



# McLeod Dam

## GREEN ENERGY PROJECT



*healthy environment   healthy community   healthy economy*

### WHAT IS GREEN ENERGY?

Green Energy is a term used for energy that is generated in such a way that it is not harmful to the environment and is renewable. Water power projects are generally green. The McLeod Dam Green Energy Project is a “run of the river” project that does not require water storage, and will provide entirely green energy.

### WHAT IS THE GREEN ENERGY PROJECT?

As part of our Go-Green initiative, Quinte Conservation decided it is important to conserve energy that is used by our organization. We were the first Conservation Authority to purchase hybrid vehicles back in 2003 and we undertook some modifications to our office building to cut electrical and gas energy costs. We also realized that we could go a step further and

produce energy that is currently being “wasted” at our dams. We studied our dams and found that four of them could be good possibilities for generating clean, green energy.

By harnessing this new, renewable energy we will be reducing the equivalent of 5,000 tonnes of carbon dioxide each year from our air. The project will produce enough energy to power the equivalent of 400 homes.

Construction began in July 2007 for Quinte Conservation’s Green Energy Hydro Project at the McLeod Dam, on the Moira River in the city of Belleville. It was completed in the fall of 2008. The construction part of the project included modifying the dam to maximize the amount of energy generated and the installation of turbines to generate the electricity.

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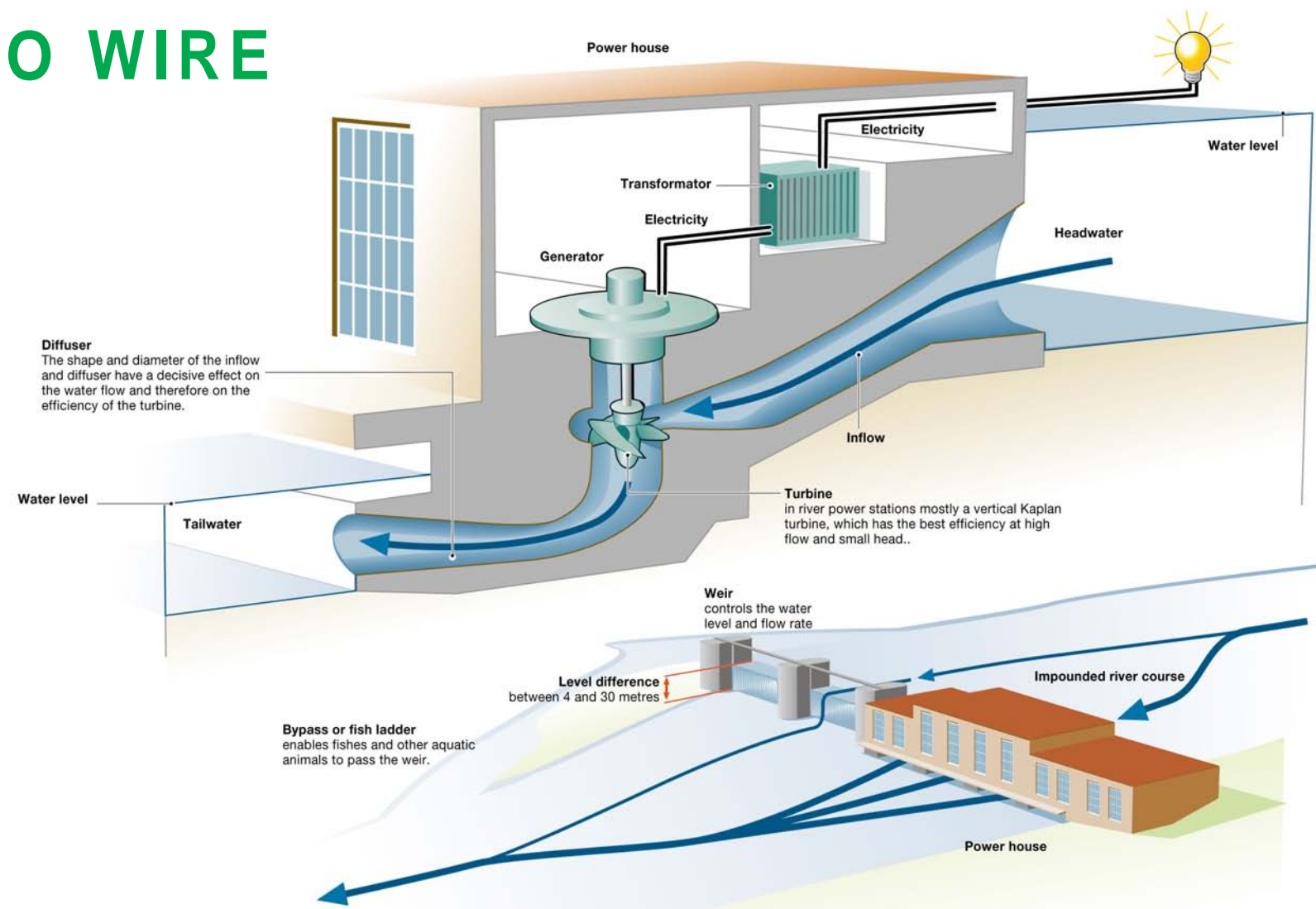


