

## This week's issue:

# ARE GREEN TECHNOLOGIES WORTH THE INVESTMENT?



As Amanda walked through the park, she noticed a big new trash can called a BigBelly. When she looked it up on the web, it turned out to cost \$6,000! The BigBelly has a solar-powered compactor inside, so it **maximizes** the amount of trash contained while minimizing the number of times it needs to be emptied. The BigBelly is one of many “green technologies” now available. But does it make sense to **invest** so much money in them? City managers and mayors say that each BigBelly will pay for itself in three years, because they only need to be emptied once a week. Traditional trash cans get emptied once or twice a day, at a cost of about \$2,000 a year each, and the trucks that travel around to empty them use gasoline and pollute the air. Nonetheless, buying a lot of BigBelly cans could punch a big hole in any city’s budget!

The BigBelly uses a **renewable** energy source, the sun. Many other renewable technologies are under development. Some people are putting solar panels on their roofs, and switching from electricity produced with coal or gas to solar-powered electricity. Solar-powered cars and planes are under development. Solar-powered light strips have been installed on some rural highways; once in place, the strips run for free and rarely require maintenance. Investors are developing solar panels that can replace the asphalt on highways; these panels use solar power to generate heat (so that ice and snow melt immediately), light (so that streetlamps are unnecessary), and extra electricity for nearby towns and cities.

Investment in these solar technologies is expensive. The Department of Transportation gave \$100,000 to the solar pavement project, but several million more will be needed just to finish the development. Is it worth investing in such expensive technologies? Should we **proceed** to invest in technologies that may never be practical on a large scale? Shouldn’t we **conserve** public funds for more immediate needs, like improving schools and fixing potholes? What if we develop green technologies but lack the funds to proceed with using them? How high a price should we pay for green technology?

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conserve | renewable | invest | proceed | maximize

## USE THE FOCUS WORDS

**conserve** (*verb*) to protect from loss

➞ **Sample Sentence:** Jose and Rachel carefully **conserved** their water as they hiked through the desert.

🗣️ **Turn and Talk:** What are three things you can do to **conserve** water at home?

**renewable** (*adjective*) able to be replaced

➞ **Sample Sentence:** Nations around the world are investing in **renewable** energy.

🗣️ **Turn and Talk:** Describe what is meant when people talk about “**renewable** resources.” What are some examples?

**invest** (*verb*) to put money or resources toward something, expecting a future benefit

➞ **Sample Sentence:** Research institutions **invest** a lot of money into programs for recycling, water purification, and renewable energy.

🗣️ **Turn and Talk:** What can young people do to **invest** in their futures?

**proceed** (*verb*) to move forward

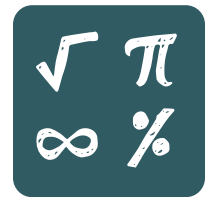
➞ **Sample Sentence:** Since the road was under construction, many signs alerted drivers to “**proceed** with caution.”

🗣️ **Turn and Talk:** Has the school year **proceeded** according to your expectations? Explain.

**maximize** (*verb*) to increase to the greatest possible amount

➞ **Sample Sentence:** Green technology can help conserve the natural environment and **maximize** resources.

🗣️ **Turn and Talk:** How do you **maximize** the amount of sleep you get on school nights?



