

Examining Energy

Examining **Wind Energy**



Jordan Boyle

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Endless Wind

Turning on the lights can be expensive. Have you ever heard your family complain about the high cost of electricity? Today, most of the world's energy comes from non-renewable sources. These non-renewable sources can have negative effects on the environment, and they will also eventually run out.

Innovators and scientists are always looking for ways to improve our sources of energy. Alternative energy research focuses on balancing our energy consumption needs against the needs of our environment. Finding renewable sources of energy to create electricity might also lower your family's electric bill.

Today, more than 80 percent of U.S. power comes from fossil fuels, the most common non-renewable energy source. Fossil fuels include oil, coal, and natural gas. They are made from organic material buried underground for millions of years. Because they take so long to make, we can't make more once we've used up our current supply. Wind power does not burn fossil fuels, so it creates less pollution. This renewable, clean



Seeking alternatives to fossil fuels, many communities are turning to wind for energy.


energy source is becoming more and more attractive to those concerned about the environment.

Wind farms use turbines to turn the power of wind into electricity. Humans have used the wind to do important work for thousands of years. While the supply of wind is unlimited,

the strength of wind varies. Energy harvested by turbines must be captured and transmitted through cables to power the cities where people live. Some people are concerned about the impact of wind farms on natural landscapes, wildlife, and human health. Like all energy sources, wind power has limitations. But most energy experts agree that wind has an important place in our energy future.

EXPLORING WIND ENERGY

In this book, your job is to learn about wind energy and its place in our energy future. When did humans begin using wind power? How can the breeze you feel at the park turn on lights or power your computer? Can wind power alone meet our energy needs? What are the drawbacks of wind energy?

Megan Cruz is writing an article on alternative energy sources for her school newspaper. First she is researching wind energy. She will travel around the world interviewing experts and visiting scientists in the field. Reading her journal will help you in your own research. 

A Walk in the Park

I begin my investigation at the city park. It's a warm, breezy day, and many families are out enjoying the sunshine. Sailboats stream across the lake, racing faster with each gust of wind. Children watch their kites soar high in the sky. I can see the power of the wind all around me. To get started on my wind investigation, I'm meeting with Ken and Jasmine Peterson. Jasmine is a meteorologist, and Ken works for a group studying how neighborhoods can use clean energy sources. I'm hoping that between the two of them, I can learn a little more about wind and how people use it.

As we watch the drifting sailboats, Ken tells me a little about the history of the wind energy industry. "Interest in wind energy has been driven largely by concerns about the use of fossil fuels. Burning fossil fuels can harm the environment, which is a major concern. But there are also concerns about the



Have you ever harnessed the wind's energy by flying a kite?

cost and supply of fossil fuels. Gasoline is made from crude oil. In the 1970s, supplies of crude oil in the United States reached new lows. The low supplies accompanied by increased fossil-fuel usage worldwide led to a global energy crisis. The rising cost of gasoline reminded drivers that fossil fuels are a limited resource.

The more we use, the less we have. The less we have, the more it costs. Right now fossil fuels are pretty inexpensive as energy sources go. But as our fossil fuel supplies dwindle, prices will go up.”

Ken tells me that in recent years, wind energy has emerged as a major alternative to expensive fossil fuels.

I say, “Because wind is free, right?”

“Not exactly,” Ken explains. “Building a wind turbine can be expensive. But the U.S. government offers tax credits to people who install wind turbines for their homes or businesses. Once a turbine is built, it is relatively inexpensive to operate.”

Ken tells me that governments are exploring new ways to spur growth in wind energy. Investors pay for much of the research that goes into developing new and better kinds of turbines. Ken explains that the cost of building and installing turbines has gone down in the past decade.

GREENHOUSE GASES

Burning fossil fuels releases carbon dioxide into the atmosphere. Carbon dioxide is a greenhouse gas. Greenhouse gases work a lot like a greenhouse for plants. These gases trap the sun’s heat in the earth’s atmosphere, making the planet warmer. Greenhouse gases help keep the earth warm enough for life. But large amounts of these gases in the atmosphere raise the planet’s temperature too high, potentially causing changes in the climate that might harm the environment.



Once wind turbines are built, they cost relatively little to operate.

Jasmine chimes in, “Wind is an attractive energy source because it is completely renewable—it will never run out.”

“How exactly does the wind work?” I ask. It seems like an easy question, but I’m surprised by the answer. Jasmine explains that wind is actually a kind of solar energy, created by the sun heating the earth’s atmosphere. When the sun heats the atmosphere, the hot air rises very quickly. Cooler air rushes in to take the place of the rising hot air, creating wind.

“But what causes gusts of wind and breezes?” I ask.

“Air is made of tiny, invisible molecules,” Jasmine says. “You can feel the force of their weight against your skin as they

move. Sometimes these molecules are pressed close together, or under high pressure. Other masses of air have molecules that are farther apart, or under low pressure.”

Jasmine tells me that air is always on the go, moving from areas of high pressure to low pressure. Currents of air swirl around our planet—sometimes in gentle breezes, sometimes in fierce gusts. Hills, mountains, valleys, and even the earth’s rotation create the gusts and breezes. This movement of air is a kind of energy called kinetic energy. Kinetic energy is the energy something possesses because of its motion. A roller coaster speeding down a hill has kinetic energy.

“Days like today are great,” Jasmine adds, “but as you’ve probably noticed, it’s not always windy. This poses a problem for wind energy. We need to find a way to capture energy from wind and store it, even when the wind isn’t blowing as hard as it is today.”

As I listen, I feel the breeze as a weight against my skin. Who knew we were all under so much pressure! But I wonder, how can kinetic energy be used to do work?



Wind energy is easy to capture on breezy days. But what happens on a day when the air is still?

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