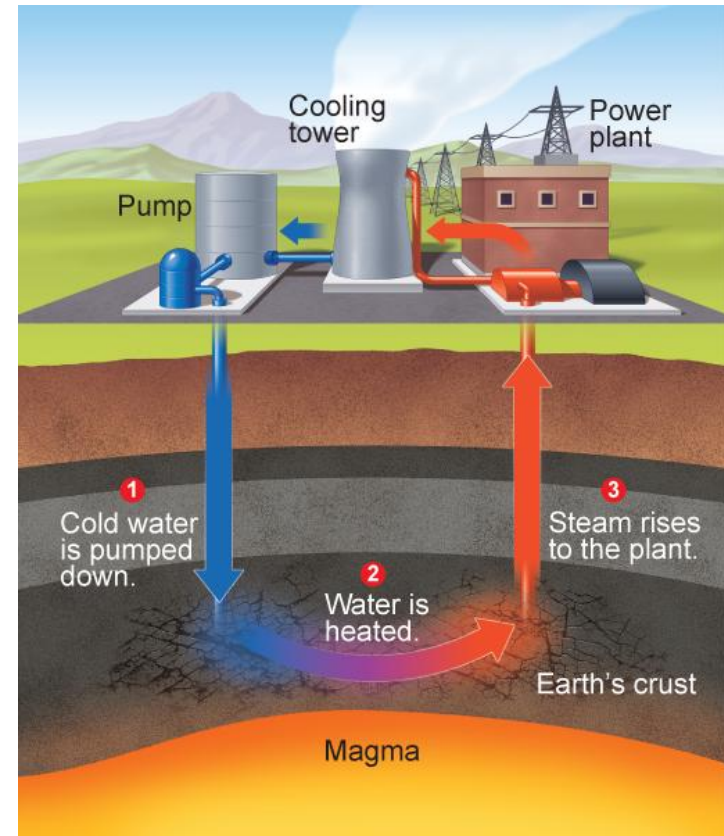
**3. Identify Resource** Identify how the energy resources hydroelectric power and wind power are similar and how they are different.





# What is geothermal energy?

- Below Earth's surface, very high heat melts rock to form magma. This heat is called **geothermal energy**.
- In some places, the magma is close to the surface. Here, underground water boils and forms steam.
- Geothermal energy can also be used to generate electricity. Steam turns generators in a power plant to produce electricity.



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## Advantages of Geothermal Energy

- Can make electricity all day and all night
- Supply will not run out

## Disadvantages of Geothermal Energy

- Can be used in only a few places in the world



**4. Identify Resource** Identify how geothermal energy resources can be used to generate electricity.



# What are biofuels?

**Biofuels** are fuels made from living things. Biofuels include:

- Wood burned for heat and light
- Leaves, food wastes, and animal wastes
- Alcohol made from corn, sugar cane, or other plants added to gasoline
- Methane gas made by bacteria breaking down wastes
- Oil from soybeans and other plants used as a fuel called biodiesel

## Advantages of Biofuels

- Renewable resource
- Burning wastes reduces land pollution

## Disadvantages of Biofuels

- Takes time for new plants to grow to replace those used
- Growing crops for biofuels reduces land for growing food
- Burning biofuels can cause air pollution
- Some kinds are expensive



**5. Identify Resource** Identify three examples of biofuels as energy resources.