The Canada Centre for Inland Waters – *Building on Success*

Environment Canada's National Water Research Institute (NWRI) is Canada's pre-eminent freshwater research facility. One of NWRI's two main centres, the Canada Centre for Inland Waters (CCIW), is home to a successful Federal Buildings Initiative energy efficiency improvement project. Located on the shore of Lake Ontario in Burlington, Ontario, CCIW is one of the world's leading water-research centres. The CCIW complex consists of six inter-connected buildings, most built in the early 1970s, with a total of almost 50 000 square metres of floor space.

An energy efficiency retrofit of CCIW was first proposed in 1993, in response to the pressing need to control energy costs, upgrade equipment and installations, and reduce the environmental impact of operations. At that time, about 50 percent of CCIW's total annual operating and maintenance costs were being spent on electricity, gas and water – totalling $1.5 million a year.

Faced with the challenge of maximizing operational efficiencies, Dave Gamache, NWRI's Manager of Building and Property Technical Services at CCIW, contacted the Federal Buildings Initiative, a voluntary program of Natural Resources Canada's Office of Energy Efficiency.

The Federal Buildings Initiative (FBI) of NRCan's Office of Energy Efficiency aims at improving energy efficiency, cutting your organization's energy costs and reducing greenhouse gas (GHG) emissions that contribute to climate change. This initiative offers a comprehensive approach for improving the energy and water efficiency of federally owned buildings. It enables federal organizations to use savings from energy efficiency measures to finance the capital costs of building upgrades, retrofits and installations. This savings-financing approach for undertaking energy and water efficiency improvements is referred to as energy performance contracting.

Energy Performance Contracting Delivers a Comprehensive Service Based on Energy Savings:

- Energy analysis
- Procurement of goods and services
- Design, engineering and construction
- Project financing
- Project management
- Specialized employee training
- Commissioning
- Monitoring and verification
- Guaranteed results

In 1995, following a competitive tendering process involving five energy service companies (ESCOs) pre-qualified by the Federal Buildings Initiative, CCIW awarded an energy performance contract to Rose Technology (now Cinergy Solutions – Demand Ltd.). The successful ESCO developed its proposal into a detailed feasibility study that outlined the efficiency measures and improvements that would produce the guaranteed energy savings.

Upon acceptance of the feasibility study, the energy savings were put into place. In addition to new equipment and improved technology, CCIW began benefiting immediately from an improved building environment, reduced maintenance, lower emissions from laboratories and access to recapitalization funding. Heightened employee awareness of energy use and efficiency resulted from the creation of a "Go Green" committee and an e-mail exchange forum. Energy management training was provided to upgrade the skills of building operators and improve the technical performance of the project.

Proven Results

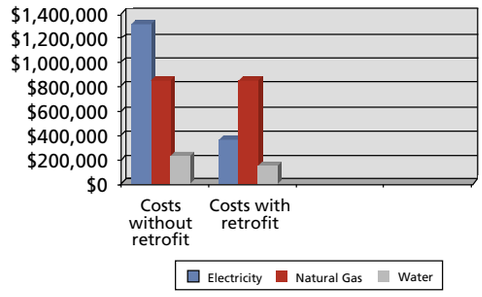
In May 2003, the energy performance component of the project ended. The project cost of $7.5 million was paid out of realized energy savings, exceeding original projections for the seven-year efficiency retrofit program. With $9.1 million in total savings, the project also reduced greenhouse gas (GHG) emissions by 6700 tonnes per year.

The following measures helped the project realize significant energy savings and associated benefits:

- An 800-kilowatt cogeneration unit and a waste-heat-fired boiler were installed in the central plant to improve efficiency and permit main boiler shutdown in the summer months.
- A thorough upgrade to the heating, ventilation and air-conditioning (HVAC) system resulted in improved monitoring capabilities, upgraded laboratory airflow, improved pressurization standards and temperature control, reduced heat loss, lower maintenance costs and improved occupant comfort.
- Installation of T-8 fluorescent tubes and electronic ballasts, "white light" metal halide units, high-efficiency exit signs, lighting control switches and occupancy sensors were among the many electrical retrofit measures.
- Installation of fume hoods with nighttime set-back capabilities reduced emissions and improved the safety of operations.
- In addition to the energy efficiency measures, a waste audit led to the implementation of wet/dry recycling.

