

Needs For and Alternatives To

**APPENDIX J**

**10/11 Sustainable Development Report**

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# 10/11 Sustainable Development Report



Registered to ISO 14001

 **Manitoba  
Hydro**

# TABLE OF CONTENTS

Message from the President	2
Introduction to Manitoba Hydro	3
Awards and Accolades	4
Manitoba Hydro Awards	4
Manitoba Hydro Place Awards	5
Wuskwatim	6
<b>PROTECTING THE ENVIRONMENT</b>	<b>10</b>
Environmental Sustainability Performance Indicator	10
2010 Gross Emissions and Sources of Greenhouse Gases (GHG)	10
Major Projects Update	12
Pointe du Bois	12
Keeyask	12
Conawapa	14
Riel Reliability Improvement Initiative	15
Bipole III Transmission Project	15
Environmental Management System Update	16
Spill Statistics	17
Reuse and Recycling	18
The Waverley Service Centre:	
Manitoba Hydro's Industrial Waste Management Hub	18
CentrePort Gas Pipeline Relocation	20
Transmission Line Vegetation Management Improves Reliability	22
Preparing for a Changing Climate	23
Protecting Biodiversity, Improving Reliability	24
Great Falls Fish Movement	25
<b>STRENGTHENING THE ECONOMY</b>	<b>26</b>
Economic Sustainability Performance Indicators	26
Saving with Power Smart*	27
Power Smart First Nations Program	28
Power Smart New Buildings Program	28

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Pyrolysis Oil Demonstration Project	30
Keeping Electricity Rates Low	31
Capturing Energy from Wind	32
Improving Operational Efficiency	33
Aboriginal and Northern Procurement	34
Green Purchases	34
Tourism	34
Aboriginal and Northern Procurement	35
<b>SUPPORTING COMMUNITIES</b>	<b>36</b>
<hr/>	
Listening to Our Customers	36
Lake Winnipeg Regulation	38
Helping to Reveal Manitoba History	40
Keewatinohk Sipiia Partnership Fund	41
Environmental Partnership Fund	42
Forest Enhancement Program	43
<b>SUSTAINING OUR WORKFORCE</b>	<b>44</b>
<hr/>	
Social Sustainability Performance Indicators	44
Safety Report 2010/11	44
Empowering Employees and Reducing GHG	46
Environmental Management in Action Online Learning Opportunity	46
Achieving a Diverse and Representative Workforce	48
Building Relationships with Future Employees	50
<b>CORPORATE PROFILE</b>	<b>52</b>
<hr/>	
Our Vision	52
Our Mission	52
Sustainable Development Principles	52
Environmental Management Policy	53



## Message from the President

Manitoba Hydro has long been committed to the integration of sustainable development into all aspects of our operations. The concept and application of sustainable development are based upon the recognition of the interconnections between the environment, economic development and social responsibility as actions in one area may affect actions in another.

The 2010/11 Sustainable Development Report is an opportunity to provide information about the activities undertaken during the fiscal year April 1, 2010 to March 31, 2011. In this edition, our fifteenth, activities are organized under the headings: *Protecting the Environment, Strengthening the Economy, Supporting Communities and Sustaining Our Workforce*. Content has been included that provides an overview of our efforts towards sustainability as we endeavour to meet the energy needs of Manitobans today without compromising the ability of future generations to meet their needs.

Our progress and positive results as we continue to provide outstanding reliability and service to the people of Manitoba are possible only through the commitment and hard work of our employees and our Board. I would like to take this opportunity to sincerely thank all involved for their efforts and offer congratulations on our mutual success. As we move forward on the sustainability pathway we will continue to integrate traditional, social, technical, economic and environmental considerations into decisions and actions. We will continue to be diligent in our pursuit of finding better ways of doing business in the interest of being responsible stewards in the communities where we operate.

We welcome feedback from all of our stakeholders. If you have any comments or suggestions on how Manitoba Hydro may better communicate our actions towards sustainability, please contact us.

A handwritten signature in blue ink that reads "Bob Brennan". The signature is fluid and cursive.

R.B. Brennan, FCA  
President & CEO

## Introduction to Manitoba Hydro

Manitoba Hydro is a provincial Crown Corporation, providing electricity to over 537,000 customers throughout Manitoba and natural gas service to over 265,000 customers in various communities in the Province. We also export and import electricity within wholesale markets in Canada and the Midwestern United States.

We are over 6,000 people working throughout the province. With capital assets-in-service at original cost approaching \$13 billion, Manitoba Hydro is one of the largest integrated electricity and natural gas distribution utilities in Canada.

Manitoba Hydro is governed by The Manitoba Hydro-Electric Board, whose members are appointed by the Lieutenant Governor in Council.

### Our System

Nearly all of the electricity Manitoba Hydro produces each year — about 30 billion kilowatt-hours (kWh) on average — is clean renewable power generated at 14 hydroelectric generating stations. The corporation also maintains two thermal generating stations and four small remote diesel generating stations. Power is also purchased from two independent wind farms in Manitoba at St. Leon and St. Joseph. Electricity is delivered to our customers over 11,700 kilometres (km) of transmission lines and 75,000 km of distribution lines. Transmission lines operating at voltages between 115 kV and 500 kV are used to transfer electricity from the generating stations across the province, inter-provincially and internationally. Distribution lines are used to link the end customer to Manitoba Hydro's electrical system. These lines are typically shorter and operate at lower voltages ranging from 4 kV to 66 kV.

Manitoba Hydro is also a major distributor of natural gas serving customers in nearly 100 communities, primarily in southern Manitoba. Natural gas is purchased from producers in Alberta and transported to Manitoba through the TransCanada Pipeline network. The gas is then delivered to our customers via 5,000 km of distribution pipe.

## Awards and Accolades

### Manitoba Hydro Awards

Manitoba Hydro received a number of awards in 2010/11. We are proud to be recognized at the local, provincial and national levels for our activities, programs and services.

**ENERGY STAR Participant of the Year** from Natural Resources Canada at the annual Market Transformation Awards which celebrate best practices in innovation and energy efficiency in all economic sectors. Manitoba Hydro was recognized as a national leader for transforming the market. This is a result of Manitoba Hydro's Power Smart Program's ongoing promotion of the ENERGY STAR label for a wide variety of residential and commercial products, including appliances, furnaces, boilers and lighting products.

**2010 Commuter Challenge Gold Award** in the 3,000+ employee category from Resource Conservation Manitoba. Manitoba Hydro employees participated by walking, car pooling, bussing, or riding their bikes to work during the national five-day competition held to raise awareness of the environmental impact each person can make in their daily routine. Employee participation rates have rapidly grown over the years, with 6 per cent taking part in 2005, 12 per cent in 2009 and a record 15 per cent in 2010. In just one week, employees spared the environment nearly 37,000 kilograms (kg) of greenhouse gas (GHG) emissions, equivalent to taking 10 cars off the road for one year.

A 2010 J.D. Power and Associates Report ranked Manitoba Hydro as **Highest in Residential Customer Satisfaction** among large electric utilities across Canada. The study was based on responses from residential customers served by the 16 largest electric utility companies. Six factors were measured: power quality and reliability, price, billing and payment, corporate citizenship, communications and customer service.

Manitoba Hydro was recognized as one of **Canada's Top 100 Employers** in a nation-wide competition. Over 2,750 companies that applied for recognition were evaluated on physical environment, work atmosphere and communication, health, financial and family benefits, diversity, environmental leadership and community involvement. Employers were compared to other organizations in their field to determine those that had the most forward-thinking programs. Manitoba Hydro, which has always enjoyed a reputation for being a great place to work with excellent working conditions and competitive compensation and benefits, entered this competition for the first time in 2010 to promote and differentiate the corporation from other employers that are competing to recruit key talent.



Manitoba Hydro was named ENERGY STAR Participant of the Year by Natural Resources Canada at the 2010 ENERGY STAR Market Transformation Awards held June 9, 2010 in Ottawa.

15 per cent of Manitoba Hydro employees participated in the 2010 Commuter Challenge resulting in first place in the 3,000+ employee category.

Manitoba Hydro was recognized as one of 2011 Canada's Top Employers competition as a company that provides exceptional workplaces for employees.



## Manitoba Hydro Place Awards

Manitoba Hydro Place embodies and demonstrates Manitoba Hydro's commitment to sustainable development. Integrating time-tested environmental concepts with advanced technologies, Manitoba Hydro Place is considered to be the first of the next generation of sustainable buildings.

The 22-storey 64,590 m<sup>2</sup> building is the largest office tower in Winnipeg, accommodating over 1,800 employees. The formal Integrated Design Process was utilized to achieve the project objectives for energy efficiency, a healthy workplace environment, urban revitalization, sustainability and architectural excellence. Designed for a climate where temperatures fluctuate 70°C annually, Manitoba Hydro Place is a model for bioclimatic design. The building's form and orientation maximize low grade solar thermal energy, wind for cooling and ventilation, and sunlight for natural lighting. From an energy usage perspective, Manitoba Hydro Place is the most energy efficient office tower in North America using just 88 kWh/m<sup>2</sup>/annually — a 66 per cent improvement over the standard *Model National Energy Code for Buildings*. While targeting LEED Platinum certification, Manitoba Hydro Place has, more importantly, achieved its ultimate goal of a superior indoor environment for the health and well being of its employees.

As the recipient of the following awards in 2010/11, Manitoba Hydro Place was recognized for its excellence in engineering, architecture, energy efficiency, urbanism and sustainability.

The American Institute of Architects and its Committee on the Environment (COTE) named Manitoba Hydro Place one of the **Top 10 Examples of Sustainable Architecture and Green Design Solutions** for 2010. The COTE Award is the profession's best known recognition program.

**2010 Keystone Award of Excellence for Building Engineering** from the Consulting Engineers of Manitoba in recognition of innovation, advancement of technology and contributions to society.

**2010 National Award for an Engineering Project or Achievement** from Engineers Canada in recognition of engineering excellence.

**2010 National Green Buildings Award** from Sustainable Architecture & Buildings Homes which recognizes excellence in the design and execution of Canadian residential and non-residential buildings of all types, including new construction, renovations and interior design projects.

**2010 Commuter Friendly Workplace Gold Level Award** from Resource Conservation Manitoba, this award recognizes Manitoban companies and organizations that walk the talk by encouraging and supporting green commuting by employees year-round.

**2010 Award of Excellence for Buildings** from the Canadian Consulting Engineers, the award is Canada's highest mark of recognition for projects by Canadian consulting engineering firms.

**2010 National Urban Design Award** from the Royal Architectural Institute of Canada. This award recognizes individuals, organizations, firms and projects that have contributed to the quality of life and sustainability in Canadian cities.

**2010 Manitoba Excellence in Sustainability Award for Research and Innovation for Sustainability**, from the Manitoba Round Table for Sustainable Development which recognizes champions of sustainability, showcases home-grown success stories and, most importantly, inspires other individuals and groups to take action.



Manitoba Hydro received the 2010 Manitoba Excellence in Sustainability Award for Research and Innovation from the Manitoba Round Table for Sustainable Development.

## Wuskwatim

Wuskwatim is a 200-megawatt (MW) generating station under construction on the Burntwood River. It is located 45 km southwest of Thompson in Nisichawayasihk Cree Nation (NCN) traditional territory, downstream of Wuskwatim Lake at Taskinigup Falls. Wuskwatim, the first new hydroelectric facility to be built in Manitoba since the completion of Limestone in the early 1990s, will produce clean, renewable hydroelectric power to help meet Manitoba's future domestic needs and provide energy to export customers.

The planning and development of the Wuskwatim Generation Station exemplifies Manitoba Hydro's ongoing commitment to sustainability. It is a multi-faceted project that incorporates responsible actions to address environmental, social and economic issues. Wuskwatim demonstrates Manitoba Hydro's commitment to First Nations engagement. The generating station is being developed by the Wuskwatim Power Limited Partnership (WPLP), an entity involving NCN and Manitoba Hydro. This partnership introduced to Canada an innovative concept between a utility and a First Nation in the development of new hydroelectric generation projects.

Both partners have fulfilled essential roles in the planning and construction of Wuskwatim. Manitoba Hydro's vision was to construct a new generating station in an environmentally sensitive, economically viable and socially conscientious manner. NCN approached the project with the purpose of maintaining the traditional use of the land while providing the community with the economic benefits of being a partner in the development and operation of a hydroelectric generating station.

On behalf of WPLP, Manitoba Hydro manages the construction of the project and will be responsible for the operation and maintenance of the generating station. Manitoba Hydro and NCN jointly developed Wuskwatim as a low head, 200 MW "run-of-river" station rather than capturing the full 350 MW potential at the site in order to minimize local environmental impacts. As a result, the construction of Wuskwatim will create less than one-half of one km<sup>2</sup> of flooding. The \$1.3 billion generation project is scheduled for completion in 2012.

### 2010/11 Activities

A major milestone in the construction sequence was achieved in August 2010 at Taskinigup Falls when the Burntwood River was closed off with a new cofferdam and the river diverted through the station's spillway. The cofferdam stopped the natural flow of the river and diverted it through the station's spillway structure, allowing workers to begin building the main dam in dry conditions.

