Texts ^{for} Close Reading™

Understanding Our Energy Resources



Understanding Our Energy Resources

Student Objectives

I will be able to:

- Read and analyze informational texts and opinion pieces about energy resources.
- Share ideas with my peers.
- Build my vocabulary knowledge.
- Conduct research to write an argument essay.

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Tips for Text Annotation

As you read closely for different purposes, remember to annotate the text. Use the symbols below. Add new symbols in the spaces provided.

Symbol	Purpose
underline	Identify a key detail.
A	Star an important idea in the margin.
123	Mark a sequence of events.
magma	Circle a key word or phrase.
?	Mark a question you have about information in the text. Write your question in the margin.
<u>.</u>	Indicate an idea in the text you find interesting. Comment on this idea in the margin.

Your annotations might look like this.

15 The accuracy of scanning potential dig sites also	Notes
improved. In the 1950s, archaeologists first began using	
instruments called magnetometers to measure magnetic	
properties below the Earth's surface. Variations in	
magnetism in the soil, for example, can help identify	
the presence of objects (artifacts) or areas where human	
activities, such as cooking, occurred. <u>The results can be</u>	lt's amazing what we can learn through
recorded and mapped to give an overview of a site for	technology!
archaeological exploration.	
16 Then, in the 1960s, lidar (light detection and	
ranging), which uses a combination of light pulses and	How low do these
radar, was attached to airplanes and used to scan for	planes fly?
possible excavation sites. Later, in the 1970s, ground-	
penetrating radar was used to identify structures buried	
beneath the ground.	

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Understanding Our Energy Resources



What does our energy future look like?





Short Read 1

Remember to annotate as you read.

Why Does the Wind Blow?

by Francine Ullman

3

Energy is the ability to cause physical or chemical change. Energy is required to move or reshape an object and also to change an object's state, such as converting a liquid to a gas by boiling. These are all examples of physical changes.

Energy is also required to bring about chemical changes, such as combining water, carbon dioxide, and sunlight to make glucose, a source of food energy for plants. Whether physical or chemical, the greater the change, the greater the amount of energy required.

Energy cannot be created or destroyed—it simply changes forms. Everything that takes place in the universe—all physical and chemical events—are the result of energy changing from one form to another. Energy has a number of different forms, but there are two main types. Kinetic energy is the energy of motion, and potential energy is the stored energy an object has.

	3 71	1 57
Energy Type	Definition	Examples
Kinetic Energy	Motion energy in matter	 Wind, flowing water, light, sound, heat, or electricity
Potential Energy	Stored energy of matter due to its position or the arrangement of its parts	 A book sitting on the edge of a table, or a boulder on a cliff Chemical energy stored in food, or fossil fuels (e.g., oil, coal)

Two Major Types of Energy

Informational Science

4	Most energy on Earth originates from the sun. The
	sun's radiant energy travels to Earth in electromagnetic
	light waves and is either reflected or absorbed by matter
	in Earth's atmosphere. Land and water formations
	on Earth's surface absorb and reradiate this energy at
	different rates, causing the gases in Earth's atmosphere to
	warm unevenly.

5

The air temperature differences between low and high latitudes cause the air around Earth to move. Warm air is less dense, so it rises, while cold air is more dense, so it sinks. This movement of air causes the winds that blow around Earth. Scientists measure wind by its speed and direction.

How Winds Form

Wind power is generated by moving air. As the sun heats the land, the air above also warms and rises. Cold air then replaces the rising air. This creates the winds that we feel most days of the year. The diagram below shows how this system works. Air tends to warm at a faster rate over land because the land retains its heat. Over the sea the air warms more slowly as heat from the sun is slowly cooled by the cold water. If you visit the seaside or a coastal area, you will probably find that it is breezier or more windy there than inland. This is because the warm air rises over the land and cold air over the sea replaces it.

Warm air rises

Moving air (wind)

Cold air descends

Short Read 2

Remember to annotate as you read.

Notes

Wind at Work

by Ken Floyd

2

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1 Wind is air in motion, and therefore it is a form of kinetic energy. According to archaeologists, humans first used gusting winds to move boats more than 6,000 years ago in ancient Mesopotamia. Throughout the world, as civilizations spread, they learned to harness energy from wind. They converted the kinetic energy of flowing wind to mechanical energy used to power windmills, which ran water pumps to drain water and irrigate farmland.

