



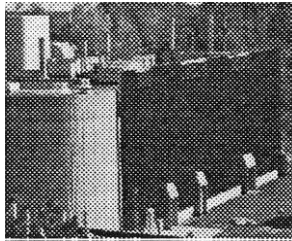
E N E R G Y E F F I C I E N C Y



Energy Efficiency
Fact Sheet

February 1999

Office of Energy Efficiency
Office de l'efficacité énergétique



"I WANT TO RETROFIT"

ENERGY SAVINGS AT NATURAL RESOURCES CANADA

This case study profiles Natural Resources Canada's (NRCan's) ongoing departmental Federal Buildings Initiative (FBI) project to promote the benefits of the FBI concept of energy efficiency retrofits. It was developed to inform decision-makers, including facility and property managers and operators, energy specialists, senior executives in the federal government and other levels of the public sector, and the private sector. It is anticipated that additional fact sheets will be issued as the project progresses.

Refer to the end of this fact sheet to find out how you can obtain more information about the FBI and NRCan's departmental project.

The federal government has promoted energy efficiency in its facilities since the 1970s. Although modest progress was made, achievement of the full potential was often hampered by the perception that federal facilities were already largely energy-efficient. In fact, many energy efficiency opportunities throughout the federal system remained.

NRCan recognized this untapped potential in 1994, when energy efficiency and environmental sustainability became priorities for the department. NRCan officials and employees were challenged to integrate economic objectives with the principles of environmental protection. For

the first time ever, a federal department would systematically retrofit all its facilities, with the goal of making NRCan the most energy-efficient federal department.

As the department responsible for setting federal energy policy, NRCan is in a solid position to lead by example. Ralph Goodale, Minister of Natural Resources, promotes energy efficiency as a way to save money and reduce greenhouse gas emissions. He is giving his full support to measures that ensure that the retrofit is completed and the energy performance of the department continues to improve beyond standard performance levels.

"We are pushing hard for private businesses to go faster and deeper . . . to

The FBI Saves Money

The Government of Canada spends about \$800 million per year on energy. Implementing the FBI in all federal buildings and facilities would save \$160 million. Implementing the FBI in government buildings at all levels throughout Canada would save \$460 million and stimulate \$4 billion in investment.

The FBI Creates Jobs

Putting the FBI to work throughout the federal government's network of 53 000 buildings and facilities would create an estimated 20 000 person-years of employment. If all levels of government acted, 80 000 person-years of employment would be created.

reduce greenhouse gas emissions," Mr. Goodale says. "So it's only appropriate for the federal government – a big energy consumer itself – to set a positive example." Thanks to Minister Goodale, NRCan is leading through action.

Top-level buy-in has been essential to the success of NRCan's department-wide energy efficiency initiatives. As Minister Goodale's predecessor

observed soon after the project was first announced, to ensure success, "it takes an initial expression of interest from a Minister and his or her department to say 'I want to retrofit' – a commitment to move forward."

Success was important. If the project was effective, operational efficiency would be improved, greenhouse gas emissions would be reduced, and taxpayers' dollars would be saved. The job wouldn't be easy, but investment in energy efficiency would result in untapped financial and economic rewards. Experts were needed to identify and carry out upgrades and to undertake staff training throughout the department's network of sites. At the time, however, there was no money in the

capital budget to pay for the work. In addition, NRCan was in the midst of major restructuring when the former Minister announced the retrofit project, and no one knew how much would be cut or which facilities might become surplus.

THE FEDERAL BUILDINGS INITIATIVE MEETS THE CHALLENGE

The department turned to the FBI for help. The FBI offers a flexible approach to updating federal buildings with energy-saving equipment and practices by providing departments with the tools to access private sector expertise and financing, if needed. As well, it offers a full range of energy management products and services, including planning workshops and training programs tailored to maximize the benefits of retrofit projects.

Under the FBI's energy performance contracting (EPC) arrangement, a pre-qualified energy services company (ESCO) finances the project, supplies and installs new equipment, and guarantees the savings. The savings stream generated by the retrofit (the pre-retrofit energy bill minus the post-retrofit energy bill) is paid to the ESCo until the cost of the project is recovered. Once the ESCo is paid, the savings are retained by the department. Departments have the option to take advantage of this private sector financing arrangement or to use

internal resources to pay for the required upgrades - and thereby enjoy the savings at an earlier stage. The FBI offers a full range of products and services to assist federal departments to improve the energy efficiency of their facilities.

NRCan's Deputy Minister, Jean C. McCloskey, is also a strong supporter of the FBI approach. The FBI "provides Canadians with new and effective concepts and programs based on advanced technology," Ms. McCloskey says. "Energy efficiency in buildings and facilities include significant cost savings, a contribution to environmental challenges and job creation."

CHOOSING AN ESCO - THE ROAD TO SUCCESS

Once the decision had been taken to access private sector financing, the next step was to select an ESCo. According to Bev Reasbeck, NRCan's departmental representative for the project, choosing the right ESCo was essential to ensuring success.

"The working relationship that will develop with the contractor you finally select will be very close and will continue over a long period of time," Mrs. Reasbeck says.

