

Lesson 7: Renewable energy - is it worth the cost?

Part 1 – Student group activity

Which costs more: energy that is produced from renewable sources or non-renewable sources?

Examples of renewable sources are: wind, solar, biomass; examples of non-renewable sources are: coal, oil, natural gas and uranium.

To answer this question, think about what the term “cost” means. Does the word “cost” refer to money? If it does, then you would likely answer that renewable energy costs more. You would be right if you were thinking about immediate dollar cost. But, what if you were thinking about the cost to our health and the environment? You might answer that non-renewable energy costs more. For example, energy from coal is cheap to produce, but it creates air pollution that can harm our lungs. For the three types of renewable energy listed below, decide if these types of energy are worth their cost. Think about whether the information in each bullet is an advantage or a disadvantage for that type of energy. Use a happy face 😊 for an advantage and a frowning face ☹️ for a disadvantage. A few bullets are left blank for you to create your own points!

1. What is wind energy? Did you know that wind energy...

- Is pollution-free; (example) _____ advantage 😊
- Is energy that comes from the wind; _____
- Does not produce greenhouse gases; _____
- Does not produce toxic waste; _____
- Can only be produced when there is wind; _____
- Is expensive to produce; _____
- _____; _____

(What else do you think about wind?)

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Part 1 – Student group activity (continued)

2. What is solar energy? Did you know that solar energy...

- Is energy that travels to the earth from the sun; _____
- Comes free from the sun and it is almost unlimited; _____
- Requires expensive panels and equipment to trap the sun's energy;

- Is pollution-free; _____
- Depends on how strong the sun is during the day; _____
- _____; _____
(What else do you think about solar?)

3. What is biomass energy? Did you know that biomass energy...

- Is produced by the release of energy that is found in plants; _____
- Can be produced from corn or other crops; _____
- Results in less carbon dioxide than energy from fossil fuels; _____
- Uses land that could be used to produce crops to eat ; _____
- Uses fuels (like corn, wheat and barley) that grow in warm weather;

- _____; _____
(What else do you think about biomass?)


If your group is interested in learning more about these sources of energy, go to the Natural Resources Canada website at www.canren.gc.ca.



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Part 2 – Student worksheet

Use this chart to organize the most important advantages and disadvantages of each energy type from the previous page. Discuss with your group and choose the **top three** “advantages” and/or “disadvantages” for wind, solar and biomass and enter them in the space provided. When you are finished, think about whether you think renewable energy is “worth the cost”.

Type of Energy	What are the advantages?	What are the disadvantages?
<p><i>(example)</i></p> <p>Wind </p>	<p>1. Wind energy is pollution free</p> <p>2. Does not produce toxic waste</p>	<p>3. Wind energy is expensive to produce</p>
Wind		
Solar		
Biomass		

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Teacher instructions

(Note: it is important for students to have completed Lesson 6 prior to this exercise.)

Introducing the activity

- Write this question on the front board: “Which costs more: energy that is produced from renewable sources or non-renewable sources?” Ask students to think about this question quietly for a moment, and then ask them what is meant by the word cost. Explain that when we ask how much something costs, we usually refer to money; then poll them to find out if they think that there are other kinds of costs. *(Using non-renewable energy, such as coal for example, can cost us our health because of the air pollution it produces.)*

Ideas for teaching Part 1 – student group activity

- Organize students into small groups of three or four. In these small groups, students will read through the hand-out together. Encourage students to take turns reading. The activity will also work if you read the handout out loud with the class. At the end of each bullet, students should pause to discuss whether the point is an “advantage” or a “disadvantage” and draw a happy or sad face accordingly. You may want to discuss ahead of time what is meant by an advantage or disadvantage. What should emerge by the end of the activity is that there are more advantages than disadvantages to using renewable energy. However, you may find that what one student considers an advantage, another student may see as a disadvantage. Of course, there is far more research regarding advantages and disadvantages if students wish to continue their investigations independently.

Ideas for teaching Part 2 – student worksheet

- Students should still be in their small working groups for this exercise. This worksheet consolidates the learning from the previous one but challenges them as a group to pick the top three advantages and/or disadvantages for each source of renewable energy.
- At the end of the exercise, ask each group to present the results from one energy source and explain how they arrived at their choices.
- Conclude the exercise by asking students whether they think renewable energy is “worth the cost”. Generate even more discussion by asking them why they think the debate over shutting down coal-fired electrical generating stations in Ontario continues!