By the end of this fiscal year, about 80 per cent of the concrete had been placed with most structures now complete as 54,600 m<sup>3</sup> of concrete were placed during the year in addition to the 65,000 m<sup>3</sup> already placed since concrete work began in May 2009. Additional concrete placement is still required for the powerhouse and miscellaneous structures.



*Measuring the slope along transect.*



*Measuring and assessing characteristics of a beaver lodge Fall 2010.*



Wuskwatim aerial shot.



Left: Recording transect information. Right: Wuskwatim construction.



NCN Citizens gathering traditional medicines during the 2010 Wuskwatim Ethinesewin tour. Ethinesewin is the traditional knowledge and collective wisdom of Nisichawayasihk people.

As in past years, 2010/11 monitoring activities were performed in accordance with prescribed legislation, permits and authorizations, as well as the Wuskwatim Project Development Agreement signed between Manitoba Hydro and NCN. Total suspended solids and continuous turbidity monitoring took place in the Burntwood River before, during and after major in-stream construction activities. This included removal of the rock plug at the end of the spillway channel, construction and removal of various cofferdams and diversion of the river through the spillway for the first time. The spillway gates were systematically opened to minimize sediment inputs into the river and as a result, monitoring indicated that no significant change in total suspended solids occurred during the process.

Pre-impoundment GHG monitoring is being undertaken to measure GHG emissions before the creation of the forebay. Terrestrial monitoring included aerial and ground surveys of aquatic fur bearing animals to determine current lodge locations as well as pre-project data collection to determine baseline mercury levels in muscle and liver of these same animals.

Heritage resources were recovered during the intensive pedestrian survey and shovel testing that was conducted after the unearthing of a pre-European contact burial. A number of new artifacts were discovered at previously recorded heritage sites.

After five years of construction activities, socio-economic monitoring continued to provide information on the economic and social impacts resulting from the project. The project continues to contribute significantly to Manitoba's economy in terms of employment, labour income and tax revenues. From the start of construction to the end of March 2011, WPLP has purchased almost \$144 million in goods and services from Northern Manitoba Aboriginal businesses, including \$136 million and \$2.8 million from NCN and Thompson based businesses respectively, of which \$20.5 million was spent in the 2010/11 fiscal year.

A second survey of indirect and induced impacts was undertaken with the assistance of Aski'Otutoskeo Ltd., NCN's monitoring company, and the support from NCN's Implementation Office staff. Businesses in Thompson and Nelson House were surveyed to assess the indirect and induced employment and business opportunities that occurred during peak general civil contract activity. The intensive construction activity undertaken in 2010/11 resulted in project employment



*Woman offering tobacco to the grandfathers by the sweat lodge during the river closing ceremonies.*

peaking at just over 1,050 workers, slightly lower than the previous year peak. Aboriginal workers continue to be a significant part of the workforce, comprising 39 per cent of all hires from construction start to March 2011.

Numerous measures are in place at Wuskwatim to support the retention of northern and Aboriginal employees at the job site and to ensure that sensitivity and respect for local culture is demonstrated throughout construction of the project. Activities include on-site cultural awareness training for employees, voluntary counselling services and cultural ceremonies held at key construction milestones. To commemorate the flow of the Burntwood River through the Wuskwatim structure, a special river closing ceremony was held. Organized by the cultural coordinator for the project, the ceremony acknowledged NCN's respect for the land and water and Manitoba Hydro's commitment to develop projects in cooperation and consultation with local people by incorporating aboriginal aspects and considerations. The event was attended by NCN Elders, Chief and Council members and Manitoba Hydro representatives and featured a pipe ceremony, sweat lodge and spiritual offerings at the river's edge.



Top: Opening the river.  
Bottom: Wuskwatim construction.



Ti-Pi used during the river closing ceremonies.

# PROTECTING THE ENVIRONMENT

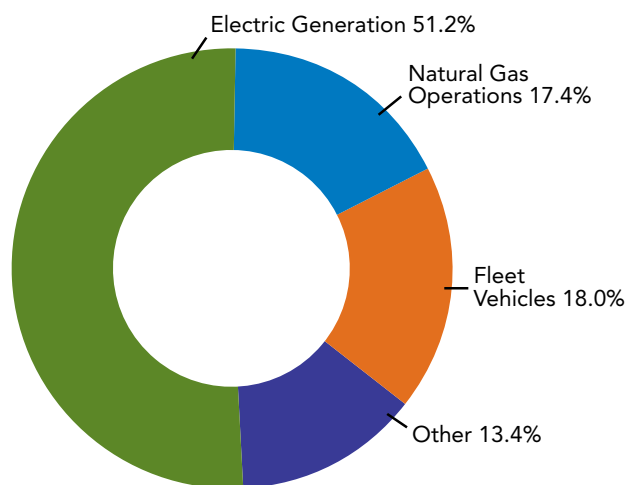
At Manitoba Hydro, we strive to be proactive in protecting the environment in everything we do. We accomplish this by integrating environmentally responsible practices in all aspects of our business. Environmental protection is carried out by employees whose time is fully dedicated to monitoring programs, climate change initiatives, environmental research and development. It also takes the form of day-to-day efforts by our employees who integrate environmental considerations while carrying out their duties and responsibilities.

## Environmental Sustainability Performance Indicator

INDICATOR	TARGET	PERFORMANCE
Greenhouse gas emissions from Manitoba Hydro Operations	< 520 kilotonnes/yr (6% below 1990 levels)	132 kilotonnes (Calendar 2010)

## 2010 Gross Emissions and Sources of Greenhouse Gases (GHG)

Over 98 per cent of the electricity Manitoba Hydro supplies the province and export markets is clean, renewable hydro generated electricity. Manitoba Hydro's GHG emissions represent only two per cent of provincial emissions and are among the lowest of any Canadian utility.



2010 Greenhouse Gas Emissions by Source

The largest and most variable sources of emissions are the result of the combustion of coal and natural gas to generate electricity. These fossil-fuelled sources of emissions must always be ready to respond to demands for power in emergency situations, such as drought and equipment outages. The remaining GHG sources are both lower in magnitude and are relatively stable as the actual annual emission amounts do not vary much. The Other category includes emissions from natural gas used for building heating, emissions from diesel generation used to provide power in four remote northern communities and emissions of sulphur hexafluoride (SF<sub>6</sub>) — a gas that is used in electrical equipment because of its superior electrical insulation properties.

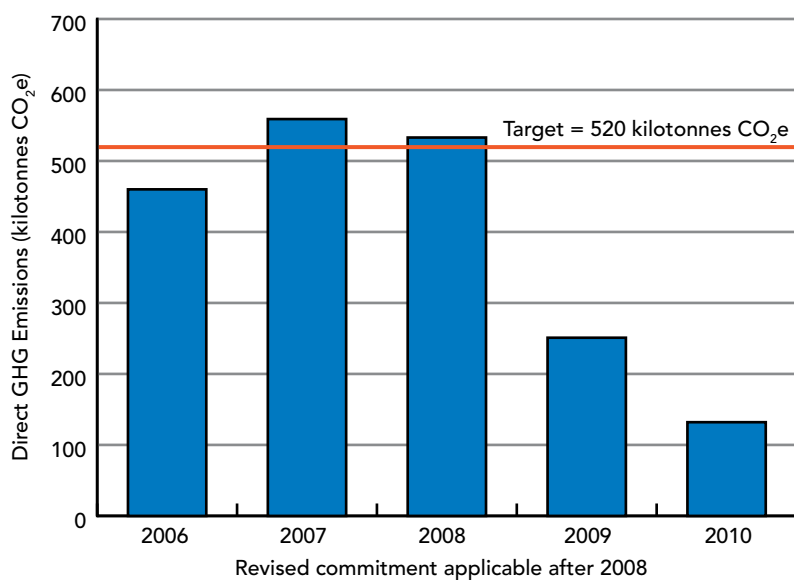
## 2010 Reduction Target and Performance

Manitoba Hydro's target is to maintain annual direct GHG emissions below 520 kilotonnes of CO<sub>2</sub>e, equivalent to a six per cent reduction below 1990 emission levels. In 2010, direct GHG emissions were 75 per cent below the target (132 kilotonnes of CO<sub>2</sub>e) which greatly exceeded the voluntary commitment. Significant factors that contributed to the success in reducing the production of or increasing the displacement of emissions include:

- the continued development of renewable hydropower,
- the establishment of Power Purchase Agreements with Manitoba wind farms, and
- Power Smart programming that enables increased exports to markets using primarily fossil-fuel generation.

Manitoba Hydro has restricted the operation of its single remaining coal-fired generating unit to only maintain readiness for and to respond to emergency situations. Operating in this manner ensures full compliance with the Provincial *Climate Change and Emissions Reductions Act* which came into effect in 2010.

Manitoba Hydro's exports contribute to significant emission reductions outside of provincial boundaries. When considering the total net implications of operations, both direct emissions from facilities as well as the indirect implications of exports and imports, Manitoba Hydro has contributed to cumulative global emission reductions equivalent to almost 160 million tonnes of carbon dioxide equivalent (CO<sub>2</sub>e) since 1991.



Direct emissions compared to target

## Major Projects Update

Manitoba Hydro is investing in the next era of hydroelectric development now so future generations will continue to benefit from a legacy of affordable, reliable and environmentally friendly source of power. Included are updates on some of the major capital projects undertaken in 2010/11.

### Pointe du Bois

Built in 1911, the Pointe du Bois Generating Station is the oldest operating hydro generating station in Manitoba. In 2002 Manitoba Hydro acquired the station as part of the purchase of Winnipeg Hydro. The Pointe du Bois Spillway Replacement Project is required in order to maintain public and dam safety and to provide a safer working environment for employees.

The project consists of constructing a new primary and secondary spillway along with new earth fill dams. There are no plans to rebuild the powerhouse at this time. The powerhouse will continue to operate with ongoing activities to maintain safety and reliability.

The Environmental Impact Statement (EIS), required under the *Canadian Environmental Assessment Act and the Environment Act (Manitoba)*, and the *Navigable Waters Protection Act* application are anticipated to be filed with regulators in early summer of 2011. Following regulatory approval, the Pointe du Bois Spillway Replacement Project is projected to commence construction in late 2011.

### Keeyask

Working together as the Keeyask Hydropower Limited Partnership (KHLP), development of the Keeyask Generation Project is a collaborative effort between Manitoba Hydro and four Manitoba First Nations: Tataskweyak Cree Nation and War Lake First Nation [acting as the Cree Nation Partners], York Factory First Nation and Fox Lake Cree Nation.

The Keeyask site is located in Northern Manitoba on the lower Nelson River approximately 60 km downstream of the Split Lake community (Tataskweyak Cree Nation) and 175 km northeast of Thompson. The Keeyask Generating Station will be a source of renewable energy providing approximately 695 MW of capacity and producing an average of 4,400 gigawatt hours (GWh) of electricity each year.

In 2010/11 work continued towards the completion of the regulatory review and licensing processes, including finalization of the environmental impact assessment to be filed in the spring of 2012. In March 2011, a preliminary project description for



Artist's rendition of Pointe du Bois spillway replacement – post construction.



the Keeyask Generating Station Project was submitted to federal regulators.

Pending federal and provincial regulatory approvals, construction of the generating station will provide approximately 4,500 person years of direct employment over a seven year period, with first unit in-service targeted for 2019 and all units commissioned by 2021.

The Keeyask Infrastructure Project (KIP) consists of preliminary work on access road construction and camp development. Early action on this infrastructure is intended to maximize local

capacity building, training and employment and to enable timely construction of the Keeyask Generating Station once all necessary regulatory approvals are secured. In addition, Provincial Road 280 will be upgraded as a lead-up to work on Keeyask.

In March 2011 the environmental licence for the KIP was issued to the KHLP. Infrastructure construction is expected to start in summer 2011 and provide an estimated 184 person years of employment over the three year duration of the project.



Top: Biologist and TCN field assistant processing benthic grab samples.  
Bottom: TCN field assistant collecting aquatic habitat data in Looking Back Creek.

Top: Winter caribou trail project.  
Bottom: Juvenile lake sturgeon.

Looking upstream  
at the Limestone  
River Crossing.



## Conawapa

Conawapa Generating Station is currently in the pre-construction and licensing phase. This planned generating station will be Manitoba Hydro's largest hydroelectric project with a capacity of 1,485 MW. Located within the Fox Lake Cree Nation Resource Management Area, the proposed site is approximately 30 km downstream of the Limestone Generating Station and about 90 km northeast of Gillam. The site will utilize the natural steep river banks of the Nelson River, which are more than 50 metre (m) high, to create a reservoir almost completely within the banks and limiting the flooding to approximately 4.2 km<sup>2</sup> of land.

Left: Hydraulics  
workshop.  
Right: Boats in  
Nelson River.



Proposed site of Conawapa.

