

2015

ENVIRONMENTAL PERFORMANCE REPORT

NALCOR ENERGY 2015

At Nalcor Energy, our business focuses on the development, generation, transmission and sale of electricity; industrial fabrication and the exploration, development, production and sale of oil and gas.

We lead the development of the province's energy resources and we focus on growth that is both environmentally-responsible and sustainable. Throughout the company, our people are committed to building a solid foundation for the future and making a difference in our province.

Nalcor's operations include: Newfoundland and Labrador Hydro (Hydro), Churchill Falls, Lower Churchill Project, Oil and Gas, Bull Arm Fabrication, and Energy Marketing. All lines of business are included within the scope of this Environmental Performance Report.



Achieving excellence in safety is Nalcor's number one priority. Nalcor's pursuit of safety excellence encompasses the safety of our employees, contractors and the public. Our safety framework drives our safety initiatives as

it is built on leadership, procedures and equipment, competence, supportive culture, union management alignment, responsibility, and reporting.

MESSAGE FROM THE CEO, STAN MARSHALL

2015

At Nalcor Energy, we strongly believe in our role as an environmental steward of Newfoundland and Labrador. Through our work, we focus on effective and environmentally sound practices as part of our promise to be environmentally responsible and sustainable.

The Environmental Performance Report is an important record of Nalcor's commitments, accomplishments, partnerships, and energy conservation activities. It allows us to reflect on what we, as a company and as a community, can do in our own lives to support a healthy and sustainable environment for present and future generations.

In this 2015 Environmental Performance Report, we document our efforts towards achieving our goal of becoming an environmental leader in Newfoundland and Labrador. Our strategic directions focus on accountability, transparency and sustainability in environmental

protection. Our work combines both continuous improvement and implementation of innovative approaches to environmental protection and energy conservation.

This report addresses our work to protect our resources and enhance conservation and efficiency; it also presents the outcomes and successes we have created as a result of this effort. In the past year, we have achieved our standard of environmental excellence as measured by our ISO certification. We achieved 100 per cent of our environmental targets and we have taken the first steps in developing Nalcor's first sustainability strategy.

The achievements we've had and the challenges we've overcome can be attributed to the skills and knowledge of our employees. Our employees use their passion, experience and their commitment to safety in all sectors to help us keep that promise to protect and enhance our



environment. We work together to achieve our company's vision for a strong economic future for the people of our province and the generations who will follow.

A handwritten signature in blue ink, appearing to read 'Stan Marshall', written over a light blue horizontal line.

Stan Marshall, President and CEO

2015 Highlights

- Achieved 100 per cent of our environmental targets for the first time since we registered the Environmental Management System in 1999
- Improved waste management plans and programs for Exploits and Menihek facilities
- Across Hydro and Churchill Falls, we've improved the quality of data and the process of reporting fuel storage and use
- Improved Industrial Waste Handling at Hydro Generation
- Developed Environmental Awareness strategy and enhanced Waste Management Awareness (Reduce, Re-Ruse, Recycle, Rethink) at Holyrood
- Revitalized the recycling program at Hydro Place
- Conducted trials of new herbicide product and lowered rates with existing products with the potential to reduce herbicide use
- Implemented a wood waste segregation and re-use program at the Muskrat Falls site, resulting in the diversion of more than 3000 tonnes of wood waste from the municipal landfill in 2015 and saving the project approximately \$2 million in transportation and tipping fees
- Recycled/reused 100 per cent of salvageable material through the Wooden Treated Materials Reuse Program
- Upgraded the Churchill Falls Sewage Treatment Plant to improve water quality for the town of Churchill Falls
- Began development of Nalcor's first corporate sustainability strategy
- Achieved 2.7 Gigawatt Hours (GWhr) of energy savings in residential and commercial customer sectors
- Achieved 5.4 GWhr in internal energy efficiency savings, mainly through variable frequency drive project in Holyrood.



Bishop's Falls Dam.

Corporate Management

At Nalcor there is an established Corporate Management Framework that guides the environmental direction of the company. Through this framework, environmental targets, goals, objectives and plans are developed. To administer the Corporate Management Framework, the Leadership Team works with a committee of managers with responsibilities for facilities and operations with environmental aspects. The goal of this group is to co-ordinate the development and maintenance of the

overall Environmental Management System (EMS) for Nalcor and to identify environmental priorities appropriate to the Leadership Team’s activities and responsibilities. A common and consistent Corporate Environmental Policy and Guiding Principles set the standard for all Nalcor companies. Our staff carry out periodic reviews of activities and issues to ensure consistency with corporate standards.

Environmental Policy and Guiding Principles

Nalcor is dedicated to supporting and maintaining a diverse and healthy environment for Newfoundlanders and Labradorians now, and in the future. The company maintains a high standard of environmental responsibility and performance through its comprehensive Environmental Management System which guides all work from planning to implementation. Within the policies and guiding principles of the EMS, all decision-making and environmental actions are based upon the following:

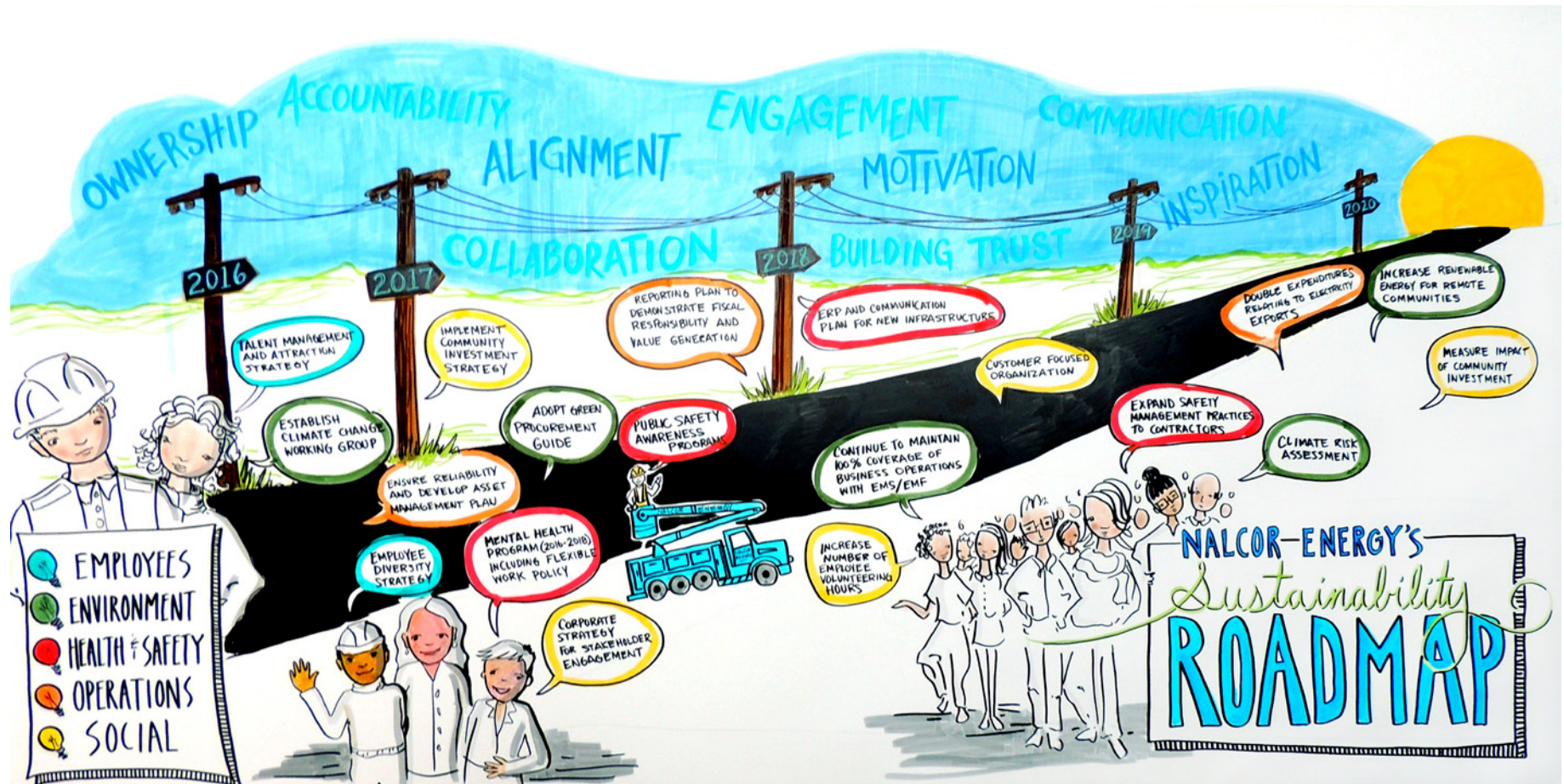
Prevention of pollution	Improve continually	Comply with legislation
<ul style="list-style-type: none"> • Implement reasonable actions for prevention of pollution of air, water and soil and minimize any pollution which is accidental or unavoidable. • Use the province’s natural resources in a wise and efficient manner. • Incorporate energy efficiency into all elements of asset management and promote energy efficiency for our customers and other stakeholders. • Maintain a high standard of emergency preparedness to respond quickly and effectively to environmental emergencies. • Recover, reduce, reuse and recycle materials wherever possible. 	<ul style="list-style-type: none"> • Audit facilities to assess potential environmental risks and to identify opportunities for continual improvement of environmental performance. • Establish environmental objectives and targets and monitor environmental performance. • Integrate environmental considerations into decision-making processes at all levels. • Empower employees to be responsible for the environmental aspects of their jobs and ensure that they have the skills and knowledge necessary to conduct their work in an environmentally responsible manner. • Add value by engaging key stakeholders and partners. 	<ul style="list-style-type: none"> • Comply with all applicable environmental laws and regulations, and participate in the Canadian Electricity Association’s Sustainable Electricity program. • Periodically report to the Board of Directors, Leadership Team, employees, government agencies, and the general public on environmental performance, commitments and activities. • Monitor compliance with environmental regulations and quantify predicted environmental impacts of selected activities on the environment. • Respect the cultural heritage of the people of the province and strive to minimize the potential impact of corporate activities on heritage resources.

Sustainability

Hydro and Nalcor Energy - Churchill Falls (CF(L)Co) are members of the Canadian Electricity Association (CEA) and are active participants in the Sustainable Electricity program. This program relies on a set of indicators to track the overall sustainable development performance of the electricity industry.

The CEA and its members place a high value on sustainable development, and as such, participation in this program is a condition of CEA membership. Through the Sustainable Electricity program, Hydro and CF(L)Co have made a commitment to improve continually its overall sustainable development performance, and report to stakeholders in a timely and transparent manner.