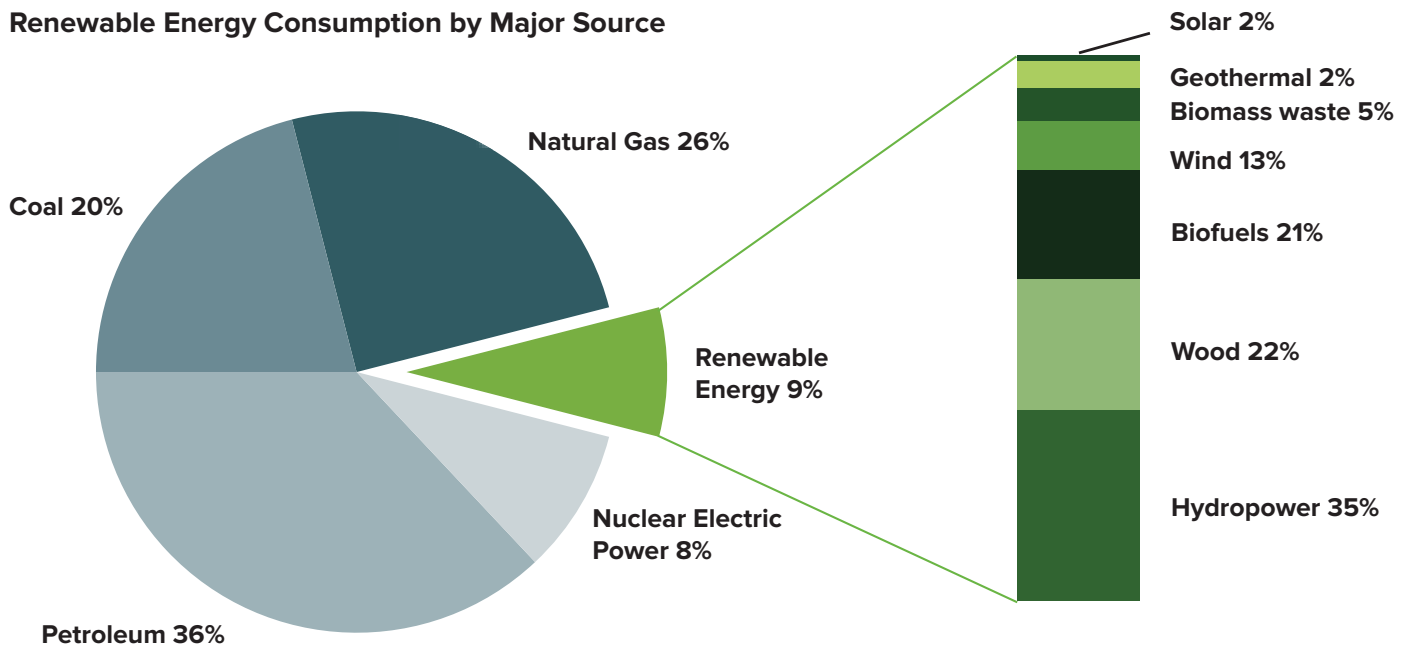
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## DO THE MATH

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. The information below comes from the U.S. Energy Administration's 2011 report.

Renewable Energy Consumption by Major Source



**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:** Nine percent of the energy Americans consume comes from **renewable** energy sources. Of this, 13% comes from wind. What percent of America's total energy consumption comes from wind?

**Discussion Question:** Nations around the world are **investing** in **renewable** energy. In 2005, 8% of the energy produced by the European Union (EU) 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. As of 2015, this change is **proceeding** on schedule: The EU is on track to meet its goal. Should the U.S. set a similar goal? Why or why not?





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## THINK 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 **conserve** money.”

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

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

Energy Source	Statistics by unit		Statistics for our school (using 20 megawatt hours per year)	
	Cost (\$/MWh)	CO <sub>2</sub> Emission (tons / GWh)	Cost (\$/year)	CO <sub>2</sub> Emission (tons/year)
Coal	100.1	1,145	2,002	22.9
Natural Gas	67.1	338	1,342	6.76
Wind	86.6	20	1,732	0.4
Solar	144.3	31	2,886	0.56

Which energy source is the least expensive?

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

Which energy source emits the least 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?



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## DEBATE THE ISSUE

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

# A

We should **invest** heavily in green technologies.

OR

# B

We should **proceed** cautiously with green technologies.

OR

## CREATE YOUR OWN

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jot down a few notes on how to support your position during a discussion or debate.

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Be a strong participant by using phrases like these:

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

““ I believe that...””

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

““ I agree with you, but...””

