

Renewable Generation

Alternative Energy Generation

ERTH Power offers service and information dedicated to supporting cleaner ways to generate power. Many of our customers have already utilized these powerful renewable resources, providing clean energy for communities across Ontario.

Ontario has many exciting opportunities for producing clean energy. Today there are a variety of alternative energy sources our customers can adopt one of the following energy sources:

- Wind
- Solar
- Biomass
- Hydroelectric
- Geothermal

Wind Power

Wind has been utilized by people for centuries as a means to generate energy for common everyday tasks. Today we have the opportunity to do the same. Wind power is a reliable source of clean, renewable energy generated primarily by wind turbines in large open areas, uninterrupted by trees and buildings.

Energy produced by wind turbines is clean, creating no harmful waste or emissions. Unlike other energy sources, wind power operates on its own, thereby preserving water sources. While wind power currently generates 563,000 Canadian homes, Ontario has the potential to harness this infinite resource to generate power across the province.

How wind power works

A large majority of wind turbines are structured with blades atop of a tall tower which rests on a horizontal shaft base. Wind currents cause the blades to rotate, turning the shaft in unison. Inside the head of the turbine a generator produces an electrical current which is carried across cable lines to transmission lines. Depending on the size of wind generator, transmission lines send the energy to a local utility grid or directly to Ontario homes and businesses.

Solar Power

Solar energy has been around since the beginning of time. When harnessed or directed to a conductor, the sun's energy of both light (photovoltaic) and heat (solar thermal energy) acts as a renewable source of energy. Solar energy is used to heat our houses, water and food. The sun's light is also utilized to turn light from the sun directly into electricity through the use of silicon solar paneling, also called photovoltaic panels.

How Solar Power Works

When sunlight hits a solar panel, electrons in the silicon begin to move around. The electrons move through wires that are built into each solar panel, creating electricity. Solar panels on homes or businesses have the capability to generate electricity that can power entire building. To ensure continuous power throughout the night large sized batteries are attached to the solar panels. The sun heats the panels throughout the day and the batteries store this energy allowing for electricity to be used at night and during cloudy weather conditions.

Some common uses of solar energy today can be found in construction signs along the highway. The flashing orange text

is powered by solar panels resting on top of the signs. At night the energy stored in the batteries of the panels is used to light up the sign. Solar panels on the roofs of homes are used to heat swimming pools, outside lighting and the home itself. An example of solar thermal energy is a solar oven. These ovens are simple to make with everyday items of cardboard, tin foil, black paint and plastic and can reach temperatures over 250 F.

Biomass Energy

Biomass represents a potentially large source of renewable energy. As a renewable energy source, biomass is a reliable source of power. The organic material made from biomass acts as a replacement to non-renewable resource, holding the capacity to produce fuel or heat.

Biomass is derived from food processing, agricultural and industrial by-products, as well as wood pellets, manure and some forms of garbage. When burned biomass releases carbon dioxide into the atmosphere, however biomass gasses are carbon neutral meaning they output an equivalent amount of carbon dioxide the plant provided when alive through photosynthesis

How Biomass energy works

Energy stored in biomass can be released through methods of burning and conversion. When burned, biomass releases chemical energy in the form of heat providing electricity for homes and businesses. Conversion of biomass materials such as: crops, rotting garbage, animal fat and waste products can be fermented to produce transportation fuel such as methane, ethanol and biodiesel.

Biomass enables municipalities to better manage their municipal waste, reducing the amount of garbage buried in landfill sites as well costs associated with garbage removal and burial. Many of us with wood burning fireplaces use the

energy source of biomass to heat our homes.

Biomass is particularly appealing for the commercial industry sector. Manufacturing companies can utilize the benefits of burning biomass materials to reduce their electrical consumption and waster output.

Hydroelectric Power

Hydroelectric power is generated by the force of flowing and falling water. As both a reliable and cost efficient renewable energy source, hydroelectric power provides electricity to communities across Ontario. The landscape of Canada is ideal for hydroelectric power, having both mountains and rapidly flowing rivers and streams.

In an effort to remain environmentally cautious the majority of water power installations in Ontario are run-of-the river operations, operating without dams, thereby avoiding the obstruction of water flow. As well, wind power can be used to help pump water into reservoirs where the water is stored for later hydroelectric power use.

How Hydroelectric Power Works

One of the most common forms of water power today is hydroelectric plants. The implementation of a hydroelectric plant takes time and expertise but once established these turbines can have a very long lifespan. Today, hydroelectric plants provide 650,000 megawatts of power worldwide, accounting for 25 per cent of the earth's energy output.

The construction of a dam creates a large lake or reservoir from which power can be generated from. The water surges through the dam, spinning the blades of a giant turbine. This turbine is connected to a generator which produces electricity as it spins. After water runs through the turbines it flows back into the river on the other side of the dam.

In addition to providing energy for electricity, hydroelectric power plants can also help control flooding. In keeping with being environmentally conscious, hydroelectric plants have developed safe initiatives, helping fish habitats migrate through their regulatory streams. Power plants also use hydroelectric power to generate the electricity within their operations.

Geothermal Power

As an alternative to traditional methods of heating and cooling a home, geothermal energy is energy powered by the earth's ground temperatures. As a renewable energy resource, geothermal energy consists of steam and water produced from within the core of the earth. The decay of radioactive particles produces temperatures hotter than the sun's surface.

How Geothermal Power works

Geothermal systems are installed in residential homes as an alternative to traditional heating systems. The average cost to install a geothermal system ranges from \$15,000 to \$30,000. Geothermal systems function through an exterior heating pump, generated by underground water and the earth's high temperatures.

Geothermal energy a portion of energy needed to heat a home, resulting in energy costs savings as well as environmental benefit from using less non-renewable resources. By using geothermal systems to heat the ground to building, the need for non-renewable energy sources to do the same is reduced. As well, no combustion method is required. The output of geothermal energy produces reduced level of carbon dioxide output and no pollutants during the geothermal heating process, providing clean and safe power. Although expensive, the payback can be as soon as four to seven years.

To help offset the costs of installing a geothermal home heating system, the Ontario provincial Government and the Canadian federal Government are offering grants to homeowners in an effort to encourage Canadians to use more eco-friendly home heating methods.