As part of its overall commitment to sustainability, Nalcor is currently executing a five-year plan to develop its own sustainability strategy. The artwork below represents the discussions that took place during several stakeholder engagement activities to help determine the path ahead for Nalcor's sustainability journey.



Environmental Management

Nalcor has chosen the ISO 14001 certified Environmental Management System (EMS) to drive the continual improvement of the company's environmental performance for Hydro and Churchill Falls. The management system sets the bar across the organization, in that it provides a management framework for all environmental responsibilities and is an integral part of the business organization. External auditors review the ISO 14001 EMS for Hydro and Churchill Falls every year. In 2015, the Nalcor Corporate auditor recognized the company's excellent use of objectives, targets and programs to drive improvements, its detailed comprehensive reporting which promotes transparency, and the reduction in the number of reportable spills observed for the second consecutive year.

As the organization continues to grow, Nalcor has applied the principles of the EMS to the other lines of business. For example:

- Exploits Generation successfully completed its ISO 14001:2004 internal audit.
- Menihek Generation successfully implemented an ISO 14001:2004 consistent EMS and is scheduled for an internal audit in 2016.
- Oil and Gas has implemented all processes and procedures for their Environmental Management Framework in 2015 and achieved its first Management Review.

- Bull Arm Fabrication continued to fully implement its Environmental Management Framework and began the preliminary development of an EMS consistent with the ISO 14001:2015 standard.
- The Lower Churchill Project continued to work within its Environmental Management Plan which is consistent with the ISO 14001:2004 standard and began the preliminary development of a certified ISO 14001:2015 EMS for Operations.

All areas set environmental targets as part of the continual improvement principles. In 2015, Nalcor achieved 100 per cent of its environmental targets for the first time since it registered the EMS in 1999.

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As it moves forward with its plans, Nalcor will be transitioning to the new ISO 14001:2015. This will put additional focus on strategic environmental management, leadership, lifecycle thinking, and communication with internal and external stakeholders.



Muskrat Falls Site, Labrador.

PART I – AIR QUALITY MANAGEMENT

2015



Wind Turbines at Ramea.

Hydro's mandate is to provide safe, reliable electricity at least cost. In 2015, clean hydroelectric power generated approximately 75 per cent of this electricity on the Island Interconnected System. However, to meet the total customer demand requirements and to secure the transmission supply into the Avalon Peninsula, between 15 and 25 per cent of the island's electricity continues to come from thermal generation at the Holyrood Generating

Station each year. Hydro also operates four gas turbines and 25 diesel plants across the province. Nalcor operates three wind-hydrogen diesel turbines in the community of Ramea.

The company continues to use alternative sources of energy to supplement the province's energy supply and to reduce emissions from burning fossil fuels. In 2015, Hydro purchased 181,998 megawatt hours of clean energy from the island's two wind farm projects. That's enough green energy to power more than 8,300 average single-detached homes with electric heat. It's equal to burning 289,000 barrels of oil at the Holyrood plant, and represents a reduction of nearly 147,000 tonnes in greenhouse gas emissions.

Overall, thermal production at the Holyrood Generating Station increased in 2015, by 9.7 per cent compared to 2014. Colder temperatures drove increased demand

from customers while increased utility and industrial requirements were also contributing factors. The Holyrood plant produced 24 per cent of the energy supplied by Hydro in 2015, up from 19 per cent in 2014. The increased energy production from the Holyrood plant in 2015 resulted in a 7.5 per cent increase in carbon dioxide (CO₂) emissions because of the increased fuel consumption.

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Nalcor staff use formulas approved by the Department of Environment and Conservation to calculate total emissions of CO₂, Nitrogen Oxide (NOX) and Sulphur Dioxide (SO₂) for the Holyrood Generating Station, gas turbine facilities and isolated diesel generating stations. Nalcor's overall air emissions are dominated by those arising from production at the Holyrood Generating Station.

Our calculations showed emissions of CO₂, NOX and SO₂ for the Isolated Diesel System, Labrador Interconnected System, and Island Interconnected System to be about 1,273.35, 4.35 and 4.91 kilotonnes respectively in 2015.

The Annual Air Emission Report shows emissions for the Island Interconnected System include those emitting from Holyrood Thermal, Hardwoods Gas Turbine, Holyrood Gas Turbine, Stephenville Gas Turbine, St. Anthony Diesel, and Hawkes Bay Diesel. Our System Operations department reports Net Hydraulic Production includes Bay D'Espoir, Upper Salmon, Granite Canal, Hinds Lake, Cat Arm, Paradise River, Snook's Arm, Venam's Bight, and Roddickton Mini (Menihok is excluded).

In the following sections, we show the emissions and hydraulic production. Nalcor continues to be committed to protecting the environment and continues to focus on reducing emissions from its diesel and thermal generating facilities. We have invested tremendously in environmental monitoring programs, operational controls, and fuel

changes to ensure continual improvement in emissions at the Holyrood plant. We have also invested in many plant upgrades and initiatives to help improve our environmental performance. These include:

- implementing an emissions reduction strategy
- using a cleaner fuel to reduce emissions
- optimizing overall plant efficiency through the use of state-of-the-art control and performance monitoring software to reduce air emissions and the amount of fuel consumed per kilowatt hour produced
- minimizing the use of auxiliary power to improve conversion efficiency, generating more power for the fuel burned and reduce air emissions
- operating five Ambient Air Monitoring stations in the surrounding communities
- using a Continuous Opacity Monitoring System to measure emissions density
- conducting regular stack emission testing to measure particulate, metals and sulphates in the stacks
- maintaining onsite treatment of all wastewater produced in the generation of electricity
- maintaining an emergency response program to reduce environmental risk to the community and environment
- using silencing equipment and improved operating procedures to reduce noise emissions.