In 2010/11 consultations and studies were undertaken by Manitoba Hydro with the First Nation communities in the vicinity of Conawapa, including Fox Lake Cree Nation, York Factory First Nation, Tataskweyak Cree Nation, War Lake First Nation and Shamattawa First Nation. Manitoba Hydro, the Province of Manitoba and Fox Lake have entered into a Memorandum of Agreement related to the Conawapa Project and Manitoba Hydro has agreements that establish the process with all of the in-vicinity communities.

Although the earliest in-service date is 2024, a number of engineering and environmental studies are underway leading up to the submission of the EIS. Physical and terrestrial field studies are progressing. As there are more than 38 species of fish found in the lower Nelson River and its tributaries, a number of studies on fish and fish habitat are being conducted. Of special significance are the lake sturgeon, cisco and brook trout species due to their limited distribution in the province, their susceptibility to disturbance and their importance as a source of domestic food.

No final Conawapa development, design or construction decisions have been made by Manitoba Hydro.

### **Riel Reliability Improvement Initiative**

The Riel Reliability Improvement Initiative project involves the construction of a new 230 kV to 500 kV terminal station on the east side of Winnipeg. Initially this project will provide a new station to facilitate additional power flow into southern Manitoba to serve the domestic load, particularly during a severe emergency. The addition of this station will increase the reliability of the transmission network in Manitoba.

In 2010/11, under the guidance of an approved Environmental Protection Plan construction continued including the further development of the site with major earth works, beginning construction of buildings, underground work, such as cable trays and ducts, and a

railway spur. The development of this project incorporates systems to prevent oil filled equipment releases from reaching any surface or ground water. These designs include fast drain and oil containment systems for the large apparatus such as transformers. The site perimeter ditch, which eventually feeds into the containment ponds, will prevent any contaminants from leaving the site. The station will be completed and in-service in 2014.

### **Bipole III Transmission Project**

The Bipole III Transmission Project involves the construction of a new 500 kV high voltage direct current (HVDC) transmission line on a 66 m Right-of-Way (ROW), separated from the ROW of the two existing direct current (DC) lines, along with two new converter stations Keewatinoow in the north, and Riel in the south, just east of Winnipeg. Utilizing steel transmission towers the transmission line will begin at Keewatinoow Converter Station and traverse for approximately 1,350 km to the Riel Converter Station.

Manitoba Hydro conducted a Site Selection and Environmental Assessment process as part of the development of the EIS that included an extensive literature review, field studies, key person interviews, mapping and consultations with stakeholders, Aboriginal groups and communities and the general public. The EIS will present information on the environmental assessment for the project, including the final preferred route. Work on the development of the EIS continued in 2010/11.

As part of the environmental assessment, Manitoba Hydro, in cooperation with Manitoba Conservation, conducted field studies on boreal woodland caribou to learn more about their movements and habitat. Collars were placed on the animals in early 2010 and will remain in operation for approximately three years. Manitoba Hydro will use the results to ensure all of their northern development, including the routing of Bipole III, does not

adversely affect the woodland caribou calving grounds and major migratory routes.

Additionally, Manitoba Hydro commissioned a study on the possible effects of DC electric and magnetic fields on electronic devices with a focus on any impacts on devices such as GPS receivers, magnetic, electromagnetic and radiometric surveys conducted for mining, cell phones, radio, television receivers or wireless internet.

Manitoba Hydro is developing an Environmental Protection Plan that will outline the measures that will be taken during construction and operation to avoid, prevent, or reduce potential environmental effects of the project.

On July 29, 2010, Manitoba Hydro released the preliminary preferred route and entertained questions from the public and concerned municipalities to further refine the route. The route avoids National and Provincial Parks and First Nation reserve lands. As part of

the process, extensive public and landowner consultation was conducted from February 2008 – March 2011. It is anticipated that the EIS will be filed in 2011.

Upon submission of the EIS, a review and licensing process will be conducted by Manitoba Conservation under Manitoba's *Environment Act*. Manitoba Conservation will provide the public an opportunity to comment on the Bipole III EIS. In addition, the Manitoba Clean Environment Commission will hold public hearings on the project. Subject to regulatory approval, construction is scheduled to be underway in late 2012, with a 2017 in-service date.

Bipole III will ensure the reliability and security of Manitoba's power supply with the additional benefit of adding more transmission capacity to deliver electricity from existing and planned hydroelectric generating stations to southern markets.

## Environmental Management System Update

Manitoba Hydro has successfully consolidated three separate International Standards Organization (ISO) 14001 Environmental Management System (EMS) registrations into one single corporate system. The single system will improve consistency in environmental risk identification and management across the corporation and simplify the administration of the EMS.

The EMS is a cohesive collection of policies, guidelines and plans that help to manage environmental risk and ensure that regulatory obligations are met or exceeded. The system incorporates a process to categorize all of Manitoba Hydro's activities, products and services that have the potential to impact the environment according to risk. Controls to manage these risks are then put in place. These can be in the form of processes or guidelines, such as spill response plans. Under the terms of the ISO 14001 standard, these controls must be documented, tested regularly and communicated.

In March 2011 external auditors conducted the registration audit by reviewing documents and procedures, visiting different sites and interviewing employees. This resulted in a recommendation of Manitoba Hydro's EMS for registration to the ISO 14001 Standard.



*Spill response plans are one way Manitoba Hydro manages the risk of a spill. They are also part of the tools and processes that make up the corporation's EMS.*

## Spill Statistics

Spills and releases are recognized as a significant activity within Manitoba Hydro's EMS. In 2010/11 there were sixty reportable occurrences with 10 priority releases. The results indicate an increase in reportable and priority releases mainly due to a better understanding of reporting requirements for natural gas releases and a change in reporting criteria related to polychlorinated biphenyls (PCBs). In all cases, protocols were followed to clean up areas affected by the releases.

Reportable releases are those that must be reported to regulatory officials. They exceed (but are not limited to other hazardous materials or criteria):

- 100 litres of insulating oil or other petroleum materials,
- 45 parts per million (ppm) of PCBs,
- 10 or more kg of ozone-depleting substances,
- one kg of sulphur hexafluoride, or
- more than five litres of waste oil or antifreeze.

Priority releases are those that involve petroleum products or PCB-contaminated

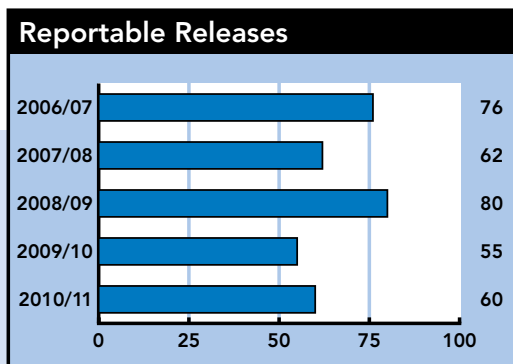
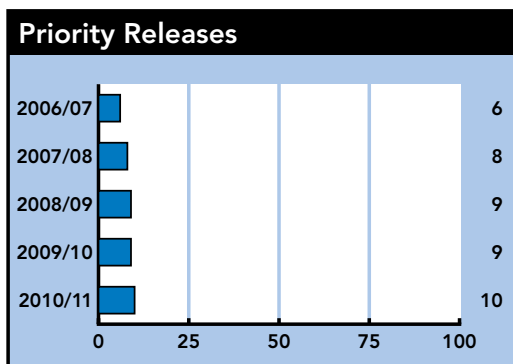
substances in which the release volume is greater than 500 litres, the released petroleum-based substance enters a water body, or the release contained over one gram of PCBs.

Preventive and corrective measures for spills and releases are in place in the form of spill response plans and mitigation systems installed to reduce potential releases to the environment.

An example of Manitoba Hydro's appropriate response to a hazardous materials release in 2010/11 occurred in Winnipeg when a tractor-trailer contacted overhead wires attached to a transformer bank pole. The pole broke and the three transformers ruptured on impact with the ground which released a total of 600 litres of PCB-free insulating oil. The Winnipeg Fire Department reported the incident to Manitoba Hydro and the emergency spill response plan was immediately initiated. Two teams of employees responded. One dealt with the power outage. The other cleaned up the spill using absorbent pads to capture the oil on the asphalt surface and called in a vacuum truck to extract oil released into the sewer system.



Absorbent pads capture oil on the asphalt surface.



## Reuse and Recycling

Manitoba Hydro has a long history of reusing or rebuilding components in its generation, transmission and distribution system. These components range from residential meters to transformers to units within the generating stations themselves.

A number of other reuse and recycling activities are undertaken but are not currently tracked. For example, Manitoba Hydro recycles ash, asphalt and concrete, carpet, dismantled interior partition walls, phone directories, tires, toner cartridges and yard wastes and several rural district/regional offices may utilize collectors and processors in their local communities.



## The Waverley Service Centre: Manitoba Hydro's Industrial Waste Management Hub

The Manitoba Hydro Waverley Service Centre (WSC), located in south Winnipeg, provides a variety of unique environmental services to Manitoba Hydro. WSC facilities and employees are integral to reducing some of the waste streams created by day-to-day activities by centralizing and managing appropriate disposal of both hazardous and non-hazardous industrial wastes.

Hazardous materials produced from Manitoba Hydro's operation and maintenance activities include: used lubricating oil, filters, waste batteries, laboratory chemicals, antifreeze and paints. These are collected at WSC in preparation for recycling or disposal in accordance with provincial and federal regulations.

Services provided by the Apparatus Maintenance Shop located within WSC include: maintenance and repair of electrical equipment, oil processing, PCB decontamination, acceptance testing, safety equipment testing and repair, hazardous waste disposal and machining, manufacture and repair of unique tools and equipment.

Electrical equipment that comes into the shop is assessed and if found acceptable for reuse completely refurbished and sent back out for many more years of service. Any equipment that is not suitable for reuse is completely drained of oil and the oil processed through a system that removes PCBs and other impurities, leaving the oil in a condition suitable for reuse. This treatment system has substantially reduced the amount of new transformer oil purchased, reduced the volume of waste oil disposed of and saved Manitoba Hydro over \$1 million dollars a year.

The surplus electrical equipment is then provided to Manitoba Hydro's Materials Management Department, also located at WSC, for appropriate disposal. The Materials Management Department is responsible for the collection and recycling of all of Manitoba Hydro's scrap metal. Through recycling efforts Manitoba Hydro recovered \$965,486 from the sale of 1,172,548 kg of non-hazardous scrap materials in 2010/11.



Tanks containing recycled oil at the Waverley Service Centre.



Control panel in PCBX rig used for decontamination of oil.

Prior to 2010/11 most scrap metal collected in Manitoba (including scrapped transformers) was sent directly overseas for recycling. At the end of 2009, Environment Canada changed the PCB regulations regarding the export of PCB-contaminated equipment to other countries which changed the way Manitoba Hydro now handles low level PCB-contaminated serialized equipment (above 2 and less than 50 ppm). As the regulation now states that no person shall manufacture, export or import products containing PCBs in a concentration equal to or greater than 2 ppm, Manitoba Hydro can no longer send low level PCB-contaminated equipment (greater than 2 and less than 50 ppm) to any scrap metal recyclers. This equipment must now be further decontaminated to below 2 ppm before it can be recycled. In 2010 low level PCB-contaminated equipment was shipped to a decontamination company prior to recycling.

The following table lists materials received and handled in Winnipeg during the reporting period.

