



**Énergie NB Power**

Groupe Group



# Environmental Performance Report 2006



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## Joint Message from the President and Environmental Committee Chair

There is no doubt that society's environmental consciousness has increased substantially over the last year. Whether it was because of a movie, a book or the front page of the local newspaper is immaterial; the end result is that the environment matters on Main Street.

The environment is a priority for NB Power as well. We understand that New Brunwickers expect a balance between energy production and stewardship of our shared environment. We would not have it any other way.

Our 2006 Environmental Performance Report marks our eleventh consecutive public report of environmental activities. The report provides an accurate snapshot of our environmental initiatives and results.

We can assure you that, with respect to the environment, our operating companies always conduct their due diligence, comply with our stringent environmental policies and follow all legal requirements. Even so, our social responsibility as a trusted neighbour and Crown Corporation does not end with the fulfillment of minimum standards. As such, we strive for decisions that are proactive, responsible and prudent for the long-term. Our decisions consider both the interests of the balance sheet and of Main Street. Our decisions reflect New Brunwickers' interests for today and tomorrow.

Throughout the report you will see real instances of our environmental initiatives in action. For example, from the report you will learn:

- The refurbishment of the Coleson Cove Generating Station resulted in dramatically lower emissions through the use of advanced technologies.
- By following our due diligence process, we identified that using a heavy-lift helicopter for construction of the structures for the International Power Line was more efficient and better for the environment.
- We have entered into agreements for up to 96 MW of wind energy and are committed to delivering 10 per cent of New Brunswick's energy from renewable sources.

Our environmental report cannot accurately reflect the dedication of our employees to the stewardship of New Brunswick's environment.

Our people care.

Our people are committed.

Our people are proud of our track record and secure in our abilities to find innovative solutions to today's energy challenges.



We are pleased the environment is on the front page. For our grandchildren's sake it should be. Please take some time to review our 2006 Environmental Performance Report.



Bernard Cyr,  
Chair, Environmental Committee,  
NB Power Group Board of Directors

David D. Hay,  
President,  
CEO NB Power Group



## Environmental Governance

The Environment Committee exists to assist the Boards in establishing and maintaining appropriate Board policies that guide the companies in respect to the outcomes to be achieved in meeting or exceeding their environmental obligations.

Accordingly, the Environment Committee will regularly review:

- The scope of company operations and the environmental regulatory requirements under which the company(ies) operate;
- The environmental expectations of the shareholders and of New Brunswick citizens; and,
- The economic impact of environmental options on the company.

The Committee will also:

- Monitor environmental trends and significant changes in related environmental technology;
- Assess the impact of emerging environmental issues as the companies change their operations in pursuit of their strategic vision or as regulatory requirements and/or society's expectations shift; and
- Prepare a range of well-researched policy options and their implications of each for board deliberation, debate and decision.

The members of the Environment Committee of the Board for 2006 are: Bernard Cyr (Chair), Lise Bastarache, Susan Hicks and David D. Hay.



## The NB Power Group

The NB Power Group provides reliable, safe, and reasonably priced electricity with respect for the environment. Electricity is generated at 15 facilities and delivered via power lines, substations and terminals to more than 360,000 direct and indirect customers within New Brunswick and surrounding areas.

The NB Power Group consists of a holding company and four operating companies:

- New Brunswick Power Holding Corporation (Holdco), which provides strategic direction, governance and support to the subsidiaries for communications, finance, human resources, legal and governance. It also provides shared services on a cost-recovery basis.
- New Brunswick Power Generation Corporation (Genco), which is responsible for the operation and maintenance of the oil, hydro, coal and diesel-powered generating stations.
- New Brunswick Power Nuclear Corporation (Nuclearco), which is responsible for the operation and maintenance of the Point Lepreau Generating Station (PLGS).
- New Brunswick Power Transmission Corporation (Transco), which is responsible for operating and maintaining the transmission system.
- New Brunswick Power Distribution and Customer Service Corporation (Disco), which is responsible for operating and maintaining the distribution system.





## Environmental Policy

NB Power Group Environmental Policy is designed to communicate the Corporation's commitment to protecting the environment.

### *Statement*

NB Power Group is committed to the achievement of excellence and innovation in protecting the environment of the province, while meeting its mandate to provide economic and reliable energy to the people of New Brunswick. NB Power Group considers that the environmental performance of its facilities is as important to its customers as the quality of the service which they receive.

The environmental principles which follow guide NB Power Group's environmental performance, and affirm NB Power Group's responsibility for, and commitment to, environmental protection.

### *Leadership*

NB Power Group maintains a leadership role in the investigation of new environmentally responsible technologies and methodologies, through cooperative efforts with the public, industry, researchers, and government.

### *Environmental Standards*

NB Power Group complies with all applicable environmental legislation and other non-regulatory commitments at its facilities, from early planning through operation and finally to decommissioning.

### *Environmental Audits*

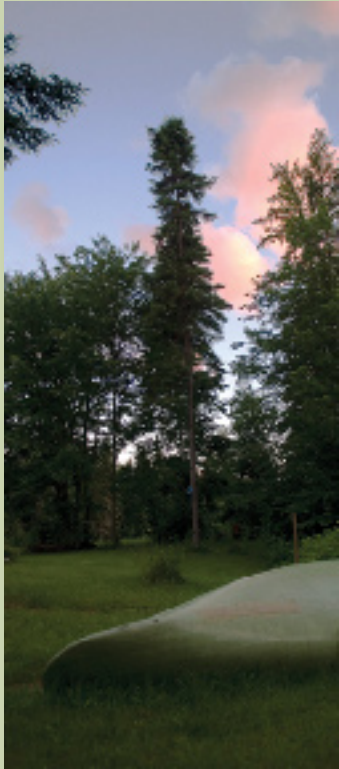
NB Power Group is committed to periodic environmental audits of its facilities and associated monitoring programs, to assess compliance with regulatory requirements and consistency with industry standards and internal procedures.

### *Environmental Protection*

NB Power Group provides a framework for setting and reviewing objectives, targets and procedures to assist its employees in meeting the utility commitment to environmental protection, prevention of pollution and improvement of its environmental management systems.

### *Partnership*

NB Power Group strives to ensure that its Environmental Policy is respected by all its partners, including contractors, consultants, and suppliers of goods and services.





## 2006 Environmental Reporting Highlights

Genco received 15 environmental regulatory approvals during 2006:

- Eight Petroleum Storage Site Licences
- Five Approvals to Operate Wastewater Treatment Systems
- Two Approvals to Operate Domestic Sewage

As a result of the Coleson Cove Generating Station refurbishment in 2005, the following emissions have been reduced:

- SO<sub>2</sub> emission rates were reduced by 77% as a result of flue gas desulphurization equipment being installed;
- NO<sub>x</sub> emission rates were reduced by 70% through modifications to the boiler; and
- Particulate emission rates were reduced by 75% with the addition of the wet electrostatic precipitator.

In 2006, the operation of PLGS avoided emissions of approximately 3.63 million tonnes of carbon dioxide. In addition 58,925 tonnes of sulphur dioxide and 12,980 tonnes of nitrogen oxide were avoided.

Transco received 7 environmental regulatory approvals during 2006:

- Helicopter approval from the National Energy Board
- EIA approval from Department of Environment (DoE) for use of helicopter
- Blanket Watercourse and Wetland Alteration Permit
- Three License of Occupation for Protected Areas
- Domestic Sewage Approval for Eel River

NB Power has committed to purchasing up to 400 MW of wind energy and recently entered into agreements for up to 96 MW.

NB Power contributed to an International Electric Power Research Institute study on tidal power. The study identified 90 MW of tidal power resources in New Brunswick.





## NB Power Holding Corporation (Holdco)

### Overview

Holdco provides governance as well as corporate and shared services to NB Power Group's other business entities.

### Environmental Services

Environmental Services, a division of Holdco, provides support to the four operating companies by:

- Integrating environmental management with operations and project planning;
- Acquiring regulatory approvals for facilities and new construction;
- Monitoring compliance with regulatory approvals and reporting to regulating agencies;
- Consulting with external agencies and stakeholders on environmental issues;
- Providing environmental information to customers, staff, regulatory authorities and the public; and
- Monitoring and providing input on new and revised environmental standards and legislation.

### Environmental Council

The Environmental Council, comprised of members from each operating company, assists in communicating and maintaining the commitment to the Holdco Environmental Policy throughout the group of companies.

Their purpose is to:

- Ensure there is clear understanding of environmental responsibilities between the operating companies and Environmental Services in order to fulfill environmental responsibilities;
- Develop a co-operative approach between council members to share knowledge and identify key resources;
- Review the status of environmental management systems;
- Communicate key environmental challenges facing the areas represented by council members; and
- Establish and maintain a database of environmental legislation appropriate to the operating companies and assign responsibility to track legislative changes so there will be appropriate communication to council members and operating personnel.



## National Benchmarks

Holdco, as the parent company, is a member of the Canadian Electricity Association and participates in the Environmental Commitment and Responsibility (ECR) program.

Through this industry-wide initiative, electric utilities report on specific measures and indicators to benchmark performance. The principles of the ECR program are to:

- Be more efficient in our use of resources;
- Reduce the adverse environmental impact of our business;
- Be accountable to our constituents; and
- Ensure that our employees understand the environmental implications of their actions and have the knowledge and skills to make the right decisions.

Holdco submitted data to the ECR Program for the year 2005 on behalf of NB Power Group.

