



## Annex A

### Industrial Energy Efficiency Collaboration Success Stories

#### **Energy and Mines Ministers' Conference**

Halifax, Nova Scotia  
July 2015





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## Cost savings

### Air Liquide tackles 70 percent of operating costs

Electricity consumption  
reduced by 6.4  
megawatt-hours (MWh)

\$500,000 per year saved  
in electricity costs

Operations of three  
plants were assessed and  
optimized.

As the largest air separation plant in Canada, Air Liquide was looking for electricity cost saving opportunities anywhere it could. The company uses electricity to drive compression equipment, in process heaters, instrumentation and cooling systems.

Air Liquide operates three air-separation plants, each with different electricity efficiencies, depending on their age and capacity. An analysis of electricity costs for each of the three plants showed that by expanding the production capacity of the most energy-efficient plant, the two less efficient plants would significantly reduce their electricity use. Through an assessment of its facilities and their equipment, the company initiated a customized project in which a surplus compressor was rebuilt.

The Independent Electricity System Operator (IESO) was formerly known as the Ontario Power Authority. The IESO's **saveONenergy<sup>OM</sup> PROCESS & SYSTEMS** program, delivered through Air Liquide's local distribution company Horizon Utilities Corporation, provided \$120,000 for the energy conservation project. Air Liquide invested the remainder of the \$1.2 million total project cost in rebuilding and installing the compressor, including building the foundation, requiring and modifying controls and linking the compressor to the air-separation unit. The IESO \$120,000 incentive helped reduce the payback period to a little more than two years.



With their plants optimized for energy efficiency, Air Liquide is seeing dramatically reduced energy costs and has achieved the expected electricity savings.

**“The major cost in the air-separation process is electricity. Seventy percent of operating costs are for electricity. Probably no other business has as high a percentage of its costs in electricity. Our continuing focus has been to reduce these costs.”**

**-Keith Rowan, Director of Canadian Operations, Air Liquide**

Source: Independent Electricity System Operator

## Flin Flon's Hudson Bay Mining and Smelting reduces operating costs by 90 percent

Annual operating costs reduced from \$86,732 to \$9,668

450 horsepower (hp) pumps replaced with 150-hp pumps

Improved reliability and less frequent maintenance

Hudson Bay Mining and Smelting (Hudbay) has operated in the Flin Flon Greenstone Belt for more than 85 years. Since the mid-1950s, Hudbay had used two pumps, among the largest in its powerhouse, to feed a cooling tower that supplies water to furnaces and processes throughout the metallurgical complex. Following the recommendations of an audit by **Manitoba Hydro**, Hudbay replaced the large pumps with smaller ones that provided alternating service and delivered only as much water as the cooling tower needed.

Manitoba Hydro's recommendations not only achieved impressive savings, but also reduced the need for maintenance to once per decade and equipped the motors with variable frequency drives to operate the pumping systems at optimum efficiency.



**“By going Power Smart, we’re saving money and the environment.”**

- **Todd Boyd, Superintendent  
Hudson Bay Minerals Inc.**

Source: Manitoba Hydro



## Brookside Poultry cuts annual heating costs in half

**Annual heating cost cut in half with geothermal system**

**Temperature must be maintained for 24,000 to 28,000 chicks.**

**Heat pumps were bought from a local supplier.**

Brookside Poultry looked at greener and lower cost energy alternatives to keep operations competitive. In an average winter, heating costs can run between \$18,000 and \$25,000 for two barns. After receiving a \$30,000 heating bill for a three-month period in the winter, Karson Lewis, owner of Brookside Poultry, started looking at alternative energy solutions.

After investigating other sources of energy, Lewis installed a closed-loop geothermal system to heat both barns. The total project cost of \$248,000 was offset by assistance from several programs, including:

- **Efficiency Nova Scotia**
- **Nova Scotia Farm Investment Fund**
- **Natural Resources Canada's (NRCan) ecoENERGY Efficiency for Industry**

With the help of these programs, the payback period of this investment was reduced to 5 to 6 years, which made it a feasible option.