MATERIAL	QUANTITY	RECOVERED	HANDLING
<b>OFFICE RECYCLING PROGRAM</b>			
Aluminum	0.39 tonnes		Aluminum collected at 360 Portage is separated and sorted by and then hauled off site for reprocessing.
Cardboard/Packaging	150.83 tonnes		Cardboard and other packaging material not reused for packaging is collected for reprocessing.
Paper	48.87 tonnes		White paper is recycled into newsprint and tissue products; non-white paper into boxboard, cardboard, and insulation.
Plastic	0.83 tonnes		Used plastic oil bottles and antifreeze containers are recycled locally into parking curbs.
<b>NON-HAZARDOUS SCRAP MATERIAL SOLD</b>			
ACSR (reel & container, scrap)	226,999 kg	\$215,036	Aluminum conductor steel-reinforced (ACSR) poly is sold to scrap dealers or repaired and reused in the system. This includes aluminum scrap which includes pipe, plating, etc., and is sold to scrap dealers for recycling.
Brass	5,686 kg	\$28,135	Sold to scrap dealers for recycling.
Bushings	12,890 kg	\$3,287	Sold to scrap dealers for recycling.
CCSR Cable	9,756 kg	\$34,417	Sold to scrap dealers for recycling.
Control cable	19,024 kg	\$95,763	Sold to scrap dealers for recycling.
CU Bare	4,615 kg	\$27,826	Sold to scrap dealers for recycling or repaired and reused in the system.
CU Poly	12,689 kg	\$75,701	Sold to scrap dealers for recycling or repaired and reused in the system.
CU Underground	0 kg	\$0	Sold to scrap dealers for recycling.
High Density Plastic Pipe	10.3 tonnes		High density plastic pipe remnants from gas installation work are delivered to a local manufacturer for shredding and reuse in their manufacturing process.
Luminaries (Aluminum Road)	35,533 kg	\$21,080	Non-repairable units are sold as scrap.
Meters (Electric & Gas)	109,116 kg	\$77,545	Sold to scrap dealers for recycling.
Miscellaneous scrap	n/a	\$40,462	Sold to scrap dealers for recycling.
Pallets	0	\$0	Standard pallets are reused. Unusable units are sold to a wood recycler and turned into dyed wood landscape chips.
Poles	359	\$6,550	Sold to scrap dealers for recycling. Some salvaged poles are reused as is or cut to another common size and put back in stock. Bits and pieces of scrap timber and poles are routinely sent to Brady landfill for chipping.
Serialized Equipment	337,113 kg	\$274,747	Refurbished and reused where cost-effective. The rest is sold to scrap dealers for recycling.
Station Batteries	1,300 batteries	\$8,450	Sold to scrap dealers for recycling.
Steel	242,553 kg	\$56,487	Surplus steel and bolts that cannot be reclaimed are sold to scrap dealers for recycling.
Low Level PCB Serialized Equipment	154,905 kg	\$0	Shipped for decontamination prior to recycling.
<b>HAZARDOUS MATERIALS</b>			
Aerosol cans	7,500		Containers are punctured, the contents collected as mixed solvent, and shipped to a hazardous waste facility. Cans are sent to a local scrap metal dealer for recycling.
Antifreeze	11,890 L		Used antifreeze is collected and shipped to a hazardous waste facility.
Apparatus	337,113 kg		After oil is removed, electrical apparatus is sold to scrap dealers.
Batteries (Acid)	1,300		Sold to scrap dealers for recycling.
Bulbs (Fluorescent)	10,646 tubes		Shipped off-site to a lamp recycler for crushing. Aluminum, glass, phosphor powder, and mercury are reused.
Bulbs (HID)	22,815 bulbs		Used mercury and sodium vapour bulbs are shipped off-site to a lamp recycler for crushing. Glass, brass, aluminum, lead, and mercury are reused by industry.
Filters	63 drums		Oil and diesel fuel filters are sent to a local recycler. Filter casings are disposed of as scrap.
Grease	1,640 L		Disposed of through a waste contractor, incinerated, or mixed and burned.
Luminaries Repaired	416		Returned for reuse in the system. Non-repairable units are sold as aluminum scrap (see above).
Mercury	0		Mercury used in various types of electrical equipment is usually recycled and reused on-site. In some cases it is shipped off-site for recycling.
Paints	2,215 L		Some surplus paint is donated to a local charity, while the remainder is incinerated as hazardous waste by a contractor.
PCB Transformers (<200 ppm)	20		Decontaminated to <45 ppm of PCBs and reused in Manitoba Hydro's system or sold to scrap dealers.
PCB Transformers (>200 ppm)	1		Decontaminated to <45 ppm of PCBs and reused in Manitoba Hydro's system or sold to scrap dealers.
PCBX waste	20,295 L		Waste from PCB treatment containing Fuller's earth, caustic water, or polymer is disposed of through a waste contractor.
Transformer Insulating Oil	1,298,750 L		Since 1985 Manitoba Hydro has chemically destroyed PCBs in transformer insulating oil using a registered process. Once the PCBs are removed, the oil is renewed and reused in oil-filled electrical apparatus.
Transformers	940		Repaired in single-phase section and returned for reuse in the system.
Waste Oils	143,985 L		Waste lubricating and hydraulic oils are recycled by a hazardous waste contractor.
Waste solvents	4,920 L		Hazardous waste contractors collect waste solvents and blend them off-site with waste fuels, which are then used for fuel in asphalt plants and cement kilns.

## CentrePort Gas Pipeline Relocation

*Sturgeon Creek bypass. Upstream and downstream dams in place with a trackhoe trenching through the middle.*

*Note the blue trailer pump and hoses taking flows downstream. The bypass allows for the work to commence installation of the 16" natural gas pipeline through and under Sturgeon Creek.*



*Installation of steel plates to prevent water infiltration in between the upstream and downstream clay dams.*



*View of the Sturgeon Creek bypass looking downstream.*

In 2010/11 construction began on CentrePort Canada, a 20,000-acre inland port northwest of the James Armstrong Richardson International Airport. Established as a foreign trade zone, CentrePort Canada will become a hub of transportation activity that brings together road, rail and air cargo to a central location for re-distribution with the intent of facilitating international trade and creating value-added services.

As part of the overall project, the governments of Canada and Manitoba jointly funded the construction of a four-lane divided expressway that links the inland port to the Perimeter Highway. To accommodate this new expressway, Manitoba Hydro relocated approximately three-and-a-half km of 406 mm (16") natural gas steel transmission pipeline. This project presented many challenges, the most significant being the nature of the soil in this area — glacial till, made up of hard pan with scattered large rocks and buried boulders. This required the pipeline be installed by open trenching instead of the less disruptive method of horizontal directional drilling.

The largest environmental challenge was the installation of the pipeline through Sturgeon Creek as the waterway provides fish habitat for feeding, spawning, nursery and over-wintering. Working in a collaborative manner, Manitoba Hydro employees coordinated numerous construction staging and environmental meetings involving the contractor and the CentrePort environmental team.

All team members had to ensure conformance with federal guidelines focused on protection



*Placing clean stone prior to the clay dams. This prevents downstream turbidity in the water when removing the clay dams.*



of fish and fish habitat. To ensure construction did not negatively impact the surrounding environment, turbidity monitoring was required both upstream and downstream of the construction area. Turbidity monitoring was undertaken prior to, during and following construction until turbidity returned to pre-construction levels. The final results indicated that the turbidity levels fell within nationally recommended limits. Once turbidity monitoring was established, the upstream dam was installed. After the fish had moved downstream along with the flow of water, the second dam was installed to isolate the construction area from Sturgeon Creek flows.

The construction of the temporary dams allowed for bypass pumping, enabling the isolated area to be pumped down to allow a track hoe to trench through the creek bed to install the pipeline. Upon completion, the dams were removed and the creek bottom restored with clean stone. The new 406 mm (16") natural gas pipeline was tied in on March 6, 2011.



*Installation of the 16" natural gas pipeline through the bypass and perpendicular to Sturgeon Creek. The pipe across the trench is the flow of Sturgeon Creek being pumped from upstream to downstream of the dams.*



*Left: Installation of one of the clay dams ovetop of the clean stone. Right: The downstream Sturgeon Creek bypass dam removed.*



*Sturgeon Creek bypass dams and pumps removed with some bank restoration still required. The 16" pipeline now runs under the Sturgeon Creek.*

*Sturgeon Creek bottom restored.*

## Transmission Line Vegetation Management Improves Reliability

Since 1968, the North American Electric Reliability Corporation (NERC) has been committed to the development of standards to ensure the reliability of the bulk power system in North America. These standards have been developed to prevent events such as the Eastern Seaboard Blackout which affected 55 million people in 2003. As part of Manitoba Hydro's export power licences from the National Energy Board, utilities with international transmission lines are expected to comply with applicable NERC standards. NERC standards became mandatory for Manitoba Hydro on June 18, 2007 and enforceable on June 1, 2008.

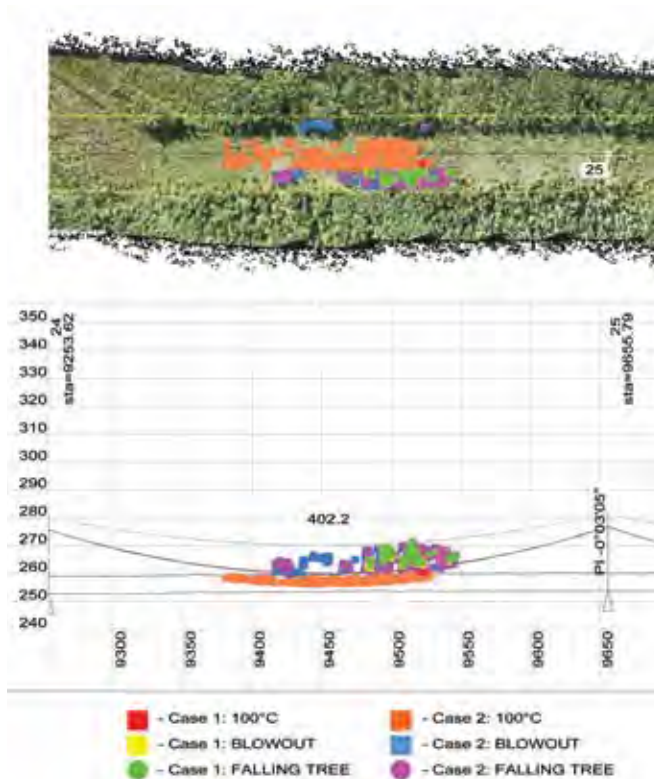
Many of the day-to-day activities of Manitoba Hydro are governed by these mandatory reliability standards and failure to comply carries penalties and sanctions. The NERC Transmission Vegetation Management Standard, applicable to Manitoba Hydro's transmission system with voltages of 230 kV and higher, dictates that a utility must have in place a documented Transmission Vegetation Management Plan (TVMP) that describes the vegetation management standards and the strategy to ensure that these standards are met. The TVMP defines the minimum distance between vegetation and a conductor (transmission line) to prevent flashovers and requires a detailed schedule for inspections and any required vegetation management work. A flashover is a disruptive discharge that may cause outages.

Compliance with the NERC standard requires that no vegetation breach the established minimum distance to the conductor, along with the complete implementation of all other aspects of the TVMP. Vegetation contacts are separated into three categories in order of severity: grow-in, fall in from inside the ROW, and fall in from outside the ROW. Grow-in includes trees growing up under as well as alongside the conductor.

The challenge for Manitoba Hydro line inspectors is ensuring the necessary flash-over gap is not compromised by vegetation growth/movement or conductor movement. Transmission lines can move considerable distances due to sagging as the wire heats up under electrical load and wind.

Movement also varies from span to span depending on time of year, location, span length, line type and tension.

To address this challenge, Manitoba Hydro Line Maintenance uses Light Detection and Ranging (LiDAR) combined with high resolution orthophotography and computer modeling technology to identify potential locations of vegetation encroachment. LiDAR is similar to RaDAR, but uses laser light instead of radio waves to measure the distance to an object. From this, three dimensional models are produced that calculate all possible locations of the conductors, the distance to any surrounding vegetation and the possibility of vegetation contact in the event of a break or fall. Based on the minimum distance clearances between the conductor and vegetation and a growing buffer, locations requiring tree control are identified. Maintenance crews are then deployed to remove encroaching vegetation enabling Manitoba Hydro to better direct resources on a priority basis.



Using LiDAR, a plan and profile of location requiring vegetation control are developed.

## Preparing for a Changing Climate

Climate change is a long-term shift in overall weather conditions. It is measured by changes in temperature, precipitation, wind, snow cover and other weather parameters. It can involve both changes in average conditions and in variability, including changes in extremes.

Global climate has changed over the past century and it is likely that it will continue to change in the forthcoming decades in the form of global, regional and local temperature and precipitation patterns. Increasing temperatures and altered patterns of precipitation will impact the hydrology of Canada, which in turn may affect the generation, transmission and distribution of hydroelectricity.

Manitoba Hydro is investing in the resources and tools required to identify potential risks and/or benefits that the changing climate may have upon future operations. In 2010/11 the Manitoba Hydro Research and Development Program funded two projects.

### Canadian Precipitation Analysis Project

In collaboration with the University of Manitoba and the Meteorological Research Division of Environment Canada, this project will produce real-time mapping of six-hour precipitation accumulation on a 15 km resolution that will be used for hydrological modeling and other water resource applications.

### Isotope-Monitoring Network

In collaboration with the University of Manitoba, an Isotope Monitoring Network on the Nelson River system was established to understand the overall hydrological conditions in the watershed. Water is composed of hydrogen and oxygen molecules and these molecules can have different atomic masses. The measurement of the atomic mass of the hydrogen and oxygen molecules defines a water isotope. Water isotopes are useful tracers of the water cycle because they are naturally occurring and they systematically partition with phase changes (i.e. solid to liquid to vapour) in the hydrologic cycle. Water sampling for water isotopes can help to distinguish water sources, to examine the progressive downstream evolution of flow, to quantify evaporation losses on various reaches and to examine the mixing and interaction of various rivers. The stable isotope data produced by this project, coupled with the existing hydrometric program, will facilitate the calibration of physically-based hydrological models used by Manitoba Hydro in remote watersheds to predict future water availability under a changing climate.



Isotope sampling.



Isotope sampling.

## Protecting Biodiversity, Improving Reliability

Ospreys are large raptors reaching 60 cm in length with a 2 m wingspan. Ospreys are found in a variety of habitats worldwide, but are primarily located near water bodies as their diet consists almost exclusively of fish. Nests are located in high places, such as cliffs, rocky outcrops, trees, or on human-made structures such as utility poles. The nests consist of a large heap of sticks, driftwood and seaweed. Nest-building is an ongoing activity for the birds who return to the same nest annually. In Manitoba, ospreys provide a unique challenge to Manitoba Hydro's operations.

