



A Need for Alternative Energy

We use energy every day.

It fuels cars and powers cell phones. It cools homes when it's hot outside and warms them when the weather turns cold. It provides light through the night while the sun shines on the other half of the world.

All this energy must come from somewhere. Since the 1700s, people have relied mostly on fossil fuels such as coal, oil, and natural gas. These materials burn easily to create heat and can be turned into electricity. But they are far from perfect.

Our supply of fossil fuels is limited. Experts predict that **fossil fuels will dwindle and their cost will rise**. In addition, **burning these fuels releases harmful substances**.

Some substances trap heat within the **atmosphere**, leading to **climate change**. Others cause health problems, including heart and lung diseases.

What Can We Do?

Renewable energy sources such as **solar**, water, geothermal, and wind are healthier sources than fossil fuels. They can serve our electricity needs while reducing the damage done to the planet and us.

Turn the page to learn how we can use the natural movement of air to generate electricity. Learn the secrets of wind power!



Blowing Through History

Thousands of years ago, wind was one of the only energy sources available. Wind made it possible for people to travel, process foods, and even make music. Over time, human innovations and technology advancements made these wind-related processes more **efficient** and effective.

Invented in the 1960s, the sport of windsurfing combines sailing and surfing.



Wind Above the Water

Offshore winds are usually stronger and steadier. As a result, offshore wind farms generate more electricity than ones on land. The turbines in these watery wind farms are among the largest in the world. Because they are anchored to the seafloor, most offshore turbines are built in shallow waters near land.

Charging Up

The electricity generated by wind farms is usually sent to the public electrical grid. The grid distributes the electricity to homes and businesses. Electricity generated by wind turbines can also be stored in batteries. This allows turbines to supply power even when the wind isn't blowing strong. Because wind can be unpredictable, storing electricity in batteries can make wind energy more effective.

Timeline of Wind Energy

3000 BCE

Ancient people develop the first known sailboats.

3000 BCE



800s CE

800s CE
Windmills are used in ancient Persia (modern Iran) by this time.

1887

Scottish inventor James Blyth produces electricity for the first time using a windmill.



1887



1920s

1920s
George Darrieus invents the first wind turbine with a vertical axis.



1970s

1970s
Worldwide oil shortages lead to an increased interest in wind energy.

1980

The world's first wind farm is built in New Hampshire.

1980



1991

1991
The first offshore wind farm is built off the coast of Denmark.

2017

Wind energy provides more than 5 percent of all the electricity generated in the United States.

2017



THE BIG TRUTH!

Pros and Cons

Wind is powerful. It is cleaner and more sustainable than other energy sources. But is it the perfect replacement for fuels such as coal or oil? You decide.

The PROS about Wind Energy

- 1 It is available everywhere. Fossil fuels can only be found in certain places.
- 2 It does not release any harmful gases into the atmosphere. In contrast, the gases released by burning fossil fuels are a cause of climate change.
- 3 It is renewable, while Earth only has a limited supply of fossil fuels.
- 4 In the long run, it is cheaper than fossil fuels.

Coal mine



Cheaper in the long run



Expensive to get started

Bat



Wind farm



The CONS about Wind Energy

- 1 Wind energy is **variable**. We cannot predict its strength and direction. It doesn't always blow strong enough to power a generator.
- 2 Wind farms take up a lot of space, and most wind turbines are very large.
- 3 Some people think wind farms are ugly and ruin the appearance of natural landscapes.
- 4 Turbines can kill or injure birds and bats.
- 5 Getting started with wind energy is expensive. Installing a wind turbine for a single home can cost as much as \$70,000!
- 6 Turbines can be loud, affecting those who live nearby.

Pollution from processing oil