Others will benefit from Brookside Poultry's experience with geothermal heating. The Lewis' farm is taking part in a Nova Scotia Department of Agriculture study about the use of renewables, and Lewis has shared his experience with geothermal energy to encourage other farms to consider the renewable energy source.



**“We are still looking at 50 percent cost savings [annually] even though power went up 0.5 cents per kilowatt-hour (kWh) over last year. I am quite optimistic I can easily save 50 percent.”**

- **Karson Lewis, Owner  
Brookside Poultry**

Source: Efficiency Nova Scotia and Canadian Industry Program for Energy Conservation (Natural Resources Canada)



## Helping SaskPower's largest customers save electricity pays off

**Annual electricity cost  
reduced by \$575,000**

**Project optimized fans that  
operated 24 hours per day**

**27 Saskatchewan  
companies participating**

Three years ago, SaskPower launched a program to help industrial customers identify and correct energy waste in their production processes. The **Industrial Energy Optimization Program (IEOP)** offers customized, high-quality technical assistance and financial incentives to identify, develop and implement energy management and capital projects. IEOP benefits customers by helping them to save on their power bills. By reducing the demand for power, SaskPower also benefits by slowing the need for new electrical infrastructure.

The savings in electricity costs for IEOP participants are long term and substantial. One manufacturing plant in southern Saskatchewan reduced its annual electricity cost by \$575,000 after rethinking how it used two 1,600-hp fans that ran 24 hours a day pulling air through the plant.

By redesigning and resizing so one fan could do the job of two, the company was able to permanently turn off the second fan and save 9,227 MWh every year. This project was made possible by the IEOP program, which contributed 50 percent of the required funds to complete the project. In the end, the company's payback period for the investment was just 1.7 years.

More than 27 companies have signed up for IEOP to date, in sectors ranging from mining, oil and gas, manufacturing and agriculture, to paper products. Uptake in the program is projected to grow along with Saskatchewan's population and economy. And as it does, SaskPower will be there, exploring ways to give its customers the power to save.



Source: SaskPower

## Competitiveness and productivity

### Imperial Oil Sarnia improves operations with steam leak repair program

Natural gas consumption  
reduced by 7.5 million  
cubic metres

More than \$3 million in  
annual energy savings

A reduction of 14,350  
tonnes (t) in carbon  
dioxide (CO<sub>2</sub>) emissions



Imperial Oil's Sarnia site includes integrated chemicals manufacturing and a petroleum research facility. The operation can process about 124,000 barrels of crude oil per day, which provides customers with heat, transportation and manufacturing feedstock.

Imperial first identified its steam system at the Sarnia facility as an energy-intensive process where investing in energy efficiency could pay off. The huge plant size was a challenge in implementing the approach.

**Union Gas Limited** account and project managers then worked with Imperial Oil to identify steam system improvements and to verify the energy costs of steam system losses. Union Gas also provided \$140,000 in incentive

funding for steam system projects at the facility.

As a result of this initiative to address steam leaks, Imperial dedicated a full-time employee and invested in new equipment to test and repair all 9,000 steam traps across the site and set up a site steam leak repair program at the refinery.

Other benefits of implementing a steam leak repair program include:

- Steam losses well below the industry average.
- Early problem identification to avoid major costs.
- Short project payback periods.
- Savings channeled into operational improvements.

**“We find that our dedicated steam system efficiency program pays for itself. The savings are so valuable that the return on investment is almost immediate.”**

- **George Pfaff, Energy Coordinator  
Imperial Oil Sarnia**

Source: Union Gas Limited

## Kamloops' New Afton mine uses energy management to be a world leader

**A 1 percent reduction in energy costs is worth hundreds of thousands of dollars per year.**

**Each project also had operational, environmental and safety benefits.**

**The mine is on track to exceed their energy savings objective of 9 gigawatt hours (GWh).**

The life span and profitability of a mine is inextricably linked with fluctuating commodity prices and substantial expenses for energy. Because of efficient production and very specialized mining methods, New Gold is one of the lowest cost producers in the global mining industry. They anticipate that energy management will reduce their costs even further.