When ospreys nest on utility poles in Manitoba Hydro substations, their habit of dropping sticks on the conductors and equipment can cause both phase-to-phase and phase-to-ground faults. This can result in outages and cause reduced reliability.

To encourage ospreys to locate their nests away from substations, Manitoba Hydro's Line Maintenance crews have installed nesting platforms. These nesting platforms are built on hydro poles that are higher than the structures inside the station. While this doesn't completely prevent ospreys from nesting inside substations, it does reduce the risk of outages caused by the birds.

*Left: Ospreys present challenges to Manitoba Hydro.  
Right: Osprey nest on platform.*



*Osprey nest on platform located outside of substation.*



Great Falls Generating Station.

### Great Falls Fish Movement

In order to better understand fish movement downstream of typical generating stations, a study was completed at the Great Falls Generating Station on the Winnipeg River. Hydroacoustic transducers (highly accurate fish finders) were mounted on the upstream face of the powerhouse to estimate the number and size of fish passing through the Great Falls powerhouse.

From July to November 2010, an estimated 33 to 43 fish per hour (averaged monthly) passed through the generating station. Most of the fish were very small, with 80 per cent of the fish that passed having a total length of 15 cm or less. Fish community sampling immediately upstream of the generating station suggested that the more common species of fish in the forebay include yellow perch, mooneye, spottail shiner, sauger and trout perch.

The study found that most of these fish passing through typical generating stations are very small and are therefore less likely to incur injury or mortality as a result of passage. This study will be continued in 2011/12 to examine the relative movement of fish over the spillway as compared to the powerhouse.



Hydroacoustic fish transducers were mounted on the upstream face of the powerhouse to estimate the number and size of fish passing through the Great Falls powerhouse.

# STRENGTHENING THE ECONOMY

Manitoba Hydro’s mission is to provide a reliable supply of energy to meet the needs of the province and to promote economy and efficiency in the development, generation, transmission, distribution, supply and end-use of energy. Manitoba Hydro engages several strategies to support a strong Manitoba economy. We have implemented one of the most aggressive Demand Side Management programs in North America. We provide reliable electrical service at rates that are among the lowest in North America. We work with potential independent power producers, technology suppliers, customers and others to review and encourage development of economic emerging energy systems. And, we continue to incorporate operational efficiency savings, all of which contribute to enhance the strength of the local, regional, provincial and national economies.

## Economic Sustainability Performance Indicators

INDICATOR	TARGET	PERFORMANCE
Demand Side Management Power Smart	531 MW	556 MW
	1,736 GWh	1,834 GWh
	53 million cubic metres (m <sup>3</sup> ) natural gas	58 million m <sup>3</sup> natural gas
Electricity rates	Lowest in North America	Lowest In North America
Debt:equity ratio	Maximum 75% debt except during years of major investment	73%

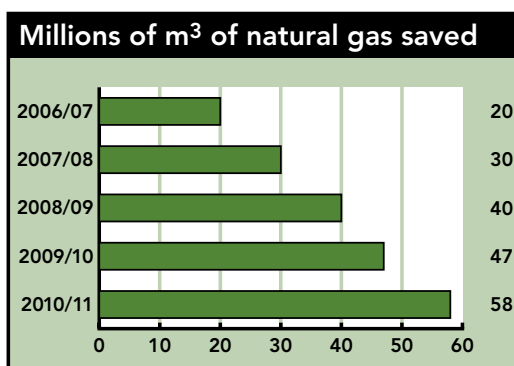
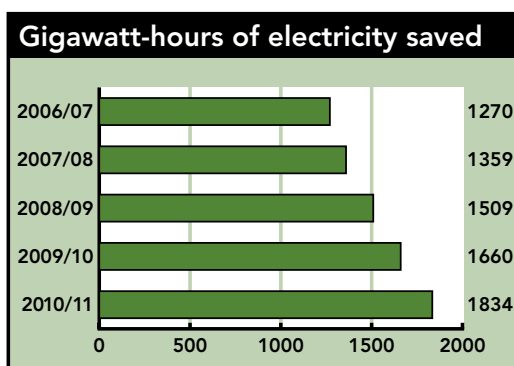
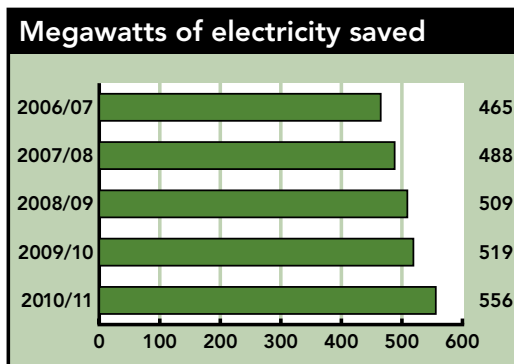
## Saving with Power Smart

Manitoba Hydro's Power Smart portfolio includes 35 customer service, cost-recovery, incentive-based and rate-based programs customized to meet the specific energy needs of residential, commercial and industrial markets. During 2010/11, there have been over 139,564 participants in the various Power Smart programs. Cumulatively, there have been almost 700,000 participants since the inception of Power Smart at Manitoba Hydro in 1989.

Power Smart programs enable lower electricity and natural gas consumption among Manitobans and save participating customers money on their energy bills. Surplus electricity can be exported for revenues that keep domestic prices down and defer the capital expense of infrastructure such as substation upgrades and reduce GHG emissions outside of Manitoba by displacing fossil fuel based electricity generation. Conservation of natural gas directly reduces GHG emissions within Manitoba.

By the end of 2010/11, Manitoba Hydro's current and prior Power Smart portfolio of residential, commercial, agricultural and industrial programs achieved an estimated 1,834 GWh in annual electric energy savings, 556 MW in electric demand savings and 58 million m<sup>3</sup> in annual natural gas savings. This includes 95 GWh and 182 MW of non-persisting savings from the Customer Self-Generation and/or Curtailable Rate programs.

In 2010/11 alone, the savings reduced customers' electricity bills by \$58 million and natural gas bills by \$23 million. Cumulative customer savings to date total more than \$574 million.



## Power Smart First Nations Program

The Power Smart First Nations Program was launched in the summer of 2008 to meet the specific needs of First Nation communities. The program is designed to capture energy efficiency opportunities. A spin off benefit includes economic stimulus within communities when local community members are employed to install the energy efficient measures.

Using a dedicated team partnership approach, each First Nations community works with a Manitoba Hydro energy specialist to help support and encourage the communities to capture energy efficient opportunities. This specialist works with the community to take a holistic approach on energy efficiency and assists in developing effective implementation plans that are executable at the community level. This specialist also works with the community to identify commercial employment opportunities.

Through the Power Smart First Nations Program, Manitoba Hydro provides funding for energy efficiency upgrades including insulation and basic energy efficient materials such as pipe wrap, low flow showerheads, caulking and compact fluorescent lights. Energy efficiency workshops and seminars are offered to the community as well as providing training and funding for the installation of materials. This provides economic support to the community as well as sustainable solutions for home improvements.

Through the Power Smart First Nations Program First Nations communities' energy usage is reduced, jobs opportunities are created and home comfort improved. In 2010/11, 133 homes participated in the program saving 520,297 kWh and 272 kW. The average savings per home was 3,912 kWh providing an average savings per home of \$257.

## Power Smart New Buildings Program

The Power Smart New Buildings Program provides technical guidance and financial incentives for designing, constructing and operating new energy-efficient buildings in Manitoba. Innovative strategies and processes to build cost-effective, energy-efficient buildings include:

- **Integrated Design:** a collaborative approach to building design that includes key stakeholders and design professionals from conception to completion.
- **Building Simulation:** the use of software modeling to maximize the building's energy efficiency.
- **Building Commissioning:** verification and documentation that the new building and systems are planned, designed, installed, tested, operated and maintained for optimal building performance.
- **Energy Management:** recommendations for operational improvements and behavioural changes that manage and minimize energy costs.

A prime example of new construction completed in 2010/11 that meets the Power Smart Design Standards is the MTS Iceplex. This 172,000 ft<sup>2</sup> facility includes four regulation-size rinks, 22 dressing rooms, concessions, a pro shop, conference centre, restaurant and sports bar and fitness training centre. With over 21,900 hours of programming a year, the MTS Iceplex is a new recreational landmark for Winnipeg and surrounding areas.

Manitoba Hydro Power Smart played an integral role in guiding the MTS Iceplex team through the design and construction phases of the project. A number of energy efficient initiatives were implemented to meet the program's minimum requirements of at least 33 per cent greater energy savings than the *Model National Energy Code for Buildings*. These measures included lighting and controls, occupancy sensors, high-levels of insulation, heat recovery systems and high-efficiency condensing water heating systems.

This has resulted in an impressive 1,120,000 kWh in estimated annual energy savings, \$117,700 in yearly bill reduction savings and an annual reduction of 1,310 tonnes of GHG emissions.





*The MTS Iceplex will produce 33 per cent greater energy savings than the Model National Energy Code of Canada.*

## Pyrolysis Oil Demonstration Project

The Pyrolysis Oil Demonstration Project was undertaken as the first of five demonstration projects in Manitoba Hydro's Power Smart Bioenergy Optimization Program. This program assists with the development and introduction of new technologies and alternative fuels in order to establish the technologies' effectiveness in Manitoba. As part of a market development strategy, this project introduced pyrolysis oil as an alternative fuel source into the Manitoba marketplace and developed the technology required to seamlessly integrate it into existing power and heat generation operations.

Tolko's Manitoba Kraft Papers Division, located in The Pas, manufactures high-performance unbleached kraft paper. Due in part to volatile fossil fuel prices, Tolko was interested in exploring alternatives for replacing fossil fuels with suitable renewable alternatives. As the forestry industry is one of the largest employers in The Pas, efficiencies in Tolko's operations have a great impact upon the local economy as well as the community at large.

The steam requirements for both the kraft paper mill and the saw mill are supplied by two large high pressure steam boilers. The Recovery Boiler consumes black liquor, a by-product of the paper-making process. The Power Boiler consumes waste wood and two types of fossil fuels, bunker C and waste oil, to generate the balance of the facility's high pressure steam requirements.



*View of burner head as pyrolysis oil is burned in Tolko's Power boiler.*



*Tolko's Steam and Recover control room where monitoring of the burn test occurred.*



*Manitoba Hydro commissioned the Mobile Burn Test Unit (MBTU), a new technology designed and built to specifically meet the requirements of the Bioenergy Optimization program. The MBTU heats and pumps pyrolysis oil to the burner at correct temperature, pressure and flow rates.*



*Tolko operations in The Pas. As the forestry industry is one of the largest employers in The Pas, the efficiencies in Tolko's operations have a great impact upon the local economy as well as the community at large.*

Approximately 40 per cent of the facility’s electrical power is derived from the steam production via the operation of a steam-driven turbo-generator. Although the fossil fuels represent a small portion of the energy consumed, those fuels represent a significant operating cost for the facility.

The main driver of the project was finding a technology that Tolko could deploy to run their power generation system more economically. In consideration of Tolko’s location, it was apparent that a wood-derived liquid biofuel would be a promising alternative to the heavy fuel oil consumed in its steam and recovery operations. Pyrolysis oil is considered a renewable energy source in that it is a liquid fuel derived from wood waste manufactured through the fast pyrolysis of biomass.

This project was undertaken and completed in three phases. In Phase One, Manitoba Hydro commissioned the Mobile Burn Test Unit (MBTU), a new technology designed and built to specifically meet the requirements of the Bioenergy Optimization Program. In Phase Two, the test procedure and combustion conditions were optimized in preparation of a long-term combustion test. In Phase Three, the continuous operation of a large industrial boiler firing only pyrolysis oil and hog fuel was demonstrated. A stack test was completed during Phase Three to determine the emissions produced from the combustion of pyrolysis oil for comparison with the emissions from the two fossil fuels utilized in the boiler.

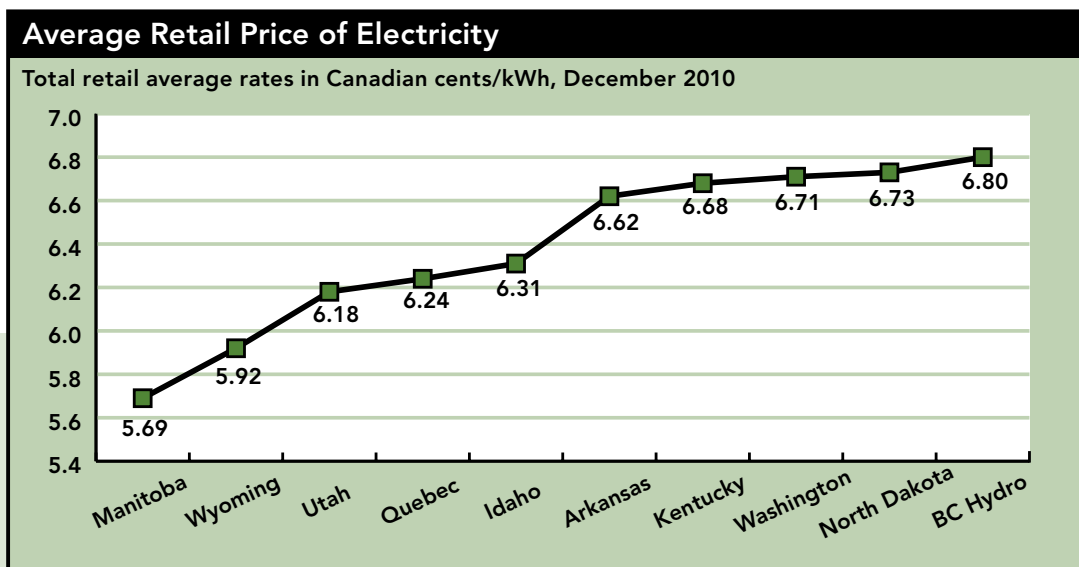
The two main benefits of using pyrolysis oil for combustion instead of bunker C and waste oil were a reduction in the reliance on non-renewable resources and a decrease in emissions.