### Environmental Commitment and Responsibility Program Indicators 2005<sup>0</sup>

	NB Power	CEA
<b>Atmospheric Emissions<sup>1</sup>:</b>		
Mass Gross CO <sub>2</sub> Emitted Per Unit of Net Fossil Generation (kg/kWh)	0.772	0.95
Mass Gross CO <sub>2</sub> Emitted Per Unit of Net System Generation (kg/kWh)	0.441	0.33
Mass Net CO <sub>2</sub> Emitted Per Unit of Net Fossil Generation (kg/kWh)	0.772	0.91
Mass Net CO <sub>2</sub> Emitted Per Unit of Net System Generation (kg/kWh)	0.441	0.31
Mass SO <sub>2</sub> Emitted Per Unit of Net Fossil Generation (g/kWh)	5.10	4.39
Mass SO <sub>2</sub> Emitted Per Unit of Net System Generation (g/kWh)	2.90	1.50
Mass NO <sub>x</sub> Emitted Per Unit of Net Fossil Generation (g/kWh)	1.60	1.66
Mass NO <sub>x</sub> Emitted Per Unit of Net System Generation (g/kWh)	0.90	0.57
Number of Spills Reported to External Agencies	89	526
<b>PCB Management:</b>		
Total inventory of high level PCB material in storage (tonnes)	0	45.5
Total inventory of low level PCB material in storage (tonnes)	2.248	442.5
Total amount of high level PCB material sent for destruction (tonnes)	0	195.4
Total amount of low level PCB material sent for destruction (tonnes)	31.252	1178.1
Generation of Low and Intermediate Level Radioactive Waste <sup>2</sup>	20.72	439.6

<sup>0</sup>Figures are for calendar year 2005 consistent with the reporting timeframe for the ECR Program.

<sup>1</sup>Genco numbers are higher than the industry average due to the fact that the industry average includes a large percentage of hydroelectric generation in Canada. Genco emission rate of SO<sub>2</sub> per unit of fossil generation is higher than the industry average due to generation from fuels with higher sulphur content.

<sup>2</sup>Nuclearco number is significantly lower than the industry average due to the number of reactors in prolonged outages in Ontario.

Findings from the ECR Program are used to assess where the NB Power Group is relative to other Canadian organizations wherever there is a like-to-like' basis for comparison.



## NB Power Generation Corporation (Genco)

### Overview

Genco operates one of North America's most diverse generating systems consisting of 14 hydro, coal, oil, and diesel-powered stations. This network of conventional generating stations produces safe, economical and dependable electricity with a generating capacity of 3,313 MW.

Genco is committed to generating electricity while ensuring the protection of the environment. Each generating station operates with approvals issued under the New Brunswick Department of Environment (DoE) *Clean Environment Act* and *Clean Air Act* and in accordance with provincial and federal acts and regulations.

Advanced environmental protection equipment is used to allow Genco to effectively manage air emissions and wastewater discharges. Genco has also established a progressive waste management and minimization program.

### Environmental Management System

Genco has five distinct Environmental Management Systems (EMS) in place, which collectively cover all of the generating stations. They are:

- Belledune Generating Station, which includes the Millbank and Ste.-Rose combustion turbines;
- Dalhousie Generating Station;
- Grand Lake Generating Station;
- Coleson Cove Generating Station, which includes the Grand Manan combustion turbine; and
- Hydro stations, which includes the Mactaquac, Grand Falls, Beechwood, Tobique, Milltown and Sisson Generating Stations.

Each EMS is a voluntary program implemented to manage the environmental aspects of operations. Genco EMSs are consistent with the new ISO 14001:2004 standards.

Station employees maintain their EMS by:

- Monitoring performance (through internal and external audits);
- Training employees; and
- Reviewing the applicability of procedures and emergency response plans.

Contractors and other non-Genco employees whose work may have an impact on the environment are also required to adhere to the Genco EMSs.

Management reviews of the EMSs find that they are functioning as intended and designed.

The tables below provide an overview of the objectives and targets established as part of the EMS program.

Hydro Generating Stations EMS		
Objective	Target	Performance
Beechwood and Tobique		
Oil Management Program	Develop procedure for taking governor oil volumes	Carried to 2007
	Develop graphs for governor oil volumes	Carried to 2007
	Check what is available for appropriate sight glasses for accumulators and sumps and change out sight glasses	Carried to 2007
	Review shutdown settings for governor oil pumps	Carried to 2007
Thermal Generating Stations EMS (Belledune - BD, Millbank - MB and Dalhousie - DH)		
Objective	Target	Performance
Spill Management Program		
Reduce potential for spills that may cause a significant impact on the environment	BD - Phase II of the equalization basin repairs	Risk assessed and controlled
	BD - Determine permanent treatment options for the Ash Leachate Pond	Target achieved
	BD - Seal Oil	Carried to 2007
	BD - Review MSDS on Pet Coke	Target achieved
	BD - Identify piping/manholes that require inspection for possible cleaning	Target achieved
	MB - Study feasibility of recommissioning fuel oil storage tank #1	Carried to 2007
	MB - Replace the Leak Detection Panel	Carried to 2007
	MB - Install leak detection at units #3 & 4	Target achieved
	DH - Arrange for Non-Destructive Testing (NDT) of problem areas on the oil delivery pipeline and compare current NDT results with those taken previously	Target achieved
	DH - Investigate potential use of east-side lagoon (i.e. fire water backup) or the possibility of decommissioning	Target achieved
	DH - Arrange for sampling of west-side lagoon to determine contents and the potential areas for disposal	Target achieved
	DH - Schedule east lagoon to be cleaned	Carried to 2007
	DH - Prepare tender document for dredging of west-side lagoon, which will be issued in 2007	Target achieved



## Thermal Generating Stations EMS (Belledune - BD, Grand Lake - GL, Dalhousie - DH, Millbank - MB, Ste.-Rose - SteR)

Objective	Target	Performance
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### Waste Management Program

Reduce waste (garbage and fly ash) sent to landfill	BD - Tracking of fly ash produced/transferred	Target achieved
	DH - Identify potential storage areas of fly ash from hoppers for cool-down prior to bagging (understand and prevent cross-contamination of fly ash into gypsum)	Target achieved
	DH - Determine the total cost of chemical usage if ash is processed in waste water treatment	Target achieved
Improve site appearance	GL - Arrange for proper disposal of waste storage compound inventory	Target achieved
	GL - Schedule a lakeshore/plant perimeter cleanup day	Carried to 2007

### Air Quality Improvement Program

Reduce the number of reportable air quality exceedences in the long term	BD - Review the paving requirement	Paving replaced with water application
	BD - Identify and repair source of flue gas leak at ID fan dampers	Target achieved
	BD - Rename the Air Quality Station in the DCS screens	Target achieved
	BD - Assessment of the FGD capacity to determine if removal can be increased	Not possible at this time due to operational restrictions
	BD - Installation of isolation valve at the discharge of P5	Deemed not necessary
	BD - Stack Annulus Fan Review to prevent rusting of liner (flaking)	Carried to 2007
	DH - Purchase one SO <sub>2</sub> analyzer and install on the ambient air quality monitoring system at Pte. à la Garde, Quebec	Target achieved
Comply with Approval to Operate - Air	DH - Research the reliability of SO <sub>3</sub> (acid dew point) analyzer monitoring	There is nothing available for continuous monitoring SO <sub>3</sub> emissions.
	MB - Replace the air quality network instruments	Target achieved
	SteR - Improve heat tracing on the NO <sub>x</sub> water injection	Carried to 2007



## Thermal Generating Stations EMS (Dalhousie)

Objective	Target	Performance
<b>Water Use Management Program</b>		
Reduce freshwater consumption	Maximize use of recycled water	An average of 44.22% of treated wastewater was recycled per month; target was 30%
	Divert spring water to Flue Gas Desulphurization (FGD) make-up	4,809,600 USG diverted; target of 3,500,000 exceeded
	Ensure the fire water consumption does not exceed target	An average of 6,780,000 USG fire water used per month; target was 8,000,000
	Investigate all water sources at the plant (other than ground water) to reach a goal of zero discharge from waste water	Target achieved
	Install piping to allow reject water to be used for make-up to the FGD	Carried to 2007
	Continue efforts to optimize water collection from gypsum product vacuum belt filters	Target achieved
	Implement steam trap program by creating an EMS preventative maintenance work order that will identify all steam traps	Target achieved
	Determine the performance monitoring frequency of each trap	Target achieved
	Record the performance findings in work order history	Target achieved
	Identify the steam traps that have a performance gap and generate a work order to the maintenance department to make the necessary repairs	Target achieved
Re-route groundwater entering Unit #2 turbine room sump by pumping the groundwater directly to the existing FGD groundwater collection sump near the FGD elevator in the storage compound (new collection tank, pump, and piping)	Carried to 2007	

## Thermal Generating Stations EMS (Grand Lake)

Objective	Target	Performance
<b>Wastewater Management Program</b>		
To effectively operate the ash lagoon	Ash Lagoon Upgrade: <ul style="list-style-type: none"> <li>Prepare technical specifications for the upgrade of the southwest berm on #4 Lagoon</li> <li>Upgrade the southwest berm on #4 Lagoon</li> <li>Extend the section of metal-pipe on the Ash pipeline into #4 Lagoon and remove the associated culvert at the south berm</li> <li>Complete draft report of the engineering assessment of the southwest berm on #4 Lagoon</li> <li>Receive engineering review on the east dyke section adjacent to the #4 Lagoon</li> <li>Review and assess the condition of the east and north berms for the #3 Lagoon</li> <li>Investigate a method to establish a minimum vertical clearance of 1 m between the top of the berm and the level of ash, which is adjacent to the berm, for #4 Lagoon</li> </ul>	Target achieved
	Investigate the possibility of quick installation of stop logs to completely cease flow from lagoon	Target achieved
	Investigate the possibility of easy operation of gate to completely cease flow to lagoon	Carried to 2007
	Revise procedure to reflect requirements to cease flow from lagoon	Target achieved
	Determine feasibility for fly ash removal system	Target achieved
	Investigate alternate route for plant water when #8 ash pump not available	Target achieved
	Construct permanent line for plant water when #8 ash pump not available	Target achieved
	Arrange for hydroseeding of Ash Lagoon	Lagoon being modified
	Investigate possibility of fly ash removal system	On target
	<b>Document Management Program</b>	
To improve EMS documents and procedures so that they can be used as training tools and as useful documents to control and manage environmental aspects.	Prepare/review Radiation Section for Emergency Response Manual	Target achieved
	Approve Radiation Section/Emergency Response Manual	Target achieved
	Prepare spreadsheet detailing review schedule for EMS related documents	Target achieved
	Track revisions and approval of EMS related documents	Target achieved
	Review/revise Operator training packet to prioritize EMS related documents	Target achieved
	Update emergency contact card	Target achieved
	Schedule training for casuals as per training matrix	Target achieved
	Review/revise Environmental Section of Orientation package	Target achieved
	Approve Orientation package	Target achieved
Assess cost replacement of air conditioning units with non-ODS refrigerant	Target achieved	