New Gold's New Afton mine is the first mine in North America to achieve ISO 50001 certification by implementing an energy management system. The mine underwent an energy review and energy improvements that led to cost savings, operational improvements and safer working environments.

An energy management information system (EMIS) was essential to enable plans, decision making and taking effective action to manage energy use and costs. The system relies on meters, relays and transmitters that produce information that is accurate and readily available to inform forecasting and operational planning, as well as employees making use of that information. Communication, training and awareness play vital roles in reaping the benefits of ongoing energy management.

The New Afton mine received support from **BC Hydro** and **NRCan's ecoENERGY Efficiency for Industry**. Funding from BC Hydro paid for a full-time energy specialist who was dedicated to implementing the system, as well as for equipment such as blowers and compressors and improvements to the mine's ventilation. NRCan provided funding to support the implementation of the EMIS, provided training and recognized New Afton's achievements with a **Canadian Industry Program for Energy Conservation (CIPEC)** Leadership Award. Energy management consultants and suppliers with experience in industrial facilities also played an important role in realizing New Afton's objectives.

**“With low commodity prices and increasing offshore competition, energy efficiency improvement is one of the few places where an increase in profitability can be found.”**

- **Andrew Cooper, Energy Specialist  
New Gold**

Sources: Canadian Industry Program for Energy Conservation (Natural Resources Canada), BC Hydro, New Afton mine

## Corner Brook Pulp and Paper optimizes processes to reduce energy costs

Annual electricity cost savings of \$800,000

Greenhouse gas (GHG) emissions reduced by 17,000 t per year

22 GWh per year of electricity saved



Corner Brook Pulp and Paper (CBPP) newsprint mill is an important part of the economy of western Newfoundland and Labrador. Construction of the mill began in 1923 with the first paper produced in 1925. The company's paper is renowned for its outstanding printability and is used extensively for four-colour printing.

CBPP also plays a role in the generation of electricity. CBPP operates two hydroelectric plants for its energy needs and a cogeneration plant. When they produce steam for paper production, they also use that steam to generate electricity that they sell to Newfoundland and Labrador Hydro. Through a capacity assistance arrangement, a common arrangement between industrial facilities and utilities, CBPP provides additional power to the provincial electricity system by providing Newfoundland and Labrador Hydro access to generated capacity and reducing its demand on the system.

In 2014, Newfoundland and Labrador Hydro's **Industrial Energy Efficiency Program** provided incentives of approximately \$1.2 million to CBPP to support energy efficiency retrofits. The funding supported three projects to reduce energy intensity of pulp production for making paper by upgrading and optimizing the thermo-mechanical pulp (TMP) process. The TMP process is energy-intensive and produces a high quality fibre for papermaking. Wood chips are heated at high temperatures with steam, and the fibres are separated mechanically in a pressurized refiner. This process reduces the wood chips to cellulose fibres (or pulp), which is used to make paper. The retrofits will reduce energy consumption by eliminating several motors and by reducing excessive energy required at the mechanical stage.

**“The paper industry is an extremely competitive business. Energy cost reduction by reducing electrical consumption is one the most impactful initiatives CBPP can undertake. The TMP project has been a complete success and is one more step in CBPP gaining competitive advantage over their competitors. CBPP's long-term sustainability is dependent on the successful execution of initiatives such as this.”**

- **Richard Tull, Vice-president and General Manager  
Corner Brook Pulp and Paper Limited**

Sources: Newfoundland and Labrador Hydro, Corner Brook Pulp and Paper Limited

## Michelin Bridgewater recognized for meeting corporate global energy challenge

**The Energy Olympics initiative engaged 13 teams and 75 employees.**

**Most ideas generated to be implemented within 12 months**

**Energy awareness is now part of the introduction for new hires.**

Michelin Worldwide challenged its plants to shave 20 percent from their energy consumption by 2015. At the Bridgewater operation, the energy manager realized that every employee would have to be engaged in the task in order for the plant to reach its target.