In the twentieth century, engineers developed ways to convert the kinetic energy of wind to produce electricity. Today, massive wind turbines tower over windswept lands throughout the world. Wind farms with many turbines send large amounts of electricity to homes and businesses.

The largest wind farm in the United States is Caithness Shepherds Flat in Oregon. The farm can produce 1,800,000 megawatt hours of electricity per year. That is enough to power 160,000 households for one year.

For wind turbines to produce this much electricity, they have to be big. The largest turbine in the world measures over 135 meters (442 feet) high with 61-meter (201-foot) blades. The turbine is taller than a 40-story building. A single blade is longer than four school buses. The typical wind turbine found on a U. S. wind farm is somewhat smaller. Most of them measure from 100 meters (328 feet) to 122 meters (399 feet) high.



The kinetic energy of wind turns the generator of the turbine, which converts that energy to produce electricity.

Notes

The Wind Turbine

- 1. The blades of the turbine face the wind.
- 2. The wind turns the blades in a circle.
- 3. The spinning blades turn a generator.
- 4. The generator sends electricity down a cable.
- 5. The electricity enters the electric grid.

As of 2014, wind energy produced only around 4 percent of all electricity in the United States. However, the use of wind to power homes, buildings, and even cars is increasing every day. There are many advantages that come from using more wind energy. But there are also disadvantages. On the following pages you will read opinions on both sides of the issue.

The Case for Wind: Efficiency

8

6 Wind energy is an essential renewable source of electricity for a nation that consumes nearly four trillion kilowatt-hours (kWh) per year. Most of the electricity produced in the United States still comes from nonrenewable resources, such as oil, coal, and natural gas. These resources may seem to be abundant, but they will eventually run out. And burning these fuels to generate electricity is not just harmful to the environment. It is devastating.

7 Wind energy, on the other hand, is abundant, inexhaustible, clean, and incredibly efficient. Wind turbines generate electricity directly, converting the kinetic energy of wind to turn turbines and rotate electric generators. Burning fossil fuels involves converting the potential energy in the fuel source into thermal energy, which is then used to convert liquid water into the kinetic steam power that turns generators to produce electricity.

When coal, for example, is burned to produce
electricity, more than 60 percent of the stored potential
energy is lost as waste heat. Coal, petroleum, and nuclear
power plants have an average efficiency rate of 31 percent.
By comparison, wind has an efficiency rate of 95 percent.
There is no contest.

9 As the United States moves forward in the twenty-first century, the answer to its energy needs is to invest and innovate and find the best technology to harness and store wind energy.

Notes

Informational Science

The Case Against Wind: Inconsistency

- 10 The United States has critical energy needs, but wind is not the answer. Proponents of wind power pledge that wind is a clean and efficient source for electricity. A closer look reveals that wind still does not live up to this promise.
- Is wind clean? Yes, but while wind might not emit harmful pollutants, wind farms still wield horrific environmental impacts. Turbines kill birds, bats, and other wildlife at an alarming rate.
- Is wind efficient? Yes, but only when it's blowing! The fact is that wind is inconsistent. It is still not—and may never be—reliable enough to replace fossil fuels. The reason is that when the wind isn't blowing, another fuel source is always needed to support the grid. Wind has never covered the capacity needed at peak hours for consumers. Only when scientists have the technology to capture and convert wind's kinetic energy into potential energy that can be stored will it serve as a real solution. Until then, investors should focus on more efficient technology for the burning of renewable biofuels as well as promising solar power technology.

13 There is no question that the United States needs alternative energy sources to replace fossil fuels, but wind power will take us in the wrong direction. Biofuel and solar energy technology is money better spent.

Word Study Read

Remember to annotate as you read.

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Notes

The Six Winds

One evening many moons ago, an Inuit man noticed the light of the Milky Way spilling across the frozen tundra. The light entranced him, and he followed it to a solitary tree. The man took a piece of the wood from the tree home and carved it into a doll. When he was content with his handiwork, he put the doll aside.

Later that night the doll came alive and rose into the air, following the light of the Milky Way into the eastern sky. There the doll saw an opening covered with a bulging patch, and the doll knew the east wind was pushing behind it.

3 The world will be livelier if I let the wind through, thought the doll, so he unfastened the patch, and the wind blew through, sending reindeer down to the world below. The doll thanked the wind and instructed it to blow powerfully sometimes, delicately other times, and occasionally not at all.