With the help of the FBI, NRCan's departmental representatives developed basic terms of reference for the project. Firms on the FBI's Qualified Bidders List were invited to an information session for details on the scope of the planned

project and on preconditions for qualification as bidders. A request for proposal was developed based on FBI model documents, and proposals were submitted by two qualified firms, who were then invited to make presentations.

To help evaluate the proposals, Mrs. Reasbeck suggests that ESCo presentations be considered carefully.

"The presentations can tell you a lot, especially if you have established criteria to base your decisions on," she says. "You'll be able to get a good feel for intangibles, such as ease of communication and approaches to problem-solving."

The final selection was made and a letter of intent was signed with Rose Technology Group, a Toronto-based ESCo, in June 1995. A cross-country feasibility study was launched immediately after the letter of intent was signed and continued while the final contract negotiations were concluded.

A BUNDLED PROJECT

NRCan operates about 300 facilities with an interior floor space of 385 000 square metres and average annual energy costs of \$34 per square metre in the baseline year (1993-1994). A bundled approach was adopted so that a number of facilities -

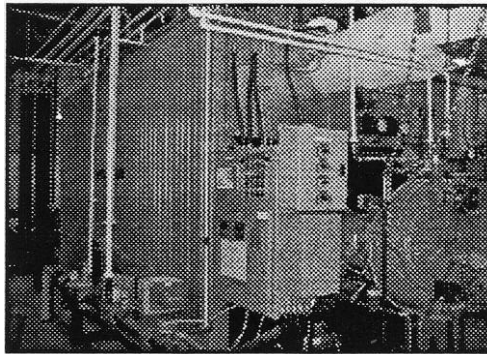
Rose Technology Group was formed in 1984 and is now firmly established as a leading Canadian ESCo, with offices in Newfoundland, Nova Scotia, New Brunswick, Quebec, Ontario, Alberta and British Columbia.

Rose Technology Group provides a turnkey service and takes responsibility for EPC engineering, financing, equipment supply and installation.

rather than single buildings - could be considered together, with overall payback based on the average financial return from all the selected measures for the bundled facilities. This approach ensured that a greater number of longer-term payback measures could be justified than would have been possible under projects at single sites. In addition, to avoid the risk of renovating buildings that might become surplus to departmental needs, the project was divided into two phases.

Fourteen sites totalling 300 000 square metres were selected for Phase I of the NRCan retrofit. These included:

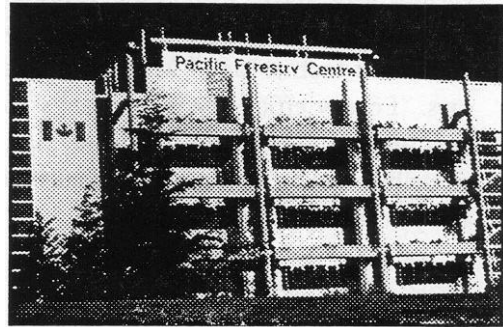
- Canadian Centre for Mineral and Energy Technology (CANMET) complex, Nepean, ON



Nepean, Ont

- Geomagnetic Laboratory, Ottawa, ON
- Eastern Satellite Tracking Station, Cantley, QC
- Great Lakes Forestry Centre, Sault Ste. Marie, ON
- H.J. Flemming Forestry Centre, Fredericton, NB
- Laurentide Forestry Centre, Ste-Foy, QC

- Mining Research Laboratory, Val d'Or, QC
- Energy Diversification Laboratory, Varennes, QC
- GPS Laboratory, Priddis, AB
- Northern Forestry Centre, Edmonton, A B
- Geomagnetic Station, Yellowknife, NWT
- Resolute Bay Station, Resolute Bay, NWT



Victoria, BC

- Tuktoyaktuk Station, Tuktoyaktuk, NWT
- Pacific Forestry
- all small and seasonal sites

Phase II will address NRCan's Booth Street headquarters complex in Ottawa and will be launched once the long-term space requirements of the department are defined.

A WIN-WIN CONTRACT

Phase I of NRCan's EPC was finalized and signed in June 1996. At the end of the eight-year, \$7.8 million project, the department's energy bill will be reduced by 18 percent, or almost \$900,000

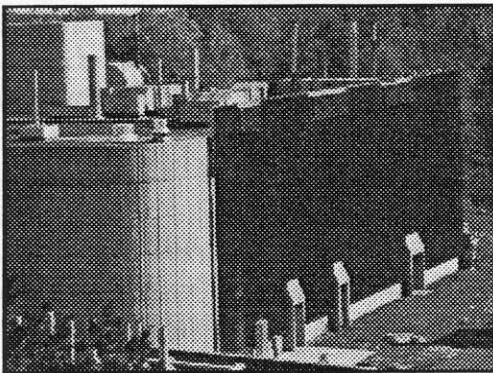
annually. NRCan pays nothing up front for most of the work; Rose Technology is paid from revenue generated by energy savings. All savings will be retained by NRCan once the contract expires in 2004.