The Energy Olympics was an in-house, plant-wide competition where participating teams and individuals vied for prizes and recognition. The initiative resulted in a spirited contest that promoted energy efficiency awareness, ingenuity and fun.

The gold medal team came up with a scheme to maximize participation and encourage everyone to come up with ideas from their areas of the plant, with each team doing one thing per month to help energy reduction. Other winning ideas included a motivational video, now used as part of employee orientation, and energy-saving tips in the company's day planner.

In addition to the benefits of ongoing plant-wide interest and engagement in energy efficiency, the ideas and solutions that the Energy Olympics generated unified employees and management to work toward reduced energy consumption. The facility was recognized for their accomplishments. Bridgewater's accomplishments were recognized by Michelin's North American Headquarters, and the facility was awarded the first **Bright Business North Star Award** by Efficiency Nova Scotia.

**“For us, the key was making energy awareness part of the everyday running of the business, making it one of the metrics in the manufacturing process we can benchmark against.”**

- **Travis Crouse, Tire builder  
Michelin Bridgewater**



Source: Efficiency Nova Scotia



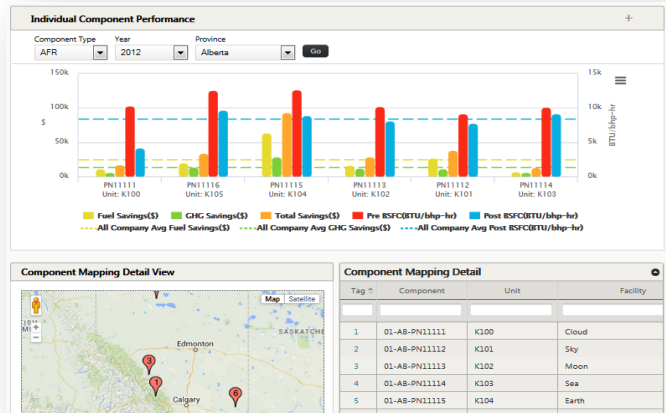
# Automated savings and best practices for the oil and gas industry with Cap-Op

DEEPP users have saved \$2.6 million of fuel gas.

Project returns improved by 34 percent over a two-year period.

\$900,000 of value added by verifying 60,000 t of carbon offsets

Energy efficiency in the oil and gas sector offers substantial opportunities. As compared to large emissions sources such as oil sands operations and electricity generation, oil and gas energy efficiency encompasses a very large number of relatively small but repeatable projects. Small projects must be executed and tracked very efficiently in an automated and standard manner to meet cost thresholds. Cap-Op's Distributed Energy Efficiency Project Platform (DEEPP) automates and standardizes data acquisition and handling to streamline equipment performance and air emissions reporting for such projects, while combining administrative and management functions to avoid duplication. It also integrates asset management and emission reduction reporting and includes real-time reporting on project results.



DEEPP's first module focused on efficiency improvements for natural gas compressor stations. In natural gas applications, efficiency projects enable compounded productivity gains since the fuel gas saved stays in the pipeline for sale to consumers. The program is being expanded to focus on adding technologies and offset projects to the platform, including replacement of high-bleed pneumatic devices.

Cap-Op received funding from several government programs and industry groups to develop and implement DEEPP for Canada's oil and gas sector:

- NRCan (ecoENERGY Efficiency for Industry)
- National Research Council (Industrial Research Assistance Program )
- Environment Canada
- Alberta Department of Energy
- Petroleum Technology Alliance of Canada, an industry-based organization that facilitates innovation, collaborative research and technology development, demonstration and deployment for a responsible Canadian hydrocarbon energy industry

**“The Cap-Op [DEEPP] system improved our operational efficiency . . . by helping us economically achieve GHG offsets and [by] monetizing that value.”**

- Milos Krnjaja, P.Eng.  
Energy Efficiency Engineer, Cenovus Energy Inc.

Sources: Natural Resources Canada and Cap-Op Energy Inc.

