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ARE GREEN TECHNOLOGIES WORTH THE INVESTMENT?

Word Generation - Unit 2.15

Focus Words

conserve | renewable | invest | proceed | maximize

WEEKLY PASSAGE

The BigBelly is a solar powered trash can. About 50 of them have been installed in different locations around the city of Boston. The BigBelly compacts its contents automatically and only needs to be emptied once or twice a day. Normal public trash cans usually need to be emptied more than fifteen times a day into garbage trucks. The BigBelly reduces the miles garbage trucks drive, and thus is a "green" technology.

Green technology, also known as CleanTech, can help to **conserve** the natural environment and **maximize** resources. A lot of money is **invested** into programs for recycling, water purification, and **renewable** energy. Renewable energy uses natural resources that are quickly replenished by nature, such as sunlight, wind, and ocean tides. Supporters say that CleanTech programs minimize the damage done to the world by humans. They claim that renewable sources of energy are better for the environment.

Other groups argue that green technologies have costs as well as benefits. For example, the BigBelly trash cans in Boston cost up to 6,000 dollars each. Do they save enough money by keeping garbage trucks off the streets to be worth it? The electricity that powers CleanTech electric cars is sometimes made in power plants that use oil. Do electric cars reduce pollution or increase it?

What do you think about this debate? How high a price should we pay for green technology? Do you wonder whether all the programs called "green" are better than what is already out there? If so, how would you **proceed** to inform yourself?

TEACHER

Reading Comprehension/Discussion Questions:

- What is "green technology"?
- What are some examples of "green technology"?
- If a technology is termed "green", is it automatically a good thing?

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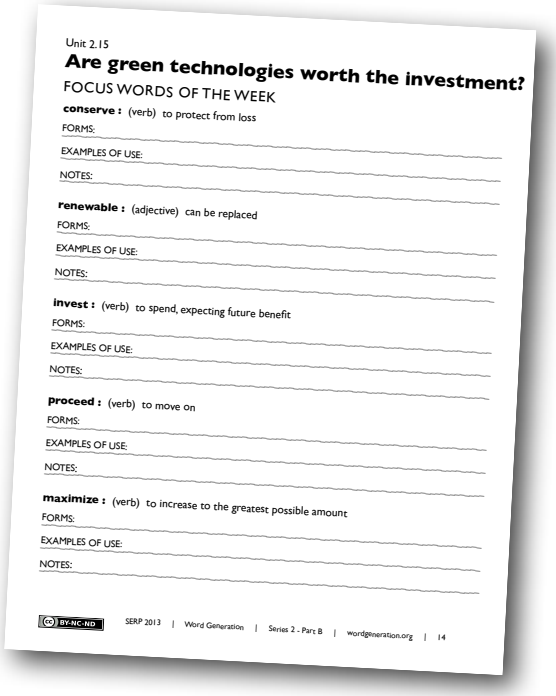
PLEASE NOTE:
THE STUDENT VERSION OF THIS PAGE IS FORMATTED DIFFERENTLY



Unit 2.15
Are green technologies worth the investment?
FOCUS WORDS OF THE WEEK

conserve : (verb) to protect from loss
FORMS:
EXAMPLES OF USE:
NOTES:

renewable : (adjective) can be replaced
FORMS:
EXAMPLES OF USE:
NOTES:

invest : (verb) to spend, expecting future benefit
FORMS:
EXAMPLES OF USE:
NOTES:

proceed : (verb) to move on
FORMS:
EXAMPLES OF USE:
NOTES:

maximize : (verb) to increase to the greatest possible amount
FORMS:
EXAMPLES OF USE:
NOTES:

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WORD CHART FOR TEACHERS

This chart is not in the student book. It is a resource for teachers to support students in the use of the focus words each week. Students are provided one page in each unit immediately following the weekly passage with a basic definition printed and space for taking notes.

