



### 8C Energy Sources and Use #3

Some energy sources cost less than others and some cause less pollution than others....

### Resources

- [Energy Quest](#)
- [On-Line Renewable Energy Education Module](#)
- [The Franklin Institute Science Museum](#)

## Energy Sources and Use

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### Purpose

To distinguish between renewable and nonrenewable sources of energy; to investigate a variety of renewable energy resources and compare the benefits and drawbacks of each.

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### Context

Students will use Internet resources to investigate and compare alternative sources of energy. It is presumed that students have some basic prior understanding of the concept of energy.

This investigation uses many resources from Energy Quest, an Educational Supersite. The recommended readings and activities in this investigation would be most appropriate for fourth or fifth grade students. However, this site provides ample resources for adapting the lesson to a wide variety of reading levels.

You may wish to preview [The Energy Story](#) prior to introducing these activities, to gather background information on energy resources and to identify the most appropriate resources for your students.

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### Planning Ahead

These websites list the materials and instructions for activities in this lesson:

- [Investigating Wind Energy](#)
  - [Energy Story](#)
  - [About Renewable Energy](#)
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### Motivation

To introduce this activity, have students read [California - Discover Its Energy](#) on the Energy Quest website. Here, a group of "energy-nauts" introduces students to the concept of energy, and the importance of using energy resources wisely. The introduction includes a list of the energy resources that are used in the state of California. Ask students which resources they have heard of, which are used in their homes, and which are used in school.

Tell students that they will be energy-nauts for their own community. They will research to find the theory, applications, environmental impact, and cost related to a specific energy resource. Each group will present its findings and the class will attempt to reach a consensus on the most practical source(s) of energy for the community.

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### Development

Read, or have students read [Fossil Fuels](#).

Ask students:

- What are the major forms of fossil fuels?
  - How were fossil fuels formed?
  - How are these fuels collected?
  - What are the advantages and disadvantages of using fossil fuels?
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Go to the Solstice Crest—Center for Renewable Energy Systems Technology site to read the sections on [What are the environmental benefits of renewable energy?](#) and [How much would it cost a household to do renewable energy?](#) related to renewable resources. These reports are somewhat sophisticated, but clearly and concisely present the case for utilizing renewable energy technologies.

After reading the reports to/with students, ask:

- Why does this report suggest that communities should begin to look at alternative energy resources?
  - What are the benefits of using renewable energy technologies?
  - Why aren't some renewable resources widely accepted today?
  - Which energy resource is cheaper in the short run? In the long run?
  - What is meant by the terms "environmental costs" and "social costs"? What are some examples of each?
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Divide students into teams of three or four. Each team will be responsible for researching either Solar, Wind, Geothermal, Biomass, or Hydropower systems.

Ideas for students to consider include:

- How does this technology work?
  - How might this energy resource be used?
  - What are some examples of its current use?
  - What is the environmental impact of this technology?
  - What is the cost of this technology?
  - Are there hidden environmental and social costs?
  - Is this technology widely accepted today? Why or why not?
  - What obstacles have to be overcome for it to be accepted?
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Students might use any of the following online resources, in addition to any print resources available in the classroom:

- [California - Discover Its Energy](#)
  - [About Renewable Energy](#)
  - [Energy Story](#)
  - [Ask Energy Ant](#)
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Students will complete a group presentation on the topic they have researched. Allow the class ample time to compare the potential benefits and drawbacks of each.

Ask questions such as these:

- Which form of energy is most cost efficient?
- Which has the least impact on the environment?
- Which is most realistic given the specific demands and resources of your community?

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### Assessment

After all group presentations have been completed and discussed, have students write a persuasive essay in which they recommend a renewable energy technology that could potentially be used in their community. They should offer evidence to support their recommendation, including the environmental and/or economic benefits of this resource.

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### Extensions

For four inquiry-based activities related to wind and wind energy, visit the Franklin Institute's [Investigating Wind Energy](#).

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For a hands-on activity related to solar energy, go to [Make A Pizza Box Solar Oven](#) on Solar Now Project's site.

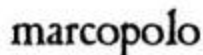
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Energy Quest's [Science Projects for Kids](#) offers hands-on projects related to Hydropower, including one in which students create a small water turbine model.

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Students can share their findings on renewable energy with a local congressperson via email. If they don't know the address, they can find it at [Who Is My Representative?](#)

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