## ArcelorMittal's global energy management network

Corporate goal of reducing CO<sub>2</sub> emissions by 8 percent from the 2007 level by 2020

Forum established 26 standardized best practices used across all plants

Management tracks progress of meetings to show value of meetings

ArcelorMittal is the world's largest steel and mining company with more than 230,000 employees and operations in 60 countries. The size and diversity of the company's employees and sites offer a tremendous opportunity to share knowledge and best practices. The company's international round tables represent "networking opportunities that encourage contacts among plants to share information, best practices and expertise on energy efficiency and other issues," explains Sonya Pump, Senior Energy Specialist at ArcelorMittal Dofasco in Hamilton, Ontario, Canada's largest producer of flat rolled steel.

Employees and managers involved in energy-related projects at ArcelorMittal Dofasco take part in regularly scheduled, energy-focused meetings. Meeting objectives include discussions about best practices and the replication of energy projects and initiatives. The meetings also provide updates on issues such as global energy pricing, energy trends, research updates and technology. Pump adds that internal benchmarking and ideas and opportunities on how to close these gaps are discussed. "At each face-to-face meeting, participants commit to follow up on two to four practices or projects," says Pump. "We follow up on these during web and conference calls throughout the year, and while some may not translate into implementation, they provide ideas to test in each plant."

A recent ArcelorMittal meeting in Hamilton included 32 participants from 19 plants in North America. The North American group also has a monthly discussion on research initiatives and holds regular world-wide conference calls where best practices are shared. At a meeting in Belgium, Pump discussed EMIS with 56 representatives from plants in Europe, North America, Asia and Africa that have implemented various EMIS systems.

ArcelorMittal facilities across Canada are members of the CIPEC, a partnership between private industry and the federal government that aims to promote and improve Canada's industrial energy efficiency and reduce GHG emissions from energy use in the industrial sector. NRCan profiled ArcelorMittal's approach to energy management in the monthly newsletter *Heads Up CIPEC*, a web-based publication that highlights companies' successful implementation of energy efficiency measures, which is circulated to more than 10,000 professional and academics interested in industrial energy efficiency. ArcelorMittal facilities also use of programs such as NRCan's **ecoENERGY Efficiency for Industry** and Ontario's **Independent Electricity System Operator's (IESO) Industrial Accelerator Program** to achieve their energy objectives and bring experience to ArcelorMittal facilities around the world.

**"My discussions with managers from Brazil, Spain, Belgium and France about their current systems helped me define the scope and needs of the EMIS system that we plan to implement in Hamilton."**

- Sonya Pump, Senior Energy Specialist, ArcelorMittal Dofasco Hamilton

Source: Canadian Industry Program for Energy Conservation (Natural Resources Canada)



## St. Marys Cement cuts costs with energy management and demand response

Electricity consumption  
reduced by 10.3 million  
kWh

\$750,000 per year from  
demand response  
program energy savings

80 percent of facility  
processes reviewed to  
identify saving

St. Marys Cement is a major producer of cementitious materials. The company forms a key component of North American operations for Votorantim Cement, based in Brazil.

Many of the lowest cost projects yielded the biggest paybacks, including the installation of occupancy sensors, ceiling fans and programmable thermostats and using variable speed drives on motors. Other easy fixes included the use of monitoring and control software, lighting upgrades and automating processes to shut down equipment when inactive.



The single most important change, however, was rescheduling certain plant operations to off-peak hours. The Bowmanville plant participated in **the IESO Demand Response Program (DRP)**, a contract-based program that provided cash rebates to companies that shifted their energy use to off-peak times.