## Thermal Generating Stations EMS (Belledune - BD, Millbank - MB, Ste.-Rose - SteR, Grand Lake - GL and Dalhousie - DH)

Objective	Target	Performance
<b>EMS Improvement Program</b>		
To ensure continual improvement of the EMS	BD - Develop the EMS awareness training program for Belledune staff	Target achieved
	BD - Develop an electronic central file for Belledune/Millbank/SteRose	Carried to 2007
	BD - Review and update the Station orientation program	Carried to 2007
	BD - Provide an "open house" to members of the public	Carried to 2007
	MB - Develop a revision of all Significant Environmental Aspects (SEA) with staff to ensure roles and responsibilities are understood and identify to all personnel	Target achieved
	SteR - Develop a revision of all SEA with staff to ensure roles and responsibilities are understood and identify to all personnel	Target achieved
<b>Revise EMS Management Program</b>		
To align the EMS with key business objectives	GL - Develop Management Summaries for new SEAs	On Target
	GL - Review and revise EMS Manual and Training Manual as required	Target achieved
	GL - Present revised EMS to employees (EMS awareness)	Target achieved
	DH - Review and develop a new training matrix	Target achieved
	DH - Review training requirements for all departments	Target achieved
	DH - Update the EMS Awareness training package to conform to the revised International Standard ISO 14001:2004	Target achieved

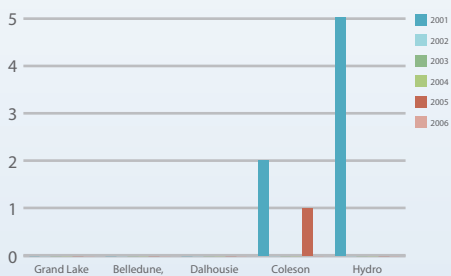
## Audit Results

During 2006, audits of all five EMSs were conducted. Each audit team was comprised of an external consultant as lead auditor and a minimum of one employee from another Station or from Environmental Services.

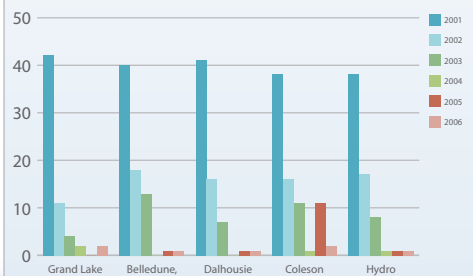
Each of the five audits focused on the activities, products and services that were managed by the particular EMS. In all cases, the ISO 14001:2004 standard and each station's policies, procedures and programs were used as audit criteria.

The graphs below summarize how each station has progressed compared with previous audits. Each station has maintained an acceptable level of conformance over the last six years. The 2006 audit represented the first full audit against the ISO 14001:2004 standard.

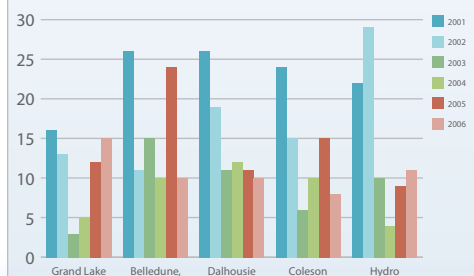
Major Non-Conformances



Minor Non-Conformances



Opportunities for Improvement



A summary of the EMS audit findings concerned Operational Control; EMS Documentation; Training, Awareness and Competence; and Emergency Preparedness and Response. Most of the findings were related to EMS administration and documentation.

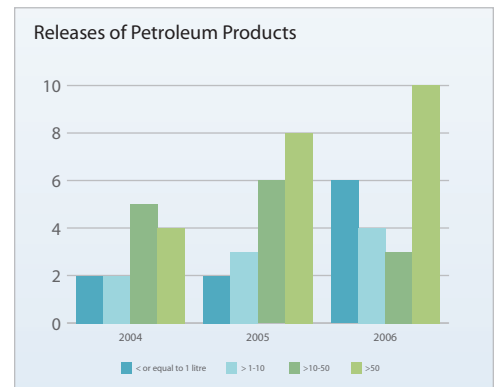
In the case of the Coleson Cove Generating Station, the refurbishment project in 2005 resulted in the requirement to make significant changes to the station's EMS. The 2005 EMS audit occurred before these changes were complete, which likely contributed to the increased number of audit findings.

The results highlighted that a lot of work had been done to ensure that the EMS was maintained at an acceptable level. However, it must be noted that the auditors expect to see substantial completion of current projects that address non-conformances of the previous audit.

## Waste Management

Each year, Genco reports results to the National Pollutant Release Inventory (NPRI), a nationally legislated, publicly accessible inventory that tracks:

- On-site releases to air, water and land;
- Off-site transfers for disposal; and
- Off-site transfers for recovery, reuse, and recycling.



In 2006, Genco reported a total of 23 spills of petroleum products, none involved PCB contaminated oil. There were three spills of an unknown quantity - two were described as hydrocarbon sheen and one was water from a flue gas duct. In all cases, cleanups were conducted and the incidents were reported to the appropriate regulatory authorities.

## Combustion Products Management

Genco continued the following measures to reduce the need for landfill for its combustion products:

- The synthetic gypsum (a product of the flue gas desulphurization system) produced at the Belledune, Dalhousie and Coleson Cove Generating Stations was sent to be processed into wallboard.
- Fly ash (another combustion product from the burning of coal) produced at the Belledune station was diverted from landfill through sale to the concrete industry, through a partnership with Separation Technologies Canada (STC).
- Fly ash and bottom ash from the combustion of heavy fuel oil at the Dalhousie and Coleson Cove Generating Stations was recycled for the extraction of vanadium.

## Climate Change and Other Future Planning

In May 1992, Canada was one of 150 world governments to adopt the United Nations Framework Convention on Climate Change. In 1997, the world governments adopted the Kyoto Protocol with its legally binding constraints on greenhouse gas (GHG) emissions. Canada has ratified the Kyoto Protocol on climate change with a commitment to reduce greenhouse gas emissions by 6% of 1990 levels during the period between 2008 and 2012. In December 2004, Russia ratified the Kyoto Protocol and it came into effect February 16, 2005. In the fall of 2006, the Federal Government introduced the *Clean Air Act*. The purpose of the Act is to introduce a “made in Canada” approach to managing greenhouse gas emissions and criteria air containments (CAC). The criteria air containments are sulphur dioxide, nitrogen dioxide, mercury and particulate matter.

While emissions from New Brunswick account for 3% of Canada’s GHG, all jurisdictions will be called to address climate change. Approximately 90% of New Brunswick’s 20 million tonnes of carbon dioxide emissions come from the combustion of fossil fuels with electricity generation accounting for 47% or nine million tonnes.

In preparation of the expected implementation of the Kyoto Protocol, Genco formed a Greenhouse Gas Committee in late 2004, to address the challenge of reducing emissions starting in 2008. In response to the *Clean Air Act* introduced by the Federal Government in 2006, the committee reviewed their mandate and expanded it to include clean air. As a result, the committee was renamed the Clean Air Committee.

Their objectives are:

- Ensure that the NB Power Group has a voice in the ongoing development of GHG and CAC rules and regulation(s);
- Establish dialogue with the appropriate provincial departments that are currently developing the Provincial Climate Change Action Plan;
- Provide a forum for resolving intra-company issues relating to climate change;
- Stay abreast of developments in other jurisdictions (federal and provincial) and industry sectors;
- Ensure senior management is informed on key issues and developments;
- Make informed recommendations to senior management; and
- Develop and implement an overall compliance strategy for the NB Power Group.

## Air Quality

Genco is committed to managing air emissions by maximizing efficiency through advanced technology within its operations. It also supports national industry initiatives through the Canadian Electricity Association (CEA).

Measures to address air issues are adapted, to suit the diversity of technologies and fuel/generation sources as well as socio-economic needs. Strategies adopted by the CEA



to address these issues generally adhere to a set of principles aimed at optimizing the following solutions:

- Continued provision of safe, affordable and reliable electricity;
- Integrated management of various air emissions (SO<sub>2</sub>, NO<sub>x</sub>, PM, Hg, and CO<sub>2</sub>);
- Accommodation of full fuel/generation source diversity;
- Consideration of regional differences, in electricity supply and demand as well as air quality issues; and
- Flexibility of implementation mechanisms, allowing a full array of market and other instruments.

### *Ambient Air Quality*

Generation operates and maintains five air quality networks situated around the Dalhousie, Belledune, Millbank, Grand Lake and Coleson Cove Generating Stations. Each network is an Environmental Information System (EIS) providing ambient sulphur dioxide data in addition to nitrogen dioxide, total suspended particulate and fine particulate matter from various sites. Meteorological data is also acquired from within four of the five networks. Each EIS is continually monitored at each generating station to ensure that the station operates with ambient ground level concentrations within the terms and conditions set out in each Certificate of Approval to Operate-Air Quality. A summary of the networks are as follows:

- Dalhousie - six sites monitoring sulphur dioxide. One of the six sites along with an additional site monitor total suspended particulate matter. A tower monitoring meteorological data is situated within the network. One of the six sites is located in the Province of Quebec.
- Belledune - five sites monitoring sulphur dioxide. In addition, two of the sites monitor nitrogen dioxide and fine particulate matter. A tower monitoring meteorological data is situated within the network.
- Millbank - two sites situated in the network monitor both nitrogen oxide and sulphur dioxide. One of the sites monitors total suspended particulate matter.
- Grand Lake - four sites situated in the network monitor sulphur dioxide and total suspended particulate matter. A tower, situated at the station monitors some meteorological parameters.
- Coleson Cove - four sites within the network monitor sulphur dioxide. In addition two of the sites monitor fine particulate matter. A tower monitoring meteorological data is situated within the network.