⁴ Next the doll traveled to the southeastern sky and unfastened its patch. The wind that was released blew trees and bushes to the world below. The doll instructed the wind as before, and then continued to the southern, western, and northwestern skies, where the winds carried sea spray, rainstorms, hail, and sleet. When the doll reached the northern sky and unfastened its patch, a bitterly cold blast brought tears to his eyes. The doll immediately replaced the patch and instructed the wind to blow only in winter so the people could prepare for it.

Finally, the doll returned to the man's home and never left again. Since then, Inuit people have told the story of how the six winds came to the world.

BuildReflectWrite

Build Knowledge

Identify the advantages and disadvantages of wind power. Based on your comparison, what conclusions have you drawn about wind as an energy source?

Wind Power		
Advantages:	Disadvantages:	
Conclusions:		

Reflect

What does our energy future look like?

Based on this week's texts, write down new ideas and questions you have about the essential question.

Research and Writing

Research renewable forms of energy. Write an essay in which you explain the advantages and disadvantages of three different types of renewable energy and argue for which one you think is the best solution to the energy crisis.

Choose Your Topic

This week, conduct a pre-search to identify renewable forms of energy that you would like to research. Construct three or more guiding questions that will help you focus your research on the information you will need for your essay.

Extended Read 1

Remember to annotate as you read.

Notes

Energy Choices

by Laura McDonald

People rely on energy to survive. People could not go anywhere, do anything, make any products, or warm their homes without energy. As a result, energy sources play a huge role in global economies. They affect jobs, earnings, and, in some cases, whole industries.

Energy sources can be renewable or nonrenewable. Renewable energy sources are replaced about as fast as they are used, so they will never be used up. Wind and solar energy are good examples of renewable energy. Geothermal heat from inside Earth and the energy of moving water, or hydropower, are also renewable sources of energy.





Before the dinosaurs, many giant plants died in swamps.

Over millions of years, the plants were buried under water and dirt.

Heat and pressure turned the dead plants into coal.



- 3 Nonrenewable resources take millions of years to form. The supply of nonrenewable energy resources goes down as we use them. Nuclear fuel and fossil fuels are both nonrenewable energy resources. Nuclear fuel is made from the element uranium. Uranium formed billions of years ago and is found in Earth's crust.
- ⁴ Most of the world's energy depends on fossil fuels coal, oil, and natural gas—that have formed over time from ancient plant and animal remains. Fossil fuels continue to form, but at an extremely slow rate. If the high demand for fossil fuels continues and the supply decreases, the cost of these energy sources will inevitably rise.

Notes

Energy Resources

6

- Each country has a unique set of natural energy 5 resources. Using those resources is often cheaper and more reliable than importing fossil fuels or electricity from other places. Countries use many different mixes of energy resources based on what natural resources are most readily available, what works best for their economy, and how their citizens view energy.
 - The Democratic Republic of the Congo (DR Congo) is a lush country in central Africa. It has many rivers winding through its jungles, forests, and fields. The energy of that running water provides nearly all of the energy the people of DR Congo use. They use hydropower to make electricity. They even sell some electricity to neighboring countries.

World Energy Outlook



Projections for 2040 show that fossil fuels will continue to supply most of the world's energy.

Informational Science

Notes

The Democratic Republic of the Congo relies on hydropower from its many rivers.

Saudi Arabia has few waterways but a wealth of fossil fuel resources.

- 7 Saudi Arabia, on the other hand, has very little water. Hydropower would be totally impractical in this Middle Eastern country. Saudi Arabia has vast supplies of oil and natural gas, so the Saudis extract enough fossil fuels to supply all of their energy needs. They also export oil to the United States and other nations.
- Since it is on top of volcanoes, Iceland extracts the heat stored in Earth's core and thus uses geothermal heat or "volcano power." This European country once imported coal to burn for energy, but now, Iceland gets two-thirds of its energy from geothermal sources. Geothermal heat can be used to heat buildings and swimming pools, or it can power electrical generators. Geothermal energy is very inexpensive and produces no pollution.

9 Of course, every nation receives sunlight and can use solar power. The tiny island territory of Tokelau, in the South Pacific Ocean, takes full advantage of this energy resource. The island of Tokelau is the world's first solarpowered territory. It generates more than 90 percent of its electricity from sunlight and burns coconut oil to meet the rest of its energy needs.

Wind is another energy resource available all over the world. Engineers in Denmark have learned how to capture that energy with wind turbines near the ocean shore, so Denmark plans to generate half of its electricity with wind by 2020.