St. Marys Cement achieved these savings with the help of several programs:

- **IESO's DRP**
- **NRCan's ecoENERGY Efficiency for Industry** for implementation of the ISO 50001 Management Systems standard
- **saveONenergy<sup>OM</sup> RETROFIT PROGRAM** offered by **Hydro One** and funded by the **IESO** for lighting upgrades

**“When you are a large industry in a small community, you need to demonstrate to your stakeholders that you are being the best you can be.”**

- **Martin Vroegh, Director of Environmental Affairs  
St. Marys Cement**

Source: Canadian Industry Program for Energy Conservation (Natural Resources Canada)

## Twin Rivers Plaster Rock keeps jobs in Canada

**The payback period on \$17.54 million invested was less than 3 years.**

**Efficiency improvements kept Twin Rivers operating.**

**Sixty-year-old boilers were replaced as part of this project.**

In 2008, energy efficiency projects helped the Twin Rivers Plaster Rock lumber mill keep operating. With support from **Efficiency NB**, now part of **NB Power**, the company decided to study the possibility of installing a biomass boiler to eliminate oil use and cost. The outcome of the study would determine whether the mill would remain shut indefinitely or be the basis of a modernization investment by the company.

At the heart of the upgrades was the purchase of a high-efficiency biomass boiler that made use of waste as a fuel source. Additional upgrades were made to recover and make use of waste heat to make processes more efficient, taking steps to increase the capacity of boilers and a measuring and verification plan to operate the systems at maximum efficiency.

The study of Twin Rivers was completed in early summer 2008 and in July of the same year, the Board of Directors approved the project, investing \$10.5 million for a new biomass boiler and an additional \$4 million for kiln and sawmill upgrades.

**Efficiency NB** was able to draw on their experience with **FPInnovations**, one of the largest private, non-profit forest research centres in the world, to support Twin Rivers. Efficiency NB provided half of the cost for an engineering study to build a detailed business case and highlight potential savings and supported additional studies to identify cost-saving opportunities. Support was also provided to install equipment to measure performance.

As a result of improvements, mill productivity increased, jobs were maintained in the community, the local economy was supported, and local contractors were hired to carry out upgrades.

**“Our oil costs were reaching \$3 million annually, and the savings provided by our projects have made the company more competitive.”**

- **Paul McKinley, General Manager, Lumber Division  
Twin Rivers Paper Company**

Source: NB Power/Efficiency NB and Canadian Industry Program for Energy Conservation (Natural Resources Canada)



## Environmental performance

### Encana uses non-emitting electricity to power environmental performance

**15 GWh of energy saved annually**

**Electrification means that power being used is over 90 percent clean**

**Natural gas producers working with BC Hydro have increased by more than half.**

When natural gas companies develop a new natural gas extraction facility, they typically plan to power their site operations with the energy source that is right at hand: gas. So it was unusual when Encana Corporation departed from this trend and chose to electrify its recently developed Saturn site in northeastern British Columbia.

This was a new idea for Encana, which is used to using natural gas-powered engines. Their production group had to think carefully about taking electrical service from BC Hydro. Encana definitely stepped out of their comfort zone.

Encana worked with **BC Hydro Power Smart** through its New Plant Design Initiative to identify design improvements that would make both the site's compressor and gas gathering system much more energy-efficient than would a standard design. The new site includes design features that make it more efficient, such as:

- A larger diameter pipeline, which reduces the compression load required as a result of lower frictional losses.
- Compressor cylinder upgrades, which decrease flow pressure drops within the cylinders.
- High-efficiency motors that reduce energy consumption.
- Variable speed drives on compressors, which significantly reduce energy consumption compared with using a recycle valve.

"This was a win in three directions," agrees Chris Roberts, BC Hydro's Key Account Manager. "Encana has done great work and gained recognition for it, the sector overall is gaining experience with mitigating greenhouse gas emissions, and BC Hydro is achieving its goal of helping British Columbia shift toward energy conservation."

**"There was a lot of discussion that it was the right thing to do. It ties in with our corporate responsibility of being innovative and doing things differently."**

- **Kevin Stolz, Electricity Analyst  
Encana Corporation**



Source: BC Hydro

## For IBM, sustainability is no longer an option – it is an imperative

Corporate environmental policy in place since 1972

Commitment to energy conservation recognized by NRCan and Hydro-Quebec

\$550,000 saved in 2013

IBM builds energy efficiency into its products and uses energy efficiency as a competitive advantage. Energy- and climate-related issues are at the top of the company's strategic agenda. Effective sustainability provides many corporate benefits, including competitive differentiation and positive brand image; cost efficiencies in energy, water and waste management; and the potential for gaining market share in new and growing segments. Sustainability successes are also communicated publicly to help enhance IBM's image as a company that takes corporate social responsibility seriously.

