

Sustainable Development Report

04|05



Solar greenhouse, setting for R&D to reduce emissions of greenhouse gases.



Our Performance Optimization Program annually saves Simplot Canada \$250 000.



Manitoba Hydro staff help form the province's first Urban Search & Rescue Team.



Registered to ISO 14001

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Cover: Kettle Generating Station.

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Manitoba Hydro endeavours to meet the needs of the present without compromising the ability of future generations to meet their needs. That is our sustainable development approach, which we apply in our day-to-day work at the corporation with the help of 13 sustainable development principles. The principles are listed overleaf, for reference.

In 2004/05, we applied the 13 principles in a range of projects, some of which are described in this report. Here is a brief description of several projects, each tied to one or more principles, to give some idea of how successful we have been in living up to our commitment to act sustainably.

Proposed new hydroelectric generating stations in the North—Wuskwatim, Keeyask, and Conawapa—would be the largest construction projects in the province over the next 20 years. They would create thousands of jobs for Manitobans, particularly for people living in areas around the projects; cause minimal environmental impact; and generate electricity from the power of running water, not from the combustion of fossil fuels. —1. *Stewardship of the economy and the environment.*

Our Green Procurement procedures encourage staff not only to buy products and services that have less effect on human health and the environment, but also to inform suppliers that we want green products and services, and why. —2. *Shared responsibility*

An upgrade to Kelsey Generating Station will boost power output from the station yet lower its environmental impact. —3. *Integration of environmental and economic decisions*

With proposed rate increases prompted by low water levels and persisting drought in 04/05, our electricity rates were ranked lowest of any major utility in North America. —4. *Economic enhancement*

Our Power Smart programs encourage customers to use energy wisely, which in turn saves electricity that helps defer the capital cost of constructing new generation while increasing export revenues that keep domestic prices down. —5. *Efficient use of resources*

The Forest Enhancement Project has supported the planting of more than 113 000 trees. —6. *Prevention and remedy*

We support woodland caribou studies to help in the siting of new generating stations and transmission lines that could affect the animal's habitat. —7. *Conservation*

Most of the material in the seven buildings removed to make room for our new downtown Winnipeg headquarters is to be recycled or reused. —8. *Waste minimization*

The proposed Wuskwatim Generating Station and Transmission Line project was the focus of hearings, held in spring 2004 by the Manitoba Clean Environment Commission, that marked the most extensive review of a project ever conducted in the province. —9. *Access to information, 10. Public participation, 11. Understanding and respect*

We support R&D on solar greenhouses to save energy. The greenhouses could offer socio-economic and health benefits for people living in the North. —12. *Scientific and technological innovation*

We continue to reduce emissions of greenhouse gases by exporting our renewable hydroelectricity. —13. *Global responsibility*

But listing projects against principles does not do justice to the depth and extent of our efforts, which often apply to more than one principle. For a broader perspective, we have, as in the 03/04 report, listed all stories under three categories: helping build the economy of the province while conserving the environment and meeting our social responsibilities.

The matrix helps convey that we are fully committed, not just to the concept of sustainable development but to its implementation in all aspects of our operations.

If you have ideas for better conveying our sustainable development programs and projects in future editions, and any other comments or suggestions for improvement, we would like to hear from you! Please write us at the address on the back cover.

R.B. Brennan, F.C.A.
President and Chief Executive Officer

OUR VISION

To be the best utility in North America with respect to safety, rates, reliability, customer satisfaction and environmental management, 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.

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
- 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 environmental objectives and targets annually to ensure improvement in our environmental performance
- continually improving our Environmental Management System
- documenting and reporting our activities and environmental performance.

OUR SUSTAINABLE DEVELOPMENT PRINCIPLES

Manitoba Hydro will apply the principles of sustainable development in all aspects of its operations in order to achieve environmentally sound and sustainable economic development. Through its decisions and actions to provide electrical services, the Corporation will endeavour to meet the needs of the present without compromising the ability of future generations to meet their needs.

1 STEWARDSHIP OF THE ECONOMY AND THE ENVIRONMENT

Manitoba Hydro will recognize its responsibility as a caretaker of the economy and the environment for the benefit of present and future generations of Manitobans. Manitoba Hydro will meet the electricity needs of present and future Manitobans in a manner that ensures the long-term integrity and productivity of our economy, our environment, our natural resources and safeguards our human health.

2 SHARED RESPONSIBILITY

Manitoba Hydro will ensure that Manitoba Hydro's employees, contractors, and agents are aware of our sustainable development policies and guiding principles and encourage them to act accordingly.

Manitoba Hydro will encourage the Corporation's employees to share their knowledge of the concepts and practical application of sustainable development.

3 INTEGRATION OF ENVIRONMENTAL AND ECONOMIC DECISIONS

Manitoba Hydro will treat technical, economic and environmental factors on the same basis in all corporate decisions, from initial planning to construction to operations to decommissioning and disposal. To the extent practical, Manitoba Hydro will include environmental costs in economic and financial analysis.

4 ECONOMIC ENHANCEMENT

Manitoba Hydro will enhance the productive capability and quality of Manitoba's economy and the well-being of Manitobans by providing reliable electrical services at competitive rates.

5 EFFICIENT USE OF RESOURCES

Manitoba Hydro will encourage the development and application of programs and pricing mechanisms for efficient and economic use of electricity by our customers. As well, efficient and economic use of energy and materials will be encouraged throughout all our operations.

6 PREVENTION AND REMEDY

Manitoba Hydro will to the extent practical, anticipate and prevent adverse environmental and economic effects that may be caused by Corporate policies, programs, projects and decisions rather than reacting to and remedying such effects after they have occurred. Where practical, environmentally sound products will be purchased, taking into account the lifecycle of the products. Manitoba Hydro will address adverse environmental effects of Corporate activities that cannot be prevented by:

- first, endeavouring, wherever feasible, to restore the environment to predevelopment conditions or developing other beneficial uses through rehabilitation and reclamation
- second, striving to replace the loss with substitutes that would enhance the environment

and/or associated resource uses while offsetting the type of damage experienced

- third, making monetary payments for compensable damages on a fair, equitable and timely basis.

7 CONSERVATION

Manitoba Hydro will to the extent practical, plan, design, build, operate, maintain and decommission Corporate facilities in a manner that protects essential ecological processes and biological diversity. Manitoba Hydro will give preference, where practical, to projects and operating decisions that use renewable resources or that extend the life of supplies of non-renewable resources.

8 WASTE MINIMIZATION

Manitoba Hydro will manage all wastes arising from Corporate activities by:

- first, endeavouring to eliminate or reduce the amount generated
- second, striving to fully utilize reuse and recycling opportunities
- third, disposing of remaining waste in an environmentally sound manner.

9 ACCESS TO ADEQUATE INFORMATION

Manitoba Hydro will share relevant information on a timely basis with employees, interested people and governments to promote a greater understanding of Manitoba Hydro's current and planned business activities and to identify impacts associated with the Corporation's plans and operations.

10 PUBLIC PARTICIPATION

Manitoba Hydro will provide opportunities for input by potentially affected and interested parties when evaluating development and program alternatives and before deciding on a final course of action.

11 UNDERSTANDING AND RESPECT

Manitoba Hydro will strive to understand and respect differing social and economic views, values, traditions and aspirations when deciding upon or taking action.

Preference will be given to those alternatives which best fulfill Corporate objectives while minimizing infringement on the ability, rights, and interests of others to pursue their aspirations

12 SCIENTIFIC AND TECHNOLOGICAL INNOVATION

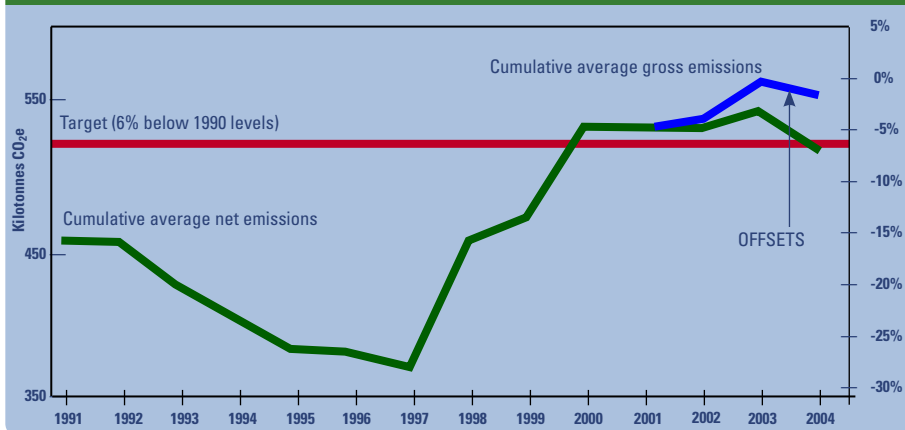
Manitoba Hydro will research, develop, test and implement technologies, practices and institutions that will make electrical supply and services more efficient, economic and environmentally sound.

13 GLOBAL RESPONSIBILITY

Manitoba Hydro will recognize there are no political and jurisdictional boundaries to our environment, and that there is ecological interdependence among provinces and nations. Manitoba Hydro will consider environmental effects that occur outside of Manitoba when planning and deciding on new developments and major modifications to facilities and to methods of operation.

ENVIRONMENT

Cumulative average gross and net emissions of greenhouse gases from Manitoba Hydro's operations



Meeting Greenhouse Gas Commitments

Manitoba Hydro made a commitment to reduce its average net greenhouse gas emissions over the period from 1991-2007 to 6% below the level in 1990. The 1990 level was 553 kilotonnes of greenhouse gases, measured in carbon dioxide equivalent (CO₂e).

The commitment was originally established under the previous national Voluntary Challenge and Registry program.

Hydro is set to meet that voluntary commitment, with average net greenhouse gas emissions over the period from 1991-2004 at 516.2 kilotonnes—7% below the 1990 level.

Our positive situation is the result of several actions that have increased our renewable hydro and wind generation, demand-side management, fuel switching, gas distribution system improvements, fleet improvements, education, and research and development. In addition, our greenhouse gas management strategy includes emission reduction offsets, such as those associated with natural gas demand-side management programs. We have export sales contracts that establish the ownership of greenhouse gas emission reductions that would have otherwise occurred due to alternative fossil-fuel-fired generation.

In 2004, our gross greenhouse gas emissions were 463.7 kilotonnes of CO₂e—about 16% below the 1990 level, the reference year of our emission reduction commitment.

Emission intensity figures also show that we are performing well. In 1990, we emitted 26 tonnes of CO₂e/gigawatt-hour; in 2004, we emitted 14 tonnes of CO₂e/gigawatt-hour—a drop of 46%.

In addition to our voluntary commitment, we successfully maintain another greenhouse gas commitment through our participation in the Chicago Climate Exchange.

Reducing Fleet Emissions

Manitoba Hydro continues to strive to reduce emissions from its fleet of vehicles. We now have five gasoline/electric hybrid vehicles—three cars and two pickups—which substantially reduce fuel consumption and emissions. Purchasing of more hybrids is planned.

We are set to convert a hybrid vehicle to a plug-in hybrid, which would allow the batteries to be charged with a normal 120-volt circuit, greatly expanding electric operation. With conversion, the car could get up to 125 miles to the gallon by combining energy from the engine, power from the grid, and regenerative braking.

We use biodiesel and E10 ethanol at our refueling sites in Winnipeg, and promote the use of biodiesel throughout the province.