### *Monitoring Equipment*

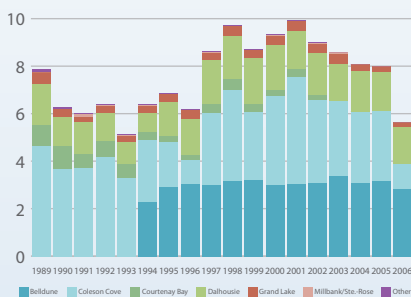
Air quality and emissions monitoring equipment is installed at all thermal generating stations and at the Millbank combustion gas turbine station. The equipment monitors emissions and corrective actions at the station are taken when required.

## Precipitation Monitoring

Genco continued to operate seven precipitation monitoring sites for the measurement of wet sulfate deposition (acid rain). Genco participates jointly with the New Brunswick DoE in operating a combined total of 13 sites, which constitute the New Brunswick Precipitation Monitoring Network. Audits of each site are conducted every second year as per the quality assurance requirements for internal audits to be performed on the Precipitation Monitoring Network.

The precipitation monitoring program provides weekly information on the chemistry of precipitation at selected locations throughout New Brunswick. This program has shown that as much as 80% of the acid rain falling on New Brunswick is transported by weather systems from other parts of Canada and the United States. Information from the program is shared with Environment Canada's Meteorological Service of Canada and is included in the National Atmospheric Chemistry Database (NAtChem). The database was set up in 1987 and its main purpose is to determine the chemistry of regional scale precipitation in Canada and the US. Complete information is available on the Environment Canada website at: [http://www.msc-smc.ec.gc.ca/natchem/index\\_e.html](http://www.msc-smc.ec.gc.ca/natchem/index_e.html)

Carbon Dioxide Emissions  
Megatonnes



## Carbon Dioxide

In 2006, the total carbon dioxide emissions were 5.63 megatonnes, compared to 7.98 megatonnes in 2005.

## Nitrogen Oxide

The New England Governors and Eastern Canadian Premiers have targeted a 30% reduction in nitrogen oxide (NO<sub>x</sub>) emissions by 2007. The recently completed refurbishment of the Coleson Cove Generating Station has significantly contributed to Genco reaching these targets. The generating station is equipped with advanced combustion control systems to limit NO<sub>x</sub>.

Additionally, technologically advanced low nitrogen oxide burners are installed at the Belledune Generating Station. They are designed specifically to limit nitrogen oxide emissions.

At the Millbank and Ste.-Rose combustion turbines generating stations, high-efficiency water injection systems are used to control NO<sub>x</sub> emissions. These systems use ultra-pure water produced from each station's water treatment plant.

## Sulphur Dioxide

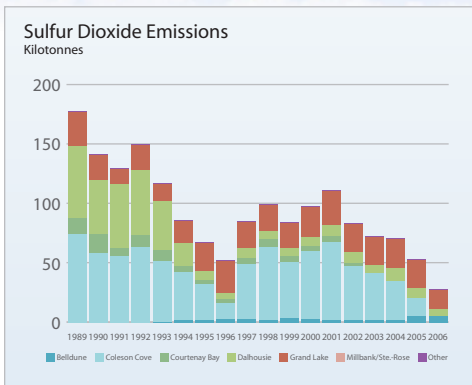
The Government of Canada and the New England Governors and Eastern Premiers are working to achieve regional and national reductions in sulphur dioxide (SO<sub>2</sub>) emissions.

The New Brunswick DoE has indicated it favours a two-phase reduction of Genco's existing annual sulphur dioxide limit of 123,000 tonnes.

- Phase 1 - a 30% reduction by 2005 (86,100 tonnes limit)
- Phase 2 - a 50% reduction by 2010 (61,500 tonnes limit)

Through its *Sulphur Dioxide Emissions Reduction Program - January 2001* and the

refurbishment of the Coleson Cove Generating Station, Genco has met the Phase 1 reduction, with total sulphur dioxide emissions for 2005 at 52,600 tonnes.



Total sulphur dioxide emissions for 2006 were 27.91 kilotonnes, well below the DoE Phase 2 target.

Since 1993, cumulative emissions from Genco facilities have been 544.62 kilotonnes below the annual limits.

To achieve these results, a flue gas desulphurization system (scrubber) was installed at the Coleson Cove, Belledune, and Dalhousie Generating Stations. These systems significantly reduce SO<sub>2</sub> emissions.

A low-sulphur light fuel oil, which ensures low sulphur dioxide emissions, is used at the Millbank, Ste.-Rose and Grand Manan Generating Stations.

## Particulate Matter and Ozone

In 2000, federal, provincial and territorial governments signed the Canada Wide Standards (CWS) for particulate matter (PM) and ozone. These standards commit governments to significantly reduce PM and ground-level ozone by 2010.

By 2010, scientific, technical and economic analyses will be completed to reduce information gaps and establish, if appropriate, revised targets for PM and ozone CWS for the year 2015 and beyond.

To achieve these objectives, electrostatic precipitators are used to control particulate emissions at the Coleson Cove, Belledune, Dalhousie, and Grand Lake Generating Stations. These stations demonstrated success in keeping particulate emissions below 160 mg/m<sup>3</sup> (milligram of particulate per cubic meter of exhaust gas), which is Environment Canada's guideline for new stationary sources.

There are no significant particulate emissions from the Millbank and Ste.-Rose combustion turbines.

## Mercury

On October 11, 2006, the Canadian Council of Ministers of the Environment (CCME) approved the *Canada Wide Standard for Mercury Emissions* from coal-fired electric power generating plants.

The standard requires that emissions from Genco be reduced from an estimated value of 140 kg per year to 25 kg per year by 2010. This represents a reduction of 82%.

The following table shows the required mercury reductions by province:

Caps for Existing Coal-fired Plants		
Province	Estimated Emissions (kg/yr) <sup>1</sup>	2010 Cap (kg/yr)
Alberta	1,180 <sup>2</sup>	590
Saskatchewan	710	430 <sup>3</sup>
Manitoba	20	20
Ontario	495	4 <sup>4</sup>
New Brunswick	140	25
Nova Scotia	150	65
<b>Total</b>	<b>2,695</b>	<b>1,130<sup>*</sup></b>

<sup>1</sup>Based on 2002 to 2004 utility monitoring program results.

<sup>2</sup>Alberta's commitment is through the implementation of the Clean Air Strategic Alliance Electricity Project Team recommendations. Alberta emissions are based on a 90% capacity factor.

<sup>3</sup>Saskatchewan's early actions, between 2004 and 2009, will be used to meet its provincial caps for the years 2010 to 2013.

<sup>4</sup>Ontario will help meet the CWS of 60% capture of mercury by 2010, and help exceed it in the near future with an ultimate goal of 0 mercury emissions from coal fired power generation.

\*These values subject to change when Ontario finalizes mercury cap.

The document is available on the CCME website at: [http://www.ccme.ca/ourwork/air.html?category\\_id=86](http://www.ccme.ca/ourwork/air.html?category_id=86)

Genco mercury emissions account for 1.7% of the total from northeastern North America and are mostly due to use of indigenous coal.

The Belledune Generating Station stopped using indigenous coal in 2002, which significantly reduced its mercury emissions and allowed Genco to meet the target for 2005.



## Water Quality

Genco operates six hydro generating stations including Sisson, Grand Falls, Tobique, Beechwood, Mactaquac and Milltown.

Genco has an agreement with the Department of Fisheries and Oceans (DFO) Canada and the New Brunswick Department of Natural Resources to ensure that there is enough water above and below the dam on the Tobique River



headwaters for fish habitat. Facilities enabling fish to make their way upstream are in place at the Mactaquac, Tobique, Beechwood and Milltown stations.

All thermal generating stations have wastewater treatment systems to monitor and control the quality of effluent. In addition, at the Grand Lake and Belledune Generating Stations, coal pile runoff is also collected and treated.

In accordance with their regulatory Approval to Operate, analyses were performed on wastewater effluent at each station. During the year, over 99% of wastewater effluent analyses were found to be within approval limits.

During 2006, Dalhousie Generating Station received a renewed regulatory Approval to Operate their solid waste facility.

New Brunswick DoE issued an Approval to Operate a domestic sewage system at the Coleson Cove Generating Station.

In addition, petroleum storage site licenses were issued for each thermal generating station and each combustion turbine. Eight such licences were issued.

The *Canada Shipping Act* requires that the Dalhousie Generation Station conduct annual oil spill response training and exercises. These activities took place in August. They included:

- A presentation by Environment Canada on SCAT (Shoreline Cleanup Assessment Technology). The exercise was held at the Camp Chaleur in Charlo.
- The Dalhousie Emergency Spill Response Team conducted a spill exercise at Hamilton Beach, shore line HE-17, Camp Chaleur.
- Environment Canada, Atlantic Region's Group participated by doing the SCAT portion and Dalhousie Generating Station (NB Power) Spill Response Team deployed deflection boom to protect the beach and Charlo River outlet.

Observers of the exercises and training included officials from the Canadian Coast Guard, Environment Canada, East Coast Response Centre, Village of Charlo and Genco. Officials were satisfied with the overall effectiveness and efficiency of the operations.

