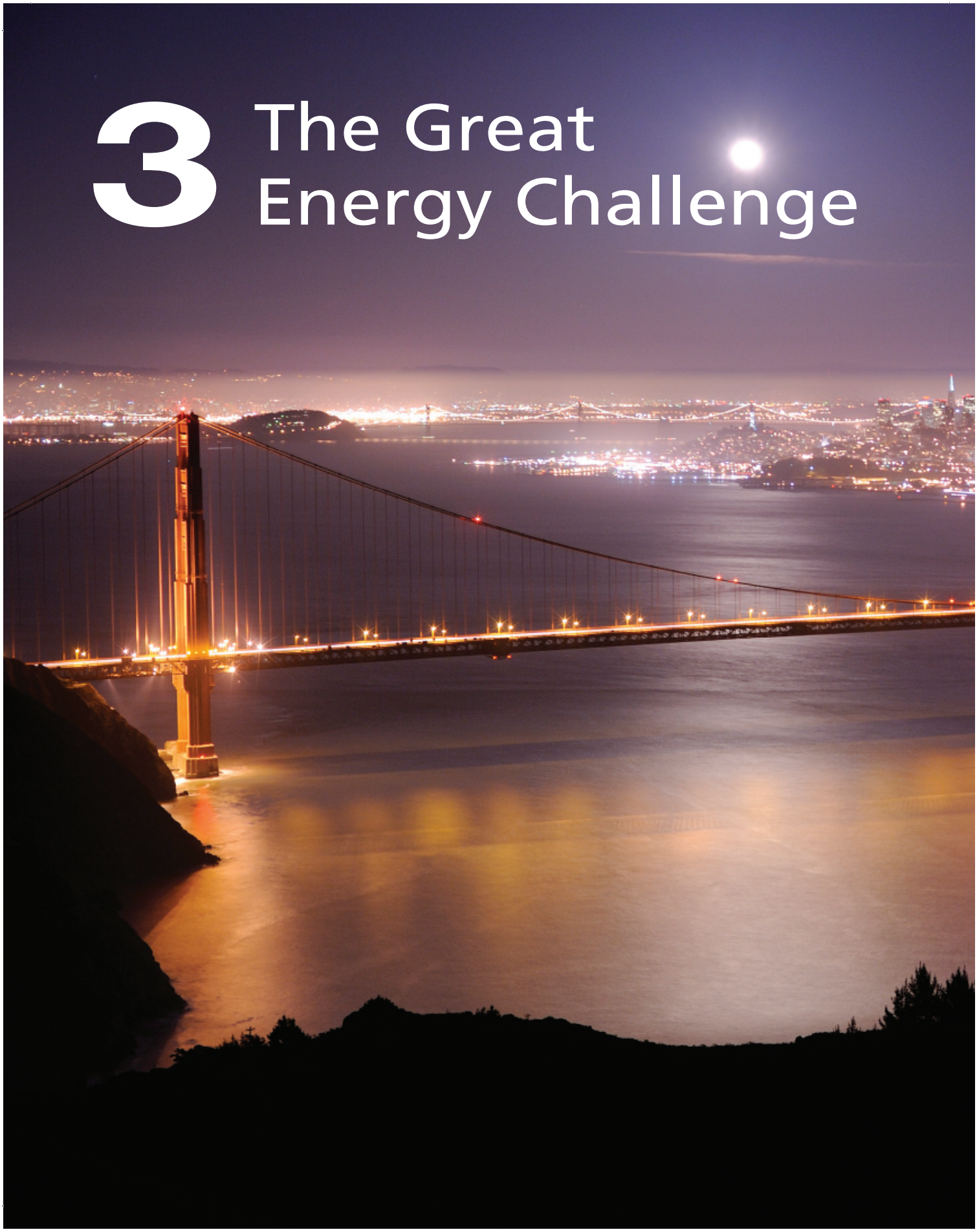
3 The Great Energy Challenge



1 Do you know what these energy sources are? Use your dictionary to look up any unfamiliar words. Of the four, which one produces the most energy worldwide today? Which ones produce safe, clean energy?

a. solar panels
b. a nuclear reactor
c. a wind turbine
d. an oil rig

2 Read the unit title. What do you think an "energy challenge" is?

3 What energy challenges is the world facing now?

Unit Outcomes

In this unit, you will learn to:

- refine your use of future tenses
- identify the pros and cons of an issue
- express an opinion and give examples to support it
- persuade an audience to make a change

Vocabulary

consume to use, especially in large amounts
eliminate to remove something entirely
entire the whole of something
generate to make or produce
project to predict
rely on to depend on or use
residents the people who live in a certain place (house, neighborhood, city, etc.)
reverse to cause something to move in the opposite direction
run out to use something (up) completely
source the origin or starting place of something
supply to give an amount; provide
sustainable long-lasting or good for the environment

reverse *the effects (of something), ~ a decision, ~ the order, Put your car in ~.*

PRONUNCIATION Notice that these two words are different. *We're launching the **PROject** next year. They **proJECT** a 10 percent increase by 2020.*
For more information on heteronyms and stress shift, see page 146.

A Read the energy statistics. Use the word bank to help you. Did any of the information surprise you? Why?

Did you know?

- Hydro power could generate 20 percent of the energy that developed nations need.
- Wind power could supply forty times more energy than we consume now.
- One hour of sunlight can supply the world with enough energy for an entire year. Using solar energy (instead of fossil fuels) could also help reverse the effects of global warming.
- Coal, the largest source of electric power today, can be mined in a third of the world's countries.
- Experts project that natural gas will produce 26 percent of the world's energy by 2020.
- Oil powers our lives, but using oil is not sustainable and experts predict it will run out in the next century.
- Residents of France rely on nuclear power; 78 percent of the country's electricity comes from this energy source, more than any other nation in the world.

global warming an increase in Earth's temperature caused by burning ***fossil fuels*** (oil, gas, and coal)

B Which words from the list go with *energy*? Complete the Word Partnership box.

Word Partnership

Use *energy* with:
v: consume, g_____,
r____ out (of),
s_____ *energy*
n: *energy* s_____

C Discuss these questions with a partner.

1. Which energy sources does your country rely on the most?
2. Are there energy sources we should eliminate from our day-to-day lives?
3. Do you believe that oil will eventually run out completely? Why or why not?
4. What is one thing you or your community can do to consume less energy?
5. Do you think we can reverse the effects of global warming? Why or why not?

Grammar

A Choose the best answer(s) for items 1–4. More than one option may be possible. Then explain your answers to a partner.

1. **A:** Do you want to see a movie? **B:** I can't. _____ this evening.
   a. I'm studying **b.** I'll study **c.** I'm going to study
2. Experts think the cost of solar power _____ decrease in the future.
   a. is going to **b.** will
3. **a.** I'll text you when I get a break. **b.** I'll text you when I'll get a break.
4. At this time tomorrow, ____ to Asia.
   a. I'll travel **b.** I'll be traveling

Review of Future Forms	
definite plans	**I'm going to take** the TOEFL next Saturday. **I'm taking** the TOEFL next Saturday.
predictions	By 2040, there **are going to be** over 8 billion people on Earth. By 2040, there **will be** over 8 billion people on Earth.
promises	**I'll call** you tonight after I get home. I **won't** forget.
ongoing future actions	Within ten years, Germany **will be using** less oil and more renewable sources.

B Complete this quiz with an appropriate future form of the verb in parentheses. Then ask and answer the questions with a partner.

1. Which country _____ (consume) the most energy in the near future?
   a. China **b.** India **c.** the United States
2. Which country _____ (have) the largest per person energy consumption this year?
   a. Canada **b.** Russia **c.** South Africa
3. What country _____ (continue) to generate the most geothermal energy?
   a. Iceland **b.** Costa Rica **c.** the United States
4. Which country _____ (run) 50 percent of their cars on ethanol (fuel made from corn) in the future?
   a. Mexico **b.** Brazil **c.** Japan
5. Global energy demand will _____ (increase) as the population _____ (increases). How much of that increase _____ (come) from the richest countries in the world?
   a. 7 percent **b.** 17 percent **c.** 27 percent

C Discuss these predictions with a partner. Do you agree with the statements?

In the future . . .