Air Emission Working Group

In 2015, the Nalcor Environmental Services Team established an Air Emission Working Group which meets quarterly with the Newfoundland and Labrador Department of Environment and Conservation to discuss issues and challenges with air emissions at Hydro. Topics discussed include diesel engine replacements and the selection of Best Available Control Technology for new emission sources and dispersion modelling (that is, using computer software to predict ground level concentrations of contaminants associated with burning fossil fuels and renewal of operating approvals for diesel generation sites).

Through this working group, the team developed a schedule and received government approval to proceed with modelling for 19 diesel generation sites. The



Workers at Holyrood participate in a safety talk.

model software takes into account localized terrain and meteorological data to more accurately predict the ground level concentrations of contaminants around our diesel facilities. The use of this model will allow Hydro to more accurately predict the impact its facilities are having on local communities/airsheds and take action to investigate and/or remedy any potential air emission issues.

In 2015, staff created models of the Nain, Hopedale and Charlottetown diesel generating stations. The results of these models predicted lower ground level concentrations of SO₂, NO₂ and particulates than previously estimated. Based on the modelling results, we do not see any signs of any potential adverse effects on air quality in these communities as a result of our diesel operations.

Reducing emissions at Holyrood

One of our annual objectives for Hydro is to minimize the emissions from the Holyrood Generating Station. The annual operating time of the Holyrood plant has an effect on the emissions generated by the plant. To help reduce emissions, we set a corporate target for 2015 to achieve not more than a nine per cent variance from the ideal production schedule at the plant.

Three things can drive the ideal production schedule:

- total power requirement on the Island Interconnected System during peak load periods (8 a.m. to 8 p.m.)

- total power requirements on the Avalon Peninsula during peak load periods, and
- the water storage levels in Hydro’s reservoirs.

The main driver for determining the number of units required online at Holyrood is the load requirements of the Avalon Peninsula. These are to ensure system security and to protect against the unscheduled loss of system equipment. For example, if the correct number of generating units are not online and one unit was forced offline, Hydro may not be able to meet the total load demands of the Avalon due to low voltage or transmission overload conditions.

Employees at the Holyrood plant work with System Operations staff to ensure the plant can determine the optimum number of Holyrood units. In 2015, the ideal operating time for the Holyrood generating units was 15,485 hours. The variance hours from ideal are summarized in Table 1.



Holyrood Generating Station.

During 2015, planned equipment outages caused the majority of the yearly variance outages. The plant experiences planned equipment outage variances when key or critical pieces of equipment are taken out of service for planned and necessary maintenance or for repairs. To reduce this risk during these periods, the Holyrood plant had to run an additional unit above and beyond the normal loading requirement.

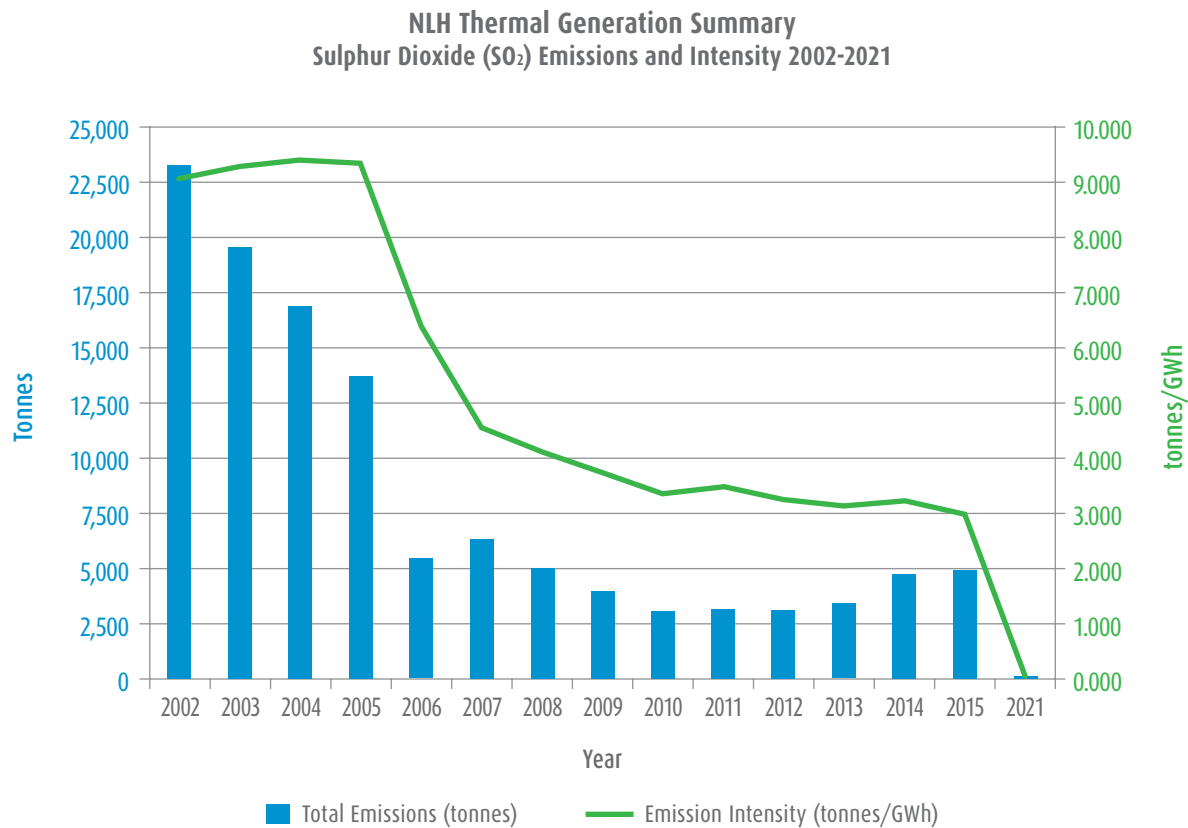
Table 1: 2015 Holyrood Variance Hours	Hours	Per Cent
Forced Outage	36	2.07%
Maintenance Outage	121	6.96%
Systems Operations Scheduling	18	1.04%
Generation Supply Required for three units ON at all times	364.9	21%
Unit Start-up	94.7	5.45%
Equipment Outages	1,103	63.48%
Total	1,737.6	100%

