



Banff National Park of Canada: Reducing Energy Consumption—Helping the Environment

1 Background

Established in 1885, Banff National Park is the birthplace of Canada's parks system and part of the Canadian Rocky Mountain Parks World Heritage Site. The park spans 6641 km² of valleys, mountains, glaciers, forests, meadows and rivers in southwest Alberta. This part of a complex chain of national, provincial and territorial parks and wilderness areas, which totals 5 million acres, has been set aside for posterity. The site is one of the world's largest protected domains.

In July 2002, Banff became the first national park in Canada to sign an energy performance contract (EPC) with an energy service company (ESCO) aimed at improving the energy efficiency of 88 of its buildings over 10 years. The process began in December 2000 when the Parks Canada Agency issued a request for proposal (RFP) to improve the energy efficiency of its buildings at Banff. The Federal Buildings Initiative (FBI), a program within Natural Resources Canada's Office of Energy Efficiency, worked with Parks Canada to assess possible energy efficiency opportunities and any preliminary work required to deliver the improvements. Both parties determined that an EPC could help update Banff National Park's infrastructure and enhance the energy management practices of its operations, thereby reducing its energy and water consumption and greenhouse gas (GHG) emissions.



Figure 1. Banff National Park Welcome Center.

2 Project Highlights

Banff National Park awarded a 10-year, \$506,426 comprehensive energy efficiency project to MCW Custom Energy Solutions Ltd. in 2001, and signed the EPC the following year. The construction phase of the project was completed in 2003. MCW is currently monitoring the project.

The project focused on updating 88 of the 200 buildings at the park. Each spans about 65 to 135 m², totaling 20 119 m² in floor space. Several types of buildings were retrofitted, including garages, offices, and campground washrooms.



The EPC currently generates over \$72,362 in annual energy and water savings and has reduced GHG emissions by 370 tonnes per year. MCW has already implemented the following energy efficiency measures:

- **Lighting retrofits.** T-8 fluorescent lamps replaced inefficient T-12 fixtures. Other lighting features include LED exit signs, screw-in compact fluorescents, de-lamping, and the use of reflectors.
- **Installation of new high-efficiency refrigerators.** New refrigerators in the staff residences and garage typically operate at less than half the consumption of the old units.
- **Improvements to building envelope.** Re-caulked windows and the installation of door seals reduce air and moisture infiltration. A door interlock in the holding area in the main garage reduces uncontrolled heat loss.
- **Installation of new high-efficiency front-loading washing machines and gas dryers.** The new washing machines yield significant water and gas savings. The use of a gas dryer instead of a conventional electric dryer helps lower fuel costs.
- **Replacement of natural draft boilers with new high-efficiency condensing boilers.** The new boilers in the warden's office and the general works and trades area allow considerably lower flue gas temperatures, due to the stainless steel construction of the boiler and flue.
- **Revamping of heating, ventilation and air-conditioning (HVAC) controls.** Heating controls in the main garage now improve indoor air quality with the replacement of carbon dioxide sensors. Interlocking make-up air units and exhaust fans, as well as programmable thermostats for all unit heaters, provide damper control to ensure summer free-cooling and a controlled air supply.
- **Solar hot water collector.** A solar hot water collector on the roof of the campground shower facility helps reduce the amount of fuel needed to heat water.

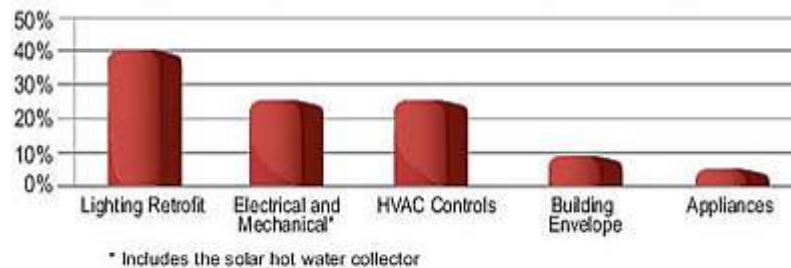


Figure 2. Energy efficiency measures and their projected savings.

3 Employee and Public Awareness

3.1 Employee Awareness

An employee awareness program helps educate and motivate building occupants. When employees know how their actions can affect energy consumption, they can directly contribute to the savings already achieved through the technical retrofits.

As part of Banff National Park's employee awareness campaign, the MCW team held a "Celebrate Success Day" in all the major buildings in the park.

MCW set up booths and invited building occupants to information sessions that explained the energy efficiency project and its measures. The sessions promoted the positive impact of the project on building operations and costs, as well as the environment.

3.2 Public Awareness

As one of the world's premier destination spots, the park boasts more than 3 million visitors a year, not including an additional 4.6 million people who travel through the park on the Trans-Canada Highway.



Visitors want a chance to experience and enjoy the beauty and wildlife of the national parks, and they look to Parks Canada to demonstrate best practices in energy conservation and energy alternatives.

The high volume of visitors and their interest in environmental issues create a unique opportunity for Parks Canada to showcase new technology, promote energy conservation and highlight efforts to reduce GHG emissions and air pollution.

Banff National Park and MCW mounted information displays at major centres throughout the park to inform visitors of the importance of energy and water conservation. The displays include materials detailing the project, its conservation measures and the efforts of Banff National Park to reduce GHG emissions and help the environment.

For example, the new solar hot water collector at the campground shower facility attracts a great deal of attention and offers an opportunity to showcase a visible and low-cost renewable energy measure. Step-by-step graphics make it easy to understand how solar energy works. The display also reminds visitors that the amount of hot water is finite and their personal conservation plays a part.

4 Project Highlights

Now that its EPC project is complete, Banff National Park is continuing to curb energy consumption and control costs by implementing further savings opportunities, including:

- Installation of high-efficiency furnaces in all staff homes within the park. This has significantly lowered natural gas consumption
- Continued upgrades to lighting and thermostat applications with new technology, as it becomes available
- Project managers at the park are constructing a new “off-grid” washroom facility. It will use solar panels to generate all its energy for light and heat.

The Banff National Park EPC project continues to deliver environmental, financial and operational benefits. Its experience is serving as a model for the entire national parks system, which is helping Parks Canada develop a long-term plan to manage the energy efficiency and environmental impact of its buildings.