## Refurbishment of Coleson Cove

As a result of the Coleson Cove Generating Station refurbishment in 2005, the following emissions have been reduced:

- SO<sub>2</sub> emission rates were reduced by 77% as a result of flue gas desulphurization equipment being installed;
- NO<sub>x</sub> emission rates were reduced by 70% through modifications to the boiler; and
- Particulate emission rates were reduced by 75% with the addition of the wet electrostatic precipitator.

## Dalhousie Generating Station - Supply of Fresh Water

All thermal generating stations require a secure supply of fresh water. The fresh water for the Dalhousie Generating Station is supplied via the reservoir associated with the Eel River Dam.

The dam was originally built in 1963 to supply fresh water to the Town of Dalhousie and other local industrial and commercial users.

In 2004, the Department of Supply and Services made an application to the DoE through the Environmental Impact Assessment (EIA) regulation to remove the dam and restore the Eel River estuary to its pre-existing conditions.

The EIA was completed on March 31, 2006, and as a result, the proponent of the action has recommended the removal of the dam. Genco is awaiting confirmation of this action from DoE.

If the dam is removed, the Dalhousie Generating Station will lose its fresh water supply, therefore Genco is currently evaluating various options to replace the Eel River supply.

ZENON Environmental Inc. conducted a five-week pilot study using a membrane system with various combinations of enhanced coagulation and/or granular activated carbon (GAC) pre-treatment to treat pulp & paper secondary effluent. The primary objective was to demonstrate stable membrane performance while meeting predetermined water treatment objectives.

The process has proven to be feasible but it is necessary to identify all of the potential uses for the water and to determine the required removal of COD/Colour in order to finalize the process required for treatment.

## In the Community

### *Arbor Day*

In May, Grand Lake Generating Station held an Arbor Day event at Minto Memorial High School. A beautiful red maple tree was planted to commemorate the 8<sup>th</sup> annual celebration of Arbor Day in Minto. This community event featured:

- Minto Elementary-Middle School's Destination Conservation Group presented highlights of their school's environmental activities;
- A few high school students reflected on their experience in the Envirothon 2006 held in Fredericton; and
- A member of Grand Lake Generating Station's environmental improvement team gave a presentation on the importance of trees to the environment; including helpful hints on planting, caring for and pruning trees.

## Other Initiatives

- As spring arrives, ice and snow melts, increasing water levels and creating a potential for floods and ice jams in New Brunswick rivers. Genco actively monitors water and ice levels along with the provincial Emergency Measures Organization and the River Forecasting Centre.
- Staff from the Coleson Cove Generating Station actively participated in the Community Environmental Liaison Committee and the Saint John Air Quality Working Group.
- All thermal stations offer site tours to the public and provide information on operations and environmental controls.
- The site adjacent to the Beechwood Generating Station offers an arboretum where visitors can enjoy native trees, flowers, shrubs, and a nine-metre flower clock. The Milltown site is used by members of the community for walking, biking, picnics, and sports as well as the annual New Brunswick Day Lumberjack Competition.
- The Grand Lake Generating Station continues to support Minlak, a community-recycling depot.

System Map					
Station	Capacity	Units	First Service	Fuel	Environmental Protection
<b>Thermal</b>					
Belledune	458	1	1993	Coal	Flue gas desulphurization unit (scrubber), electrostatic precipitators, wastewater treatment facility, emissions monitoring system, low NO <sub>x</sub> burners, gypsum recycling, air quality monitoring network, groundwater monitoring system, ash recycling
Dalhousie	300	2	1969	Oil	Flue gas desulphurization unit (scrubber), electrostatic precipitators, wet electrostatic precipitators, wastewater treatment facility, emissions monitoring system, air quality monitoring network, gypsum recycling, ash recycling, groundwater monitoring system
Coleson Cove	978	3	1976	Oil	Flue gas desulphurization unit (scrubber), electrostatic precipitators, wet electrostatic precipitators, wastewater treatment facility, emissions monitoring system, ash recycling, gypsum recycling, air quality monitoring network, groundwater monitoring system
Grand Lake	57	1	1963	Coal	Electrostatic precipitators, wastewater treatment facility, wastewater chemical injection systems, air quality monitoring network, flue gas chemical injection system, emissions monitoring system, coal pile run-off collection and treatment system
Courtenay Bay	109	3	1961-1967	Oil	Wastewater treatment facility, emissions monitoring system, ash recycling, air quality monitoring network



System Map					
Station	Capacity	Units	First Service	Fuel	Environmental Protection
<b>Combustion</b>					
Millbank	199	4	1991	Diesel	Wastewater treatment facility, water injection system (NO <sub>x</sub> control), air quality monitoring network, groundwater monitoring system
Ste.-Rose	100	1	1991	Diesel	Wastewater treatment facility, water injection system (NO <sub>x</sub> control), air quality monitoring network, groundwater monitoring system
Grand Manan	28	1	1989	Diesel	Noise control
<b>Hydro</b>					
Mactaquac	672	6	1968-1980	Water	NB Power operates six hydro dams on the St. John, Tobique, and St. Croix Rivers. Each station operates its reservoir with consideration for recreational users. Mactaquac, Beechwood, Tobique and Milltown have fish passage facilities.
Beechwood	113	3	1957-1962	Water	
Grand Falls	66	4	1928-1931	Water	
Tobique	20	2	1953	Water	
Sisson	9	1	1965	Water	
Milltown	4	7	1928-1969	Water	
<b>Nuclear</b>					
Point Lepreau	635	1	1983	Uranium	Point Lepreau Generating Station (PLGS) operates with approval from the Canadian Nuclear Safety Commission, the federal regulator of nuclear facilities, and the New Brunswick DoE and Local Government under the <i>Clean Environment Act</i> and <i>Clean Air Act</i> . PLGS monitors all radioactive liquid effluent and gaseous effluent. PLGS activities are managed, regulated and monitored from the transportation of the fuel to the site, through station operation, to the storage of used fuel.





## NB Power Nuclear Corporation (Nuclearco)

### Overview

Nuclearco operates the Point Lepreau Generating Station (PLGS). It is a thermal generating station powered by a CANDU 6 nuclear reactor. Nuclearco is getting ready for the refurbishment of the Station, with the scheduled outage set to begin in 2008. PLGS supplies up to 30% of New Brunswick's energy requirements. The refurbishment and continued safe and reliable operation of PLGS are key to avoiding an increase in carbon emissions for the Province of New Brunswick.

Compared to electricity generated from other thermal sources, nuclear generation's airborne emissions are insignificant. However, some of the station's environmental aspects must be addressed quite differently because the station's fuel is radioactive.

Whether it is the transportation of fuel to the site, station operations, or the storage of used fuel, activities at PLGS are carefully managed, regulated and controlled. All radioactive and conventional liquid and gaseous effluents are closely measured and monitored.

In addition, PLGS operates an Environmental Radiation Monitoring Program. Results are available to the public and reviewed by the Canadian Nuclear Safety Commission (CNSC), the federal regulator of nuclear facilities, each year.

PLGS operates under approvals from the CNSC, which maintains an on-site office. It also has approvals to operate from the New Brunswick Department of Environment under the *Clean Environment Act* and the *Clean Air Act* for the non-nuclear systems at the station, including the wastewater treatment, domestic wastewater, auxiliary boiler and diesel generator operations.

### Environmental Management System

The PLGS Environmental Management System (EMS) covers all conventional and radiological activities and operations that may create an impact on the environment. Everyone working at the station, including supplemental staff, is required to adhere to the EMS.

PLGS registered its EMS to the international standard ISO 14001 in 2001. All registrants are required to be assessed yearly by a maintenance audit conducted by the station's ISO Registrar. Every three years, PLGS is required to be re-registered to the ISO standard. The next registration audit will be conducted in the fall of 2007.

Internal and ISO Registrar EMS audits were conducted at PLGS in 2006. Most of the findings were related to EMS administration and documentation issues.

## Improvements Under the Environmental Management System

Continuous improvement is part of the Nuclearco Environmental Management System. In 2006, the following improvements were achieved:

- Replacement of the station chillers with units using a low level or negligible Ozone Depleting Potential (ODP) refrigerant;
- Reduction of the number of inactive waste water non-compliances;
- On-going integration of Refurbishment Project activities with the PLGS EMS;
- Installed sample wells, conducted water quality tests and prepared the final closure plan for the landfill; and
- Reduction in the volume of contaminated oil solids at the station.

## Waste Management

The Solid Radioactive Waste Management Facility (SRWMF) is used to store used nuclear fuel and radioactive waste in above ground vaults. These are specially designed to safely store radioactive waste thus protecting workers, the public and the environment. These structures are regularly monitored by NB Power staff, the Canadian Nuclear Safety Commission (CNSC) and the International Atomic Energy Agency (IAEA).

At PLGS, used nuclear fuel is initially stored on-site, under water, in the spent fuel bay for approximately seven years. This spent fuel is then removed from the spent fuel bay, dried, sealed in special containers and moved to the above-ground, dry fuel storage canisters located at the SRWMF. The long term management of the spent fuel will be addressed in cooperation with the Nuclear Waste Management Organization whose mandate is to establish a permanent repository for spent fuel.

In 2002, Canadian nuclear utilities established the Nuclear Waste Management Organization (NWMO) to meet the requirements of the *Nuclear Fuel Waste Act*. The *Act* requires that nuclear utilities identify and implement a long-term management approach for spent nuclear fuel in Canada.

In 2005, the NWMO published its final report, entitled *Choosing a Way Forward*. The report recommends Adaptive Phase Management for the long-term care of used nuclear fuel. Adaptive Phased Management is both a technical method and a management approach to waste fuel management. The end goal is to locate all of Canada's used nuclear fuel in one location and isolating and containing it deep underground in a suitable rock formation.

This recommendation was submitted to the Federal Department of Natural Resources. The federal government will decide on the appropriate choice.

## Water and Spills

More than 98.5% of the analysis performed on conventional wastewater effluent from PLGS produced results within the approved limits. Nuclearco is required to report all spills of hazardous material, including petroleum products, to the appropriate regulatory authority.