Word	Meaning	Forms			Related Words
		Inflectional	Basic Word Classes	Prefixes/ Suffixes	
conserve	(v.) - to protect from loss	conserves conserved conserving		conservation conservationist conserver conservatory	conservative
renewable	(adj.) - can be replaced	renew renews renewed renewing	new	renewability renewable nonrenewable	anew newness
invest	(v.) - to spend, expecting future benefit	invests invested investing		disinvest reinvest investment investor	vested divest
proceed	(v.) - to move on	proceeds proceeded proceeding		proceedings procedure	exceed process
maximize	(v.) - to increase to the greatest possible amount	maximizes maximized maximizing	maximum	maximization maximal	max out (slang)

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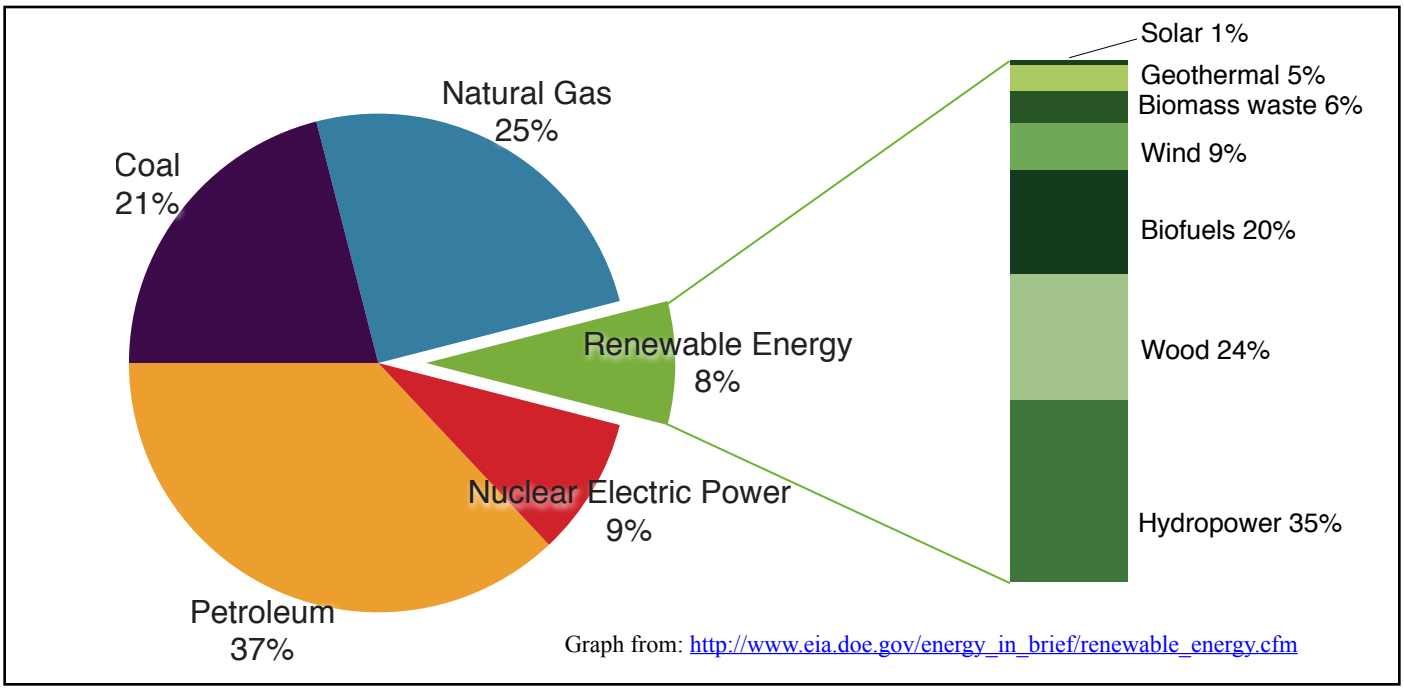
PROBLEM OF THE WEEK

As Americans worry about **conserving** resources, more people are thinking about **renewable** energy. The Obama administration promised to **proceed** toward **maximizing** production of cleaner energy, and has **invested** in wind and other renewable energy sources. However, most of America's energy still comes from non-**renewable** sources like oil and gas.



