Biopower - the Answer to the Oil Shortage?

By Cindy Grigg

[1] *Caption: Fibrominn, the first poultry litter-fueled power plant in the U.S., opened in Benson, Minnesota, in 2007.*

[2] Did you know that cars can run off the energy from peanuts? Did you know electricity can be made from bamboo? These are examples of biopower. Biopower is using plants or animals to make energy. Biopower is good for the environment. It uses natural materials or waste products that might otherwise be thrown away. It creates little or no pollution. And it emits less carbon dioxide than fossil fuels. Carbon dioxide emissions are the cause of global warming. Unlike fossil fuels, sources of biopower can easily be replenished so that supplies will never run out. It is a renewable resource.

[3] Where does biopower come from? Some of the sources are probably familiar to you. Some may come as a surprise. Wood has been an important fuel since humans learned how to harness fire millions of years ago. In some developing nations, wood still provides more than 80% of people's heating energy.

[4] Plants like bamboo are perfect energy crops. They grow very fast. When burned as fuel, these plants release only as much carbon dioxide gas as they absorbed while growing. As they do not release any extra carbon dioxide into the atmosphere, they do not add to global warming.

[5] Before plants can be used as engine fuel, they have to be turned into an energy-rich liquid. Some bacteria contain an enzyme that breaks down the cellulose that plants are made from. When broken down by the bacteria, the cellulose turns into a liquid fuel called ethanol.

[6] In the United States, some cars now use gasohol. Gasohol is a mixture of ethanol and gasoline. Ethanol can be made from corn, soybeans, or sugar cane. Brazil has been making ethanol fuel from sugarcane since the early 1970s. At that time, there was a world oil shortage. Brazil found a new fuel source in its many acres of sugarcane. It takes about two-and-a-half acres of sugarcane to make enough fuel to run a car for 10,000 miles.

[7] In some places, manure from chickens and other animals is sometimes used to fuel power plants. A power plant in Thetford, England, burns a half-million tons of chicken manure every year. It makes enough electricity for 93,000 homes.

[8] Diesel engines can run on oil made from many things besides petroleum. Biodiesel fuel can be made from algae growing on sewage ponds. It can be made from waste cooking oil. It can be made from peanuts, soybeans, and even seaweed! All these things are rich in carbon and hydrogen compounds. These can be made into engine fuel.

[9] Biodiesel fuel has many advantages. It is biodegradable. It generates more power than ordinary diesel. And it creates less pollution and carbon dioxide emissions.

[10] Earthworms are nature's recyclers. They help us recycle kitchen scraps to make compost, a natural fertilizer. A similar process can get energy from other waste products. Land-fill garbage, sewage, and other waste products can be used to make biopower. In this process, bacteria, instead of earthworms, gobble up the waste and produce methane. This flammable gas can then be burned to make heat or electricity.

[11] The world is an energy-hungry place. Supplies of fossil fuels like oil, gas, and coal are not evenly distributed around the world. Some countries produce more than they need. Others need more than they can produce. Energy-rich countries sell their fossil fuels to energy-poor ones. They need pipelines, ships, and trucks to carry the oil, gas, or coal to wherever they are needed. Biopower options can help energy-poor countries meet their needs. Biopower is better for the environment. It creates less pollution. It releases less carbon dioxide into the atmosphere so it helps with the problem of the greenhouse effect causing global warming.

Name _____ Science Pd _____

Biopower - the Answer to the Oil Shortage?

1. What is biopower?

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2. What are some of the advantages of biopower?

(A) Uses natural materials or waste products that might otherwise be thrown away.

(B) Creates little or no pollution.

(C) Adds less carbon dioxide to the atmosphere than fossil fuels.

(D) Is renewable.

(E) All of the above

(F) None of the above

3. Which of these is **not** a source of biopower?

(A) Landfill garbage

(B) Plants

(C) Manure

(D) Coal

4. Ethanol is made from _____.

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5. Which country has been using ethanol since the 1970s?

(A) England

(B) The United States

(C) Brazil

(D) All of the above

6. Which country has a large power plant that produces electricity from chicken manure?

(A) England

(B) The United States

(C) Brazil

(D) None of the above

7. How many acres of sugar cane must be grown to make enough ethanol for a car to run 20,000 miles?

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8. What living things are used to process sewage or landfill garbage into methane gas?

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