We have also installed more than 100 anti-idling signs at Hydro offices around the province to discourage idling of vehicles by employees and the public.

Manitoba Hydro has installed temperature sensitive command starts to cycle engines off and on. It is planning on installing on-board monitoring systems that keep track of engine idling, to advise drivers of their idling performance. Over a year, engine idling in the light fleet alone could cost \$1 million at the pumps.

We are a co-sponsor of the Manitoba Lung Association's Tune up Your Tailpipe program, a free public vehicle emissions testing service. We also support Bye Bye Beaters, a program aimed at permanently removing 1987 and older cars/light trucks from daily use in Winnipeg, to reduce emissions and improve air quality.



Screening for fugitive emissions at a natural gas pressure regulating station

Getting a Better Handle on Fugitive Emissions

In 2004, Hydro supported environmental research on fugitive emissions—unintentional leaks from natural gas pipeline operations.

Fugitive emissions of natural gas are about 95% methane, which is 21 times as effective in retaining heat in the atmosphere as carbon dioxide.

Findings will help develop a fugitive emissions measurement protocol that improves the accuracy of fugitive emissions estimates, which currently can be off by as much as 500%. The protocol will also ensure consistency in reporting greenhouse gas emissions by Canada's gas transmission and distribution industry.

Fugitive emissions represent 74% of the emissions from Hydro's natural gas pipelines. In 2004 fugitive emissions accounted for 15.6 kilotonnes of carbon dioxide equivalent.

Emissions from Our Fossil-Fuel-Fired Generators

On average, Manitoba Hydro generates about 95% of its electricity from hydroelectric resources. The remainder is generated by two thermal stations or is purchased.

We have the second lowest proportion of overall energy produced from fossil fuels compared to all other Canadian provinces and territories. It is equally low when compared to electric utilities in most US states.

Although we produce most of our energy from hydroelectric generating stations, river flows are subject to significant seasonal and annual variation while energy demand within the province and export commitments change with time.

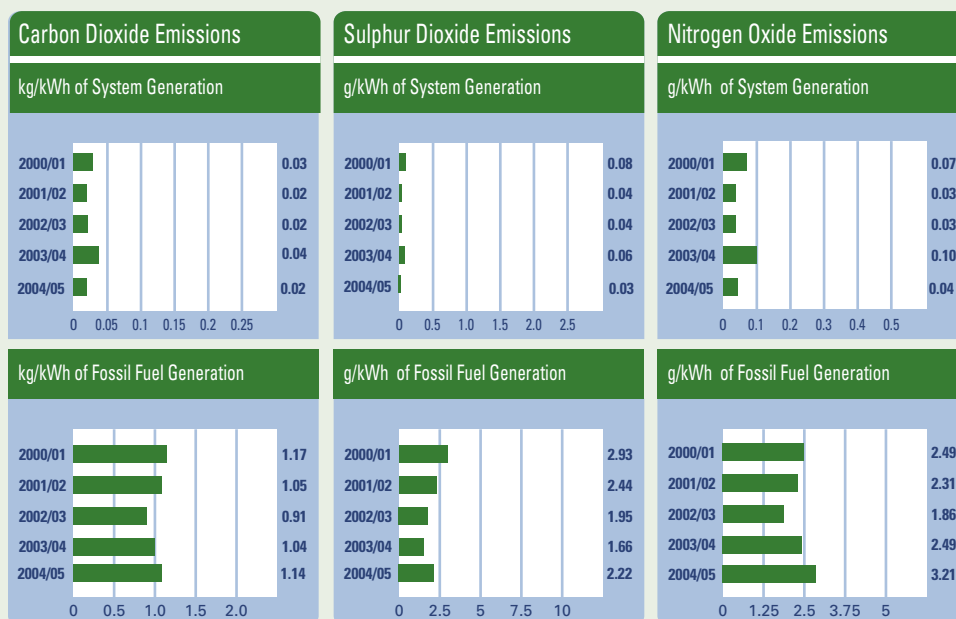
To ensure the efficient and reliable long-term operation of our generating system, we rely on non-hydroelectric resources, which operate independent of river flows, to provide supplemental electricity when hydroelectric resources alone cannot meet demand.

Our single coal-fired generating unit has a very small capacity (105 MW) compared to most other coal-fired generating stations in North America. Its capacity is less than 2% of our installed generating capacity. The unit's relatively small size, efficient operating practices, environmental controls, and use of high-quality coal combine to minimise effects on the environment.

Emissions of carbon dioxide, sulphur dioxide, and nitrogen dioxides in 2004 were roughly half those in 2003. The decrease reflected our need to run our thermal generating stations less than usual in 2004 due to increased production from our hydroelectric generating stations as a result of improved water levels.

Fossil fuel emissions deviated from 2003 levels. The deviation was caused by operating the coal-burning unit at higher loads and burning the coal more efficiently. Levels of sulphur dioxide were anomalous in 2003, due to a transition in analytical methods initiated in 2003.

Our coal-burning generators represent only 20% of our thermal generation. Further, we use Powder River coal from Montana—which produces less sulphur than lignite and has higher heat content.



Hydropower Small Source of GHG Emissions—Research

Hydropower reservoirs and natural aquatic systems all emit greenhouse gases. In fact, Manitoba’s lakes and reservoirs emit greenhouse gases within the same range.

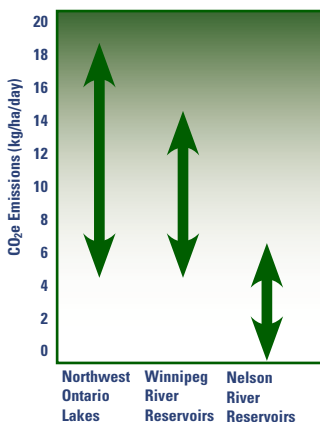
In contrast to other sources of electrical generation, hydropower is a very small source of greenhouse gas emissions. Levels are comparable to other types of renewable electricity, such as wind.

These findings are based in part on collaborative greenhouse gas research by Fisheries and Oceans Canada on emissions from Hydro’s reservoirs. From 1999 to 2004, Hydro staff have been drawing water samples each week from 10 reservoirs during the ice-free season and sending them to Fisheries and Oceans Canada for gas analysis of carbon dioxide, methane, and oxygen.

Year-round monitoring devices have also been installed at McArthur Falls and Kettle Rapids to determine levels of carbon dioxide and oxygen.

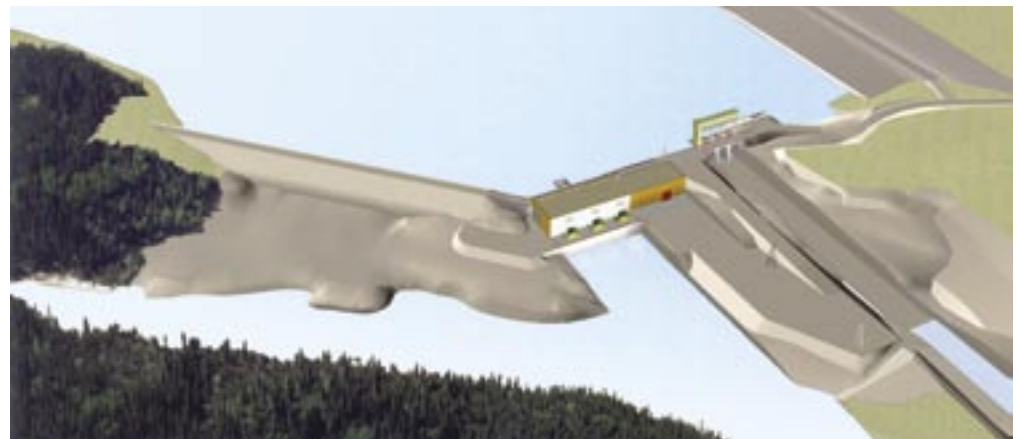
Weekly water sampling by staff at northern generating stations has yielded data of sufficiently high quality that the research can now continue with automated monitoring at selected sites. Hydro staff will continue to help maintain the automated monitors.

The research is set to continue toward developing common methods to quantify net greenhouse gas production from reservoirs.



Greenhouse gas emissions from reservoirs in Manitoba and natural lakes in Ontario. Natural lakes data from the Experimental Lakes in NW Ontario; reservoir data from Manitoba Hydro/Fisheries and Oceans sampling program.

Schematic of the proposed Wuskwatim Generating Station on the Burntwood River near Thompson, Manitoba.



Wuskwatim Hearings Held

In spring 2004, Manitoba’s Clean Environment Commission (CEC) held 32 days of public hearings on the environmental impact and justification of Wuskwatim Generating Station, including sessions in Winnipeg, Thompson, and The Pas.

The hearings completed a public review process that began in December 2001, when Manitoba Hydro and Nisichawayasihk Cree Nation (NCN) submitted Environment Act Proposal Forms for the Wuskwatim Generating Station and Transmission Line to Manitoba Conservation. They marked the most extensive review of a development ever conducted in Manitoba. And for the first time in history, a single government body reviewed both the environmental impacts and economic justification of a project.

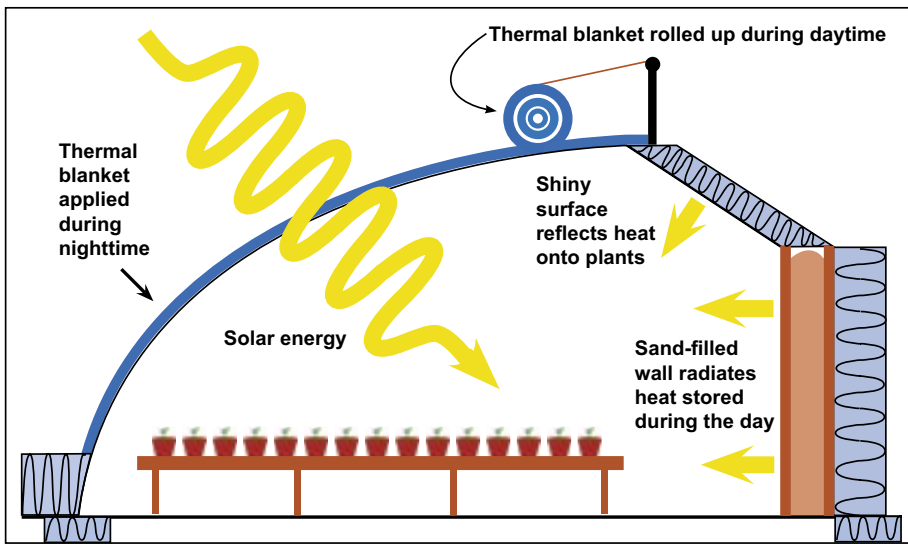
In its October 2004 report, the CEC recommended the project be licensed under the Manitoba Environment Act. It found that Manitoba Hydro and NCN had adequately justified the project and that it was viable and economic. The CEC concluded that if an appropriate mitigation and monitoring regime is put in place, and the station and lines are built and operated as proposed, adverse effects on the biophysical, socio-economic, and cultural environments will not be significant.

The CEC also said that if the project is managed in an appropriate manner, benefits could be significant for Aboriginal people, northerners, and all Manitobans.

Before Wuskwatim can proceed, government regulatory approvals must be secured and a Partnership Development Agreement between Manitoba Hydro and NCN must be finalized and approved by a vote of NCN members. NCN will then undertake community consultation before holding a community vote to ratify the Project Development Agreement.

Provincial licenses and permits will be issued on completion of the government consultation process on the development’s potential impacts on Treaty and Aboriginal rights. The federal environmental review process involves completion of a comprehensive study report.

