11 Methane Digester

Certain strains of bacteria produce a gas when they digest biomass, such as animal manure or municipal sewage, in the absence of oxygen. When the bacteria digest the biomass, they produce what is called biogas, which is composed primarily of methane and carbon dioxide. Biogas can be cleaned and used to replace natural gas as a fuel for the production of heat or electricity, or as a transportation fuel. The organic residue remaining at the end of the digestion can be further processed to make an excellent compost or soil conditioner for the garden. Can you find the methane digester on the poster?

12 Solar Air Heating

The sun's energy can also be used to heat different types of buildings. We all know how hot it can get sitting in the classroom in the middle of May or June on a sunny day. However, many buildings can benefit from this energy in the fall and winter. The most common solar air heating system is the Canadian designed Solarwall™. Dark metal cladding is mounted over a south-facing wall of a building. Sunlight hitting the cladding warms the air near its surface, and the heat is then drawn through thousands of little holes in the cladding into the building. Search the Internet for "solarwall" and see what you can find out about this Canadian technology.

13 Tidal Power

Tidal power is energy extracted from ocean tides. The ocean, through the continuous movement of water in the form of waves and tides, embodies a huge amount of naturally occurring physical energy. One way to harvest this energy is to generate electricity by trapping ocean water in reservoirs at high tide and release it through hydro-electric turbines as the tide goes out. Did you know that the Bay of Fundy in eastern Canada has the highest tides in the world? Can you locate the tidal power plant in Canada?

14 Wind Pumper

Wind energy was used to pump water long before the discovery of electricity. There are about one million wind-driven water pumps in the world. There are two types of wind pumps: mechanical and electrical. On the poster you will find mechanical wind pumps that are often used on farms to irrigate crops or provide water for farm animals. Find out how these systems work and where they are used.

15 Large Wind Turbines

Large wind turbines are used to generate electricity. To give you an example of the size of these turbines, the tower height alone can vary from 60 to 100 metres and the diameter of the blades from 30 to 60 metres. The turbine, including the tower, can weigh as much as 150,000 kg. You will find thousands of these turbines in the world. Do you know where you can find large turbines in Canada?

To order additional copies of this fact sheet and poster, please contact:

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You can also obtain a copy of this fact sheet and view the accompanying poster by visiting our Web site at ***http://www.nrcan.gc.ca/es/erb/reed***.

Cette brochure est aussi disponible en français sous le titre : Coup d'oeil sur les énergies renouvelables – C'est tout naturel !

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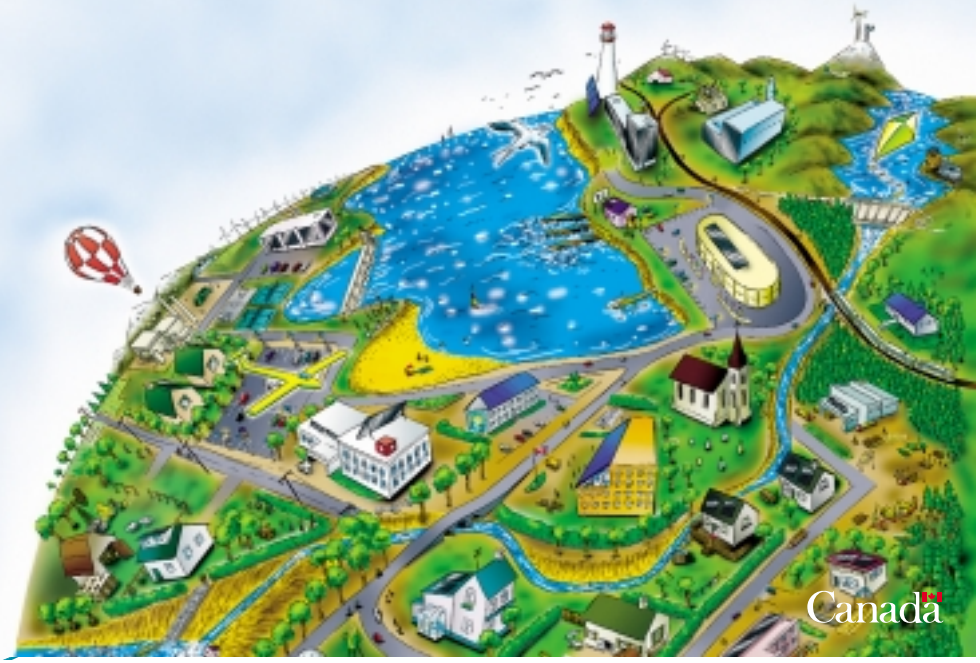
Quick Facts on Renewable Energy

It's only natural!