Graph from: http://www.eia.doe.gov/energy_in_brief/renewable_energy.cfm

Option 1: Which of the following is true?

A) Americans get more of their energy from coal than from petroleum (oil).
B) Americans get more of their energy from coal than from all **renewable** sources combined.
C) Americans get more of their energy from natural gas than from petroleum.
D) Americans get more of their energy from hydropower than from nuclear electric power.

Option 2: Eight percent of the energy Americans consume comes from **renewable** energy sources. Of this, 9% comes from wind. What percent of America's total energy consumption comes from wind?

Answer: .72%

Discussion Question: Nations around the world are **investing** in **renewable** energy. In 2005, 8% of the energy produced by the European Union came from **renewable** sources. To **maximize** renewable energy production, the EU set a goal of producing 20% of its energy from renewable energy sources by 2020. In 2010, this change is **proceeding** on schedule: the EU is on track to meet its goal. Should the US set a similar goal? Why or why not?

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THINKING SCIENTIFICALLY

Sekou is giving a report on **renewable** energy.

"Scientists say **conserving** energy is not enough. We need to switch to **renewable** sources of energy like wind, water, and sun. To **maximize** our efforts, people around the world must work together."

Sekou **proceeds.** "Two scientists named Mark Jacobson and Mark Delucchi have a plan to meet all the world's energy needs with renewable energy by 2030. Their plan would require governments to **invest** a total of 100 trillion dollars."

"What about using renewable energy here at school?" asks Nadia.

"Good question!" says Sekou. "I wonder if there is a renewable energy source that would both decrease our school's emissions and save us money...."

→ Sekou did some more research on renewable energy to learn about cheap ways to decrease emissions from the school and took notes to share with the class. She calculated how much each energy source would cost her school.

Sekou's Notes:

	Statistics by unit		Statistics for our school (using 20 megawatt hours per year)	
Energy Source	Cost ($ / MWh)	CO_2 Emission (tons / GWh)	Cost ($ / year)	CO_2 Emission (tons / year)
Coal	100.1	1145	2002	22.9
Natural Gas	67.1	338	1342	6.76
Wind	86.6	20	1732	0.4
Solar	144.3	31	2886	0.56

Data Source: http://www.eia.gov/tools/faqs/faq.cfm?id=427&t=3

Which energy source is the least expensive?

Natural Gas

Which energy source emits the least carbon dioxide?

Wind

Are any of the energy sources both inexpensive and healthy for the environment?

Wind is the best option. Natural gas is cheaper, but emits more carbon dioxide.

Discuss what other information should be collected before proposing using any of these renewable sources in your district. What might school leaders want to know?

TEACHER
Some possibilities:
- What are the district's current energy sources and costs?
- Are there additional overhead costs to switching to different sources?
- Can cost and carbon emissions be reduced through conservation?

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DEBATING THE ISSUE

TEACHER
Whatever the debate format, ask students to use academically productive talk when arguing their positions. In particular, students should provide reasons and evidence to back up their assertions. It may be helpful to read these sample positions to illustrate some possibilities, but students should be encouraged to take their own positions about the issue at hand.

Get ready...

Pick one of these positions (or create your own).

A "Green technology" is good. It saves the environment.

B Not all "green" technologies are worth the investment.

C "Green technologies" are only worth the investment to the people who can afford them.

D "Green technology" is sometimes no better than the programs already in place.

E _____
_____
_____

Get set...

Be ready to provide evidence to back up your position during your class discussion or debate. Jot down a few quick notes:

_____
_____
_____
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_____
_____

GO!

Be a strong participant by using phrases like these.

I believe that...

I agree with you, but...

You make a good point, but have you considered...

Can you show me evidence in the text that...

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WRITE ABOUT IT

Support your position with clear reasons and specific examples.
Try to use relevant words from the Word Generation list in your response.

Focus Words

conserve | renewable | invest | proceed | maximize

TEACHER

Ask students to write a response in which they argue a position on the weekly topic.

Put the writing prompt on the overhead projector (or the board) so that everyone can see it. Remind students to refer to the word lists in their Word Generation books as needed.

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