If all unfolds as expected, construction could start in 2006, with an in-service date of 2012.



Solar greenhouse at Elie, Manitoba, under construction December 22, 2004. Although the temperature that afternoon was -22°C , with winds gusting to 20 km/h, the temperature inside the greenhouse was a promising -1°C .

Solar Greenhouse Set to Reduce Emissions

Researchers from the University of Manitoba are trying to determine the feasibility of growing vegetables in a solar-heated greenhouse over the winter months in Manitoba.

Manitoba Hydro supports the research, which could reduce greenhouse gas emissions while benefiting the province's greenhouse growers by lowering their heating costs.

The greenhouse, constructed in 2004 on a vegetable grower's plot at Elie just west of Winnipeg, is a type of solar greenhouse popular in northern China where winter temperatures are comparable to those in southern Manitoba.

The south-facing half of the greenhouse resembles a conventional structure, with the familiar arc-shaped steel tubing covered by a single layer of 6-mil poly.

But most of the rear wall is made of sand held between two sheets of galvanized steel about a foot apart.

The sand absorbs the heat of the sun during the day, then radiates it at night to maintain greenhouse temperatures.

A cotton blanket, stored like a carpet on a steel rod along the top of the greenhouse, is unrolled over the plastic sheeting at night to conserve heat.

In northeast China, where the greenhouse is manufactured, more vegetable crops are produced in greenhouses than on fields. Across China, some 68 000 hectares are covered by solar greenhouses.

There are nearly 250 commercial greenhouse operations in Manitoba, with a production value of \$20 million. Heating is a major cost.

"If the greenhouse proves effective, the research could help growers use less electricity or natural gas," says Ray Boris, an agricultural engineer with Hydro.

"There would be attendant reductions in greenhouse gas emissions through lower energy consumption by heating systems.

The greenhouse may also be tested in northern communities, where successful operation would offer socio-economic and health benefits for people living in the North."

Pole Life Extension Saves Trees, Money

In 2004/05, Manitoba Hydro inspected and extended the life of more than 61 000 power distribution poles at a cost of \$3.4 million, for an additional 15 years of service. The work deferred over \$120 million in replacement costs.

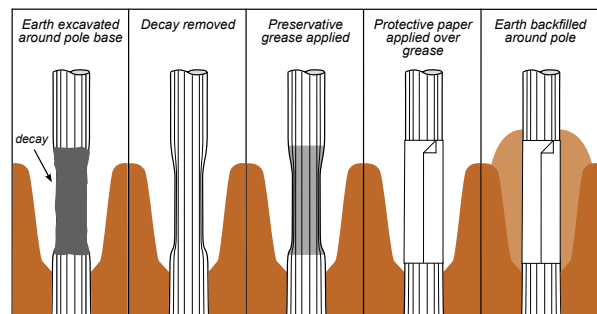
There are roughly 750 000 wood poles in our entire transmission and distribution system. The average life expectancy of wood poles is about 45 years; however, the service life of individual poles ranges from 10 - 100 years.

The pole life extension program, which started in 1981, has given longer life to more than 350 000 wood poles in Manitoba Hydro's system. It has not only saved millions of dollars by deferring replacement costs but also reduced the number of trees that have to be harvested to make new poles.

To extend the life of poles, crews excavate around the base, scrape off any decayed wood, apply an environmentally friendly preservative paste made of copper

naphthanate and borax, cover the paste with protective wrapping, then backfill the pole.

Most of the poles considered unfit for life extension are recycled.



Pole life extension sequence. The average application extends the life of a pole for another 15 years. Applications can be repeated, with the possibility of extending pole life up to 80 years.

Reuse and Recycling at Hydro — 2004/05 Highlights

Material	Quantity	Handling
Non-Hazardous		
Aluminum cans	Approx 800 kg	Removed by a volunteer and donated to a Selkirk non-profit collection agency for recycling.
Aluminum (scrap)	25 728 kg	Sold to scrap dealers for recycling.
Asphalt & concrete	N/A	Asphalt & concrete recovered from trenching through roads and sidewalks is re-used by Manitoba Hydro as a road fill and dust inhibitor.
Brass	10 469 kg	Sold to a scrap dealer for recycling.
Carpet	N/A	Used/worn carpet returned to manufacturer for re-manufacturing into new carpet.
CCSR cable	6 287 kg	Sold to scrap dealers for recycling.
Cardboard/other packaging	83.07 tonnes	Cardboard that is not re-used for packaging is collected through the Corporate recycling program where it is often compacted and shipped overseas for reprocessing into packing material.
Control cable	28 670 kg	Sold to scrap dealers for recycling.
Conductor	156 672 kg	Sold to scrap dealers for recycling or repaired and reused in the system.
Copper	26 489 kg	Sold to scrap dealers for recycling.
Dismantled walls	N/A	Approximately three-quarters of these interior wooden partition walls are re-used internally.
Electrical apparatus	174 540 kg	Single-phase transformers are refurbished and reused where cost-effective. Electrical apparatus that cannot be repaired is sold to scrap dealers for recycling.
Fine office paper	94.48 tonnes	Paper recycled through the corporate recycling program includes materials collected through backhaul to collection centres. Data for material recycled through local initiatives at rural locations is unavailable. White paper is recycled into newsprint and tissue products; non-white paper into boxboard, cardboard and insulation.
Metal leads	2 570 kg	Lead attached to pole top pins is removed and disposed of by a licensed collector.
Newsprint	Approx 600 kg	Removed by a private contractor and added to virgin newsprint fiber from Head Office only.
Phone directories	Approx 7 tonnes	Collected by Manitoba Telecom Services; reprocessed for shingling, roofing paper, and egg trays.
Plastic	1.36 tonnes	Plastic collected through the corporate recycling program consists primarily of HD plastic pipe remnants from gas installation work that is picked up and delivered to a local manufacturer for shredding and re-use in their manufacturing process. In addition, plastic #2, HDPE and #4 LDPE are collected and shipped to a local manufacturer of plastic wood products such as fence posts, decking and parking lot abutments. Volume for this material is not available.
Porcelain insulators	N/A	Sent to a recycler. Crushed and mixed with gravel to make concrete. Steel component sent to another recycler.
Scrap steel and bolts	299 597 kg	Surplus steel and bolts that cannot be reclaimed are sold to scrap dealers for recycling.
Scrap meters	48 482 kg	(16 810 kg hydro, and 31 672 kg gas meters); sold to scrap dealers for recycling.
Street light luminaries	38	When damaged or obsolete street lights are replaced, they are returned to Manitoba Hydro for recycling, reuse, or disposal. To date, 192 488 have been reused in the system after repair.
Street light standards	7	Returned to service.
Tires	Over 300	Long-wearing tires are used on vehicles to minimize tire changes. Used tires total more than 300 annually (about 5% of the corporate-wide total; see footnote). A local contractor collects the used tires and recycles them into floor mats and other products.
Toner cartridges	Approx. 1100	Our supplier sends empty cartridges to a local re-manufacturer where they are dismantled and internal parts, including toner, are replaced. The cartridge shell can be recycled as many as 10 or 12 times. The exception is Lexmark "prebate" cartridges which are returned to Lexmark for re-manufacturing.
Transformers (scrap)	690 234 kg	Drained scrap transformers are sold to scrap dealers for recycling of metals.
Wood pallets	883	Standard pallets are reused at Manitoba Hydro. Unusable ones are sold to scrap dealers.
Yard wastes	N/A	Grass clippings and tree/shrub cuttings from the corporation's grounds are composted and returned to condition flower beds.
Hazardous		
Aerosol containers	8400	Containers are punctured and the contents collected as mixed solvent and shipped to a hazardous waste facility. Containers are sent to a local scrap metal dealer for recycling.
Antifreeze	6 765 litres	Used antifreeze is collected and shipped to a hazardous waste facility.
Apparatus (sold to scrap)	690 234 kg	After oil is removed, apparatus are sold to scrap dealers.
Batteries—acid	104	Sold to scrap dealers for recycling.
Bulbs-fluorescent	15 739	Shipped off-site to lamp recycler for crushing. Aluminum, glass, phosphor powder, and mercury reused.
Bulbs-HID	6 937	Used mercury and sodium vapor bulbs are shipped off-site to lamp recycler for crushing. Glass, brass, aluminum, lead, and mercury are reused by industry.
Filters	50 drums	Oil and diesel fuel filters are sent to a local recycler. Filter casings are disposed of as scrap.
Grease	1 845 litres	Disposed of through a waste contractor, incinerated, or mixed and burned.
Luminaries repaired	1 052	Returned for re-use in the system.
Mercury	2 kg	Mercury used in various types of electrical equipment is usually recycled and re-used on-site. In some instances it is shipped off-site for recycling.
Paints	1 845 litres	Some surplus paints are donated to a local charity, while the remainder are incinerated as hazardous waste by a contractor.
PCB transformers (<200 ppm)	232	Decontaminated to <45 ppm of PCBs and reused in our system or sold to scrap dealers.
PCB transformers (> 200 ppm)	148	Decontaminated to <45 ppm of PCBs and reused in our system or sold to scrap dealers.
PCBX waste	17 835 litres	Waste from PCB treatment comprising Fuller's earth, caustic water, or polymer is disposed of through a waste contractor.
Poles	184	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.
Tar	1 kg	
Transf Ins Oil decontaminated	1 295 610 litres	Since 1985 Manitoba Hydro has chemically destroyed PCBs in transformer insulating oil using a registered process. Once PCBs are removed, oil is renewed and reused in oil-filled electrical apparatus.
Transformers repaired in single phase section	902	Returned for re-use in the system.
Waste Oils	171 654 litres	Waste lubricating and hydraulic oils are recycled by a hazardous waste contractor.
Waste Solvents	4 920 litres	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.

Note: N/A—Not available. This table covers recyclable materials handled and received in Winnipeg only. Several rural districts/regional offices utilize collectors and processors in their own areas.

Making Green Procurement Part of Corporate Decisions

In 2005, Hydro staff received a safety circular on recycled toner cartridges, a new “green” product they were encouraged to try. The product was also featured in “Safety Circulars—News and Views,” in the Hydrogram (Hydro’s weekly corporate newsletter), and on Mpower (Hydro’s inhouse corporate web site).

Known as a green product of the month, the cartridges are part of a corporate-wide push to purchase products that have less effect on human health and the environment, compared with competing products.

In the search for environmentally preferable products, purchasing staff consider:

- “green” aspects of a product over its lifetime, including raw materials needed to manufacture the product



Installing a recycled toner cartridge in a photocopier

- how it is produced, manufactured, packaged, and distributed
- its operation, maintenance, and disposal
- whether or not it can be reused.

More than 12 000 items have been sorted into “green” categories, from worst to best, to help staff make better purchasing decisions.

Other efforts to go green include training employees in green procurement, and encouraging them to notify their suppliers that they want green products, to increase demand that might make the products less expensive and easier to find.

Green purchasing practices and procedures, now in preparation, will be tested in pilot projects.

Green procurement also applies to the purchase of environmentally preferable services that are delivered with a lesser or reduced effect on human health and the environment, compared with competing services.

Green services make the most efficient use of materials, energy, and water; generate a minimum of waste; and minimize the release of harmful substances into the environment.

Ash and Oil Recycling Statistics

In 2004, 7 534 tonnes of ash, a byproduct of coal burned at Brandon Thermal Generating Station, were used by contractors in the Brandon area as backfill for road bases. The amount of ash recycled depends on how busy the contractors are. The station produced 10 963 tonnes of ash in 2004. The quantity was lower than the previous year because drought conditions that forced Brandon and Selkirk to operate more than usual in 2003 had improved .