Fewer people will be driving gas-powered cars.
More people will rely on nuclear energy.
My country is going to be oil independent.
Your own idea: _____

Listening

A Look at these two groups of verbs in bold. What do they mean? Discuss your ideas.

1	I'm going to **reduce** my work week from forty hours to thirty. My doctor told me to **cut down** / **cut back** on desserts.
2	To be a vegetarian, you need to **eliminate** all red meat from your diet. I need to eat better, but I cannot **give up** chocolate completely. I love it too much!

B You're going to listen to the introduction to a TV program. What do you think it's about? Tell a partner. Then listen and complete the sentence in your own words.

The program Our Green Planet will be following everyday people as they _____.

C Listen to each person. Check (✓) the energy-saving actions that they are taking.

The Novak family

- ☐ use a bicycle instead of a car for short trips
- ☐ reduce air travel
- ☐ grow their own food

The Noguchi family

- ☐ unplug all electronic appliances daily
- ☐ change the temperature settings on the refrigerator
- ☐ hang clothes to dry

The Perez family

- ☐ carpool (to drive together with others)
- ☐ buy only locally made products
- ☐ use solar energy for heating water or cooking

D Look at the items in Exercise C that you didn't check. Why doesn't the family do these things? Listen again and take notes using the pattern below. Then explain your answers to a partner.

The _____ *family doesn't* _____ *because . . .*

Ask

Answer

Mr. Noguchi counted the electronic appliances in his home. How many are in your home? In the kitchen? In the living room? In your bedroom?

Connections

A Read through the survey alone and underline any words you don't know. Then discuss the survey as a class. Can your classmates explain the unfamiliar words to you?

ARE YOU READY TO GO ON AN ENERGY DIET?

1. _____ Eliminate at least three chemical housecleaning products.
2. _____ Buy only locally made or grown products.
3. _____ Resist the urge to buy an item that you don't use often.
4. _____ Eat a vegetarian diet one day a week.
5. _____ Grow your own food.
6. _____ Give up at least one processed food that you normally eat.
7. _____ Use public transportation at least three times a week.
8. _____ Unplug phone chargers when they are not in use.
9. _____ Give up bottled water for tap water.
10. _____ Turn off the tap when you're brushing your teeth.
11. _____ Recycle all glass, aluminum, plastic, and paper.
12. _____ Eliminate the use of plastic and paper bags when shopping.

Chicago waterfront

B Working alone, take the survey above. Write the letter of a statement below (*a, b, c, d*) next to each item in the energy diet survey.

a. I do this already.
b. I'll try to do this in the next month.
c. I'm going to do this someday in the future.
d. I can't do this. It seems impossible.

C Compare your answers with a partner. How similar or different are you?

D Look at your **b** and **c** answers in the energy diet survey. Complete these sentences and talk about your personal energy diet plan.

Starting this weekend, one change I'll make is _____.

After I make my first change, I'll _____.

When I *get discouraged about sticking to my energy diet*, I'm going to _____

_____.

By this time next year, I think I'll *be* _____.

Reading

A Take the quiz and compare ideas with a partner. Then scan the reading to check your answers.

SOLAR ENERGY Quiz

1.	The sun generates more energy than humans can use.	T	F
2.	Worldwide, most electricity is produced using solar energy.	T	F
3.	Solar energy generates a lot of pollution.	T	F
4.	Solar energy can only be used in places that get a lot of sunlight all year.	T	F

B Why aren't we using solar power more? List some of your ideas. Then read the passage to check your answers.

C Read the passage again. On a separate piece of paper, list at least two advantages and two disadvantages of each method of gathering solar energy (steam generation and PV panels).

Reading Strategy

Identifying key details The article compares two ways of gathering solar energy. As you read, watch for keywords like *advantage, disadvantage, drawback, however*, *(al)though,* and *on the other hand* to help you identify key details.

D Use your answers from Exercise C to act out this role-play.