During 2006, there were a total of ten spills reported to the DoE. No spill involved PCB-contaminated oil and each was less than 50 litres. The spills were contained, cleaned up and reported to the appropriate regulatory authority.

## Radiation Monitoring

The PLGS effluent monitoring program measures radioactive airborne and liquid emissions from the station. Emissions were measured at levels well below the operational target, which itself is approximately 2% of the radiation level occurring naturally in the environment.

Nuclearco's Environmental Radiation Monitoring Program objectives are to:

- Provide data confirming PLGS's compliance with applicable guidelines and regulations;
- Establish and maintain the capability for monitoring so that an effective response can be made to emergency conditions; and
- Maintain a database of results to help with the detection of trends.

Results from the Environmental Radiation Monitoring Program are available to the public and reviewed by the CNSC, the federal regulator of nuclear facilities, each year. For the most recent report, go to: [http://www.nbpower.com/en/commitment/environment/report/enviroreport2006/\\_private/docs/PLGS\\_Environmental\\_Radiation\\_Monitoring\\_Report\\_2006.pdf](http://www.nbpower.com/en/commitment/environment/report/enviroreport2006/_private/docs/PLGS_Environmental_Radiation_Monitoring_Report_2006.pdf).

Staff at the Nuclearco Health Physics Department are responsible for managing the monitoring program. Since 1976, more than 34,000 samples have been analyzed in order to define background radiation from natural sources and to assess the emissions from PLGS. The program is reviewed annually to ensure the samples collected, collection frequency and analytical techniques are appropriate.

During 2006, analyses were performed on samples of air, water, food, vegetation, soil, sediment and sea life from around the station as well as from remote locations. These analyses found that the public radiation dose from PLGS was about 0.57 microsieverts for 2006. This is well below the legal limit of 1,000 microsieverts per year and even further below the natural radiation background for the area which is measured at between 2,000 and 3,000 microsieverts per year. The measurement is also below the station design target of 50 microsieverts per year.

Emissions have always been well below the station design target since PLGS was commissioned in 1983.

## Point Lepreau Generating Station Refurbishment Project

The Point Lepreau Generating Station Refurbishment Project was announced on July 29, 2005, with Atomic Energy of Canada Limited (AECL) as the general contractor. The major activity during the refurbishment outage, which will begin in the spring of 2008, will include the replacement of all 380 fuel channels, calandria tubes and feeders. These and other related activities will extend the life of the station for an additional 25 to 30 years.

The refurbishment project continues to progress safely, on time and on budget. The project staff recently achieved a major milestone with the completion of civil construction activities at the Solid Radioactive Waste Management Facility extension. This licensed site will safely store radioactive waste created during refurbishment, as well as support the next 25 to 30 years of PLGS operation.

Construction activities to date were completed on-time and included activities in three phases of the Solid Radioactive Waste Management Facility site:

### *Phase I*

- Completed construction of two new vault structures (with provision to build two more on an as-needed basis) for the storage of radioactive waste.

### *Phase II*

- Completed ground clearing and preparation for future dry used fuel storage; and
- Placed, levelled and compacted approved granular fill in the area.

### *Phase III*

- Completed construction of five retube component structures and two additional waste vault structures; and
- Completed installation of monitoring equipment, administrative facilities, fencing and lighting for the area.

Subsequent to the SRWMF operating licence and the environmental assessment approvals, an Environmental Assessment Follow-up Program was implemented in 2004. This program includes the following five activities:

- **Expanding the existing baseline information for the site** - This activity is complete, and no unexpected results were received. Baseline information was gathered as follows:
  - a. Baseline inventory of fish in the nearby stream;
  - b. Non-radiological baseline chemistry in the nearby stream;
  - c. Non-radiological baseline chemistry in groundwater around the waste site; and
  - d. Radiological sampling of the nearby stream.

- **Expanding the existing radiation monitoring programs to incorporate the additional facilities at the SRWMF** - This activity is complete, with the installation of additional boreholes and related monitoring.
- **Conducting periodic assessments of the health, safety and environmental program associated with the SRWMF** - These assessments were completed, with no major issues identified, and improvements made where applicable. Assessments were conducted on:
  - a. The construction-related training program;
  - b. The construction environmental monitoring programs; and
  - c. The construction environmental management oversight activities.
- **Implementation of a construction environmental protection plan** - This activity is complete. The plan that was implemented covered roles and responsibilities, environmental monitoring, contingency planning, training, regular and emergency reporting; and documentation.
- **Continuing the public consultation program** - This program is ongoing through various communications media such as the Powering the Future website, newsletters and a toll-free information line.

For further information on the history of the program or results of the activities noted above, visit the project website at: <http://poweringthefuture.nbpower.com>.

## Climate Change

In 2006, the operation of PLGS avoided emissions of approximately 3.63 million tonnes of carbon dioxide. In addition 58,925 tonnes of sulphur dioxide and 12,980 tonnes of nitrogen oxide were avoided.

These figures are virtually the same as the previous year as the total generation is very similar from year to year. There were approximately 6,700 fewer MWh less generation in 2006 when compared to 2005. This resulted in the slight reduction in the avoided emissions.

## In the Community

Nuclearco employees at PLGS take great pride in their community. They continue to play an active role by participating in initiatives such as:

- Earth Day with the local school;
- Co-chairing an after-school science program;
- Local environmental beautification programs for the area;
- Fundy Fisherman's Day event; and
- Various activities with emergency responders including fire departments, RCMP and Emergency Measures Organization.

PLGS staff are proud to contribute to their local organizations, participate in community events and volunteer for numerous worthy causes.



Staff strive to be good neighbours by having open communication with their community. A Community Liaison Committee, comprised of Point Lepreau employees, Holdco employees and local residents meet regularly to share information.

PLGS also publishes a newsletter which is sent to local communities, additionally, information is provided through their website at: <http://nuclear.nbpower.com>.

A speaker's bureau has been established, regarding the environmental impact of the Point Lepreau Refurbishment Project and information is shared by participating in public information sessions and stakeholders' meetings.

Nuclearco has made the Peninsula of Point Lepreau accessible to the Saint John Naturalists' Club Inc. to study the migration of the Black Scooter and to raise awareness of the importance of the migration of the Black Scooter in the area.



## NB Power Transmission Corporation (Transco)

### Overview

Transco is responsible for carrying electricity from generating stations to in-province and out-of-province customers. To do this, Transco uses a network of high-voltage lines, terminals and switchyards. Transco's environmental efforts focus on minimizing the impact of its construction, operation and maintenance related activities.

It owns, operates and maintains 49 terminals and switchyards that are interconnected by more than 6,700 km of transmission lines, ranging in voltage from 69 kV to 345 kV, which are linked with neighbouring electrical systems such as Québec, Maine, Nova Scotia and Prince Edward Island.

Transco also provides technical and maintenance support to other NB Power companies. These specialized activities include apparatus maintenance and vegetation management at substations for Disco and at generating stations and terminals for Genco.

Some of Transco's activities are subject to provincial environmental legislation. These include:

- Construction, maintenance or dismantling of transmission lines. These activities require approval under the *Clean Environment Act*;
- Work that could affect waterways is performed in accordance with the *Clean Water Act*;
- Use of pesticides adheres to the *Pesticide Control Act*; and
- Work conducted during the fire season requires approval from the Department of Natural Resources.

Transco is building a second major interconnection to the New England market. The International Power Line project will run from the existing Point Lepreau terminal to the Maine border. The project has undergone multiple approval processes including an environmental assessment under the *Canadian Environmental Assessment Act*.

### Environmental Management System (EMS)

Transco has implemented an EMS consistent with the ISO 14001:2004 standard, which provides a structured and systematic approach to managing environmental issues. Transco employees, contractors and other non-employees whose work may have an impact on the environment are all required to adhere to the Transco EMS.

The program focuses on continual improvement through:

- Planning;
- Operational control;





- Auditing (both internal and external);
- Corrective actions; and
- Management review.

Over the last four years, the Environmental Management System has matured and it continues to be refined to improve environmental performance.

### *EMS Audit*

A decision was made to postpone the EMS audit scheduled for September 2006 because key personnel involved in Transco's environmental management system have been focused on environmental matters associated with the construction of the International Power Line.

In order to ensure progress on the findings of the last audit, additional staff will be assigned to the environmental management program and a project plan will be prepared. The EMS audit has been rescheduled to the fall of 2007.

### *Sulphur Hexafluoride*

The CEA has signed a Memorandum of Understanding (MOU) on sulphur hexafluoride (SF<sub>6</sub>) releases with Environment Canada. Sulphur hexafluoride is a high-density gas used as an insulator in the electricity industry in circuit breakers, switchgear and other electrical equipment.

The purpose of the MOU is to demonstrate the commitment of the electricity industry to manage SF<sub>6</sub> in an environmentally responsible manner and to report annual releases. Transco currently provides the CEA with estimates of SF<sub>6</sub> releases. Transco is currently formalizing annual tracking and reporting of SF<sub>6</sub> releases, and will develop a policy and procedure on SF<sub>6</sub> management, which will be incorporated into the Transco EMS.

In 2006, approximately 40 kg of SF<sub>6</sub> gas was released because of breaker maintenance or leaks. Releases occurred in Iroquois, Eel River, Dalhousie, Mactaquac, Bathurst and Moncton.

### *Compliance Audits*

Holdco staff from Environmental Services perform compliance audits for Transco. These audits monitor the effectiveness of the EMS and help ensure compliance with provincial and federal regulations. During the year, three compliance audits were conducted as crews worked on transmission lines. Subsequently, action plans were implemented to address findings raised by the audits.

Over the year, Transco's environmental staff conducted more than 50 orientation sessions for employees and contractors working on the International Power Line project. The sessions focused primarily on wetlands, watercourses, species at risk, waste management

and spill management. Employees and contractors were also provided with copies of environmental approvals and permits and contact information in the event of an incident.