Several kinds of electrical equipment across Hydro’s system use oil as an insulant and coolant. During equipment maintenance, the oil is sometimes cleaned and returned to the equipment or replaced with new oil. Oil that is not re-used may be sold to other companies, that recycle the oil or burn it for heat.

The percentage of insulating oil reused in 2004/05 is significantly higher than in 2003/04. The reason is that Hydro re-processed more oil in the field for its own re-use, while less oil was recycled by a third party for use in other than electrical equipment.

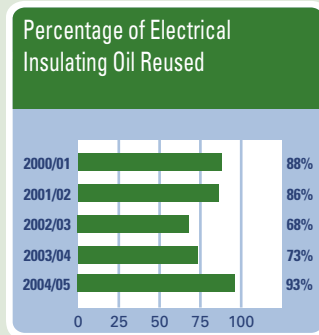
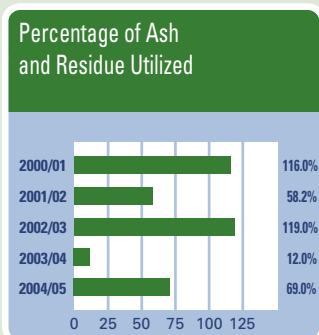
Material from Old Buildings to Be Recycled, Reused

More than 90% of the materials in the seven buildings removed to make room for Manitoba Hydro’s new downtown headquarters in Winnipeg were reused or recycled.

Materials include wire, metal, glass, wood, bricks, glass blocks, concrete, and even marble.

Most of the recycled material did not leave the site. Concrete walls and floors from the seven buildings were crushed into rubble for the new foundations, and fir beams may become part of a canopy over the south entry to the double office towers. The most popular items for reuse in other locations were bricks and ceiling tiles, followed by cabinets, lights, water heaters, fans, and sinks and toilets.

Hydro donated the woodwork, mechanical equipment, and windows from the interior of the Royal Bank building to the Manitoba Eco Network, to assist in the green construction of their newly-constructed downtown office space.



New Headquarters a Model of Energy Efficiency

Manitoba Hydro's new 22-storey headquarters, under construction in downtown Winnipeg, is designed to achieve a building energy reduction target of 60%, which would make it one of the most energy efficient office buildings in North America.

The corporation is aiming for a "gold" designation under the Canadian Green Council's LEED rating system.

LEED—Leadership in Energy & Environmental Design—is a tool for design teams and owners to set green project goals, identify green design strategies, measure and monitor progress, and document success.

Resting on a podium of retail office spaces, the splayed double office towers are clad in a double-walled glass facade that reduces heating and cooling requirements in extreme temperatures and maximizes daylight admitted into the building.

A ground source heat pump system will warm and cool the building by withdrawing heat from the ground, or returning heat to it, through 280 boreholes reaching down 400 feet.

Atriums at the south end of the building will pre-heat incoming air, taking advantage of the roughly 2 300 hours of sunshine Winnipeg enjoys annually.

Three 6-storey waterfalls in the atriums are designed to release or absorb humidity for optimum humidification of supply air to offices year round.

Fresh air from the atriums is drawn through offices and exhausted to the outdoors with the help of a solar chimney, the northernmost feature of the building. The sun's heat on the sides of the chimney causes air to rise in a stack effect that draws out the exhaust air.

When outside temperatures fall below 5°C, dampers in the chimney close and fans pump exhaust air from the building through the underground parkade for ventilation and heating. In winter, some of the exhaust air is circulated through a heat exchanger that preheats fresh air entering the building at the south atriums.

The building's ventilation system gets a boost from prevailing winds which blow from the south.

High ceiling height and floor-to-ceiling walls of glass admit lots of natural light, particularly at low sun angles, reducing the need for artificial light. Because of the long, narrow footprint of the building, offices toward the interior still receive plenty of natural light.

Several terraces on the roofs of the podium, the 2- and 3-storey retail office spaces at the base of the towers, carry a living carpet of mosses, grasses, and lichens. The roof-top gardens form an insulating mat that lowers heating and cooling costs in the offices below and reduces ambient greenhouse gases by absorbing carbon dioxide.

The 22-storey building, with nearly 700 000 square feet, will cost an estimated \$188 million to construct.

The additional cost of achieving a 60% reduction in energy consumption, compared with conventional buildings of this type, will pay for itself in energy savings over about 15 to 18 years, then start saving money.

*Artist's concept
of Manitoba
Hydro's
new office
headquarters in
Winnipeg*



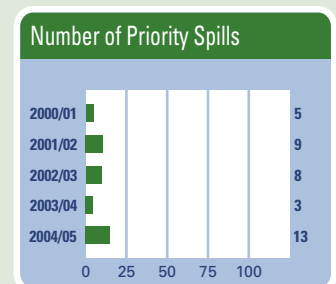
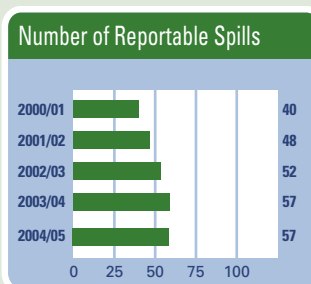
Spill Statistics 04-05

The total number of reportable and priority spills remained within the five-year historic range, at 57 and 13 respectively.

In all cases protocols were followed to clean up areas affected by the spills. Reportable spills are those that must be reported to regulatory officials. They exceed:

- 100 litres of insulating oil or other petroleum materials
- 45 parts per million of PCBs
- 10 or more kilograms of ozone-depleting substances
- 1 kg of sulphur hexafluoride, or
- more than 5 litres of waste oil or antifreeze.

Priority spills are those that involve petroleum products or PCB contaminated substances in which the spill volume is greater than 500 litres or the spilled substance enters a water body.





Safeguarding the Caribou

Manitoba Hydro supports research on the Wapisi herd and other woodland caribou populations to shed light on caribou behaviour. Results could help in the siting of new generating stations and transmission lines that could affect the animals' habitats.

As part of the research, DNA is extracted from fecal material to identify individual animals, augmenting other methods used to determine key population parameters.

A good understanding of population structure, size, and trends is essential to assessing and mitigating the impact of industrial activities on the species.

It is complemented by the collection of data on the whereabouts of the herds through aerial surveys. When interpreted, tracking data show where the caribou have gone, yielding insights into their habitat requirements, migration patterns, and other life-cycle characteristics, as well as the potential effects of resource development.

Woodland caribou in the province are widely dispersed, from the Manitoba-Ontario border to Lynn Lake.

Caribou live in the boreal forest and use a variety of habitats including mature spruce, jack pine, and treed bog. Their main source of food is lichen, but they may also eat twigs, leaves, and sedges.

Raptor Public Education Program

The Raptor Public Education Program, of the Manitoba Wildlife Rehabilitation Organization, brings public attention to the protection of birds of prey. Hawks and owls that have been rehabilitated following an injury are a key component of school programs and public information activities. The birds are wonderful educational ambassadors, encouraging Manitobans, young and old, to protect endangered species.

The program is one of 22 projects in 04/05 that received funding under Manitoba Hydro's Environmental Partnership Fund, which supports projects by community based, not-for-profit organizations that focus on education for sustainable development.

Regulating Lake Winnipeg

Manitoba Hydro is authorized under a Water Power Act licence to regulate outflows from Lake Winnipeg for power production purposes.

Lake Winnipeg is the fifth largest lake in Canada and the largest reservoir in our system. The other significantly-sized lakes that Manitoba Hydro regulates are Cedar Lake and Southern Indian Lake.

Below-average water levels were experienced on Lake Winnipeg at the beginning of the year. Above-average snowmelt runoff, combined with heavy spring rainfall events, produced higher inflows to the lake. As a result, lake levels rose sharply to above average in early May. Water levels remained above average for the rest of the year.

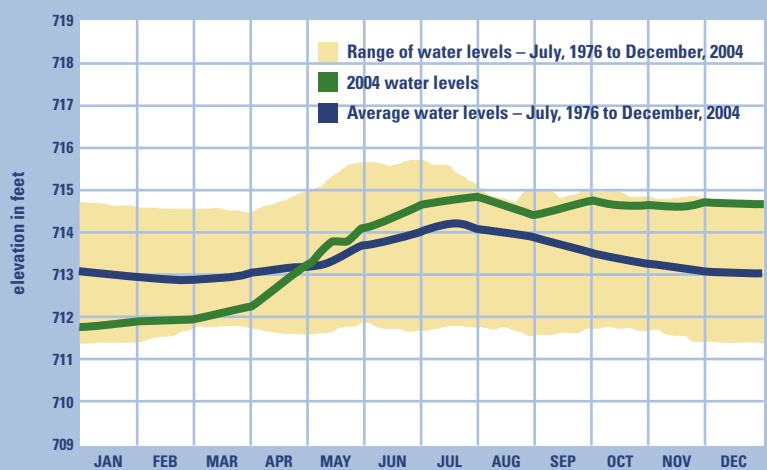
As inflow conditions began increasing, Lake Winnipeg outflows were stepped up to above average by mid-April and to near maximum by mid-November where they remained throughout the balance of the year.

During the second half of 2004 water conditions in the Lake Winnipeg basin

were some of the wettest experienced since 1913. Following the drought conditions of 2003, 2004 represented the largest turnaround in water supply conditions on record.

Note: The water level chart shown in the 03/04 report is incorrect. For the correct version, consult www.hydro.mb.ca/environment/publications.

Lake Winnipeg Wind Eliminated Water Level



Environmental Management Part of Kelsey Generating Station Upgrade

Kelsey Generating Station is set for an upgrade that will make more efficient use of water flowing through the station and reduce the environmental impact of station operation.

The seven turbines at the station will be equipped with self-lubricating greaseless bearings. In the current turbines, any excess grease from re-greasing is lost in the river, where it can potentially cause contamination.

The turbines will also be rerun with turbine blades shaped to speed more fish safely through the dam.

In addition to its environmental benefits, the upgrade will produce 35% more power from the station, increasing its output from 225 megawatts to more than 300 megawatts, making more efficient use of our water resources.

The project is a good example of Manitoba Hydro's Environmental Management System in action. The system is consistent with ISO 14000, a series of international, voluntary, environmental management standards that provides a common framework for managing environmental issues.

Under the EMS, audits are conducted by an independent agency twice annually to check, monitor, and improve our environmental performance.

In 2004/05, audits identified a handful of minor non-conformances, primarily with documentation, that have been remedied.

Studying Sturgeon

In 2004, Manitoba Hydro sponsored research on sturgeon at the Deep River Science Academy, in a continuation of earlier work on rearing lake sturgeon on different diets.

One group of sturgeon was fed a diet of black fly larvae, the second a traditional fish hatchery diet, to compare growth and health of the two groups. Researchers also tried to evaluate the ability of hatchery lake sturgeon to survive once they are released into the wild.

Findings will be of value to fisheries managers interested in rearing and stocking sturgeon.

Manitoba Hydro supports this type of field research and several other programs that safeguard the sturgeon, because the species shares many rivers in the province with our hydroelectric generating stations.

We fund the Grand Rapids Hatchery, which produces sturgeon fingerlings for stocking; sponsor ongoing academic studies of the sturgeon; and fund or serve on several boards and committees, including the Saskatchewan



Kelsey Generating Station, on the Nelson River



River Sturgeon Management Board and the Nelson River Sturgeon Co-Management Board. These are part of our efforts to halt the depletion of sturgeon in the province and help re-establish populations.