Energy Strategies

Every energy resource comes with some cost to the environment. Mining coal and uranium, drilling for oil, constructing solar panels, and damming rivers for hydropower all damage the environment to some extent. Countries that burn fossil fuels pollute the air and contribute to global climate change. Even wind turbines kill millions of bats and birds each year.

Iceland relies mostly on geothermal energy from beneath Earth's surface to generate electricity. Denmark uses a combination of wind turbine technology and coal to support its electrical grid. So the energy choices countries make are often hotly debated by their citizens.
 Many countries pass energy laws to protect the environment



Environmental activists protest energy choices in a recent demonstration.

and fund research for alternative energies and green technology. Countries also have educational programs in their schools about energy resources and how to best use them, and easy ways to help save energy.

13 Most nations have a plan, or strategy, for using resources to generate energy. Denmark's strategy is to produce 50 percent of its electricity from wind and to be free from fossil fuels by 2050. Tokelau plans to produce all of its power from renewable resources and to use money saved to fund other projects. France's goal is to replace some of its nuclear power with safer forms of energy.

The island nation of Tokelau, off of Fiji in the South Pacific, relies almost exclusively on solar power to meet its energy needs.

Informational Science

Notes

14 The United States' energy strategy is still under discussion. In an address to Congress in 2009, President Barack Obama said, "To truly transform our economy, protect our security, and save our planet from the ravages of climate change, we need to ultimately make clean, renewable energy the profitable kind of energy." As of this writing, most energy in the United States comes from fossil fuels, nuclear energy, and hydropower, and there is debate about which kinds of energy should be used in the future and how they should be funded.

Like any "hot" issue, this debate will continue well into the future, but as time passes, decisions will have to be made because not all energy sources are in infinite supply.



Informational Science

The Future of Energy

The debate on energy and what kinds of energy countries should use continues. Here are opinions from both sides of the issue of oil drilling. Oil drilling is just one aspect of the debate on energy and its future.

"In the old economy, energy was produced by burning something—oil, coal, or natural gas—leading to the carbon emissions that have come to define our economy. The new energy economy harnesses the energy in wind, the energy coming from the sun, and heat from within the earth itself." —Lester R. Brown, Plan B 4.0: Mobilizing to Save Civilization, 2009

"Despoiling nature to get at the tiny trickle of oil we have left won't make any significant difference in what we pay at the pump—not now and not ever. And it won't make our country any less dependent on foreign fuel. Our thirst for oil is bad for national security, bad for our economy and bad for the environment."

—Alternative Energy ProCon.org

"America needs to say no to pumping up Big Oil's profits and yes to forging a new clean energy economy."

—The Natural Resources Defense Council

"If Congress were to expand the areas available for active exploration, we could make more domestic energy available to Americans in the future, while sending a strong positive supply signal to markets today, potentially putting downward pressure on prices."

—Exxon Mobil

Word Study Read

Remember to annotate as you read.

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Notes

Going Geothermal

In the 1960s, Icelanders depended on fossil fuels such as coal and oil to heat their homes. When an oil crisis arose in the 1970s, they realized the necessity of finding a new heating resource, and they had the wisdom to choose one that improved the breathability of the air and lowered heating prices. They opted for geothermal energy—heat from the interior of Earth.

- 2 The country of Iceland is located in a global "hot spot." Straddling the North American and Eurasian tectonic plates, Iceland has more than 100 volcanoes, many hot springs, and multiple steam fields. It is from here that Iceland obtains its geothermal energy. Today one of Iceland's most important uses of geothermal energy is to provide heat. Nine out of ten households use it. In addition, Iceland has increased its use of geothermal energy to generate electricity.
 - The athleticism of Icelanders is reflected in their love of swimming, so geothermal energy is also a perfect choice for heating public pools. Geothermal energy also has practical uses in fish farming and food production. It is even used to de-ice sidewalks and parking lots.

At one time, Iceland was considered one of Europe's poorest countries. Today, thanks to the application of geothermal energy, Iceland's standard of living is high. Icelanders are optimistic about the future of geothermal power, and they have even begun to explore ways to use the emissions from a geothermal electric plant to produce methanol for cars.

BuildReflectWrite

Build Knowledge

In the reading selection "Energy Choices," which facts and reasons would you choose to support the idea that reliance on fossil fuels as an energy source should be reduced? Make a statement summarizing your point of view.