## Asset Management and Vegetation Management

Transco monitors equipment to proactively identify pieces that should be maintained, upgraded or replaced. Its hardware maintenance program is in place to ensure the reliability of the transmission system and to extend the life of aging and deteriorating infrastructure. In 2006, work was conducted along 375 kilometres of transmission lines. To minimize the impact of weather conditions such as wind and snow, Transco's work included replacing insulators, cross-arms and poles on older lines.

Transco boasts a comprehensive vegetation management program which:

- Restricts uncontrolled vegetation growth;
- Complies with NERC's reliability standard for vegetation management;
- Promotes alternate land use options for rights-of way;
- Protects migratory birds and their nests;
- Protects watercourses; and
- Establishes guidelines for pesticide use.

### *Vegetation Management*

In 2006, Transco employees trimmed trees and brush on approximately 1,000 km of transmission line rights-of-way (ROW) by cutting, pruning or mowing by manual or mechanical means. The vegetation management program is in place to avoid uncontrolled vegetation growth that can often create fire or safety hazards, hinder routine line maintenance and cause interruptions in electric service when they grow into or fall on power lines.

### *North American Electric Reliability Council (NERC)*

In 2006, Transco continued to update the vegetation management program to ensure compliance with the requirements of the NERC Reliability Standard (FAC-003-1) for vegetation management. This standard will ensure a consistent approach across North America while providing greater reliability across the North American system.

Transco participated in a NERC audit conducted in August 2006 by a NERC Readiness Audit Team of the New Brunswick System Operator. Personnel responsible for the vegetation management program reviewed the controls and procedures in place to maintain vegetation on the rights-of-way to the auditors. The NERC Readiness Audit Team found that Transco's program had the necessary systems, tools, and personnel to manage vegetation growth.

## *Alternate Use*

As part of the vegetation management program, Transco discusses alternate land use options with landowners affected by rights-of-way. A secondary use agreement allows landowners to cultivate low growing plant species such as Christmas trees, ornamental trees and blueberries on lands occupied by transmission lines, while ensuring that vegetation remains below twelve feet. The agreement allows landowners to make a profit from the land that would otherwise be unused, while aiding in the vegetation management process and ensuring the reliability of the line.

## *Migratory Birds and Watercourses*

The vegetation management program establishes a framework for employees and contractors to receive directions on the protection of migratory birds and their nests, as well as watercourse protection. During training sessions, employees are instructed to identify and mark nests during clearing activities so they can be avoided until after the nesting period.

In June of 2005, the Migratory Birds Convention Act (MBCA) was amended to allow for the development of regulations that would address permitting of incidental take of migratory birds and their residences. “Incidental take” refers to the unintentional (but not necessarily unforeseen) injuring, killing, capturing or disturbing of migratory birds or removal or damage of “residences” of migratory birds. Until an incidental take regulation is developed, any of these activities is a violation of the Act.

Transco participated in a CEA working group that is preparing a paper addressing incidental take issues related to the electricity industry. This paper will be presented to Environment Canada and the Canadian Wildlife Federation. Transco will continue to work with the CEA to provide feedback on the development of these regulations.

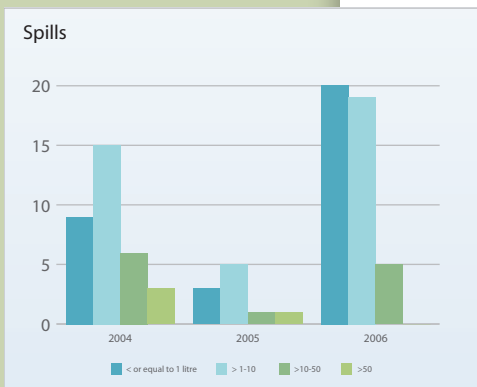
## *Herbicide Use*

The vegetation management program establishes guidelines for use of herbicides. Herbicides are used to control weeds located inside the yards of substations, terminals, remote radio sites, dam sites, fuel tank farms and at generating stations. Trained crews

respect a code of practice for the application of herbicides, which includes acceptable conditions for use and the need for appropriate pesticide application permits from DoE.

## **Spills**

From 2005 to 2006, the number of reported releases of petroleum products involving Transco increased from 10 to 44. Twenty-six spills, nearly 60%, involved less than ten litres. Thirty-seven leaks, almost 85%, can be attributed to the increased level of field activity associated with the International Power Line project.





During peak construction activities, approximately 100 pieces of equipment and vehicles containing hydraulic oil were operating along or in the vicinity of the right-of-way.

As part of the EMS, Transco employees responsible for the management of petroleum-related activities receive on-going training. Training and awareness among employees has led to a better understanding of the procedures and reporting requirements associated with such spills. All spills were contained, cleaned up and reported to the appropriate regulatory agency. No spills involved PCB contaminated material.

## Waste Management

Transco boasts several successful reuse and recycling programs. During the decommissioning of existing lines, hardware such as conductors, insulators, cross-arms and poles are removed and transported off site for reuse or recycling. If reuse or recycling opportunities are not available, the hardware is disposed of at approved facilities.

Transco employees generated a variety of other types of waste while doing their work. Waste that is a by-product of work includes rags, various hardware, cylinders, paint cans, cardboard and crates.

A waste segregation road map was developed to clearly identify waste streams and applicable waste management requirements. The benefits include:

- Pollution prevention;
- Environmental performance improvements;
- More efficient use of resources;
- Increased employee awareness; and
- Easier waste segregation both at the operation centres and in the field.

The road map is updated as new streams are identified.

## International Power Line Project

Greater transmission access in the region will be enhanced with the construction of a second New England Interconnection, referred to as the International Power Line (IPL). The IPL is a 345 kV line that will be interconnected with the state of Maine.

The NB Power Group officially launched the construction of the International Power Line with an event in Lepreau, New Brunswick on November 28, 2006. Members of the Community Liaison Committee, as well as several political representatives, NB Power Group representatives, and Emera staff participated in the announcement.



The following activities had taken place prior to 2006:

- 2001 - Application was made to the National Energy Board (NEB) for a Certificate of Public Convenience and Necessity to construct, operate and maintain the 345 kV line from Point Lepreau to a point on the Maine-New Brunswick border.
- 2002 - A Comprehensive Study Report (CSR), consisting of an environmental assessment, was submitted to the NEB. As part of the Report, Transco filed a Project Specific Environmental Protection Plan (EPP). The EPP outlines specific environmental mitigation measures Transco will implement during clearing and construction activities to minimize potential effects on sensitive areas such as wetlands, watercourses, deer wintering areas, archaeological resources and species at risk. After reviewing the CSR, the Minister of Environment of Canada concluded that the project, with mitigation, was not likely to cause significant adverse environmental effects and no further environmental assessment by a review panel or mediator was required.
- 2003 - A public hearing was held in Saint John, New Brunswick. Following the public hearing, the NEB issued a decision stating that it was satisfied from the evidence that the proposed IPL was required by the present and future public convenience and necessity. In addition, the provincial government issued a number of conditions that must be satisfied prior to construction and operation. These relate to a number of environmental protection measures to be taken prior to, during and following construction activities.
- 2004 - Transco placed advertisements in local newspapers inviting community members to participate on the IPL liaison committee. Transco also participated in the U.S. regulatory process through the Maine Public Utilities Commission (MPUC) in support of Bangor Hydro-Electric Company's request for a certificate of public convenience and necessity to construct the U.S. portion of the transmission line.
- 2005 - A session was held with the newly formed liaison committee to outline the mandate and Terms of Reference for future meetings. Since then, meetings have been conducted on a regular basis. The purpose of the committee is to focus on community views and environmental matters. It also serves as a channel from and to the community during the construction of the IPL.
- 2005 - A detailed route hearing was also held in 2005 by the NEB in response to written statements of opposition concerning portions of the detailed IPL route and the most appropriate methods and timing of construction.
- 2005 - The NEB decision was that the Transco detailed route is the best possible route for the IPL. Work also continued on the acquisition of the necessary land rights.

In order to ensure that work is carried out in accordance with the measures, obligations and commitments made during the regulatory environmental process, an Environmental Inspector and Quality Assurance Inspectors continue to monitor IPL activities. In addition, an environmental orientation is mandatory for all Transco project staff and contractor staff who are present on the construction site to ensure that environmental requirements are understood to prevent non-conformances.

## At a Glance

Length of Line:	95 km
Start Point:	Point Lepreau Terminal
End Point:	Woodland Maine
Voltage:	345 kV
Type of Structure:	Steel H-frame
Average Height of Structure:	30 m
Communities Affected:	Dipper Harbour, Lepreau, Lee Settlement, Elmsville, Waweig, St. David Ridge, and Old Ridge.

## Schedule

Regulatory Process:	May 2001 to June 2005
Construction Start Date:	February 2006
Commercial Operation Date:	December 2007

In April 2006, a Construction Agreement was signed between Bangor Hydro Electric Company and Transco to set forth the construction schedule requirements to meet a commercial operation date.

After making a decision to construct the IPL using its own resources supplemented with a third party, Transco completed a risk assessment and determined that it should review the proposed method of construction to determine if there were more cost-effective and/or efficient approaches. In completing this due diligence exercise, helicopter construction was introduced as a potential option.



In September 2006, Transco submitted a request to the NEB and DoE for an approval to proceed with the use of a heavy-lift helicopter as a method of construction for the IPL. The submission provided a description of the proposed method as well as the mitigation measures that would be implemented to minimize potential adverse effects on the environment. Based on the environmental assessment conducted on the use of helicopter, it was determined that this methodology would have positive effects on the environment. These positive effects were due mainly to the decrease in construction vehicle traffic along the access roads, within wetlands along the right-of-way and on the right-of-way itself, and decreased grading and levelling at structure sites along the right-of-way for structure assembly. Approvals were issued in late 2006.