The sturgeon is one of the province's heritage fish species.

PCB Update

Manitoba Hydro has developed a plan to remove from service—and destroy—all current stocks of PCB-contaminated equipment.

PCBs (polychlorinated biphenyls) are synthetic chemical compounds. They are still used in business and industry because of their fire-resistant and insulating properties.

Recently, Manitoba Hydro replaced thousands of capacitors containing PCBs. Most of them were at our HVDC converter stations, where they were installed in filter banks before 1979.

Out of the combined total of 22 capacitor banks requiring replacements at the Dorsey, Radisson, and Heday Converter Stations, 6 capacitor banks have been replaced to date. The remaining 16 capacitor banks will be replaced, with completion scheduled for 2009.

The replacement project is estimated to cost \$38.4 million.

It will meet the requirements of a proposed federal government regulation which will require the end of use of all PCBs greater than 500 ppm by December 31, 2009 and all PCBs greater than 50 ppm by 2014.



Banks of capacitors containing PCBs, at Dorsey Converter Station. These capacitors will be replaced with PCB-free versions.

Fires in electrical equipment containing PCBs may produce highly toxic substances such as dioxins and furans.

PCBs do not readily break down in the environment. They may move up the food chain, through aquatic plants, fish, and birds and potentially, humans.

NewsBriefs

BOREAL FOREST WARMING RESEARCH YIELDS RESULTS

Now nearing completion of its second full field season, this project continues to examine the potential long-term effects of climate change and warming on the Boreal Forest.

Setting for the research, led by Dr. Stith Gower of the University of Wisconsin, is a forest laboratory site near Thompson, northern Manitoba.

Findings to date suggest that climate warming will make the boreal forest grow faster and take up more CO₂ from the atmosphere. Further, warmer soil temperatures do not seem to trigger large losses of CO₂ from the soil.

REDUCING OIL WASTE

Manitoba Hydro has been so successful in recycling oil by reconditioning it to like-new condition for reuse that it has established a commercial business and offers major industrial customers and other utilities the same service.

Hydro has launched the Oilpros™ program, which reconditions oils used in transformers and hydraulic equipment, allowing customers to re-use their oil and avoid waste management issues.

Reconditioning one gallon of oil saves up to 80% of the cost of a new gallon while demonstrating responsible use of our natural resources.

In its first year of operation, the program reconditioned 74 000 litres of oil.

TEN YEARS OF FOREST ENHANCEMENT

Manitoba Hydro's Forest Enhancement Program has concluded its first 10 years, from 1995 - 2005. Since 1995, the program has supported the planting of more than 113 000 trees in 586 community projects throughout Manitoba.

A variety of locations in rural and urban settings have benefited, such as playgrounds, baseball diamonds, golf courses, schools, parks, hospitals, seniors' homes, walking paths, old landfill sites, museums, and cemeteries.

The program has been a wonderful boost, particularly for smaller communities seeking to improve local parks and recreational areas. It has also helped develop forest education curricula and supported university initiated forest research projects.

Funding for the program is proposed to be renewed at the end of 2005 for another 10 years.



ECONOMIC DEVELOPMENT

Major Projects Update

If Wuskwatim, Keeyask, and Conawapa are built, they will be the biggest construction projects in Manitoba over the first two decades of this century.

Wuskwatim alone could generate more than \$200 million in on-site earnings for all workers on the project. Keeyask and Conawapa would both be bigger than Wuskwatim, with proportionately larger workforces needed.

The projects are set to stimulate the economy while minimizing impact on the environment, and bring much-needed jobs and job skills to the North.

Wuskwatim

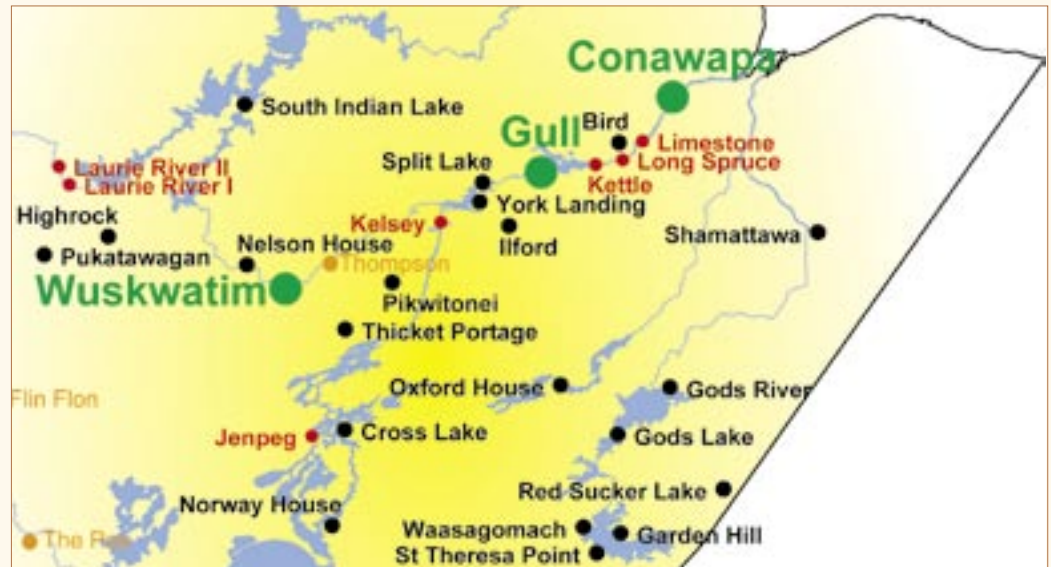
Following hearings on Wuskwatim by the Clean Environment Commission (see page 5), Nisichawayasihk Cree Nation (NCN) held a ground breaking ceremony in July 2004 for the Atoskiwin Training and Employment Centre of Excellence (ATEC). Construction began in August with a cost of approximately \$8.1 million and is to be completed in late 2005/06. ATEC will be a training and upgrading centre for NCN members and other local people. ATEC will also assist with referrals for NCN members to work on Wuskwatim. Manitoba Hydro provided advances to NCN for the construction.

The following contracts for Wuskwatim Generating Station are in various stages of negotiation: catering, access road, security, cross-cultural training, camp and work site area, site preparation and development, and supply of sewer and water services for the temporary and main camps.

Keeyask

In July 2004 Manitoba Hydro shared a draft Camp Site Construction Facilities and Infrastructure Concept, and Preliminary Design Report with the Keeyask Cree Nations (War Lake First Nation, Fox Lake First Nation, York Factory First Nation, and Tataskweyak Cree Nation) to stimulate discussions with respect to potential business opportunities. Further discussion was held around the project description, adverse effects issues, and commercial terms.

The bio-physical studies are well under way but the socio-economic elements need further work. Each community is preparing an internal work plan; the integration of these plans is important to the overall project assessment.



Conawapa

Phase 1 Community Consultation meetings were held throughout the 2004/05 fiscal year with several First Nation and Northern Affairs aboriginal communities.

The communities are:

- Granville Lake Community Council
- Nisichawayasihk Cree Nation (NCN)
- South Indian Lake Community Council
- Fox Lake First Nation
- War Lake First Nation
- York Factory First Nation
- Tataskweyak Cree Nation
- Nelson House Community Council
- Norway House First Nation and Community Council
- Pikwitonei Community Council
- Wabowden Community Council
- Shamattawa First Nation
- Manitoba Keewatinook Ininew Okimowin (MKO)
- Cross Lake Community Council
- Manitoba Métis Federation
- Thicket Portage Community Council
- Ilford Community Council
- Northern Association of Community Councils.

Meetings were also held with officials in Leaf Rapids, Thompson, Gillam, and Churchill. They served as a forum to exchange information, including project status, identify opportunities for aboriginal participation, and gather aboriginal perspectives on the project. Aboriginal opportunities include elements of income, training, employment, and business opportunities.

Feedback from these initial consultations will be considered on a go-forward basis for Phase 2 consultations on the Conawapa Generating Station project.

Running a Tight Ship

Manitoba Hydro's generation system is one of the most efficient in the country, measuring 99.4% in 04/05.

The achievement is the result of a strong supply side management program of maintenance and overhauls that improve the efficiency and performance of our generating stations to reduce energy production costs and defer the need to build new facilities.

Fossil Fuel-Fired Generation

Because of our reliance on clean hydroelectric power, our fossil fuel generation plants operate intermittently, compared with the plants of other utilities that rely on virtually continuous fossil fuel generation to supply their base load.

As a result, our fossil fuel plants are less efficient at converting fossil fuel energy into electrical energy, at 26.1% in 04/05.

The overall decline in fossil fuel generation efficiency was due to improved water supply conditions in 2004.

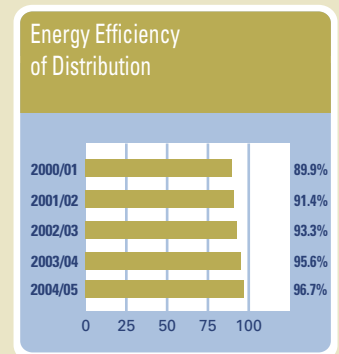
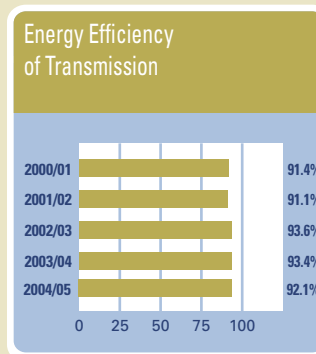
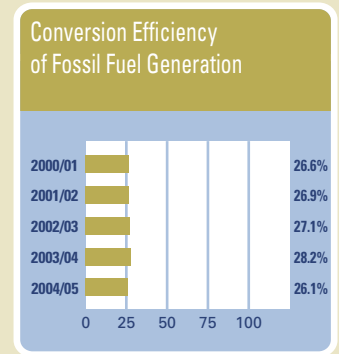
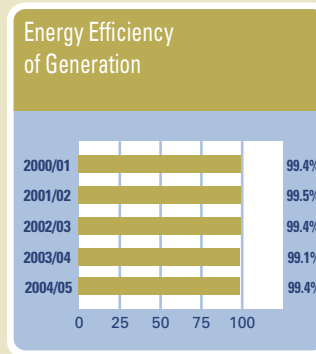
Northern Stations

Much of the power from our northern generating stations is transmitted over roughly 900 kilometres to reach southern markets.

The distance, and the fact that 16% of our transmission lines are more than 50 years old, accounts for a transmission energy efficiency of 92.1% in 04/05, slightly lower than in 03/04.

Distribution Systems

In 2004/05 our distribution energy efficiency was slightly higher than the 2003/04 efficiency rate, at 96.7%.



Internal Retrofit Cuts Costs/Adds Workplace Wellness

New energy efficient lighting at Hydro's customer service office in Brandon, Manitoba has brightened the workplace for staff.

Stock rooms are now illuminated by T8s, a high efficiency fluorescent that replaces standard T12s. T8s, which were also installed throughout the rest of the building shed a warm, white, soft light that reduces glare in office environments.

In locations with computers, T8 fixtures have plastic parabolic louvres that direct light straight down, helping eliminate glare on computer screens.

In other energy-saving retrofits, wall-mounted occupancy sensors were installed in offices.

They automatically turn lights on when someone enters a room, and turn the lights off after a period of inactivity.