# FROM WATER TO WIRE

## WHAT MODIFICATIONS WERE MADE TO THE DAM?

In order to make the most use of the energy at the site the head (height of water) was increased at the dam. The water level is raised by an adjustable gate, called an Obermeyer Weir, in the 36 meter wide spillway. During periods of lower flow the gate will be raised to keep the water level higher behind the dam. In higher flow periods the gates will be lowered to let the water pass without causing an increased flood risk.

The primary purpose of the dam is, and will remain, flood and ice control. The project has been reviewed by all federal and provincial environmental departments and ministries and no harmful long-term impacts on the environment are expected.



## HOW DOES THE PROJECT WORK?

Hydropower is electricity that is created by harnessing power from water. As water falls through a dam, it loses energy. One way to capture this energy is to place a turbine in the water's path as it moves through the dam. The greater the fall (head) the more energy is captured. Also, more energy is available as flows increase.

The two turbines installed in the McLeod Dam, called Kaplan turbines, are specially designed for low head sites. The blades can be adjusted to match the river flow to capture more energy than simply fixed blade turbines. Therefore, they are very efficient. Each turbine is connected to a generator that uses magnets and copper wire to convert the water energy into electricity.

The generator contains magnets and copper wire. The turbine shaft spins, rotating the magnets in the generator. The rotating magnets induce a current in the wire to produce electricity. Electric current from the generator at 600 volts is conducted to a transformer where it is 'stepped up' to 13,800 volts for distribution. Power lines connect the dam to the existing power grid.

Each turbine is designed to work at peak efficiency at a flow of water on the river aof the time. The project will produce five Gigawatts-hours (GWh) of power per year. One GWh is 1,000 Megawatts-hours (MWh).

## WHERE DOES THE ENERGY GO?

The electricity that is produced is fed into the local distribution system (the grid) by Veridian and used locally. Through the Ontario government's Standard Offer Program the Ontario Power Authority has issued a contract to Quinte Conservation to purchase all the power produced by the dam at \$0.11 kWh, with a slightly higher rate during peak power usage periods.

## WHAT DID THE PROJECT COST?

The project cost \$4.5 million, with over \$1 million coming from donations.

## WHO WERE THE DONORS TO THE PROJECT?

Quinte Conservation held various fundraisers and received generous donations from The Parrot Foundation, Black Bear Ridge Golf Course, The EJLB Foundation and others.

## WHERE WILL THE REVENUE GO?

Hydro revenues will be used by Quinte Conservation to pay for environmental programs that will improve the local environment as well as furthering other hydropower projects.



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