Facts	Reasons
State	ement

Reflect

What does our energy future look like?

Based on this week's texts, write down new ideas and questions you have about the essential question.

Research and Writing

Research renewable forms of energy. Write an essay in which you explain the advantages and disadvantages of three different types of renewable energy and argue for which one you think is the best solution to the energy crisis.

Conduct Research

Use your guiding questions to conduct research this week. Gather information from at least three sources, including both print and online sources. Use your sources to plan your essay.

Extended Read 2

Remember to annotate as you read.

Notes

Energy Times

Wind Power: Pros and Cons

The Time for Wind Is Now, America!

by Tabitha Jones

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In 2008, Denmark harnessed wind to generate 20 percent of its electricity from wind. That same year America got about 1 percent of its electricity from wind. Within five years, wind power produced 30 percent of Denmark's electricity. On the evening of Sunday, November 3, 2013, the country exceeded 100 percent of its electricity demand in wind power production. The portion of electricity produced from wind power in the United States at the time was just over 4 percent.

Today Denmark aims to be completely energy independent and free from fossil fuels by 2050. Meanwhile, the U. S. Department of Energy (DOE) hopes to meet 20 percent of the nation's electricity needs with windgenerated power by 2030.

³ What's wrong with this picture? Why is America lagging behind?

The DOE projects that the global demand for electricity could increase by as much as 80 percent by 2030. As the need for energy grows, the United States must look to nations such as Denmark. The U.S. needs to ramp up its investment in wind technology. Or, it will be left blowing in the breeze.

Opinion Piece

Notes



Denmark has long been a global model of what can be achieved through wind energy if a nation's people and its government get behind it. As Pulitzer Prize–winning author and journalist Thomas Friedman reported in the New York Times in 2008, "To be sure, Denmark is much smaller than us and was lucky to discover some oil in the North Sea. But despite that, Danes imposed on themselves a set of gasoline taxes, CO² taxes and building-and-appliance efficiency standards that allowed them to grow their economy—while barely growing their energy consumption—and gave birth to a Danish cleanpower industry that is one of the most competitive in the world."

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Since that article was published, the Danish have made further innovations in clean power. Today, they are a leading exporter of wind technology. Denmark's wind power industry is one of the most successful in the world and provides jobs for its people. The opposite is true for the United States. The country has subsidized the cost of fossil fuels, perpetuating widespread dependency on these seemingly low-cost alternatives. Instead, the U.S. should have invested in alternative energy innovation needed to solve the problem. Notes

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Today the continually rising prices of oil and natural gas imports are unsustainable and threaten the nation's energy security. Advancing the U.S. wind power industry makes sense for the U.S. economy, local and state job creation, and reduction of trade deficits. It also makes sense for the environment.

Burning inefficient and nonrenewable fossil fuels at the current rate is costly for both the economy and the environment. The burning of fossil fuels emits large quantities of carbon dioxide and other pollutants into the atmosphere. This is a major factor in the pollution of our air, soil, and freshwater and marine resources.

The burning of fossil fuels is also a major contributor to global climate change. According to the IPCC (Intergovernmental Panel on Climate Change), hazardous greenhouse gas emissions from fossil fuels are set to increase between 25 and 90 percent in the next twenty-five years if action is not taken. Power plants currently account for more than 40 percent of global CO₂ emissions.

If nothing is done, CO₂ emissions from power generation will increase by more than 60 percent by 2030.
 This is where wind can make a significant contribution.

The time has come for an affordable, renewable, and efficient energy alternative. Wind is the answer. As a renewable energy resource, wind has many advantages. First, wind is free and inexhaustible. As long as the sun shines, wind will blow around Earth. Using wind turbines contributes no pollutants to the ground, air, or water. Wind technology produces large amounts of electricity and uses almost no water. Other electricity production methods use trillions of tons of water as part of their operations.

Opinion Piece

Notes

¹² Also, wind technology has come a long way. The latest wind technology can allow for steady, reliable electricity. A modern wind turbine produces 180 times more electricity at less than half the cost per kilowatthour (kWh) than the most efficient turbine did 20 years ago. Today the rate is between five and eight cents per kWh, which is competitive with the price of fossil fuels. As the price of CO₂ emissions has gone up, wind power has become even more affordable. That means wind is now priced competitively with natural gas. It also remains a more affordable solution than other alternative energy sources such as solar power.