Sulphur Dioxide (SO₂)

In 2015, Nalcor and the Department of Environment and Conservation worked together to revise the methodology for calculating the total SO₂ for diesel generators and gas turbines to reflect lower sulphur content in the fuel used by these facilities. Total SO₂ for 2015 was 4,911 tonnes. Total SO₂ has shown an increasing annual trend since we

saw a low of 3,049 tonnes in 2010. We attribute this trend to an increase in thermal production and fuel consumption. While the total amount of SO₂ has been increasing, the emission intensity (or tonne SO₂ per unit of electricity produced) has been relatively stable. In 2015, total SO₂ emission increased 4.11 per cent while SO₂ intensity decreased 7.61 per cent when compared to 2014 data.

The following graph shows SO₂ emission and intensity for 2002-2015 and provides a projected data set for 2021 (post Muskrat Falls). We developed the 2021 data by calculating a five-year average (2011-2015) for diesel generators and gas turbines. When we consider that the 2021 data is an average of emissions from diesels and gas turbines, we can see clearly how Holyrood dominates the Hydro emission profile.



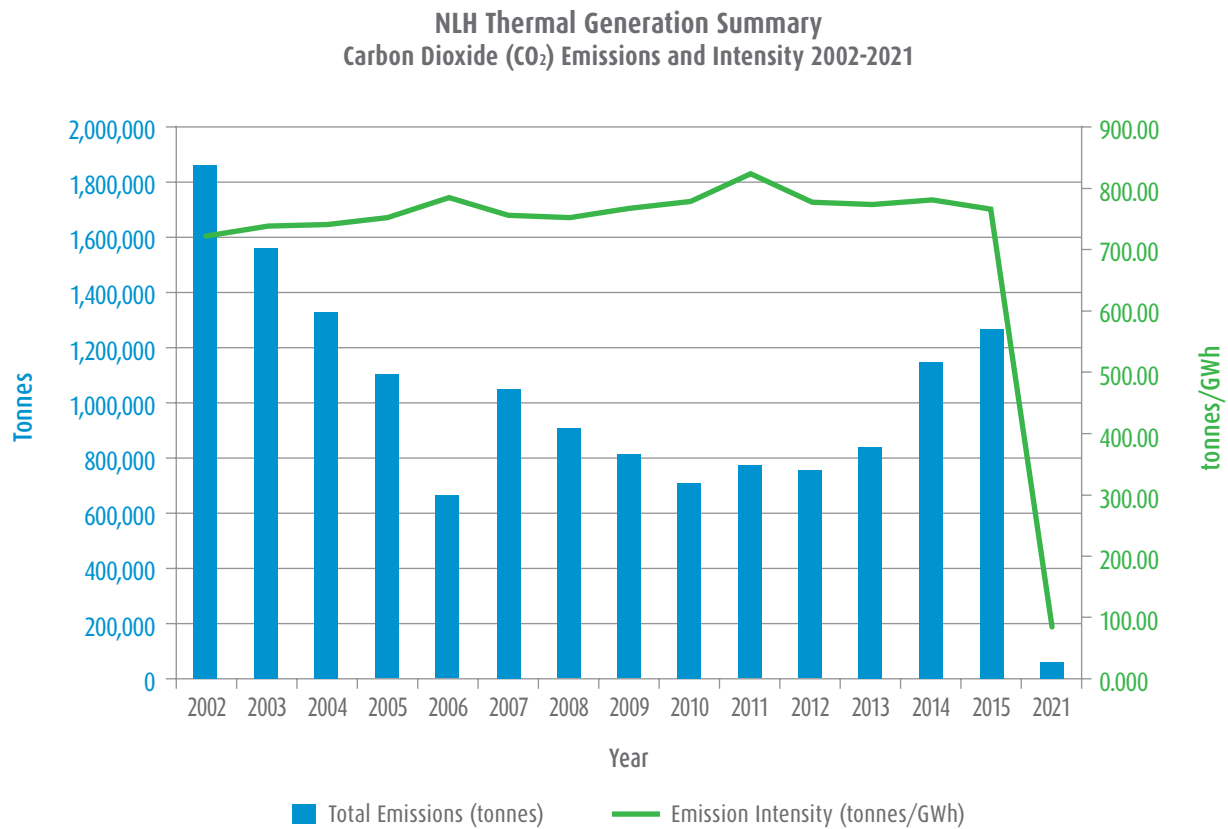
2021 data represents a five year average (2011-2015) of emissions data for diesel generators and gas turbines.