Canada

The term "renewable energy" refers to several energy sources that share one characteristic: they all produce electrical, thermal or mechanical energy without unnecessarily depleting resources. Renewable energy sources are generally defined as water, biomass, wind, solar, earth and energy from wastes. The description under each of the icons will help both teachers and students understand the various renewable energy sources and the technologies used to harness them.

1 Energy from Municipal Solid Waste

Municipal solid waste is composed of approximately 66 percent organic material, including wood, food and non-recyclable paper. When placed in a landfill, this waste decomposes and generates a gas called landfill gas. This gas is composed mostly of two other gases: methane and carbon dioxide. Only the methane gas is used to generate electricity for sale to electric utilities. It is also sold to clients for the generation of thermal (heat) energy. Does your municipality have a municipal solid waste plant?

2 Ethanol E10

Ethanol is an alcohol that can be used as a fuel. It is made by fermenting sugars that are obtained from the starch components of grains such as corn and wheat. Ethanol is used in the production of chemicals and plastics, and more recently as a transportation fuel for vehicles. E10 is a blend of 10 percent ethanol and 90 percent gasoline. Over 950 gas stations across Canada offer E10 – look for it at your local gas station.

3 Hydro-Electric Plant

Hydraulic power is a renewable energy source that comes from the movement of water. At a hydro-electric plant, whether small or large, you will find turbines and generators that convert the energy in falling water into electricity. Find out where in Canada hydro-electric plants are located.

4 Solar Electric (Photovoltaics)

Solar electric (photovoltaic) systems convert the light from the sun into electricity. These systems are normally composed of panels that are connected to other components such as switches, meters and batteries. In Canada, photovoltaic systems are used mostly in remote areas to provide electricity for cottages, telecommunications equipment, water pumping on farms and navigational aids. Take a look at the poster and find the solar electric system that is used for pumping water (hint – find the cows). Keep an eye open and see if you can locate solar electric systems in your area.

5 Solar Water Heating

The sun can also be used to heat water for your house and swimming pool. Solar water heating systems are often located on the roofs of homes or structures facing south. There are many benefits to solar water heating systems. They are environmentally friendly, since all the energy comes from the sun, and the energy is free. A solar water heating system can provide up to half of the hot water for a family of four, depending on the size of the system and how much hot water the family uses. Ask your friends if they have a solar water system or look around your neighbourhood to see if you can find one.

6 Wave Power

Waves are caused by the transfer of energy from wind to sea. The motion of the waves can be used to generate mechanical or electrical energy. Canada has no wave power plants. Do you know which countries do?

7 Small Wind Turbines

Small wind turbines are mostly used in areas where there is no access to electricity from power lines. They can be used to generate electricity for remote cottages, houses and telecommunications equipment. They come in various sizes and shapes. Look on the Internet or in your library and find out about small wind turbines and how they are used.

8 Wood Chip / Wood Waste Heating

Small pieces of wood or chips, sawdust and tree bark make an excellent fuel for heating buildings and generating electricity. This fuel is often produced in sawmills during the manufacturing of lumber for construction, furniture, doors and pallets. Did you know that wood waste is one of the most widely used renewable energy sources in Canada?

9 Firewood

Many Canadians use firewood to heat their homes during the fall and winter. Wood stoves and fireplaces are the most common types of residential wood-burning appliances. The wood is often stored by the side of the house, in the garage or in a shed. Look around your community to see where people store their firewood.

10 Ground-Source Heat Pump

Did you know that thanks to the sun's energy the temperature of the ground is fairly constant below the frost line? Depending on where you live in Canada, the temperature of the ground can vary between 5 and 10 degrees Celsius throughout the year. This means that the ground is warmer in the middle of winter and cooler in the middle of summer than the outside air. This constant temperature is ideal for a ground-source heat pump system, which uses a series of buried pipes to transfer the heat from the ground into a building in the winter. In the summer, the system is reversed to transfer heat out of the building into the ground. Find out whether homes or buildings in your community use a ground-source heat pump for heating and cooling.