13 The United States has serious energy needs, and wind is a clean and existing energy solution. Wind works *now*, and the more we invest in technology and innovation, the more sustainable our future will be!



Emissions from carbon dioxide and other pollutants rise from a coal-powered plant.

Notes

Big Wind: Full of Hot Air

by Ashford Medeia

According to the U. S. Energy Information Agency (EIA), the growth in electricity use is likely to increase "from 3,826 billion kilowatt-hours (kWh) in 2012 to 4,954 billion kWh in 2040." That constitutes an increase in demand of 29 percent by 2040.

¹⁵ Over the past few years there has been a renewed interest in the idea of replacing fossil fuels with alternative, renewable energy sources. Most citizens agree this is important for the future of the United States and the globe. The real conflict comes when people try to decide which alternative energy options are worth advancing. To be plain: everybody's got a different horse in the race.

¹⁶ With the success of nations like Denmark, which attributes its energy surplus to wind, the United States has begun embarking on a number of large-scale wind farm operations. Since 2010, companies like Google have invested more than \$1 billion in alternative energy ventures. These include some of the largest land-based wind farms. Google is also a weighty supporter of the Atlantic Wind Connection, a large-scale offshore wind farm venture. This group claims it could eventually provide enough power to support the entire East Coast power grid.

17 These are big promises. Big Wind, the group of multibillion dollar corporations such as General Electric and Boeing, are pushing for wind power as the ultimate solution. They have put forth many arguments as to why wind should win. The most appealing are that wind is both cleaner and better for the economy. However, it is easy to poke holes in these claims.

Opinion Piece

Notes



According to the American Bird Conservancy, more than half a million birds are killed by wind turbines each year.

First and foremost, wind power simply isn't the 18 gentle, clean, Earth-friendly solution it pretends to be. While wind might not emit harmful pollutants, wind farms still wield horrific environmental impacts. Even with new preventative design and technology in place at some facilities, a recent Wildlife Society Bulletin reported that wind turbines are still killing about 600,000 birds in the United States every year. This number includes 80,000 raptors such as hawks, falcons, and eagles. The number of bird deaths is only surpassed by the number of bats that perish. Bats, which are vitally important to the balance of the ecosystem, die in collisions with turbines and also when their lungs are inverted by the negative air pressure caused by the 170-mile-per-hour spinning blades.

19 The loss of habitats and increased habitat fragmentation that occurs as a result of wind farms is also rarely discussed. But physical footprint is an important measure of environmental harm. Notes

According to a 2013 article in Forbes magazine, "about 60 square miles of land covered with wind turbines is necessary to produce 1 billion kWhrs per year but the affected area for birds is more than 400 square miles. In contrast, it takes only 3 square miles of land for gas fired power plants, and less than 1 square mile for a nuclear plant, to produce the same amount of power. These include the land required for mining and drilling."

- 21 The sheer size of turbines on land or offshore destroys the beautiful natural landscape. The blasting of bedrock and building of concrete foundations needed to stabilize these structures displaces plant and wildlife, disrupts water flow, and threatens water sources. Turbines are not only habitatthreatening eyesores. They also emit incredibly loud, thumping noise pollution that can be heard up to 3,000 yards away. This is something that must be considered when measuring environmental impact.
- 22 Another falsehood about wind is that it will save the American economy. A closer look at Denmark—the supposed hallmark of wind energy—reveals that Danish electricity prices are the highest in the European Union.



Blasting bedrock for wind turbine development disrupts wildlife habitats and has negative ecological consequences.

Opinion Piece

Notes

In Denmark, the anti-wind group Neighbours of Large Wind Turbines is growing quickly. "People are fed up with having their property devalued and sleep ruined by noise from large wind turbines," says the association's president, Boye Jensen Odsherred. "We receive constant calls from civic groups that want to join," he adds.

The Danish energy think tank known as CEPOS (Center for Political Studies) also reported recently that the effect of the government subsidy has been to shift employment from more-productive employment in other sectors to less-productive employment in the wind industry. As a result, according to CEPOS, the gross domestic product of Denmark is approximately 1.8 billion DKK (Danish kroner) (approximately 328 million U.S. dollars) lower than it would have been had those employed by the wind sector worked in other jobs.