Exit signs now use light-emitting diodes that cut energy consumption by 90% over incandescents and eliminate bulb replacement for 20 years.

In 04/05, similar work was completed at other customer service offices across the province. The retrofits were completed with the help of financial incentives under the Internal Retrofit Program, which encourages facility groups and managers to schedule energy efficient renovations at Manitoba Hydro's buildings.

Savings in electrical demand and energy from the retrofits translate into significant revenues from electricity sales outside the province.

Hydro to Buy Electricity from Province's First Wind Farm

In November 2004, AirSource Power announced it would sell wind-generated power to Manitoba Hydro as part of a 25-year agreement, providing Hydro with an additional clean energy source to augment its hydroelectric power.

AirSource Power expects to invest \$210 million to develop Manitoba's first wind farm near St. Leon, creating a new clean energy source.

The 99-megawatt project, in the rural municipalities of Lorne and Pembina near St. Leon, 150 kilometres southwest of Winnipeg, will use technology developed by Vestas Wind Systems of Denmark.

It will see installation of 63 wind turbines, enough to supply the total energy needs of Portage La Prairie and Morden combined.

Construction of the wind farm is to be completed by April 2006.

The provincial government intends to develop up to 1 000 megawatts of wind power over the next decade.



How Our Rates Stack Up Natural Gas

During 2004/05, Centra Gas adjusted its natural gas prices four times to reflect the forecasted market cost of primary gas supplies.

These changes resulted in the following impacts on the annual bill of a typical residential customer:

May 1, 2004	2.9% increase
August 1, 2004	2.3% increase
November 1, 2004	2.4% increase
February 1, 2005	5.2% decrease

In addition, effective February 1, 2005 the PUB approved a 2% general rate increase related to the non-gas costs of operating the utility. This was the second change in non-gas

costs since Manitoba Hydro acquired Centra Gas in 1999. The PUB also approved a 1% general rate increase related to non-gas costs effective May 1, 2006.

As of March 31, 2005, the total annual bill for a typical residential customer ranked fifth lowest in annual bills among Canadian cities.

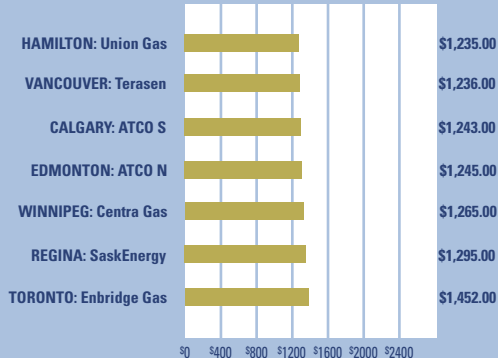
Electricity

Manitoba Hydro implemented a 5% rate increase on August 1, 2004, and an additional 2.25% increase for April 1, 2005. No rate increases were expected for 2006.

The modest rate increases were prompted by historically low water levels and persisting drought throughout the province. With the proposed rate increases, Manitoba Hydro's electricity rates rank lowest of any major utility in North America and among the lowest in the world.

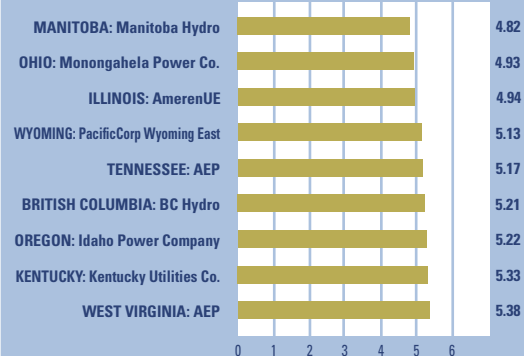
Annual Retail Gas Rates

Average annual gas bill for residential customers (3550 cubic metres/year)



Lowest Cost Electricity Utilities in North America

Total retail average rates in cents/kWh, January 2005



Power Smart in the News

New Plan Doubles Target

In late 2004, Hydro set its Power Smart energy savings target at 640 megawatts, or 1 767 gigawatt-hours of electricity, from 2005 to 2018.

The new target is roughly double the savings already achieved, from 1991 to 2004.

A supplemental natural gas plan was also released in early 2005, targeting savings of 96 million cubic metres of natural gas by 2018.

Residential Loan Passes \$50 Million

In October, Hydro's Power Smart Residential Loan, which has helped Manitoba homeowners add home comfort and energy savings since 2001, passed the \$50 million mark 2 years earlier than expected.

The loan, launched in March 2001 to help Manitobans cope with soaring natural gas prices, was targeted to hit \$50 million in 2006. Now, only 3 1/2 years later, some 15 000 loans have been processed for homeowners who have borrowed \$50 million to add comfort and lower their energy bills, mainly by topping up insulation, adding energy efficient windows and doors, and installing high-efficiency natural gas furnaces.

By the end of fiscal year 2004/05, projects under the loan saved customers an estimated \$2.2 million annually on their energy bills.

The savings translate into reductions of greenhouse gas emissions of 13 469 tonnes of carbon dioxide—the equivalent of taking nearly 3 849 cars off the road for an entire year.

Lighting Program Wins Award

In December 2004, the Canadian Energy Efficiency Alliance, a non-profit member-supported organization charged with promoting energy efficiency in Canada, presented Manitoba Hydro with a Best Practice Award in recognition of the corporation's Power Smart Commercial Lighting Program.

Hydro's Power Smart Industrial Performance Optimization Program, Commercial Heat Pump program, and Power Smart Design Standards also received Honourable Mentions.

Teaming With ENERGY STAR

Starting in 2004, Manitoba Hydro began promoting ENERGY STAR® products in the province under the slogan "Be Power Smart—Choose ENERGY STAR."

ENERGY STAR, an international symbol of energy efficiency, helps consumers identify home appliances and other energy-using equipment that saves energy. ENERGY STAR identifies products as the top high efficiency performers in their category.

Our compact fluorescent lighting promotion in fall 2004 was one of the first campaigns where we advised customers that if they purchased an ENERGY STAR product, they could be sure they were being Power Smart!

CFL Promotion Lights Up Marketplace

In fall 2004, Manitoba Hydro gave away more than 80 000 compact fluorescents to 21 000 customers during a month-long province-wide campaign that offered a buy one, get two free sale on qualified compact fluorescent lights.

The promotion encouraged homeowners to switch from incandescent bulbs to CFLs, to save money and energy, and help reduce greenhouse gas emissions.

A 13-watt CFL, equivalent to a 60-watt incandescent, uses 75% less energy and lasts 10 times longer.

The giveaway, which piggybacked on the national Switch and Save campaign offered through Natural Resources Canada, is the first of 10, planned for spring and fall over the next 5 years.



Customers Keep Saving With Power Smart

In 2004/05, we offered our customers 20 Power Smart incentive and customer service programs, ranging from energy efficient lighting and heat pads for piglets, to parking lot controllers and the optimization of industrial fans, pumps, and other motive power systems.

Power Smart programs, which began in 1992, lower electricity and natural gas consumption, saving participating customers on their energy bills.

Any surplus electricity can be exported for revenues that keep domestic prices down and defer the capital expense of building new generation.

Conservation of natural gas avoids primary and supplemental gas costs and a portion of transport, storage, and distribution costs. In addition, a value is realized for reducing greenhouse gas emissions.

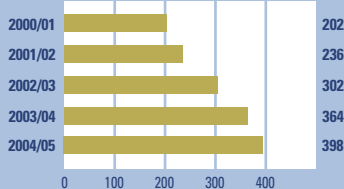
By 2004/05, the Power Smart portfolio of incentive-based programs, customer service initiatives, and codes and standards had saved 989 gigawatt-hours and 398 megawatts of electricity, and 9.1 million cubic metres of natural gas.

These Power Smart energy savings lowered participating customer bills by \$27.5 million in 2004/05 alone. Cumulative customer savings to date total more than \$188 million.

Energy savings in 2004/05 also reduced greenhouse gas emissions by 773 000 tonnes of carbon dioxide equivalent.

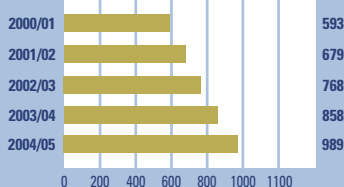
POWER SMART Savings to Date

Megawatts



POWER SMART Savings to Date

Gigawatt - Hours



Representative Projects

Here is a cross-section of Power Smart projects for 04/05. They give some indication of Hydro's efforts to encourage its customers to save energy and the environment through Power Smart technologies that use energy more efficiently.

Power Smart seeks to meet energy needs through efficiency improvements rather than new sources of generation. Programs promote products and services that deliver energy savings to Manitobans. Products are designed to last longer, reduce maintenance and labour costs, and improve living and working environments for all classes of customers.

Programs reduce energy use in the province, freeing up energy that can be sold to external customers, for export revenues. In turn, the sale of this energy helps keep domestic rates down.

Residential Earth Power Program

High on Heat Pumps

A Winnipeg couple who installed a heat pump in their brand new Winnipeg home say the novelty hasn't worn off yet.

Annual heating costs are only \$450—remarkably low even for their energy efficient 2100-square-foot home.

With electric baseboards, annual heating bills would normally average \$1 000.

They also enjoy the first-class comfort of heating and cooling with a heat pump, and the feeling they're doing their part to be 'green.' Since the heat pump doesn't burn fossil fuels, it doesn't emit greenhouse gases.

They installed their heat pump with the help of a loan under Manitoba Hydro's Power Smart Residential Earth Power program.

Thanks in large part to the loan and Hydro's efforts to promote awareness of heat pump technology, Manitoba has become the national leader in installation of heat pumps.

Although Manitoba represents less than 4% of the national population, it accounted for the installation of 770 heat pumps in 2004—nearly 25% of heat pump installations across Canada.



Hydro's booklet "Geothermal Heat Pumps for Homes" helps promote awareness of heat pump technology in Manitoba.

Power Smart New Home Program

Homeowners Enjoy Ultimate in Comfort/Savings

A couple who built a Power Smart Home in Winnipeg in 2004 are glad they took the Power Smart route.

They are saving an estimated \$350 a year on their heating bills because of the increased insulation in walls and ceilings. They are enjoying peace and quiet with energy efficient windows that block outside noise. They also love the constant supply of fresh air drawn in by the heat recovery ventilator.

With its Power Smart New Home Program, Hydro encourages prospective new homeowners to build their homes to Power Smart or Power Smart R-2000 standards.

Under the program, homeowners are eligible for an incentive of up to \$1 000 toward the purchase of a front-loading clothes washer or a \$600 rebate on their energy bill.



Energy Efficient Heat Pad Program

Heat Pads Save Money and Piglets at New Haven

When New Haven Colony, near Stonewall, retrofitted their 920-sow, farrow-to-finish operation, they decided to switch from heat lamps to heat pads to save money and piglets.

Heat pads are fibreglass mats, embedded with electrical heating elements, that form a warm bed for piglets midway along one side of the farrowing crate. They use one-third the electricity and last up to 15 years compared with 5 000 hours for a heat lamp, for lower replacement costs.

Henry Waldner, Colony electrician, says, "By making the switch we can avoid having to constantly replace heat lamps as well as corroded heat lamp fixtures. And we're looking forward to localized heating with the heat pads. It keeps the piglets away from the sow, for lower crushing losses."

The 148 crates spread over both barns once

One-week-old piglets on heat pads in a farrowing crate



used 2, 175-watt heat lamps/crate. Switching to a double 132-watt heat pad that keeps piglets warm in two crates is set to reduce the Colony's annual energy bills and heat lamp replacement costs by an estimated \$17 000.