As the energy content of pyrolysis oil is about half of its fossil fuel equivalents, it is estimated that over 30,000 litres of fossil fuels were conserved during the course of the demonstration project. In consideration of the high market prices of the fossil fuels, this represented a significant cost savings to Tolko.

Through the comparison of emissions, between the combustion of pyrolysis oil instead of the fossil fuel oils, there was a reduction in all metals tested, a considerable decrease in total particulate matter and a significant reduction in the amount of sulphur dioxide emitted from the stack exhaust. If Tolko were to rely solely on pyrolysis oil as a fuel source, they could potentially reduce their GHG emissions by up to 50,000 tonnes a year.

## Keeping Electricity Rates Low

Manitoba Hydro enhances the productive capacity and quality of Manitoba’s economy and well-being by providing reliable services at competitive rates. In the North American utility market, Manitoba Hydro continues to provide the lowest average retail electricity rates.



## Capturing Energy from Wind

In March 2010, Manitoba Hydro signed a 27-year power purchase agreement with St. Joseph Windfarm Inc, owned by independent power producer Pattern Energy, to initiate the development of Manitoba's largest wind energy project. Located approximately 100 km south of Winnipeg, the St. Joseph wind farm covers 125 km<sup>2</sup> of privately owned agricultural land in the municipalities of Montcalm and Rhineland.

Officially opened in January 2011, the St. Joseph wind farm achieved commercial operation in the spring of 2011. The St. Joseph wind farm consists of sixty 2.3 MW turbine generators, set on 80 m high towers. The installed capacity of 138 MW will provide enough clean, renewable energy to serve 50,000 homes and contribute to a regional reduction of more than 350,000 tonnes of GHG.

The St. Joseph wind farm strengthens Manitoba Hydro's position as a leader in renewable energy development and contributes to the corporate target of more than 99 per cent of renewable electricity generation. Although wind energy is intermittent, the addition of it to the Manitoba Hydro portfolio complements existing hydroelectric generation, geothermal activities and aggressive energy-conservation programming.

The construction of the St. Joseph wind farm created new opportunities and jobs and continues to provide a boost to the local, regional and provincial economies. The economic spinoffs to the local economy included construction jobs as well as long-term operational jobs. Financial benefits to landowners and municipal revenues will also be significant over the life of the project.

The St. Joseph wind energy project is the larger of two wind farms in Manitoba. The first wind farm, a 99-MW installation in St. Leon, began operation in 2005 and produces the equivalent of the energy needs of 35,000 homes. In early 2011, Manitoba Hydro participated in discussions regarding a 16.5 MW expansion at the St. Leon wind farm.



Top: St. Joseph wind farm under construction.  
Bottom: The wind farm consists of sixty 2.3 MW turbine generators set on 80 m high towers.

## Improving Operational Efficiency

Manitoba Hydro continuously looks at ways to improve the efficiency of operations and make better use of resources. Some of the activities undertaken in 2010/11 that demonstrate these efforts while providing outstanding reliability and services include the implementation of an internal electronic business process and the reorganization and consolidation of services to better meet the needs of customers and employees.

For several years Manitoba Hydro has promoted the use of public transportation by offering eligible employees discounted City of Winnipeg bus passes payable by payroll deduction. Although encouraging the use of public transit is a green initiative, the internal process used to order and distribute bus passes was not. It involved considerable employee time and a lot of paper, as the forms flowed through several departments before the bus pass could actually be issued. The new paperless process involves a computer-based interface developed to greatly streamline the process by which Manitoba Hydro cashiers distribute bus passes to employees. Upon an employee request for a bus pass, the cashier enters the pertinent information into the interface. If the information is validated, the bus pass is provided and a payroll deduction and confirmation email is generated automatically. As approximately 1,000 employees purchase bus passes monthly, Manitoba Hydro is pleased that the process is now as green as the product.

In keeping with the commitment to provide good customer service, 16 rural Customer Service Centres were created to act as central hubs for the coordination, planning and scheduling of all work undertaken in the defined service areas. Prior to this, district staff in 65 rural offices performed their own specialized administrative function such as estimating and creating work orders. Due to the complexity of these tasks, employees performing these functions may have often experienced challenges in applying this in districts where the volume of work orders was lower. By centralizing this work into the Customer Service Centres, it has allowed these functions to be performed in a more consistent, accurate and effective manner. The role of the district employees remains as the first contact in the communities and allows them to better allocate their resources to perform their work.

With the purchase of Winnipeg Hydro in 2002, Manitoba Hydro and Winnipeg Hydro control system operators began aligning their methods of operation and control with the ultimate goal of centralizing all operations into one location. By amalgamating these functions into one central control centre, Manitoba Hydro was able to eliminate redundancy in operations.

The Control Centre Integration Project concluded in October 2010 when station controls at the Central District Control Centre on Grant Avenue were upgraded and connected remotely to Manitoba Hydro's existing System Control Centre. This allowed for the control and operation of all former Winnipeg Hydro electricity distribution substations from the System Control Centre.

In 2010/11 staffing of the Kettle Generating Station Control room was changed from around the clock operation to five days per week, day shift-only operation. The station is controlled remotely at all other times by the System Control Centre. Reducing onsite control to daytime hours only has improved the work-life balance of employees and their families. The move is expected to help attract and retain more employees in Gillam and help reduce operating costs.

This change in operations is in keeping with other generating stations such as Kelsey, Jenpeg and various stations on the Winnipeg River which have unmanned shifts. The two year pilot project, launched in January 2011, will provide time to resolve issues and collect data on the effectiveness of changing the operating hours of the control room. If successful, other stations on the lower Nelson River will evaluate the potential benefits of changing their control room schedules.



*Employee bus passes can now be provided instantly by the cashier.*



*Kettle Control room controlled remotely during off hours has improved the work life balance of employees and is expected to help attract and retain more employees in Gillam and help to reduce operating costs.*

## Green Purchases

Environmentally preferable products have a lesser or reduced effect on human health and the environment when compared with competing products serving the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance and disposal of the product. Environmentally responsible or “green” procurement stresses the purchase of this type of product.

In keeping with the sustainable architecture of Manitoba Hydro Place, the benches and tables purchased for the developed outdoor spaces, including the terraces, were selected for their environmentally responsible materials as well as their unique design. The furniture is made with recycled plastic slats and a steel frame. The frames are protected with a solvent-free powder coating and a lead-free E-coat rust proofing.



*Benches and tables were selected for their environmentally responsible materials as well as their unique design.*

## Tourism

A growing trend in tourism involves visits to operational facilities where the core activity of the site is not traditionally oriented to tourism. This provides an opportunity for visitors to gain a greater understanding of the products, production processes and historical background of a company. Although this type of tourism has been around for more than 100 years, with tours of wineries and chocolate factories, the idea of Manitoba Hydro operations as a tourist destination is fairly new.

Manitoba Hydro benefits from being a tourist destination of choice in a number of ways. It provides an opportunity to educate the public on how clean renewable electricity is generated from water power, showcases facilities and enhances the company’s profile, helping to attract new employees. Tourism can also benefit communities by providing an opportunity to strengthen the local and regional economy with direct and indirect employment and increase the supply of local tourist products available.

Manitoba Hydro offers three guided tours to the public: Pine Falls Generating Station, Manitoba Hydro Place and the Manitoba Electrical Museum & Education Centre.



*Top: Manitoba Electrical Museum. Visitors can enjoy electrical appliances from the past.*

*Bottom: New Tour Display Room located at Pine Falls Generating Station.*

The Pine Falls Generating Station is located on the Winnipeg River, in the community of Powerview-Pine Falls, which is approximately 119 km northeast of the City of Winnipeg. Of the six generating stations on the Winnipeg River, Pine Falls is the third largest and the newest. It is also the last one on the Winnipeg River before the river reaches Lake Winnipeg at Traverse Bay, 13 km away.

Building tours of Manitoba Hydro Place, located at 360 Portage Avenue in Winnipeg, are available on a limited basis. This award-winning building is a showcase for innovative technologies and demonstrates Manitoba Hydro’s commitment to energy efficiency, sustainability and urban renewal.

The Manitoba Electrical Museum & Education Centre, located at 680 Harrow Street in Winnipeg, tells the story of hydroelectric development in Manitoba from the 1880s to the present. Among the displays, visitors can enjoy electrical appliances from the past and a giant appliance robot. On the lower level, a Discovery Area guides visitors through the safe use of electricity and explains how electrical energy works. A seasonal celebration of holiday lighting trends is held annually from mid-November to early January.

2010/11	NUMBER OF VISITORS	NUMBER OF TOURS
Pine Falls Generating Station	513	n/a
Manitoba Electrical Museum	6,026	134
Manitoba Hydro Place	4,322	368



Left: Manitoba Hydro staff explain to a tour group how air flow is achieved at Manitoba Hydro Place using design features such as these south facing windows that open to the outside when the building is in summer mode. Right: A tour of art work in Manitoba Hydro Place. This collection includes the work of First Nations, aboriginal and contemporary artists with meaningful ties to the province.

## Aboriginal and Northern Procurement

Manitoba Hydro demonstrates the commitment toward the corporate goal of strengthening working relationships with Aboriginal Peoples by using tendering strategies to provide opportunities to maximize aboriginal capacity building, training and employment opportunities.

In 2010/11 Manitoba Hydro’s purchases from Aboriginal-owned companies were over \$42 million, through 580 ongoing construction and other non-construction related contracts of which aboriginal people made up 24 per cent of the total labour force.<sup>1</sup>

<sup>1</sup> This figure does not include purchases by the Wuskwatim Power Limited Partnership.

# SUPPORTING COMMUNITIES

**At Manitoba Hydro, supporting the communities where we live and work is a strong part of our corporate culture and history. Our community roots are built on a legacy of 60 years of providing a highly reliable and efficient energy supply to serve Manitobans. Our community involvement goes beyond providing an energy service as we support community-based charitable organizations throughout the province. We take pride in partnerships with community groups and our role in their development.**

## Listening to Our Customers

Annually the employees in Manitoba Hydro's Customer Contact Centre receive approximately 650,000 calls and 50,000 emails. The volume of calls and emails fluctuate daily based on events such as the weather, the announcement of energy-saving programs and media coverage. All these can have a dramatic impact on the number of inquiries.

The most common questions are about energy bills, customer moving and the Equal Payment Plan. To address common billing and Power Smart questions, Manitoba Hydro has implemented automated telephone service options to provide answers. In addition, services such as appointment reminder calls, call backs for power outages and self-service power outage reporting are offered to customers. With the implementation of the online MyBill service, customers can now view and access their bills and account information online.

Although the number of calls received is decreasing, customers are asking more complicated or multiple questions about a wide variety of topics which has increased the average length of calls. Often these calls relate to follow up on Manitoba Hydro's program and service information available on the website ([www.hydro.mb.ca](http://www.hydro.mb.ca)). The communication method is also changing as more customers choose to send an email or enter the information online rather than placing a call.

To answer questions quickly and efficiently, systems — including databases that serve as quick reference guides — have been set up to assist employees to enable them to access the right information at their fingertips.

The goal of the Customer Contact Centre is to provide positive customer experiences. This goal is met by offering employees training and refresher courses on providing quality service. When considering the volume of inquiries received in 2010/11 (758,753), the number of complaints received (470) is very low.





*The goal of the contact centre, of providing positive customer experiences, is met with training and refresher courses on providing quality service.*

## Lake Winnipeg Regulation

Six major rivers flow into the Lake Winnipeg and only one, the Nelson, flows out. After the Lake Winnipeg flood in 1966, the Province of Manitoba renewed their interest in Lake Winnipeg Regulation as a means to provide flood relief. This project was undertaken to address three objectives: (1) flood control, (2) hydroelectric generation potential and (3) improved navigation.

The natural outlet of Lake Winnipeg located at Warren Landing is augmented by the channels constructed as part of Lake Winnipeg Regulation project in the 1970s. Two-Mile Channel, Eight-Mile Channel and the Ominawin Bypass Channel allow water flowing out of the lake to bypass natural pinch points, such as shallow or narrow channels and increase the lake's outflow capacity by up to 50 per cent over its natural state.