Even though research activity has increased at CCIW since the project started, energy consumption has fallen almost 15 percent from baseline levels and water consumption has dropped 33 percent.

Energy Retrofits Reduce Energy Costs



For the year 2000, the actual costs for electricity, natural gas and water at CCIW are shown on the right. Without the efficiency measures being implemented, the estimated costs for energy and water are illustrated on the left.

Building on Success

Looking back over the experience, Dave Gamache says, "This project demonstrates that environmental improvements to building operations can generate substantial economic savings as well." As each stage of the project was completed, further potential savings emerged. The initial project was just the first step to new and innovative energy efficiencies.

Since project implementation, new measures have included the construction of a "summer steam line" allowing the facility to shut the boilers off and to run on a waste heat boiler for the summer months. As well, they installed two solar walls to preheat incoming air, a photovoltaics system to generate electricity and a living wall. A living wall is an air biofilter that removes and treats airborne contaminants that can contribute to low-level, negative health effects, such as headaches, asthma, drowsiness and malaise. The living wall also offers a pleasing environment for employees who can now enjoy its beauty and fragrance and the sounds of trickling water.

NWRI intends to build on its success with the CCIW project and is now looking at more ways to save money and improve energy efficiency. Among the possibilities being considered are the naturalization of the grounds and the retrofit of the boiler plant to further increase efficiency and reduce GHG emissions.

Replicate the Success of the NWRI's Energy Efficiency Project

Your organization can transfer the success of the CCIW energy performance contract by applying the same methods. The Federal Buildings Initiative offers assistance with every aspect of your energy efficiency project, including:

- Energy efficiency project planning
- Project financing options
- Employee awareness
- Project tendering and contracting assistance
- Celebration and recognition

Find Out More About the Federal Buildings Initiative

Energy performance contracts are a proven concept that, with no up-front cost, allows for significant improvements in energy efficiency while reducing energy costs and greenhouse gas emissions.

The Federal Buildings Initiative can show you how to get started and how to plan a successful energy efficiency project. For more information on the Federal Buildings Initiative and other energy efficiency projects undertaken by federal organizations throughout Canada, visit the Web site at oee.nrcan.gc.ca/fbi or send a fax to (613) 947-4121.

For More Information

National Water Research Institute – **www.nwri.ca**
Canada Centre for Inland Waters – **www.nwri.ca/cciwdesc-e.html**

For more information on the energy efficiency project at CCIW, contact Dave Gamache, Manager of Building and Property Technical Services, by phone at (905) 336-4988 or by e-mail at Dave.Gamache@ec.gc.ca.

Natural Resources Canada's Office of Energy Efficiency

Leading Canadians to Energy Efficiency at Home, at Work and on the Road

The One-Tonne Challenge asks Canadians to reduce their annual greenhouse gas emissions by 20%, or about one tonne.

One-Tonne CHALLENGE
Take action on climate change
www.climatechange.gc.ca

Take the One-Tonne Challenge, a national effort to take action on climate change.

Improving energy efficiency reduces greenhouse gas (GHG) emissions that contribute to climate change.

By using energy efficiently and making wise consumer choices, you can reduce your individual GHG emissions by one tonne, or about 20%. Like most Canadians, you probably already take steps to conserve resources and protect the environment. Now the One-Tonne Challenge calls on you to make a bigger commitment.

For a copy of the 22-page *Your Guide to the One-Tonne Challenge*, call 1 800 O-Canada (1 800 622-6232) or 1 800 465-7735 (teletype for the hearing impaired) or visit **www.climatechange.gc.ca**. You'll find tips you can follow, information about services and incentives available to you, an on-line calculator to help you figure out how to reduce your GHG emissions, and much more.

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