The heat pads were installed with the help of Hydro's Energy Efficient Heat Pad program, which offers agricultural customers technical guidance and financial assistance to switch from heat lamps to heat pads in farrowing crates.

Commercial Lighting Program

Red River College Gets Power Smart

Red River College has transformed a woodworking classroom following a switch from mercury arc lighting to energy efficient pulse start metal halide lighting.

Over its 20-year lifetime, the new metal halide lighting will lower the College's annual electricity bills by more than \$1 200.

"The savings are substantial, but they are only part of the payoff," says Cam Asher, Technical Officer at Red River College.

"The new lights in the Carpentry Annex improve the quality of students' work by brightening the learning environment. They also make life easier for the people who maintain equipment in the room."

Following the renovation, light levels averaged 60 foot-candles at workbench level, six times the amount of light supplied by the old mercury vapour lighting.

"Students used to fight to work in the well-lit classroom next door," says Asher. "Now they fight to work here!"

Manitoba Hydro's Commercial Lighting program encourages the installation of energy efficient lighting systems, technologies, and leading edge innovations through technical guidance and financial incentives.



Metal halide lighting now supplies roughly six times as much light in the Carpentry Annex.

Performance Optimization Program

Simplot Reaps "Cool" Savings

In October 2000, energy specialists from Manitoba Hydro provided technical support to help Simplot Canada plan its new state-of-the-art potato processing plant in Portage la Prairie.

"The planning paid off," says Rick Fisch, Vice-President Special Products. "From the day we started production, the Portage Plant has been setting records for turning out more french fries for less."



Compressors in "refrigeration alley" at Simplot. They are capable of freezing more than one million pounds of french fries a day as well as other potato products, and keeping buildings cool.

Heart of production in the new plant is an ammonia refrigeration system that applies a range of Power Smart measures for maximum efficiency. Compared with conventional approaches to refrigeration, the new measures cost an additional \$827 000 that was partially offset with the help of a financial incentive under Manitoba Hydro's Performance Optimization Program, which helps industrial and large commercial customers with energy saving projects.

"The bottom line," says Fisch, "is that in just over 2 years, the refrigeration system enhancements will have paid for themselves. After that, over the lifetime of the equipment, we can expect to save more than \$250 000 every year."

Performance Optimization Program

Cutting Energy Costs at Standard Aero by 86%



One of two, 2-storey-high 10 000-gallon air storage tanks for the engine test air system. The tanks are one of the keys to an energy efficient compressed air system for Standard Aero.

Standard Aero has installed two compressed air systems at its new turbine engine maintenance and repair facility in Winnipeg, following Power Smart design options recommended by Manitoba Hydro.

The company now saves \$46 000 a year in operating costs. Traditional designs would have consumed 30 times the energy.

Measures include a variable speed drive compressor and huge air storage tanks that can supply the large bursts of compressed air needed to test General Electric CF-34 turbine engines. Meanwhile, heat recovered from both air compressors helps keep the plant warm and reduces natural gas consumption, for a drop in annual greenhouse gas emissions of 30 tonnes.

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NewsBriefs

EXPORTING SAFETY TO MOLDOVA

Manitoba Hydro's expertise in communicating electrical safety messages is set to benefit Moldova, a country of 4 million between Romania and the Ukraine, where injuries and fatalities caused by a lack of electrical safety know-how are on the increase.

Hydro staff are helping develop a public safety education program for the country, in a campaign that includes a national safety week, electric safety workshops, electric safety training for employees of utilities, and training sessions for specific groups.

The service, offered through Manitoba Hydro International, includes the preparation of three safety videos tailored to Moldova audiences.

NEW SUBSTATION DESIGN PATENTED

Hydro's engineers have designed a new type of distribution substation for serving small loads emerging in isolated locations. Known as distribution supply centres, the new substations use underground cable, pad-mounted transformers, and other equipment that can be safely located in public spaces without fencing.

By eliminating poles and overhead wiring, the new substations are visually less intrusive. They occupy less property, take 6-12 months versus up to 3 years to build, and cost about \$1.5 million, roughly half the cost of a conventional distribution station.

NEWSLETTER WINS AWARD

One of two editions of Power Smart Newsletter in 04/05 won a communications award at the annual Utility Communicators International Conference.

The award recognizes excellence in creative communications in support of the corporation's strategic marketing goals.

In 2004, Hydro issued the second and third editions of its 16-page Power Smart Newsletter, which is published to provide customers with details of our Power Smart programs.

The newsletters, inserted into daily and weekly newspapers across the province include information on saving energy and money, increasing home comfort and re-sale value, and reducing emissions of greenhouse gases through energy saved.





Lorraine Cook working as an administrative assistant at Kelsey Generating Station in northern Manitoba

Pre-Project Training Gathers Momentum

2004 marked the second year of a 5-year pre-project training program that seeks to prepare aboriginal workers for the work boom during construction of the proposed Wuskwatim and Keeyask generating stations.

Trainees have now started receiving instruction in a range of skill sets, including welding, carpentry, ironworking, and heavy equipment operation.

About 1 000 northern aboriginal participants will be trained through the program. At its culmination, 800 participants are expected to find jobs on the projects.

The \$60 million program was developed by the Wuskwatim and Keeyask Training Consortium, which is comprised of Nisichawayasihk Cree Nation, Tataskweyak Cree Nation, York Factory First Nation, Fox Lake First Nation, War Lake First Nation, Manitoba Keewatinowi Okimakanak, Manitoba Métis Federation, Manitoba Hydro, and the Province of Manitoba.

Coordination of the training is centralized, but each community plans and manages its own program.

In 2003, Fox Lake First Nation and the Radisson and Heday Converter Stations drew up a partnership to provide work experience at the stations for 10 people on a 3-month rotation.

The partnership set the stage for two consecutive work experience sessions held in February and September 2004 at the stations.

Meanwhile, two complementary programs continue to prepare candidates for pre-project training. The Frontier School Initiated Credit Program gives aboriginal high school students 90 hours of experience at the converter stations, toward a high school credit on their transcript. The Split Lake Work Experience Program gives aboriginal students job shadowing experience at generating and converter stations in the Gillam area.

Employment Equity Internships Set Stage for Summer Jobs

"I took the job to see if I had any interest in engineering. Now I'm 80% sure that I'm going into engineering," said Shahbaig Seerat, one of 11 students who took part in Manitoba Hydro's Employment Equity Internship Program in 2004. He spent one half day a week, from February to June, at 453 Dovercourt, where he modified flags on electronic drawings.

In 2004, four participants were visible minority students from high schools in Winnipeg. Some schools offer the students credit towards their high school diploma for taking part in the program. The other seven were selected in partnership with the Manitoba Aboriginal Youth Career Awareness Committee (MAYCAC) and Black Youth Helpline.

The program, which Manitoba Hydro has offered each spring since 1998, provides unpaid internships for grade 10 to 12 students who are members of employment equity designated groups—aboriginal peoples, persons with disabilities, and members of visible minority groups. Internships are arranged in locations across the province, including Winnipeg, Brandon, Selkirk, Swan River, Dauphin, The Pas, and Thompson.

Of the 11 students who completed the program in 2004, 9 were hired for summer employment, including Shahbaig.

Engineering Out the Hazard Making Workplaces Even Safer

Manitoba Hydro is now adding an extra measure of safety at locations throughout the system by adding fall protection systems that provide equivalent or better protection than fall arrest.

Fall protection systems typically include engineered guard rails, safety nets, platforms, ladders, horizontal and vertical lifelines, and mobile lifts.

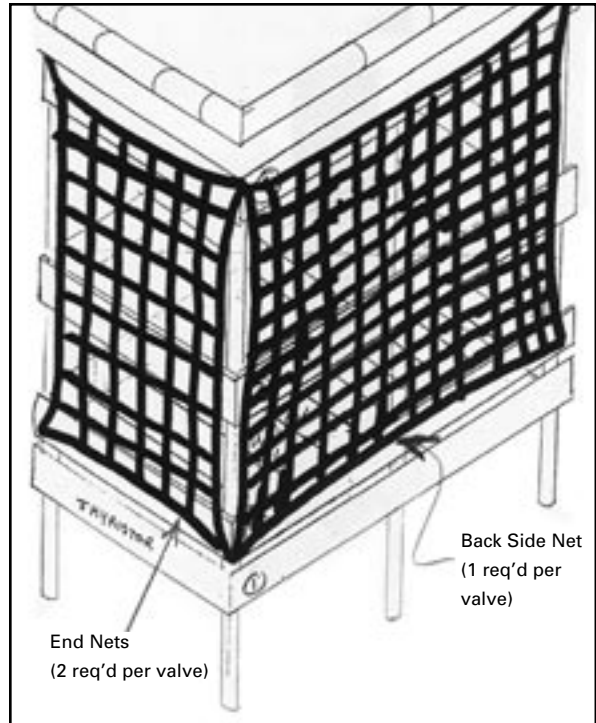
Under the corporation's Fall Protection Project, \$11.7 million has been set aside to address 650 situations throughout the system. Half the budget is expected to cover fall protection projects at the Brandon, Pointe du Bois, and Slave Falls Generating Stations.

One of the designs is a safety net for staff working on thyristors at heights of more than 2.5 metres, a fall distance specified in a Manitoba Regulation on the protection of workers who may be exposed to the danger of falling.

In 2004/05, more than 120 fall protection designs were under development, with 20 completed and installed.



Because of its height, this thyristor exposes workers to the danger of falling more than 2.5 metres. Right: Design details for a fall protection safety net for the thyristor.



The project is set to wrap up in 2004, although it is expected that fall protection systems will continue to be installed after that, for an added measure of safety that allows workers to complete their duties in a safe and efficient manner.

See overleaf for 04/05 safety statistics.

Curtains for Fire Protection

Transformer deluge sprinkler systems and deluge water curtains for the exterior walls of the Bipole II converter building exterior are among upgrades to fire protection systems for key equipment and buildings of the HVDC systems at Dorsey and Heday Converter Stations.

The upgrades, to meet fire codes standards and industry best practices, are to be completed by fall 2007.

A small fire, if not properly attended to or controlled, can lead to a catastrophic event that damages the environment and property, and claims lives.

At Dorsey, upgrades are complemented by the station's fast-drain system—a yard-wide piping network designed to carry oil and water away from burning equipment such as transformers, to the oil trap building.

Upgrades at Dorsey will include construction of a new Emergency Response building to store fire protection and spill response equipment.



Testing a fire protection system that showers water over an HVDC converter transformer at Dorsey Converter Station

Helping Form Manitoba's First Urban Search & Rescue Team

In 2004, Manitoba started organizing its own Urban Search & Rescue team, which will be formed by a group of up to 60 volunteers, roughly half from Manitoba Hydro.

USAR teams provide crucial assistance during emergencies too large or complex for local or regional municipal and industrial resources to handle.

Fire Protection Services at Hydro identified 30 candidates from various trades and backgrounds, based on training experience in structural collapses, emergency response, work in confined spaces, rope rescue, and hazardous materials.

In 2005, selected staff from Hydro joined policemen, professional firefighters, and municipal safety personnel in a range of training sessions, to gain expertise in dealing with hazards such as chemical, biological, nuclear, and radiological materials, explosives, associated fires, and unstable ground conditions.



James Avison of Manitoba Hydro learns to rappel as part of Urban Search & Rescue team training

Once fully developed, the team will become one of six across Canada with USAR capacity to assist with crisis situations at a national level.

