

# Renewable Energy Technologies

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We use energy every day. It surrounds us in different forms, such as light, heat, and electricity. Our bodies use the energy stored in molecules of substances like carbohydrates and protein to move, breathe, grow, and think. We also use energy to do work and to play. Humans have invented thousands of machines and appliances that use energy to make our work easier, to heat our homes, and to get ourselves from place to place. Some of these machines use electricity, while others, like automobiles, use the energy stored in substances such as gasoline.

Energy is easily converted from one form to another. This is an important and very useful property, because we rarely produce energy using the same device, or in the same form as what is needed for the task at hand. Since energy is often produced at some distance from its end use, we also need to transmit it from its source location to where it is needed. This is done by means of wires in the case of electricity, or pipelines or tank trucks in the case of oil or natural gas. Not all forms of energy can be easily stored or transported. For instance, light is impossible to store directly. It has to be converted to some other form, such as chemical energy first.

Renewable energy quickly replaces itself and is usually available in a never-ending supply. Renewable energy comes from the natural flow of sunlight, wind, or water around the Earth. With the help of special collectors, we can capture some of this energy and put it to use in our homes and businesses. As long as sunlight, water, and wind continue to flow and trees and other plants continue to grow, we have access to a ready of supply of energy.

## **Why is Renewable Energy Important?**

### *Energy Price Stability*

In the last three years, we have seen large fluctuations in the cost of natural gas, oil, and electricity due to global economics, market deregulation, and political events in some parts of the world. Renewable energy is not subject to sharp price changes because it comes from sources such as sunshine, flowing water, wind, and biological waste, all of which are free. This gives people greater certainty about the cost of energy, which is good for society and the economy. By comparison, fossil fuels are limited in their supply, and their price will increase as they become scarcer.

### *Clean Air*

Air pollution is a major problem in many cities in Canada and around the world. The biggest cause of air pollution in cities is the burning of fossil fuels, including fuels used for transportation. The Canadian federal government estimates that more than 16,000 Canadians die prematurely each year from diseases caused by air pollution. Thousands more suffer from long-term sicknesses and disabilities. The great advantage of using renewable energy in place of fossil fuels is that renewable energy adds very few pollutants to the environment. Renewable energy is considered “clean” and “green.”

### *Protecting Global Climates*

When fossil fuels are burned, they release carbon dioxide. This gas acts like an invisible blanket, trapping more of the sun's energy in the atmosphere, causing the Earth to warm up little by little. Carbon dioxide is building up in the atmosphere as more and more fossil fuels are used in homes, factories, and automobiles. If this continues, most scientists think our planet is likely to become significantly warmer, which could cause many serious problems around the world. These problems could include melting of arctic ice, increased forest fires, rising sea levels, loss of animal habitat, damage to coral reefs, the spreading of tropical diseases, expanding deserts, and more frequent and severe storms.

### *Protecting Landscapes and Watersheds*

Some energy projects, particularly big coalmines, hydro dams, and oil and gas activities, can have a large impact on lands and watersheds. Damage or loss of natural lands and watersheds is likely to affect humans and animals. For example, wilderness areas could be lost for when energy resources are extracted. Hydro dams can flood large areas, while the facilities associated with oil and gas and oilsands development can affect forests and disrupt animal movements and migrations. On the other hand, solar energy can provide a continuous supply of energy, which is integrated directly into buildings so that it has very little impact on land use. Run-of-river hydro plants can be designed to allow for free flow of existing streams.

### *Unlimited Supplies*

Renewable energy supplies will never run out. While the supplies of coal, oil, and natural gas are limited, sunshine, wind, biomass, and water power are considered almost limitless resources. Canada's coal supply is expected to last 200 years, and natural gas about 100 years. Our large, untapped supplies of wind, sun, water, and biomass can power our society indefinitely.

### *Jobs and the Economy*

Renewable energy can be developed in such a way that every household or neighbourhood could have its own renewable power generating equipment. This would create many new jobs for people involved in setting up and maintaining this energy supply, and in manufacturing the equipment. It is also more efficient to produce renewable energy in small amounts right where it is needed. The energy losses and equipment needed to transmit power over long distances can also be minimized in this way.

## **Questions**

1. Give some examples of non-renewable energy. Describe why they are considered non-renewable.
2. Give several examples of renewable energy. Why are they considered "renewable"?
3. What are some of the advantages of renewable energy over non-renewable energy?
4. Can you describe any examples of how renewable energy is being used in Durham Region?