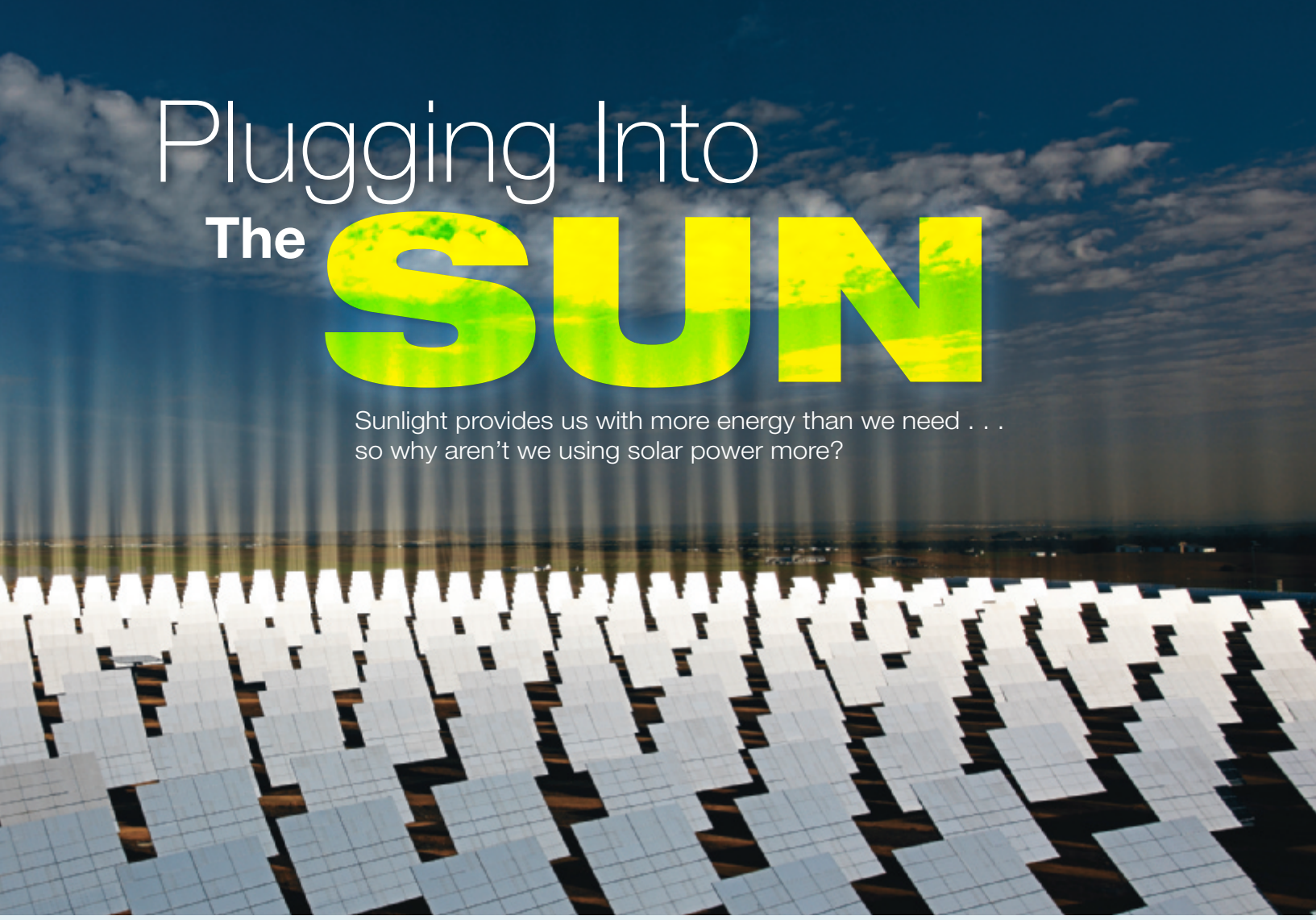
1. **Student A:** Imagine that you work for a solar energy company. You need to persuade the mayor of your city to invest more money in solar power. Give two or three reasons why this is a good idea.

   Student B: Listen to your partner's argument and ask at least two questions about the disadvantages. Did your partner convince you to invest more money?
2. Switch roles and practice again.

Our sun is the most powerful source of energy on Earth. Worldwide, humans use about 16 terawatts[1] of energy a year. The sun produces 120,000 terawatts annually—much more than we consume. Today, though, solar power is used very little; it generates less than one-tenth of 1 percent (0.1%) of the world's electricity each year.