Carbon Dioxide (CO₂)

In 2015, total CO₂ emissions increased 9.90 per cent while CO₂ intensity decreased 1.82 per cent when compared to

2014 data. CO₂ has seen a similar increasing trend as SO₂ in recent years, which is attributed to increased production and fuel consumption. Emission intensity for CO₂ has been

fairly stable since the start of data collection in 2002. The chart below shows the 2002-2015 CO₂ emissions plus projection for 2021 using diesel and gas turbine data.



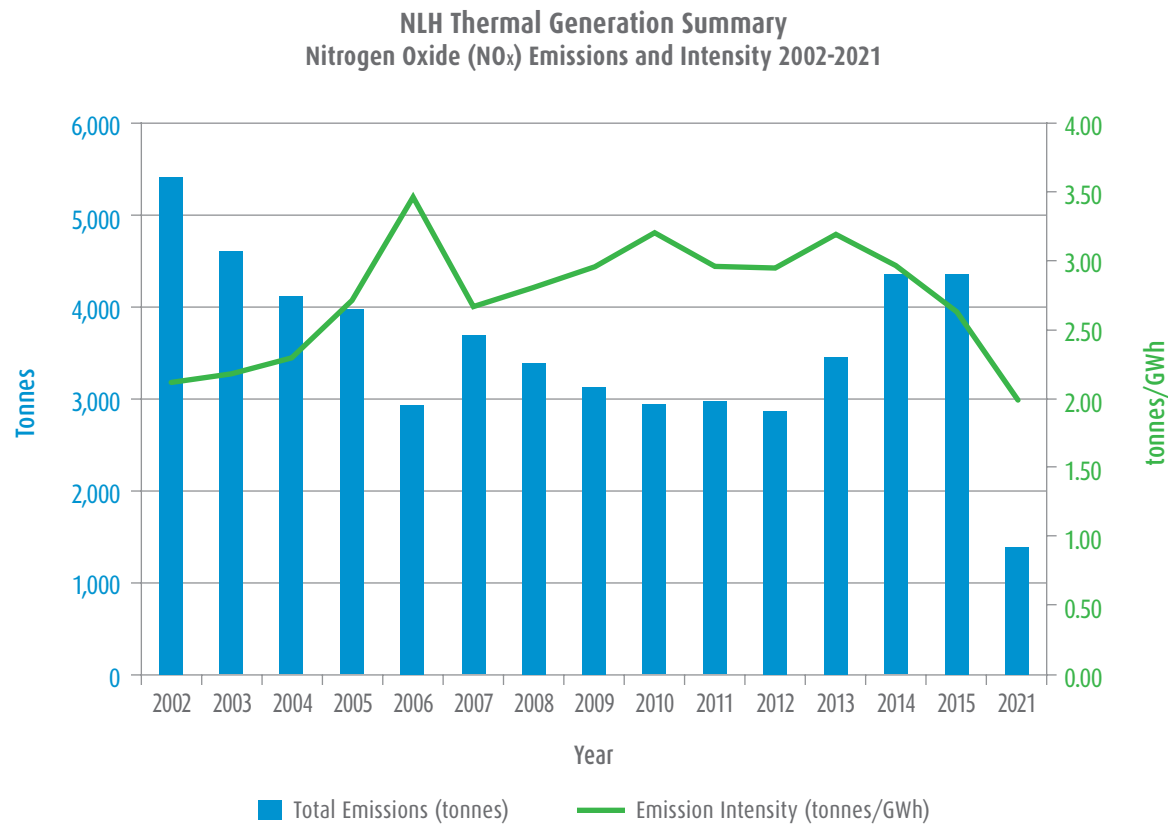
2021 data represents a five year average (2011-2015) of emissions data for diesel generators and gas turbines

Nitrogen Dioxide (NO₂)

In 2015, total NO₂ emissions decreased 0.12 per cent while NO₂ intensity decreased 11.83 per cent when compared

to 2014 data. The chart below shows the 2002-2015 NO₂ emissions plus projection for 2021 using diesel and gas turbine data. Of note, the 2021 projection for NO₂ does not

show as drastic a decrease (although it is still a significant decrease) as other parameters since NO₂ is a primary by-product of diesel combustion.



2021 data represents a five year average (2011-2015) of emissions data for diesel generators and gas turbines

Reducing Air Emissions in Muskrat Falls

The Muskrat Falls Project will power homes and businesses across Newfoundland and Labrador with clean, renewable energy for generations to come. Electricity generated from the 824 megawatt hydroelectric facility at Muskrat Falls will help meet growing energy demands in this province. The development of Muskrat Falls will position Newfoundland and Labrador as a leader in clean energy with 98 per cent of the province's energy from clean, renewable sources.

Overall, the project itself will result in a net benefit from a climate and air quality perspective by producing electricity with much lower emissions than other forms of electricity generation. The Lower Churchill agreement is a major

part of Newfoundland and Labrador's strategy to reduce greenhouse gas (GHG) emissions from increased electricity demand and to offset GHG emissions from other sources. Once in operation, we predict the project to displace more than 16 megatonnes of carbon dioxide emissions annually.