IBM Bromont must compete against suppliers from around the globe in an industry marked by constant changes in manufacturing processes. Manufacturers must seek out every competitive advantage to remain viable. The plant's energy efficiency program provides a vehicle to continually improve plant operations and reduce costs, in turn improving competitiveness. Energy savings contributed to reductions in operating costs and facilitated the installation of advanced equipment to manufacture new semiconductor technologies.

Since it issued its corporate policy on environmental affairs in 1972, IBM has launched significant energy conservation and efficiency initiatives. IBM sites across the globe are expected to follow corporate best practices, and each site's energy management practices are assessed and ranked. IBM Bromont ranks seventh in energy use across IBM. At the plant level, IBM Bromont's focus on reducing energy use has enabled a 59 percent reduction in GHG emissions since 1990 and \$5.9 million in energy cost savings since 2004. The implementation of the ISO 50001 energy management system, employee engagement and the implementation of more than 180 projects (to optimize boilers, ventilation and water systems, as well as improve manufacturing processes) contributed to these results. IBM Bromont enlists the support of government agencies and utilities to take advantage of funding and expertise. NRCan supports IBM Bromont through **CIPEC**. Utilities **Hydro-Québec** and **Gaz Métro** also play key roles in helping the facility to maximize energy savings.

For their commitment to energy efficiency and sustainable practices, IBM has been recognized by the local community, across the province and at the national level:

- Ville de Bromont awarded the facility with an award for sustainable development in 2013.
- Hydro-Québec named IBM Bromont to its Energy Savers Distinction level for reducing annual electricity consumption by 25 percent between 2005 and 2013.
- IBM Bromont received the 2011 CIPEC Leadership Award for integrated energy efficiency strategy.

**“Our ISO 50001 certification confirms our commitment to energy efficiency, it instills pride in our employees and allows the IBM plant in Bromont to shine through our local community, at the provincial level, throughout Canada and even internationally.”**

- **Louis Labelle, Plant Manager**  
**IBM Bromont**

Source: Canadian Industry Program for Energy Conservation (Natural Resources Canada)

## Suncor Energy Inc. develops a roadmap for Alberta oil sands energy efficiency and GHG mitigation

Alberta became the first jurisdiction in North America to pass climate change legislation requiring large emitters to reduce GHG emissions in 2007. **Climate Change and Emissions Management Corporation (CCEMC)** funding is collected under that legislation, the *Specified Gas Emitters Regulation*, and distributed to projects that demonstrate the potential to make change through transformative technology that has the potential for broad commercialization.



Energy efficiency projects funded by CCEMC reduce CO<sub>2</sub> emissions by finding ways for industrial operations to use less energy and burn less fossil fuel.

CCEMC energy efficiency funding includes a project at Suncor Energy Inc., a Canadian energy company that works in many facets of the industry, including the development and upgrading of oil sands. Suncor’s energy efficiency implementation initiative, the Alberta Oil Sands Energy Efficiency and Greenhouse Gas Emissions (GHG) Mitigation Roadmap, assesses and quantifies potential energy efficiency and GHG emission reductions in a real-time environment during the mining of bitumen, the use of steam-assisted gravity drainage, and in bitumen upgrading facilities.

The initiative set energy benchmarks for each stage of production and identified a list of operational and capital improvements that could be applied to a typical bitumen upgrading facility to improve energy efficiency and reduce GHG emissions. In situ operations were identified as the area with the greatest leverage for energy efficiency opportunities.

	In situ	Mining and extraction	Upgrading	Timing - Uncertainty
<b>Operational improvements</b>	3%	2%	2%	Near term (1–3 years) Low risk
<b>Capital improvements</b>	9%	5%	6%	Mid-term (3–5 years) Moderate risk

Source: Climate Change and Emissions Management Corporation