When the water level on Lake Winnipeg rises over 715 feet Above Sea Level (ASL), the *Water Power Act* licence requires Manitoba Hydro to maximize discharges to return the level of the lake to below 715 feet (ASL) as soon as possible. The additional outlet channels along with the Jenpeg Control Structure and Generating Station, located approximately

100 km north of Lake Winnipeg on the Nelson River, are the key tools for this purpose.

In a dramatic turn of events low outflows in the spring of 2010, as a result of the low snowpack from the previous winter, changed to near record inflows in late May and June 2010. The inflows into Lake Winnipeg increased from 70,000 cubic feet per second to 155,000 cubic feet per second. The summer of 2010 saw a record amount of rainfall occur throughout the Lake Winnipeg watershed which was significant in not only the volume of inflows into Lake Winnipeg but in how long these inflows were sustained. These two factors produced a peak level on the lake of 715.6 feet (ASL) on September 18, 2010. At that point, outflows from Jenpeg had been maximized since July 1, 2010 and Manitoba Hydro was operating the system to minimize the effects of the flood waters on Lake Winnipeg.

In October 2010, the strongest storm ever recorded in the Midwest spawned tornadoes, damaging winds, violent thunderstorms and torrential rains. Manitoba experienced a weather bomb, a record-setting low barometric pressures and extreme wind event, which had a dramatic impact on Lake Winnipeg. Due to



*Presentations are made about Lake Winnipeg Regulation project.*

its large surface area and shallow depth, Lake Winnipeg is prone to wind set-up/set-down events. In this case, an eight-foot difference was recorded between the north and south basins of the lake. This caused serious shoreline erosion, flooding and property damage in low-lying areas of Lake Winnipeg's south basin.

This perfect storm of events resulted in intense media and interest group attention on Manitoba Hydro's regulation of Lake Winnipeg. This attention kept Manitoba Hydro employees busy providing presentations, workshops, display booths and web-based public involvement with cottage associations, environmental non-governmental organizations (ENGOS), environmental researchers, boaters, government and the public at large about the impacts and benefits of the Lake Winnipeg Regulation.

Central to Manitoba Hydro's core business of producing electricity is having a Water Power Act licence for each of Manitoba Hydro's 14 generating stations. In December 2010, Manitoba Hydro submitted a request to Manitoba Water Stewardship for a Final Licence for the Lake Winnipeg Regulation Project. The Province has committed to providing public hearings on Lake Winnipeg Regulation through the Clean Environment Commission and to independent studies on lake regulation in response to the heightened and widespread interest in this project.

Public involvement through the licensing process will engage a diverse group of stakeholders, many with divergent interests. Lake Winnipeg stakeholders have historically requested that lake level be kept low for recreation and property protection while downstream stakeholders along the Nelson River have to deal with flooding issues associated with achieving low water levels. These various interests will be considered through public involvement in the regulatory process.



Outflows from Jenpeg have been maximized since July 1, 2010 as Manitoba Hydro has operated the system to minimize the effects of flood waters on Lake Winnipeg.



The Lake Winnipeg Regulation project involved increasing the outflow capacity of Lake Winnipeg – for both flood/drought relief and hydro-electric production – by excavating a new outlet at the north end of the Lake and construction of a control structure and generating station downstream of the outlet on the Nelson River at Jenpeg. Outflows from the Lake are controlled to keep the Lake from going too low or too high, generally within a four-foot limit.



Manitoba Hydro staff attend events with their display to answer question about the impacts and benefits of Lake Winnipeg Regulation.

## Helping to Reveal Manitoba History

The Sipiwesk Lake area near Cross Lake has been the site of many archaeological finds that are helping to write the history of Northern Manitoba. In the summer of 2010, a Manitoba Hydro employee, whose home is Cross Lake, followed the blackened path of a forest fire at Sipiwesk Lake after being told of a possible old grave site. Instead what was found were two unusual rock formations which archaeologists later identified as very old chimney stacks. This led to the realization that they had discovered David Thompson's Hudson Bay fur trading post from the early 1790s. David Thompson, who spent a little less than a year at the Sipiwesk Lake fur trading post, was a famous Canadian explorer and fur trader who contributed to the mapping of the area between northern Manitoba and British Columbia.

Since the discovery of the trading post, approximately 1,400 artifacts have been recovered from the area. These include brass wire, pipe fragments and even a Thomas Dormer pipe imported by the Hudson Bay Company and traded with the Aboriginal people during the mid-18th century.

This discovery was part of the Sipiwesk Lake Archaeological Project that is carried out annually and funded by Manitoba Hydro as part of Northern Flood Agreement programming that is ongoing with the Cross Lake First Nation. Manitoba Hydro's Waterways Management Program provides support to the project by providing archaeologists with supplies and equipment whenever they travel to Sipiwesk Lake. In addition, crews employed through the Waterways Management Program and working along the rivers and lakes in the Churchill and Burntwood systems receive training on how to recognize sites and artifacts. They also monitor known archaeological sites in their area to ensure sites are not disturbed by rising water levels. If ancient remains are unearthed, the Manitoba Heritage Resources Branch (HRB) is contacted. If human remains are found, crews will work in conjunction with the HRB, elders and community leaders, to ensure that the appropriate ceremonies are conducted and a proper reburial is undertaken.



Necklace found at the site of David Thompson's fur trading post Sipiwesk House.



Top: Artifacts found at Bruneau Point on Sipiwesk Lake. Bottom: Arrowhead found near Ross Bay Manitoba Hydro camp.



Chimney stack at the site of David Thompson's fur trading post Sipiwesk House.

### Keewatinohk Sopia Partnership Fund

Keewatinohk Sopia is Cree for Northern Rivers. The Manitoba Hydro Keewatinohk Sopia Partnership Fund (KSP) strengthens working relationships with northern communities located on the developed waterways of the Nelson, Churchill, Burntwood, Rat, Laurie and Saskatchewan rivers. The purpose of the fund is to assist northern residents that use these regulated waterways for traditional and commercial purposes with projects that enhance activities related to traditional and/or domestic resource harvesting, culture, recreation, extra-curricular education and/or programs for youth, sustainability of local cooperatives and not-for-profit organizations. Priority is given to projects that enhance the value and safety of community activities undertaken on developed waterways or on immediately adjacent land. Manitoba Hydro Aboriginal Relations employees are available to provide assistance to eligible organizations in proposal development and reporting.



KSP funding supports the development of cultural and recreational resources, such as this cultural camp.



KSP provides support toward projects that enhance activities related to traditional and domestic resource harvesting like this fish processing shed owned by a local cooperative.

## Environmental Partnership Fund

The Environmental Partnership Fund supports community-based environmental education and sustainability awareness through the financial support of projects and events. One-time or multi-year contributions are available to non-profit organizations for the development of resources and delivery of environmental education and/or sustainability awareness programming. Included are a few examples of projects funded in 2010/11.



*Grade 4 Inner City students learning about the environment with hands on activities.*

### **Bridging the Gap Program**

This innovative environmental learning program provided grade four students living in Winnipeg's Inner City an opportunity to participate in stewardship opportunities. Incorporating traditional indigenous cultural ideas into program content, students engage in curriculum-based, hands-on learning activities and participate in relevant initiatives that show respect, gratitude and an appreciation of Manitoba's natural environment.

### **And this is my Garden**

Funding was provided to a community based organization for the development of this educational DVD that showcases a community-based hands-on experiential learning project about sustainable food production and consumption in northern communities and raises overall awareness of sustainability. In May 2010, this educational DVD was presented as one of three projects in the world as a successful example of Education for Sustainable Development (ESD) good practice at the Advancing Sustainable Consumption, Production and Transportation at the United Nations (UN) Commission on Sustainable Development session at UN Headquarters in New York.



*Charlie and her sisters harvest vegetables and learn about sustainable food production.*

## Forest Enhancement Program

In acknowledgement that Manitoba Hydro's activities have an impact on the forest environment, the Forest Enhancement Program (FEP) provides funding to eligible projects that enhance and sustain the forest environment of communities and regions of Manitoba.

The program is aimed primarily at non-profit, non-government organizations including citizen, school, youth, conservation, cultural, heritage, environmental, community and service club groups and higher educational institutions.

Three categories of activity are funded: tree planting projects, forest education projects and innovative forest projects. Tree planting projects establish healthy, long-term forests or community tree stands. Forest education projects are designed to improve students' and public appreciation and understanding of the nature, role and importance of trees, forests and sustainable forest management in Manitoba. Innovative forest projects enhance the long-term sustainability and productivity of Manitoba's forest environment.

In 2010/11, Manitoba Hydro's FEP awarded funding for 45 tree planting, forest education and innovative forestry projects. A major focus of the program is to continue to promote forest ecology and environmental education for all school tree-planting projects. This would include learning about forest ecology and sustainable forest management, linked with preset curriculum outcomes.

Communities, neighbourhoods and institutions receiving support have displayed a high level of commitment and enthusiasm for their projects. Over the past 15 years, the program has funded and assisted 817 projects undertaken by non-profit, non-government organizations to enhance and sustain the natural environment of the communities.



*Residents of Osterwick came together to plant trees around their community centre to improve the aesthetics of the property.*



*Top left: Manitoba Hydro's Forest Enhancement Program funded the planting of deciduous trees at the Rivers Cemetery to provide a shady, quiet spot for visitors.  
Bottom: A major focus of the program is to promote forest ecology and environmental education for all school tree planting projects.*

# SUSTAINING OUR WORKFORCE

Manitoba Hydro is committed to the safety, health and wellness of our employees. Our safety systems and services act to minimize risks to people, property and the environment and our working conditions provide a work environment that allows employees to have a balanced approach to family, work and community. Our dynamic team of employees enables us to be an industry-leading company that supports innovation, commitment and service. Manitoba Hydro is committed to the ongoing development of our employees and provides a variety of learning options including traditional classroom, self-directed learning, online learning and extensive training in technical programs and trades.

## Social Sustainability Performance Indicators

INDICATOR	TARGET	PERFORMANCE
Accident Frequency (Number of accidents per 200,000 hours worked)	< 0.80 accidents per 200,000 hours worked	0.99
<b>Diverse workforce</b>		
Women	26%	24.4%
Persons with disabilities	6%	4.8%
Members of visible minorities	6%	5.7%
<b>Aboriginal employment</b>		
Province-wide	16%	15.5%
Northern Manitoba	45%	41.2%

## Safety Report 2010/11

Safety at Manitoba Hydro is practised and improved continuously by advancing accountability, safe work procedures, strict compliance with environmental regulations and the preservation of employee health.

The number of workplace injuries and more significantly, the severity of workplace injuries continue to decline. The 2010/11 safety performance results indicate a 23.3 per cent reduction in lost time injuries from the previous fiscal year, the second best result in a decade. Lost time calendar days were reduced by 44.9 per cent from 2009/10 to become the lowest in 30 years. These results are mainly attributable to better job planning, more in-depth tailboard discussions, better in-field



supervision, improved safety training through the design and delivery of Safety Training for Leaders, the promotion of safe work procedures and the strong emphasis on accommodation and early return to work strategies.

To experience continued improvements in safety performance in 2010/11, a three pronged approach to safety – prevention, accommodation and early return to work – was implemented to accompany better management tools, a fundamental shift to leading indicators, delivery of a corporate driving strategy and ongoing development of supervisory employees.

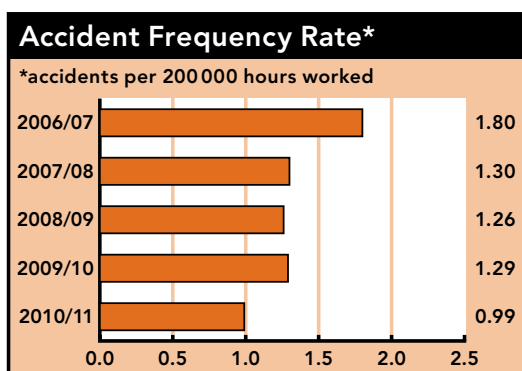
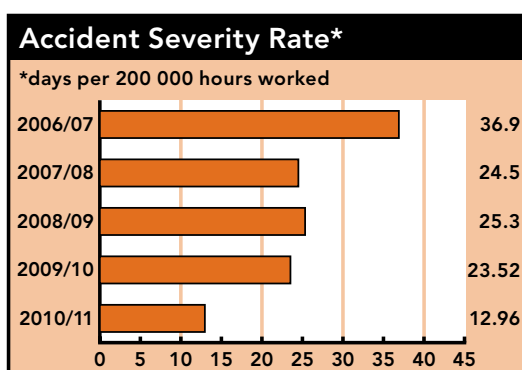
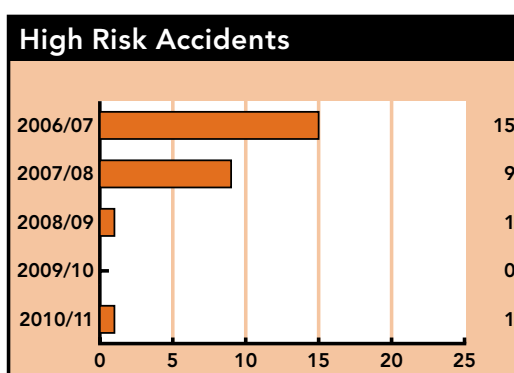
Public Contacts are contacts by members of the general public with Manitoba Hydro overhead and underground electric lines or gas lines. Although there was a modest 8.0 per cent increase in the number of incidents (702 up from 651), Public Contact injuries were reduced 45.2 per cent (17 compared to 31) with no recorded fatalities (compared to five in the 2009/10 year).