Atmospheric Protection and Monitoring at the Lower Churchill Project

As part of its commitment to protecting the environment, the Lower Churchill Project has developed an Atmospheric Protection and Environmental Effects Monitoring Plan. The plan assesses those construction and operational activities identified during the environmental assessment process that have the potential to cause adverse environmental

Once in operation, we predict the Muskrat Falls Project to displace more than 16 megatonnes of carbon dioxide emissions annually.

effects to the atmosphere through ambient air quality and greenhouse gas (GHG) emissions. The plan proposes strategies for identification, management and monitoring of greenhouse gases, and particulate and other air emissions for the project. One of the plan's commitments is the annual reporting of greenhouse gas emissions and fuel consumption, with a comparison to the predictions made during the environmental assessment.



Spillway and power house excavation at the Muskrat Falls Site.

Wind Generating Green Energy for Island Consumers

Wind generation is an environmentally-friendly, pollution-free, and endless source of energy. It is clean and leaves a small environmental footprint on the province. In 2009, in an effort to reduce emissions from burning fossil fuels, Hydro increased its renewable generation and implemented power purchase agreements for 54 MW of clean, renewable wind energy on the island of Newfoundland. The integration of wind power has broadened Hydro's energy mix and has allowed the company to continue providing electricity at a reasonable cost.

On the island, wind generation will help reduce fossil-fired generation at Hydro's thermal generating station in Holyrood. On average, the annual environmental benefits from the wind farms in St. Lawrence and Fermeuse are:

- reduction in fuel consumption by about 300,000 barrels
- reduction in sulphur dioxide emissions by more than 650 tonnes
- reduction in carbon dioxide emissions by nearly 160,000 tonnes
- generation of green energy for the equivalent of nearly 8,700 average single-detached homes with electric heat.

Net Metering

In its 2007 Energy Plan: Focusing our Energy, the provincial government committed to developing and implementing a net metering policy that would provide regulatory support



Wind Turbines at St. Lawrence.

for small-scale renewable energy sources. Net metering allows utility customers with small-scale generating facilities to generate power from renewable sources for their own consumption, and to feed power into the distribution system during periods when they generate excess power and periods when they draw power from the grid when their own generation does not fully meet their needs. The primary goal is for customers to generate sufficient electricity to supply their own needs, not to generate power to supply to the grid.

Building on previous work, the government released the Net Metering Framework in 2015 developed with Hydro and Newfoundland Power (NP). The report's authors consulted relevant stakeholders, including staff of the Board of Commissioners of Public Utilities (PUB), and gave them the opportunity to provide their input.

In many jurisdictions, governments often introduce net metering policies as part of a broader policy to encourage the development of renewable energy sources. This is true in jurisdictions which continue to rely on fossil fuels for energy generation. Newfoundland and Labrador differs from these jurisdictions, in that its system has one of the highest proportions of renewable hydro generation in North America. The province's current energy mix is approximately 75 to 85 per cent renewable, and this will increase to 98 per cent when Nalcor completes the Muskrat Falls Project.

Currently, Hydro and Newfoundland Power are preparing submissions to the PUB in 2016 to proceed with offering a net metering program.

PART 2 - PROTECTING WATER QUALITY 2015

Muskrat Falls Real-Time Water Quality (RTWQ) Network

As we continue work on the Lower Churchill Project, protecting and maintaining water quality in the Lower Churchill River is still our priority. In 2008, the Department of Environment and Conservation and Environment Canada in cooperation with Nalcor established the Real-Time

Water Quality (RTWQ) monitoring network. The monitoring network continues today to ensure the protection of ambient water resources in the Lower Churchill River.

The RTWQ monitoring network tracks emerging water quality issues and creates a database of baseline

water quality data. The information collected serves as a baseline from which the network can monitor changes throughout the construction and operation of the hydroelectric facility. The data is published on the provincial government's website and can be found at www.env.gov.nl.ca/env/waterres/rti/stations.



Muskrat Falls.

Sewage Treatment Plant Upgrade in Churchill Falls

As part of the development of the Churchill Falls Hydroelectric Generating Station, with the support of the Town of Churchill Falls, we built a sewage treatment plant in 1967 to treat domestic wastewater from the town. At the time of its construction, there was minimal oversight and regulation of wastewater throughout Canada or the province, and the installation of the extended aeration plant with activated sludge biological treatment exceeded the regulatory requirements.

Over time, there has been an increasing awareness of the impacts that wastewater systems can have on the environment. These systems represent one of the largest sources of pollution, by volume, in Canadian waters. In 2012, Environment Canada published its first-ever set of

wastewater regulations. Prior to this, the management of wastewater was subject to shared jurisdiction, which led to inconsistent regulatory regimes and varying levels of wastewater treatment across the country.

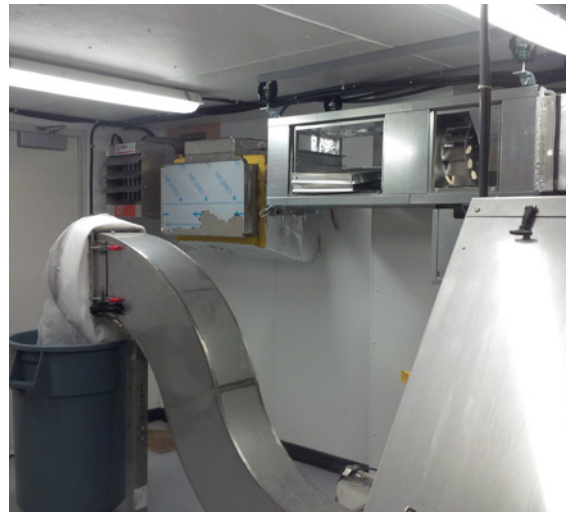
With its aging infrastructure and the new regulatory context, the 48-year-old Churchill Falls sewage plant began experiencing exceedances to the discharge quality criteria. In addition to the regulatory concerns, there were frequent maintenance issues. As a result, the town asked for and received a budget to upgrade the plant. In 2014, we completed both a review of the plant modifications and a design with the provincial Department of Environment and Conservation and Environment Canada.

