

Join the national conversation!

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 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?

Unit 2.15 - Are Green Technologies worth the investment? Focus Word Chart

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

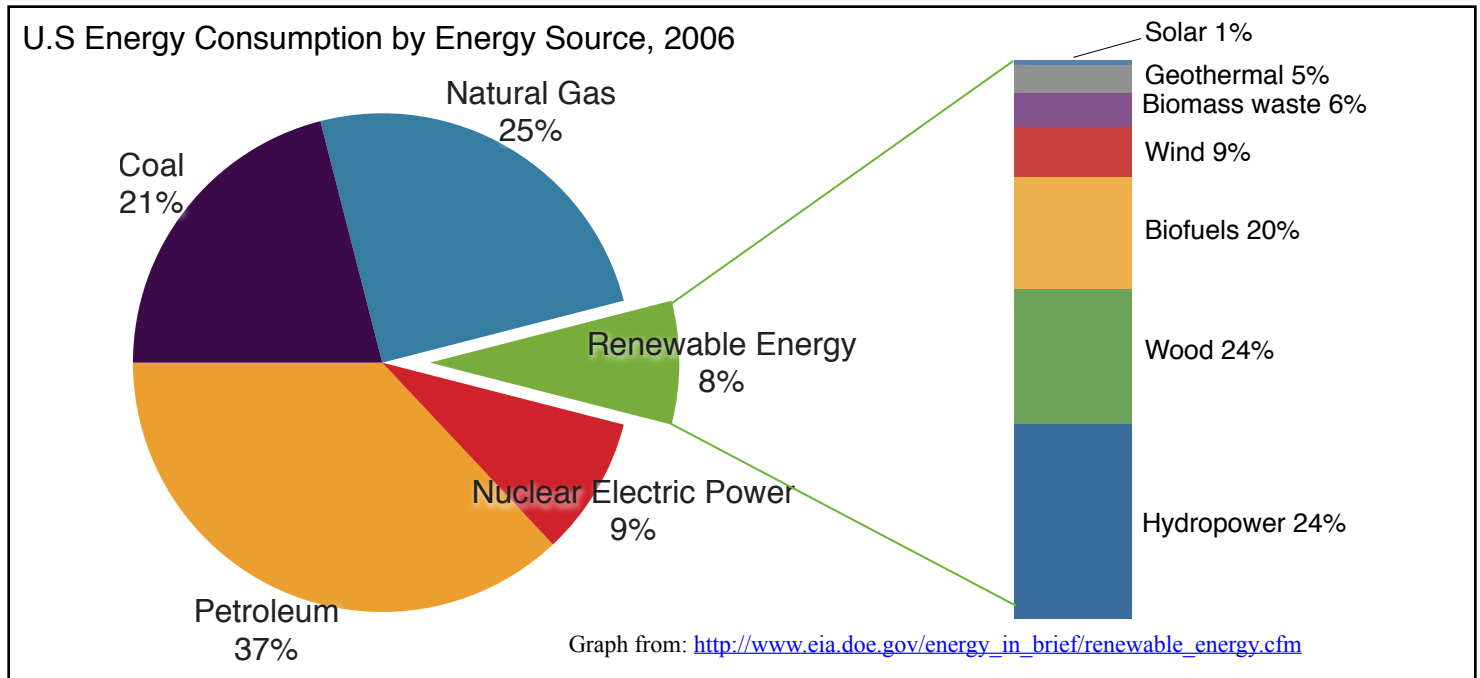
Unit 2.15 -

Are Green Technologies worth the investment?



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.



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?

Shahan, Z. (2010, February 28). Europe will exceed 2020 renewable energy target. *Scientific American*. Retrieved on October 23, 2010 from <http://www.scientificamerican.com/article.cfm?id=europe-will-exceed-2020-renewable-e-2010-02>

U.S. Energy Information Administration: Independent Statistics and Analysis. (2010, September 1). How much of our electricity is generated from renewable sources? Retrieved on October 23, 2010 from http://www.eia.doe.gov/energy_in_brief/renewable_energy.cfm

Are Green Technologies worth the investment?

Debating the Issue



GO!

I. 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 _____

Be a strong participant by using phrases like these.

...because...

I disagree with part of that...

An example might help convince me. Can you give me an example?

What part of the passage makes you think that?

2. Get set...

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

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.

Unit 2.15 - Are Green Technologies worth the investment? Science Activity



This activity is designed to help you practice thinking like a scientist and to use this week's focus words. Sometimes the data are based on real research, but they should never be considered true or factual.

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. “Let’s talk about wind!”

Question:

Is there enough wind on school grounds to power a wind turbine?

Hypothesis:

There is enough wind on school grounds to power a wind turbine. (A wind turbine requires an average wind speed of 5 meters/second.)

Materials:

- ▶ Anemometer (device for measuring wind speed)

Procedure:

1. Measure daily wind speed for one week.
2. Calculate the average speed for the week.

Data:

	Daily Wind Speed (meters/second)
Day 1	5.3
Day 2	5.4
Day 3	5.5
Day 4	5.4
Day 5	5.5
Day 6	5.4
Day 7	5.3

Conclusion:

Is the hypothesis supported or not by the data?

Supported

What evidence supports your conclusion?

The average wind speed is more than 5 m/s. (Students do not need to calculate the average – if each piece of data is more than 5, then the average must also be more than 5.)

How would you make this a better experiment?

Encourage students to consider sample size, number of trials, control of variables, whether the procedure is a true measure of the question, whether the experiment can be repeated by other scientists, data collection and recording systems, and other potential explanations for the outcome. Students should understand that these simple experiments represent the beginning of an exploration, not the end. If time permits, have students suggest how the experiment could be strengthened, emphasizing the use of the target words in the discussion.

TEACHER**Real Research**

-In the article cited below, scientists Jacobson and Delucchi describe their plan to make a global switch to renewable energies by 2030. The article contains a link to a rich-media presentation of their proposal with graphics & audio clips.

Jacobson, M. and Delucchi, M. (2009, November). A path to sustainable energy by 2030. Scientific American. Retrieved on January 16, 2010 from

<http://www.scientificamerican.com/article.cfm?id=a-path-to-sustainable-energy-by-2030>

-Backyard wind turbines, which convert wind energy to electricity, are real. Under the right conditions they can produce enough electricity to power a home. When people want to investigate installing a turbine, wind speeds are measured for about a month to determine if the average wind speed is high enough (about 5 m/s for a small turbine, and 6 m/s for a large turbine).

Classroom Discussion

Summarize the real research. (This experiment is fictitious, but wind turbines are real. They can be constructed by individuals, and can supply homes and businesses with a renewable source of energy.) Ask students to imagine that they are the students in the experiment who have determined that the wind on school grounds could power a wind turbine. How should they proceed? How can they convince their school to invest in a wind turbine?



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

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.

- ☐ Stated my own position clearly
- ☐ Included 1-2 arguments
- ☐ Included 1 counterargument
- ☐ Used 2-5 focus words

[illegible]