### Job Demands Analysis Program

The Job Demands Analysis Program was introduced in 2010/11 as part of a strategy to prevent the occurrence of overexertion injuries and enhance the return to work program for injured employees. The program is aimed at identifying key job tasks that can be used as baseline models for healthcare providers as they develop return to work plans for injured employees.

When an employee is injured on the job, healthcare providers, supervisory employees and insurers face the difficult challenge of determining when the injured employee is able to return to work and the related challenge of finding appropriate duties, modified or alternate work for that injured employee. The development of Job Demands Analysis offers all parties involved a better understanding of the physical demands of a job resulting

in better post-injury assessments and pre-assessment of training required to prevent or reduce further on-the-job injury. This is an ongoing program with the intent to target all job positions within Manitoba Hydro.



## Empowering Employees and Reducing GHG

Manitoba Hydro provides opportunities for employees to develop their full potential and practise continuous improvements through ongoing coaching and learning to enhance their technical, leadership and business skills. Employees have the ability to participate in virtual or online training which saves time, costs and reduces the impact upon the environment.

Online training enables employees to receive the training at their desks in a timely manner. This decreases the amount of time away from the job, both travelling to and attending a classroom course and enables employees to complete each topic at their own pace as well as the ability to go back for a refresher at any time.

Online training saves dollars and the energy otherwise consumed for transportation, parking and accommodation. Participation in an online course consumes an average of 90 per cent less energy and produces 85 per cent fewer CO<sub>2</sub> emissions per student than conventional face-to-face courses. And while traditional courses may use booklets or binders, the majority of online course material is electronic thereby reducing paper consumption and conserving the resources required to manufacture paper such as water, electricity, fuel, bleach and other chemicals.

Although Manitoba Hydro has offered online training courses for the past 10 years, it is only in the last three years that participation levels have grown significantly, with 1,482 participants in 2008/2009; 5,000 participants in 2009/2010; and 6,593 participants in 2010/11.

In 2010/11 employee participation in online training saved:

- \$5,056,006 in travel and travel related time,
- 3,914,923 km of travel by car or air,
- 1,290 tonnes of CO<sub>2</sub> emissions (equivalent to removing 280 cars from the road),
- 555,687 litres of gas,
- Over 1,200 days of travel (i.e.: no driving or air travel required to take training).

## Environmental Management in Action Online Learning Opportunity

An example of an online course available to Manitoba Hydro employees is the Environmental Management in Action course offered to Customer Service & Distribution (CS&D) Business Unit employees which is specific to the activities undertaken in the business unit.

Manitoba Hydro's sustainability principles of shared responsibility and access to adequate information are nested within the awareness, training and competence requirements of EMS. To meet EMS requirements employees must be aware of the environmental policy and associated procedures, requirements of the EMS, the significant environmental activities and related impacts associated with their work, the environmental benefits of improved personal performance, their roles and responsibilities in environmental management, the importance of conformity and the potential consequences of departure with specified procedures.

It was determined that developing an online computer-based training (CBT) specific to CS&D operations would be an effective way to deliver consistent messaging to meet these EMS requirements as this group of employees are geographically dispersed throughout the province. A computer-based presentation, including a test, was developed that has become part of the annual training requirements. As an online course, employees access it according to their schedules, reducing overall training costs as well as the environmental impact associated with traditional training programs. Over the forthcoming years it is expected that the content of this course will change to accommodate changes in work undertaken and updates to environmentally significant information.

In 2010/11, 95 per cent of approximately 1,700 CS&D employees successfully completed this training.



*Online courses at Hydro are gaining in popularity as employees can complete each topic at their own pace, take the training almost anywhere with internet, and go back for a refresher whenever they need it.*

## Achieving a Diverse and Representative Workforce

Manitoba Hydro's employment equity and diversity initiatives are creating a workplace that reflects the diverse populations of the communities we serve. These initiatives are integrated into the Corporate Strategic Plan and include performance targets that are reviewed annually and revised accordingly to increase the diversity of the corporate workforce. This is further demonstrated with the Summer Student Employment initiatives which seek to offer trades and technical-specific employment to all four equity groups.

### Women in the Workforce

The percentage of women in the workforce has remained steady near 25 per cent for the past three years. This figure is almost identical to the provincial labour force representation of 24.6 per cent for women in the external labour market working in the same occupations as those at Manitoba Hydro.

Manitoba Hydro was successful in increasing the numbers of women in management positions and professional occupations through internal development and external hiring opportunities.

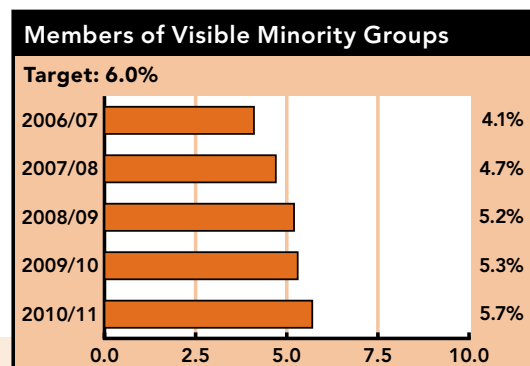
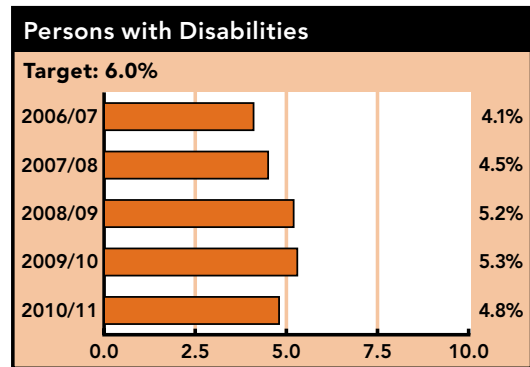
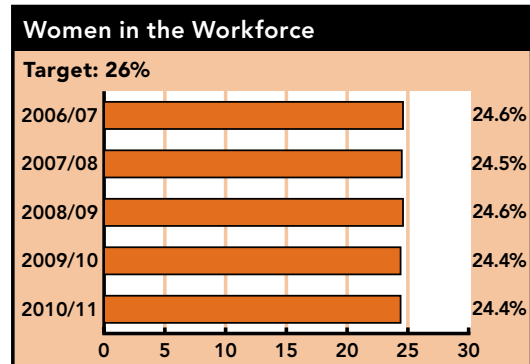
To increase the overall representation of women within the corporate workforce to 26 per cent, Manitoba Hydro encourages women to seek jobs in non-traditional occupations, such as skilled trades and technical occupations.

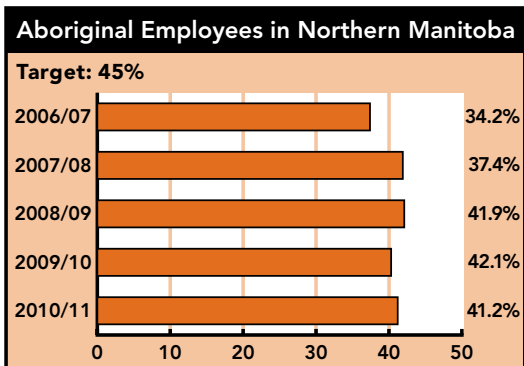
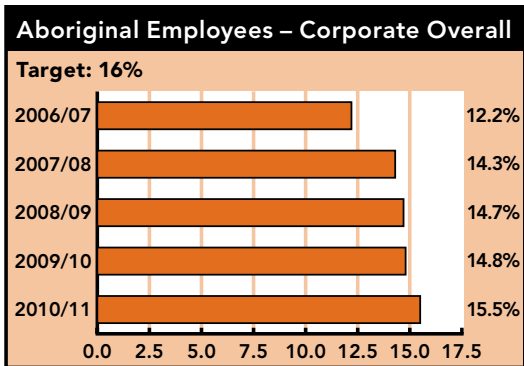
### Persons with Disabilities

The number of persons with a disability at Manitoba Hydro has remained relatively stable near five per cent following the latest Workforce Census. Special interventions to attract and retain persons with a disability are being implemented to maximize recruitment.

### Visible Minorities

The number of employees who are members of visible minority groups has increased to 5.7 per cent, largely as a result of hiring and provincial incentives to attract new foreign-born workers to the province.





## Aboriginal Employees

As of March 31, 2011, Aboriginals accounted for 15.5 per cent of the corporate workforce, exceeding the figure for Provincial Labour Force Availability for Aboriginals in Manitoba and in line with the population demographic as identified in the 2006 Statistics Canada census.

The growth of Aboriginal employment in northern Manitoba is on track to meet the short-term target, which was increased to 45 per cent. A high proportion of Aboriginal employees are younger, have less seniority and have joined the corporate workforce in entry level occupations. Manitoba Hydro is working to develop these employees by ensuring they are receiving training and development to qualify for future employment opportunities.



Manitoba Hydro's employment equity and diversity initiatives are creating a workplace that reflects the diverse populations of the communities we serve.

## Building Relationships with Future Employees

Hiring a Co-operative (Co-op) Education program student provides Manitoba Hydro with the opportunity to build relationships with students who may one day comprise the future workforce. The Co-op program is a valuable partnership between the educational institute, employers and students, whereby students complement their academic study with paid work experience. Selected students have the opportunity to apply their academic learning into a corporate work environment as part of the required component for program graduation. Priority is given to full-time students who are Manitoba residents from the job locality.

Co-op work placements must be developed and/or approved as suitable learning situations by the academic institution. Work terms are scheduled throughout the year based on alternative university/college schedules and sponsor department requests. Upon completion of the work term the academic institution provides an evaluation for the supervisor of the student to complete.

The benefits of participating in the Co-op program are numerous for both employer and student.

- Integrating Co-op programs into a recruiting strategy provides an opportunity to attract graduates of Commerce, Engineering and Technology programs.
- The rotational aspect of a Co-op program allows employers to be exposed to students of different levels and a variety of skill sets.
- The training and experience Co-op students receive on work terms, combined with their academic knowledge, prepares them for the workforce after graduation.
- Students have an opportunity to explore different career choices and develop contacts in the industry.

In 2010/11 the Co-op program hired:

- Seven students from Commerce (Accounting, Finance, Marketing, Human Resources and other majors);
- 38 students from Technology (Business, Information Technology, Electrical, Electronic, Instrumentation, Civil, Mechanical);
- Six students from the Internationally-Educated Engineers Qualifications Program (IEEQ) and;
- 10 students from Engineering (Biosystems, Civil, Electrical & Computer and Mechanical).



*Providing technology students with hands on application of their education.*



*Co-op programs provide an opportunity for Manitoba Hydro to build relationships with our potential future workforce.*



*Providing students with hands on application of their education.*

# CORPORATE PROFILE

## Our Vision

To be the best utility in North America with respect to safety, rates, reliability, customer satisfaction and environmental leadership and to always be considerate of the needs of customers, employees and stakeholders.

## Our Mission

To provide for the continuance of a supply of energy to meet the needs of the province and to promote economy and efficiency in the development, generation, transmission, distribution, supply and end-use of energy.

## Sustainable Development Principles

Manitoba Hydro recognizes that the economy and the environment are interrelated and mutually dependent. Without a healthy environment, a productive economy cannot be sustained. As well, economic development is required to pay for maintaining, restoring and rehabilitating the environment.

The corporation will apply the following 13 guiding principles of sustainable development in all aspects of its operation to achieve environmentally sound and sustainable economic development.

Through its decisions and actions to provide electrical services, the corporation will try to meet the needs of the present without compromising the ability of future generations to meet their needs.

- Stewardship of the economy and the environment
- Shared responsibility
- Integration of environmental and economic decisions
- Economic enhancement
- Efficient use of resources
- Prevention and remedy
- Conservation
- Waste minimization
- Access to adequate information
- Public participation
- Understanding and respect
- Scientific and technological innovation
- Global responsibility.

For details on our Sustainable Development Principles, visit [www.hydro.mb.ca](http://www.hydro.mb.ca).





*Manitoba Hydro Place*

## Environmental Management Policy

Manitoba Hydro is committed to protecting the environment.

In full recognition of the fact that corporate facilities and activities affect the environment, Manitoba Hydro integrates environmentally responsible practices into its business, thereby:

- preventing or minimizing any adverse impacts, including pollution, on the environment and enhancing positive impacts,
- continually improving our Environmental Management System,
- meeting or surpassing regulatory requirements and other commitments,
- considering the interests and utilizing the knowledge of our customers, employees, communities and stakeholders who may be affected by our actions,
- reviewing our environment objectives and targets annually to ensure improvement in our environmental performance,
- documenting and reporting our activities and environmental performance.



The Sustainable Development Report is published annually by:

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