After building the new transmission line, Transco will carry out final restoration work on the right-of-way to keep sediment from entering nearby watercourses and wetlands. Field inspectors will conduct inspections and ensure that erosion and sediment controls are properly installed and maintained.

Upon completion of the IPL, field staff will adhere to the following environmental requirements:

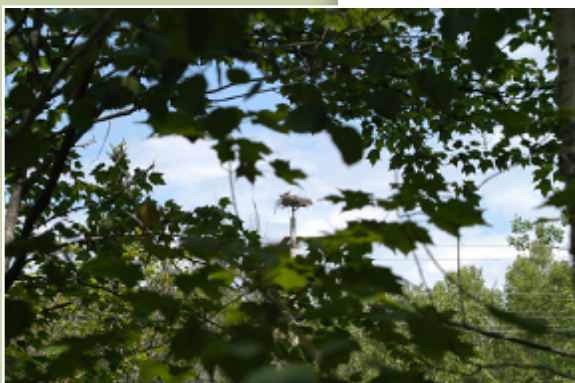


- All operation and maintenance activities will be conducted consistent with current standards, practices, procedures and regulations.
- An environmental effects monitoring and follow-up program will be implemented to verify the accuracy of the environmental assessment predictions and effectiveness of the mitigation measures.

## In the Community

Transco's communication programs ensure that communities and individuals understand the technical, economic and environmental aspects of new construction and maintenance work of transmission facilities for those who live near substations, terminals and transmission lines. Public activities for projects in Edmundston have included meetings with community residents, property owners and elected representatives.

Transco has committed to increasing awareness surrounding acceptable right-of-way use by off-road vehicles, landowner rights and environmental responsibility when riding. In 2003, discussions began with the New Brunswick Federation of Snowmobile Clubs and the New Brunswick All-Terrain Vehicle Federation to identify ways to minimize environmental impacts on the transmission system. Through consultations with the federations and provincial government stakeholders, Transco will continue to communicate and promote environmentally sensitive riding habits.



Over the years, Transco has built more than 20 nesting platforms for ospreys, which often make their nests on transmission structures. Regular patrols of transmission lines are performed to identify problem nests that may interfere with operations. These nests are trimmed to preserve the osprey's habitat and prevent contact with electrical conductors. Crow and hawk nests were also built on transmission structures.

Transco, in conjunction with Genco, worked with the Province of New Brunswick to transfer a parcel of land in the Lorneville and Musquash regions to the Nature Conservancy of Canada. As a result of the transfer, Nature Conservancy of Canada is working with local residents toward the development of a coastal walking trail, which will allow the opportunity for everyone to see, experience and protect the natural beauty of the Musquash Estuary, which is a very important coastal ecosystem.



## NB Power Distribution and Customer Service (Disco)

### Overview

Disco delivers safe, reliable and competitively priced energy to its customers via 20,000 km of distribution lines located throughout the province. Environmental efforts are focused on minimizing impacts related to the construction, operation and maintenance of this power distribution system.

### Environmental Management System

Disco has an Environmental Management System (EMS) consistent with the ISO 14001:2004 standard, which provides a structured and systematic approach to managing environmental issues. Disco employees, contractors and other non-employees whose work may have an impact on the environment are all required to adhere to the Disco EMS.

The program focuses on continual improvement through:

- Planning;
- Operational control;
- Auditing (both internal and external);
- Corrective actions; and
- Annual management review.

The program was first developed in the fall of 2002 and became operational in 2003.

In 2004, efforts were directed at:

- Day-to-day activities by reviewing field operations;
- Allowing the EMS team to provide feedback; and
- Corrective actions for issues identified at the operational level.

2005 saw the program continue to yield numerous successes as a result of increased environmental awareness among staff, resulting in the continued review of oil spill cleanup policies, more regular interaction with the NB DoE on cleanup requirements and focus on replacing deteriorating transformers before failure, thereby avoiding potential spills.

2006 saw the addition of a full-time EMS Coordinator to manage the program and address all EMS administration and documentation. Training and EMS awareness was a major focus throughout the year, culminating with an EMS awareness and information update delivered to all staff.



The 2006 EMS audit showed a significant improvement over the 2005 audit. The 2006 internal audit had no major non-conformances, only 2 minor non-conformances, and 15 opportunities for improvement. All audit findings were related to EMS administrative issues, with no findings relating to field operations or control issues. Corrective action plans were developed to address all audit findings.

## Impact of EMS

As a result of having an active EMS, the following on-going projects have been identified as having a direct environmental benefit:

- Replacement of prematurely corroding transformers in coastal locations will result in fewer transformer oil leaks.
- New vehicle wash-pad and oily-water filtration system at the Marysville Service Center.
- Revised procedures for installation of poles in coastal salt-marsh locations reduce the exposure of soil and sedimentation of marshlands.
- Implemented two new environmental standard operating procedures:
  - Pole placement along a watercourse - for line designers, and
  - Disposal of treated wood.
- New operating procedures and training for all NB Power line designers to include awareness for working around watercourses in order to minimize disturbance and sedimentation issues.
- Environmental awareness training for all pole and line contractors on where to install poles and how to minimize sedimentation and damage to watercourses.
- NB Power's new Electronic Line Designer software was updated to include the location of all provincially designated well fields and watersheds to better plan the location of poles.
- Removal of abandoned transformers from field locations to minimize potential oil spill damage to the environment.

## Waste Management

Over the past five years Disco has made a noticeable improvement in spill management, decreasing both the number and volume of spills.

In 2006, there were 58 spills for a total of 1,454 litres of oil. Both of these quantities are the lowest ever reordered for Disco. Only four of these spills contained low level PCB-contaminated oil. All spills were contained and cleaned up according to the newly revised Oil Spill Cleanup and Reporting Procedure.

## Water Heater Management

Disco rents hot water heaters to 85% of its residential customers. This translates to a need to dispose of 16,000 units annually. The disposal of these units is done in an



environmentally approved manner. Units that are less than five years old are returned to the manufacturer for reprocessing. Units that are more than five years old are sent to a smelter to be recycled, thereby avoiding landfill.

In addition, all new installed water heater tanks comply with the latest Enercan standard for energy efficiency, reducing the percentage of standby losses.

## Vegetation Management

Disco works closely with its contractors to ensure consistent adherence to standards, vehicle inspection programs, safety programs, environmental awareness training, and watercourse alteration regulations.

These efforts have resulted in consistent quality throughout the vegetation management program. The end result has been fewer hydraulic fluid spills, higher quality tree pruning, and improved reliability.

Communication programs are important to the success of Disco's vegetation management program. Initiatives include:

- The "right tree, right place" education program, which provides guidance to homeowners regarding the types of trees and shrubs that can be planted near power lines;
- Improved communications with customers and community leaders regarding proposed vegetation programs in their communities; and
- Increasing vegetation management program information on the website.

Herbicides are not used to control vegetation along the distribution line rights-of-way. Herbicides are used to control weeds inside the yards of substations, terminals and remote radio sites. Trained staff from Transco performs this work for Disco with the appropriate pesticide application permits.

## Green Energy

NB Power is committed to environmental stewardship and has recently taken additional steps to ensure a clean supply of energy to customers through the development of various renewable energy initiatives.

Renewable energy generally refers to energy derived from natural sources that can be continuously replenished, such as biogas, biomass, solar, hydro, tidal or wind. Generating electricity from renewable sources produces little to no greenhouse gases, making it an environmentally friendly fuel option.

Approximately 26% of NB Power's capacity is produced by renewable energy, primarily through hydro generation. NB Power operates six hydro facilities, including Beechwood, Grand Falls, Mactaquac, Milltown, Sisson and Tobique. In addition to existing renewable

facilities, NB Power's commitment to increasing the renewable energy mix is expressed by initiatives such as the provincial government's Renewable Portfolio Standard and Disco's Net Metering Program.



### *Renewable Portfolio Standard (RPS)*

The Renewable Portfolio Standard is a provincial standard, which requires that 10% of New Brunswickers' electricity must come from Eco Logo™ certified renewable sources by 2016. Eco Logo™ standards include generation from small wind, solar, biomass, small hydro or biogas. New Brunswick was the first province in Canada to adopt an RPS, which is incorporated in the *New Brunswick Electricity Act*.

NB Power is working on several initiatives that will help meet these targets:

- NB Power has committed to purchasing up to 400 MW of wind energy. It recently announced a 20-year power purchase agreement for up to 96 MW.
- NB Power contributed to an International Electric Power Research Institute study on tidal power. The study identified 90 MW of tidal power resources in New Brunswick.
- NB Power will continue to explore other renewable energy sources such as biomass, small hydro, tidal power and electricity generated from landfill gas.

### *Net Metering Program*

NB Power has also introduced a net metering program, which enables customers to produce their own environmentally friendly electricity by connecting a small Eco Logo™ certified generation unit (less than 100 kW) to NB Power's distribution system.

NB Power's other green initiatives include the followings:

### *Hybrid Vehicles*

Disco has been evaluating more fuel-efficient vehicles and recently added hybrids to their vehicle fleet.

### *Energy Advisors*

Disco has energy advisors located around the province, conducting home evaluations through the Home Energy Check program. Energy advisors provide expert information to customers on how to use energy as efficiently as possible. They are trained to discuss heating options, heating system sizes and provide advice to assist in minimizing energy consumption.



## *Lumalux Plus®Eco® Lights*

In 2005, Disco launched a pilot relamping program to refit street lights with the Lumalux Plus®Eco® energy-efficient high pressure sodium (HPS) lights. The new lamp has an average extended lamp life of 30,000 hours, representing a 25% increase over the standard high pressure sodium lamp life. In addition, the new lamps contain up to 90% less mercury than standard HPS lamps, and they are lead free.

## **In the Community**

Disco employees marked Arbor Day by participating in school events and making presentations on planting trees away from power lines. These fun events allow employees to share their vegetation management expertise with children by answering a variety of environmental questions.