Industrial societies were founded on the potential energy stored in fossil fuels. For the United States, stored energy sources allow people to use energy when they actually need it, not whenever the wind blows. People rely on electricity every minute of the day. It needs to be there whenever a person needs to flip on a light, cook a meal, warm a home, or run a computer. The kinetic energy of wind does not work the way the potential energy in fossil fuels works. Right now, wind electricity needs to be used the instant it is made. But there is no way to get the wind to blow in sync with the pattern of society's electricity demand.

26

This is the biggest problem with wind—not only is it harmful for the environment and the economy, but it doesn't always work. Don't ask the Danish government what's best for Americans. Ask the Danish people.

Word Study Read

Remember to annotate as you read.

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Notes

Windmills of the Netherlands

The tricolor flag of the Netherlands, or Holland, flies over a country with more than 25 percent of its land below sea level. In fact, the name Netherlands means "low-lying country." You might think of the Netherlands as a country of people who export delicious cheeses and embrace bicycle riding, but the Dutch are also known as ingenious masters of water management.

Centuries ago, people began to drain water from lowlying areas in what is now the Netherlands. To keep water off of the newly drained lands, the Dutch constructed dikes. Sometimes used interchangeably with the term *seawall* or *levee*, a dike is an embankment that holds water back. Caring for the dikes that bisected the land soon became everyone's concern. If neighboring land flooded, so did your own. So local "water boards" were established, making community members interdependent. Eventually the exhausting work of draining the land using manpower stopped. The Dutch began to build their internationally famous windmills to pump water off the land.

Today the reclamation and management of lowlands continues, but pumping is done by diesel or electric pumps. Yet working windmills still stand in the Netherlands. Some were even put back into use during World War II when expendable fuel supplies ran out. Today visitors to the Netherlands can view windmills at the Kinderdijk-Elshout mill network, a UNESCO World Heritage site. Amazingly, this network of windmills can still be utilized if and when modern equipment fails.

BuildReflectWrite

Build Knowledge

Record your ideas about wind power.

Wind Power	
What is the debate about wind power?	What is the strongest case for wind?
What is the strongest case against wind?	Is wind power a viable solution?

Reflect

What does our energy future look like?

Based on this week's texts, write down new ideas and questions you have about the essential question.

Research and Writing

Research renewable forms of energy. Write an essay in which you explain the advantages and disadvantages of three different types of renewable energy and argue for which one you think is the best solution to the energy crisis.

Write Your Argument Essay

Use your research results to draft, revise, and edit your essay. Share your essay with your peers.

Support for Collaborative Conversation

Discussion Prompts

Express ideas or opinions ...

When I read _____, it made me think that _____.

Based on the information in _____, my [opinion/idea] is _____.

As I [listened to/read/watched] _____, it occurred to me that _____.

It was important that _____.

Gain the floor . . .

I would like to add a comment. _____.

Excuse me for interrupting but _____.

That made me think of _____.

Build on a peer's idea or opinion . . .

That's an interesting point. It makes me think _____.

If _____, then maybe _____.

[Name] said _____. That could mean that _____.

Express agreement with a peer's idea . . .

I agree that _____ because _____.

I also feel that because .

[Name] made the comment that _____, and I think that is important because _____.

Respectfully express disagreement . . .

I understand your point of view that _____, but in my opinion _____ because _____.

That is an interesting idea, but did you consider the fact that _____?

I do not agree that _____. I think that _____.

Ask a clarifying question ...

You said _____. Could you explain what you mean by that?

I don't understand how your evidence supports that inference. Can you say more?

I'm not sure I understand. Are you saying that _____?

Clarify for others ...

When I said _____, what I meant was that _____.

I reached my conclusion because .

Group Roles

Discussion director:

Your role is to guide the group's discussion. Ask your peers to explain and support his or her responses.

Notetaker:

Your job is to record the group's ideas and important points of discussion.

Summarizer:

You will write a short summary of the group's comments and conclusions. Check with the group that it accurately reflects their ideas.

Connector:

In this role, you will look for connections between the group's discussion and ideas you've talked about in class or events that have happened in the real world.

Presenter:

Your role is to provide an overview of the group's discussion to the class.

Timekeeper:

Your job is to track the time and keep your peers on task.

Making Meaning with Words

Word	My Definition	My Sentence
critical		
(p. 9)		
deficits		
(p. 24)		
element		
(p. 13)		
extracts		
(p. 15)		
factor		
(p. 24)		
fragmentation		
(p. 27)		
fund		
(p. 17)		
originates		
(p. 5)		
portion		
(p. 22)		
retains		
(p. 5)		

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