Said one volunteer from Hydro, "It is an honour to make the commitment to the team."

Safety Statistics

Safety is Manitoba Hydro's most important goal and priority. Work processes and actions must conform to the highest standards. Safety must be practiced and improved continuously.

TARGETS:

- High risk accidents: 0
- Accident frequency rate: <0.80 accidents per 200 000 hours worked
- Accident severity rate: <16 days per 200 000 hours worked
- Public contacts: 25% injury reduction

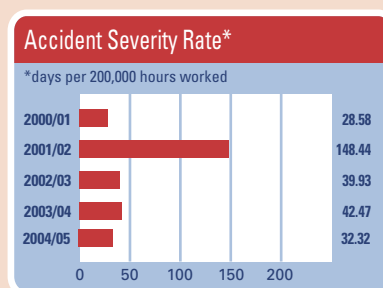
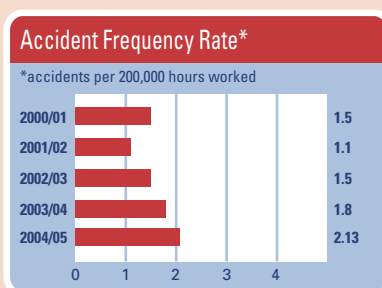
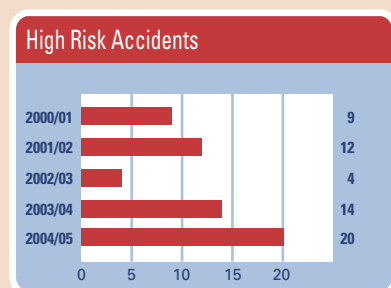
In 2004/05, there were 20 high risk accidents. High risk accidents include all reported injuries (not necessarily resulting in lost time) due to electrical contact, falls from heights greater than 3 metres, or vehicle accidents, all of which have a significant probability of a fatal or permanent injury.

The accident frequency rate indicates the number of accidents for every 200 000 hours worked. The rate was 2.13 in 2004/05, which is significantly over target for this category.

The accident severity rate indicates the number of work days lost to accidents for every 200 000 hours worked. The rate was 32.32 in 2004/05, which is also significantly over target for this category.

The number of accidental contacts that the public has with our system is also tracked. Public contacts range from vehicles striking poles to contractors digging up lines. There were 403 such incidents during 2004/05, 15 of which resulted in injuries.

As part of our public safety programs, new initiatives are being developed to encourage people to call the utility before digging, to alert farmers about overhead dangers, and to inform new drivers about proper procedures if their vehicle comes in contact with our system.



Harvester Answer to Livestock Feed Shortages?

A grain harvesting system that Manitoba Hydro has helped research as part of its efforts to promote sustainable agriculture could prove a partial answer to looming shortages of livestock feed caused by the burgeoning ethanol production industry.

Ethanol is a type of alcohol that can be used to fuel internal combustion engines, either neat or in blends with regular gasoline. Environmental issues, the high price of crude oil, and the need for renewable energy sources has resulted in a major resurgence of ethanol in the last few years.

Deny St. George, Biosystems Engineer with Manitoba Hydro, says the McLeod Harvester is poised to address the problem by increasing livestock feed supplies through more effective recovery of crop materials.

By using the chaff collected by the harvester, livestock such as beef cattle can be effectively managed, to reduce pressures on the traditional feed supply caused by ethanol production.

The McLeod Harvester collects crop residues as part of its basic strategy of splitting traditional combining into two parts: a mobile field unit and a stationary unit in the yard.

"The field unit, pulled by a tractor, collects grain kernels, chaff, and weed seeds," says St. George.

"The unit harvests everything but the straw."

The grain, chaff, and weed seeds are transferred to a truck and taken to the farm yard, where the mixture is fed to the second half of the harvester—an automated stationary unit that cleans the grain.

What is left is crushed to become millings, which consist of chaff, weed seeds, and broken or undersized kernels of grain.

According to preliminary field studies, the millings can serve as a good livestock feed at rates and nutritional values comparable to other types of feed.

In addition, by removing weed seeds from the field, the harvester reduces herbicide use.

Field unit of the McLeod Harvester. In addition to grain, the harvester yields millings, a combination of crushed chaff, weed seeds, and undersize or damaged grain kernels. What was formerly left on the field makes an excellent livestock feed that could take the pressure off feedstocks for manufacturing ethanol.



Adding Energy Conservation to the Curriculum

Science teachers throughout Manitoba are now instructing Grade 6 students in energy conservation with the help of a handbook developed by Manitoba Hydro, the Pembina Trails School Division, and the Program Development Branch of Manitoba Education, Citizenship and Youth.

The handbook offers instruction on low- and no-cost energy efficiency measures and how students can conserve electricity and water resources at home and school.

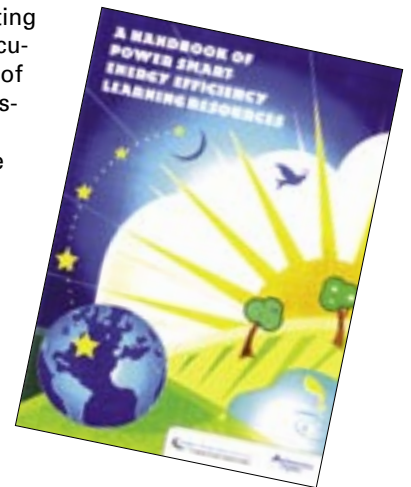
A dozen worksheets feature topics ranging from conducting a home energy audit to calculating the operating costs of exit signs and reducing emissions of greenhouse gases.

The handbook puts the finishing touches on the "Power Smart Energy Manager" project, a 4-year pilot program launched in 2001 to reduce energy consumption in 35 schools throughout Pembina Trails Schools.

Under the program, a Power Smart Energy Manager audited energy consumption, water use, and waste disposal in division schools.

The manager ultimately suggested practical energy conservation measures, from energy efficient lighting to boiler upgrades, that now save the division nearly \$300,000 a year.

Water conservation measures alone now annually save 25 million litres of water.



“Six Seasons of the North”

Aboriginal voices are clear and persistent in calling for a respectful recognition of their world view.

Elders point out that the central purpose of teaching is to develop a person who understands “why we do what we do.”

In response, the Mystery Lake School Division of Thompson in northern Manitoba developed a policy to provide more culturally appropriate programs and curriculum content that reflect Aboriginal perspectives.

The division’s student population of 3500 includes a substantial and increasing proportion of students of aboriginal ancestry,

The policy encouraged the Division’s Aboriginal Education Advisory Committee, with the help of Manitoba Hydro, to develop “Six Seasons of the North,” a curriculum now being piloted at R.D.Parker Collegiate in Thompson.

The curriculum promotes learning about the land and its resources.

Working with Elders and other primary resource harvesters, high school students observe, listen, and learn while taking part in on-the-land traditional pursuits.

To prepare for field activities, students explore ideas and cultural concepts in the classroom, seeking to bridge traditional knowledge with western science.

The curriculum helps students find balance to live peacefully and respectfully with themselves, one another, and the land, so that they can play a role in revitalizing Aboriginal Culture.

It draws its inspiration from the six annual seasonal activities of the Northern Cree people:

Takwakin — Fall

Mikiskaw — Freeze-up

Pipon — Winter

Sekwan — Spring

Mithoskamin — Break-up

Nipin — Summer

The curriculum was among 12 projects nominated for the 2005 Spirit of the Earth Awards, an annual program that Hydro developed to publicly recognize environmental contributions by Aboriginal people or non-Aboriginal people working in partnership with Aboriginal communities.

The Spirit of the Earth Awards program seeks to encourage projects or activities that improve the environment or promote environmental and Aboriginal cultural awareness.



Safeguarding the Fishermen

There are days on northern lakes and rivers when wind and waves are so dangerous that fishermen must take shelter overnight.

Now, thanks to a radio communications network, home communities can make sure that their fishermen are safe and the catch can still get to the fish plant on time.

The network was installed in 2004 with the help of Manitoba Hydro’s Keewatinohk Sipiia Partnership Fund, which was set up to assist communities on the “developed waterways” along the Nelson, Churchill, Burntwood, Rat, Laurie, and Saskatchewan Rivers, where Hydro has interests.

The fund supports projects that enhance traditional and/or domestic resource harvesting, cultural and recreational activities, extra-curricular educational activities or programs for youth, and sustainable activities of local cooperatives and not-for-profit enterprises.

With an annual budget of \$230 000, it has helped several communities, including Cormorant, Moose Lake, York Landing, Grand Rapids, War Lake, and Ilford, install such projects as modern floating docks for safer loading, handling, and delivery of the commercial fish catch; and build safe haven cabins in remote areas to help fishermen and other resource harvesters.

Priority is given to projects that enhance the value, safety, and convenience of community activities on developed waterways or land next to them.

Achieving a Diverse and Representative Workforce 2004/05

At Manitoba Hydro, we value the background, experience, perspectives, and talents of each individual employee.

We strive to create a workplace that reflects the diverse populations of the communities we serve, through our employment equity initiatives.

Our commitment to employment equity is embodied in our Corporate Strategic Plan which includes targets for a range of categories, including those charted here.

Women in the Workforce

As of March 2005, Manitoba Hydro employed 1 340 women. Women's representation continued to increase; however, close attention will be paid to ensure employment targets will be met.

Persons with Disabilities

The workforce population of persons with a disability remained constant. This static growth rate indicates that employment targets will not be met without special targeted measures to increase the hiring rate of persons with disabilities into the company.

Members of Visible Minorities

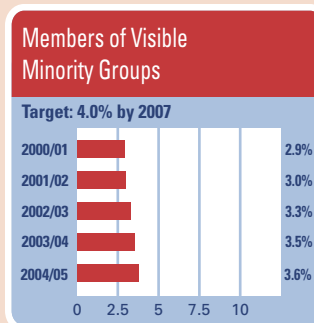
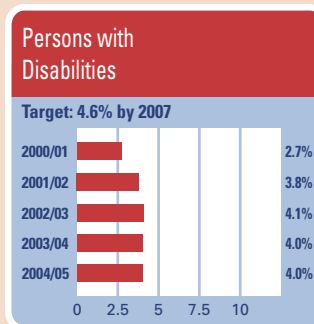
The workforce population of visible minority group members continued to increase. Indications are that the current growth rate will enable the company to achieve its employment targets for this group.

Aboriginal Employees Province-Wide

Representation continued to increase, with 586 employees declaring themselves to be of Aboriginal ancestry. The present growth rate indicates that the corporation is on track to meet its 2007 employment target.

Aboriginal Employees in Northern Manitoba

Northern Aboriginal representation continued to increase, with 191 employees self-declaring their Aboriginal ancestry. While the present rate of employment indicates that the corporation will likely meet its 2007 employment goal, close attention will be paid to ensure Aboriginal hires into full-time permanent positions continue to increase.



Work in a Confined Space

Dione Peech, Power Supply Worker, Electrical Operator, paints a protective coating on damaged surfaces of the stator in Unit 9, Limestone.

She is standing between the outside of the main rotor and the inside of the stator—a narrow, curved gap that adds new meaning to the term “confined space.”

She was the only one in her crew small enough to fit in the gap and maneuver around. The cloth on her head is to keep her hair from getting caught in the laminations of the rotor at her back.

She is perfectly safe. The rotor, which normally turns at 90 revolutions a minute when it is generating electricity, has been locked.



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