Why don't we use solar power more? To answer this question, it's important to understand the two main ways we gather energy from the sun. The first way is to place flat, computer-guided mirrors in a field. The mirrors focus sunlight onto a receiver on a tower and this produces steam. The steam is then used to produce electricity. The second way of gathering energy from the sun is to use PV (photovoltaic) panels. The panels collect sunlight and convert[2] it into electricity. Most people have seen PV panels on buildings; small ones are also on some handheld calculators.

Both ways of gathering solar energy have their advantages. Unlike oil or coal, solar power



Plugging Into The SUN

Sunlight provides us with more energy than we need . . . so why aren't we using solar power more?

generates "clean" energy that produces very little pollution. However, the steam-generation method[3] is more efficient than the PV panel method because it converts more sunlight into electricity. The steam generation method requires a lot of open space, though (for example, a big field). Long cables are also needed to transmit[4] the power from an open space to the city, which can be expensive. PV panels, on the other hand, can easily be placed on rooftops where the power is needed. There is no extra cost to transmit the energy in this way.

Both methods have a similar disadvantage: they are unable to produce enough energy when it's cloudy or dark. Engineers are working on this problem. For now, though, people who use PV panels as their main source of energy must rely on batteries at night or when the weather is bad.

One of solar energy's biggest drawbacks is cost. PV panels are still very expensive to buy. In some places, though, people are earning their money back. Wolfgang Schnürer lives in Freiburg, Germany. He powers his home using solar energy. In the winter, the panels on the roof of Schnürer's apartment do not produce enough energy. But on a sunny day in May, the panels can generate *more* energy than he and his family consume. When this happens, Schnürer can sell the extra power back to the energy company in his city. In 2008, he made 2,500 euros ($3,700) from the extra power his solar panels generated.

Despite the challenges, solar energy use is increasing worldwide. In Germany, Japan, and the United States, governments are trying to make solar power more affordable for everyone. And as people find that they can save money—and even make money—using solar power, the number of countries using this energy source will surely grow.

[1] **terawatt** a measurement of electrical power
[2] **convert** change
[3] **method** a way of doing something
[4] **transmit** send from one place to another place

Video

VIDEO GLOSSARY

impact a strong effect

contribute to be one of the causes of something

injustice a lack of fairness in a situation

roadblock a situation or condition that prevents further progress; an obstacle

A In this video, you are going to meet Lauren, a Greenpeace activist. Read about Greenpeace below. Have you ever heard of it?

Greenpeace is the largest environmental organization in the world. It works to protect our oceans and forests and stop global warming. Greenpeace activists (people who work to achieve social or political change) sometimes take the initiative in effecting changes instead of working with political leaders, even to the extent of breaking the law.

B Watch the video once through with the *sound off*. What energy issue is the video about? Then watch the video with the *sound on* and check your ideas.

C Watch and answer these questions by completing each blank with the correct word.

What is the problem? (1) _____ (2) _____ energy is something the United States has been (3) _____ (4) _____ for way too long.

What does Lauren think is a basic human right? Having (5) _____ (6) _____

What has the plant been doing? (7) _____ a significant amount of (8) _____ to the community

What does the community want to do? They want to (9) _____ the coal plant (10) _____ (11) _____.

D Watch again and answer these questions. If an answer isn't given, write "NM" ("not mentioned").

1. What is Lauren deeply concerned about?
2. How does Lauren feel about the plant?
3. What does Lauren say the plant is a roadblock to?
4. According to Lauren, what can people do to stop the plant?

E Discuss these questions with a partner.

1. Do you think it's sometimes all right to get people to make changes without involving the proper authorities?
2. Lauren says, "Sometimes we need to be leaders ourselves." Do you agree with this statement?
3. Lauren is protesting at the plant in Bridgeport, Connecticut. What other things could people in that community do to shut down the plant?

Writing

A Persuasive Paragraph

A Read the paragraph. Then answer the questions with a partner.

Change a Bulb, Save the Planet

Everyone wants to save energy and protect the environment. Now you can do both by using CFL bulbs instead of regular bulbs in your home, classroom, or office. How will this help? **For one thing**, according to National Geographic's *Lightbulb Buying Guide*, CFL bulbs use almost 75% less energy than regular bulbs. When we use less energy to light a room, we generate less CO_2. This helps the environment. **In addition**, because CFL bulbs use less energy, you'll save a lot of money on your electric bill over time. So remember: a regular bulb will light your home. However, a CFL bulb will help you save energy, spend less on electricity, and improve the environment. You can make a difference!