The contract is flexible enough to accommodate amendments and revisions as customized retrofit plans are drawn up at each site to maximize savings. Projected savings and the value of the contract have doubled since the letter of intent was signed two years ago.

Common features provided under the contract include:

- **lighting upgrades** - redesigned lighting systems for laboratories and new T-8 fluorescent lights with electronic ballasts will be installed
- **air system retrofits** - ventilation rates will be increased
- **direct digital control (DDC) systems** will add control points to networks
- **power factor correction**
- **water consumption measures** will include sub-metering

The contract has indirectly led to the consideration of other innovative



Nepean, ON

measures that are supported by NRCan under its science and technology mandate. For example, NRCan employees proposed a Solarwall® for the Canadian Centre for Mineral and Energy Technology in Nepean, Ontario. Due to the longer-term payback of the project, NRCan decided to pay for the equipment up front, while Rose Technology agreed to undertake the installation. In addition, the installation of a wind turbine to supply energy to a remote site in Resolute Bay is also being explored. Without the contract, it is unlikely that an opportunity to showcase either of these leading-edge technology solutions within departmental facilities would have occurred.

The NRCan-Rose Technology EPC is promoting sustainable development by integrating both environmental and economic objectives. Energy, operating and maintenance costs are already coming down, with accumulated savings of \$895,500 by February 1999. Reduced carbon dioxide emissions (savings to date of 4,498,560 kg) help Canada meet its international commitment to the Global Convention on Climate Change. Post-retrofit, greenhouse gas emissions will be cut by almost 4000 tonnes per year. At the same time, NRCan employees are benefiting from the project through enhanced training opportunities for facilities staff and by an overall improvement to the working environment.

PEOPLE - THE KEY TO SUCCESS

NRCan and the FBI recognized early on that it is people as much as new equipment that determine the long-term success of energy efficiency projects. It was for this reason that a collaborative approach to training evolved, involving NRCan facilities managers, Seneca College of Applied Arts and Technology, and Rose Technology Group. Building operators attended a workshop where they learned about operating problems that had already been encountered and solved and where they were briefed on the required energy efficiency training.

A needs assessment was then undertaken, which determined that facility managers and operations and maintenance employees would be offered two types of training: measure-specific training, paid for through the EPC, and comprehensive training. Measure-specific training is offered through Rose Technology; training on building environmental systems that is comprehensive and academically validated is delivered through Seneca College of Applied Arts and Technology. To date, approximately 50 percent of building operators from sites across the country have benefited from the training.

In addition, the NRCan Building Operators Advisory Group brings operators together to share knowledge and expertise. At the same time, non-operations employees at NRCan are kept

informed through the *Sharing a Vision with Energy* newsletter and the FBI departmental project web site. Electronic signs at the entrances to several sites across the country also keep employees up-to-date on the latest savings figures.

PROJECT OUTCOME AND LESSONS LEARNED

Energy data measuring the success of the NRCan-Rose Technology EPC project will not be available until the fall 1999. Early indications, however, are that the expected environmental and economic objectives are being met. In the meantime, NRCan officials have gained experience that will expedite negotiations and planning in Phase II and may help others considering this type of project. Here are lessons learned from NRCan's project:

1. **Clear support from the top is essential.** Enthusiastic top-level buy-in ensures that energy efficiency will become a priority throughout your organization.
2. **Considerable preparatory work is needed.** Reliable baseline data are essential; if you don't know how much you are spending before you start, you won't know how much you are saving when you have finished.
3. **Be flexible.** Through contract revisions to accommodate site-specific retrofit plans, total savings have doubled since negotiations began on the NRCan Rose Technology EPC.

4. **Be open.** Successful EPC projects need not be developed and implemented linearly. Expect an outpouring of creative and innovative ideas, and make provision for the project to grow to embrace them.

INTERNATIONAL RECOGNITION

Successful energy savings in NRCan buildings across Canada were recognized in November at the 1998 World Energy Engineering Congress in Atlanta, Georgia. This project won the 1998 Efficient Building Award. This prestigious, internationally recognized award was presented to NRCan for its innovation and excellence in energy efficiency and building management.

NEW, PEOPLE-ORIENTED TOOLS

NRCan's Office of Energy Efficiency has developed two new tools to help with the design and implementation of effective energy efficiency programs.

The **Energy Master Plan** helps senior managers integrate energy management planning into their strategic plans to capitalize on energy efficiency

opportunities and save money. The new "Dollars to \$ense" workshop walks participants through an energy plan from A to Z. This workshop is travelling throughout Canada in 1998 and 1999.

A Manager's Guide to Creating Awareness on Energy Efficiency covers every aspect of a successful employee energy awareness program to turn ideas into action. This guide supplies all the essentials for designing and implementing an effective energy efficiency communications campaign, including camera-ready artwork and articles that are ready to publish.

To explore the lessons learned from the NRCan departmental project in greater depth or to learn more about NRCan's Office of Energy Efficiency and the FBI, contact:

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Office of Energy Efficiency web site:
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FBI departmental project web site:
<http://nrcan.gc.ca/css/amas/fbi/>



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