



# Wind

**Wind** is moving air. We can use the energy in wind to do work. Early Egyptians used the wind to sail ships on the Nile River. People still use wind to move sailboats. In the Netherlands, people used windmills to grind wheat. The Pilgrims used windmills to grind corn, to pump water, and to run sawmills. Today, we use wind to make electricity.

## The Sun Makes the Wind Blow

The energy in wind comes from the sun. When the sun shines, some of its light reaches the Earth's surface. The Earth near the Equator receives more of the sun's energy than the North and South Poles.

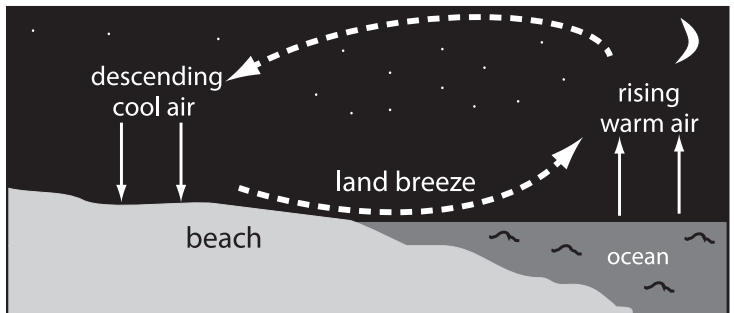
Some parts of the Earth absorb more solar energy than others. Some parts reflect more of the sun's rays back into the air. Light-colored surfaces and water reflect more sunlight than dark surfaces. Snow and ice reflect sunlight, too.

Some types of land absorb more solar energy than others. Dark forests absorb sunlight, while light desert sands reflect it. Land areas usually absorb more energy than water in lakes and oceans.

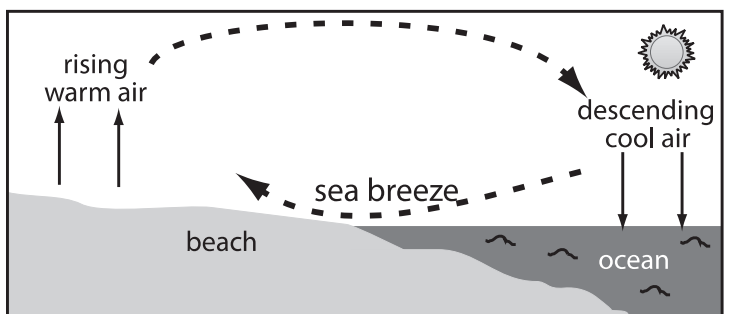
When the Earth's surface absorbs the sun's energy, it turns the light into heat. This heat on the Earth's surface warms the air above it. The air over the Equator gets warmer than the surface air near the poles. The air over the desert gets warmer than the air in the mountains.

The air over the land usually gets warmer than the air over the water. As air warms, it expands. The warm air over the land becomes less dense than the cooler air and rises into the atmosphere. Cooler, denser air nearby flows in to take its place. This moving air is what we call wind. It is caused by the uneven heating of the Earth's surface.

### Land Breeze



### Sea Breeze



# Wind Energy is Renewable

As long as the sun shines, there will be winds on the Earth. We will never run out of wind energy. It is a **renewable** energy source. It is also free since no one can own the sun or the air.

## We Can Capture the Wind

Some places have more wind than others. Areas near the water usually have a lot of wind. Flat land and mountain passes are good places to catch the wind, too. Wind turbines can also work in the ocean offshore.

Today, we use big **wind turbines** to capture the wind. Sometimes, there are hundreds of wind turbines in one place. This is called a **wind farm**. Some wind turbines are as tall as 20-story buildings!

## Wind Can Make Electricity

When the wind blows, it pushes against the blades of the wind turbines. The blades spin around. They turn a **generator** to make **electricity**. The wind turbines don't run all the time though. Sometimes the wind doesn't blow at all and sometimes the wind blows too hard. Most wind turbines run between 65 and 90 percent of the time.

Today, wind energy makes less than 10 percent of the electricity we use in the United States. Most of the big wind farms are in Texas, Iowa, Oklahoma, Kansas, and California. Many more are popping up all over the country and the world.

## Wind is Clean Energy

Wind is a clean energy source. Wind turbines don't burn fuel, so they don't pollute the air. Wind is a renewable energy source and it is free.

Older wind turbines can make a lot of noise as they spin, but new ones do not.

One wind turbine doesn't make much electricity. Most wind farms have many wind turbines. Wind farms can take up a lot of land. Most of the land they are on can still be farmed or used to graze animals.

Wind is a safe, clean, renewable energy source for making electricity.

Wind Turbine Diagram