TIP The writer uses specific facts to support his point. He cites his source by using the words *according to*.

1. What is the main goal of this paragraph?
   a. to compare two similar things
   b. to explain why you should do something
   c. to describe the pros and cons of something
2. What two benefits are discussed in the paragraph? Which words introduce these ideas?

B Read the Writing Strategy. What do you notice about the words that follow *instead of*, *rather than*, and *by*?

Writing Strategy

Being persuasive To encourage people to do one thing instead of another, you can use structures like these:

1. **Instead of / Rather than** using regular light bulbs, use CFL bulbs. You'll save energy.
2. **By** using CFL bulbs **instead of / rather than** (using) regular bulbs, you'll save energy.

C You want to encourage people to change something they are doing now. Use the structures in the Writing Strategy and the information below. Write each sentence in two ways.

You waste energy when you . . .	You save energy when you . . .
1. drive everywhere.	ride a bike.
2. throw away paper and plastic.	recycle paper and plastic.
3. drink bottled water.	drink filtered water.
4. always keep all electronics plugged in.	unplug electronics when you're not using them.
5. Your idea: _____	Your idea: _____

Instead of driving, ride a bike sometimes. / By riding a bike sometimes instead of driving, you'll save energy.

D Choose a sentence from Exercise **C** (1–5). On a separate piece of paper, write a paragraph that explains the change and gives two reasons why people should do it.

Everyone wants to save energy and protect the environment. Now you can do both . . .

E Exchange papers with another student. Read your partner's writing and answer questions 1–3 in the Writing Checklist.

Writing Checklist

Does the paragraph . . .

1. clearly state what change people should make?
2. give two reasons to make the change, using *for one thing* and *in addition*?
3. convince readers to change their behavior?

Speaking

A Work with a partner. You are going to create a public service announcement* about saving energy. Choose an idea from Exercise **C** on page 33 or think of your own. Then do the following:

Design a public service announcement that is 45–60 seconds long. It should . . .

- explain what change people should make.
- give 2–3 reasons why people should make the change.
- be interesting and make your viewers want to make the change.

For ideas, reread the paragraph and information in the Writing Strategy box on page 33 again.

B Do your presentations.

Presenters: Present your public service announcement to the class.

Viewers: Take notes on each pair's public service announcement. Answer these questions briefly:

1. What change do they want you to make?
2. What reasons did they give for making the change?
3. Did they convince you to make a change? Why or why not?

C Compare your notes in Exercise **B** with a partner. In your opinion, which public service announcement was the best? Why?

*A public service announcement is an ad that tells people about an important issue.

Expanding Your Fluency

A We can add the suffixes *-ion* / *-tion* / *-sion* to some verbs to form nouns. Complete the chart with the noun or verb form of each word. Use your dictionary to help you. Then say the words with a partner.

Verb	Noun
1. consume	
2.	conversion
3. eliminate	
4. generate	
5.	pollution

Verb	Noun
6. prevent	
7.	production
8.	projection
9. reduce	
10.	transmission

B Use the correct words from the chart to complete the sentences. Check answers with a partner.

1. How is the air quality in your city? Is there a lot of _____ or is the air clean?
2. Should we completely _____ cars in cities and encourage people to walk and bike only?
3. What things can you do to cut down on energy _____ and _____ your electric bill each month so that you pay less?
4. Which sources _____ the most energy today? Are there any energy sources we should stop using? Why?

C Think about your answers to the questions in Exercise **B**. Then do the following with a partner.

1. Take turns. Choose one of the questions.
2. Answer the question by talking for one minute without stopping, and you get a point.
3. Repeat steps 1 and 2 for a total of ten minutes. Continue until there are no more questions or the ten minutes are up.
4. The winner is the person with the most points at the end.

Check What You Know

Rank how well you can perform these outcomes on a scale of 1–5 (5 being the best).

_____ refine your use of future tenses
_____ identify the pros and cons of an issue
_____ express an opinion and give examples to support it
_____ persuade an audience to make a change