In 2015, the company completed the plant modifications, which included the installation of an ultra-violet (UV) lamp disinfection system. The new system also includes instrumentation to monitor the pH, Total Suspended Solids, dissolved oxygen, and temperature of the waste water and the UV intensity in the disinfection system. Monitoring of these parameters allows the operator to adjust the system to maximize treatment effectiveness. The new system also comes equipped with alarms to signal the need for maintenance.

We will conduct a sampling program throughout 2016 to assess the effectiveness of the plant upgrades. Our preliminary sampling results have been very positive, and we have seen improved water quality.



UV Disinfection Building.



Solids Bar Screen and Bagging Unit.



Aeration Tank Blowers.

PART 3 - BIODIVERSITY 2015

Nalcor is committed to ensuring the protection of wildlife during our construction, operation and maintenance activities. We have developed Environmental Effects Management Plans for our major construction projects such as Muskrat Falls Labrador-Island Link and Transmission Line 267. The Environmental Management Systems in place in our current operating facilities identify environmental aspects such as wildlife, and we have standard operating procedures in place to ensure operations and maintenance activities protect fish and wildlife.

Avifauna Management Programs

Nalcor is committed to minimizing impacts on avifauna species and habitats during construction of the Muskrat Falls Project and associated infrastructure. The project developed a rigorous avifauna management plan which includes comprehensive surveys, avoidance through buffers, and relocation protocols where necessary. In

addition to these measures, we provide all individuals working on the project with training and information materials to increase awareness, particularly during nesting season.

One of the components of the avifauna management plan includes directed surveys. We carry out ground nest surveys ahead of clearing activities and we establish buffers if we see active nest indicators. Surveyors not only rely upon physical structures as cues, but also look for behavioural cues that indicate a nest is present. We establish buffers depending on the species observed. We do not carry out any work or activity within these buffers until the birds have fledged the nest.

For construction of the 1,100 km Labrador-Island Transmission Link, the 2015 avifauna program included ground surveys in Labrador and Newfoundland along the right-of-way for the new transmission line. In 2015,



American Robin nest protected as part of the LCP Avifauna Management Program.

we established 35 buffer zones around songbird nests and 15 buffer zones around raptor nests in Labrador. In Newfoundland, we established a total of 161 buffers around nests, of which three were raptor nests.

Under Hydro's vegetation management standard operating procedures, we completed 195 bird nest assessments in 2015, resulting in the protection of ten active nests on our transmission lines. Once discovered, we buffered the nests and stopped work in the immediate area. Over the last three years, our employees have completed 680 bird nest assessments on brush clearing and spraying operations, with a total of 49 active nests identified and protected.

Vegetation Management – Transmission and Rural Operations

Manual brush cutting has always been a key component of the Hydro vegetation management program. Given the more than 3,000 kilometres of transmission lines we must maintain along with the geographic extent and challenging terrain we encounter, we combine this method with other vegetation control methods, such as the application of herbicides. Hydro undertakes a relatively small spray program on an annual basis. This program involves the direct foliar spray of target species only, using a handheld wand. The application of herbicide products is a highly regulated activity in the province. Hydro holds a Pesticide Operator License and each individual employee also holds a Pesticide Applicator License.

Hydro engages suppliers regularly regarding new herbicides, more environmentally friendly products, and products with low active rates. In 2015, Hydro conducted trials of products with reduced environmental impact and which continue to meet our vegetation control needs. As a result, we have successfully reduced the amount of active ingredient required to maintain control on the transmission lines.

We follow strict buffer zones for all water bodies, private land, wells, and human habitation (temporary or permanent). Before beginning the spraying program, Hydro consults with the Department of Environment and Conservation regarding the potential presence of species at risk in the areas where we plan to work. Department employees mark on the spray maps where we may encounter these species. As crews move along the line, the line supervisors watch carefully for the presence of these plants in the specified areas. If we discover at risk plants, we ensure there is a buffer in place and we will not spray in that location.

Species at Risk – Lower Churchill Project

The Newfoundland and Labrador Endangered Species Act (NLESA) manages wildlife species at risk and protects wildlife species, subspecies or populations within the province that are considered endangered, threatened or vulnerable. The NLESA does not allow anyone to disturb, harass, injure or destroy any individual of a listed species, disturb or destroy the residence of listed species, or be in possession of individuals of a listed species.



Red Wine Mountain Caribou.

Nalcor has established an Impacts Mitigation and Monitoring Plan as well as a Protection and Environmental Effects Monitoring Plan, with respect to species at risk on the Muskrat Falls Project. Together, these plans address the required aspects of species at risk for both avifauna and caribou protection, and they affect monitoring for the design and construction phases of the project.

These plans demonstrate how the company will mitigate any negative environmental effects on avifauna species at risk and caribou during construction and operation of the project. The plans also set out a program for monitoring the effectiveness of the proposed mitigation measures we are implementing for the generation and transmission components of the Muskrat Falls Project.



Snorkel surveys as part of the aquatic environmental effects monitoring program.

Aquatic Effects Monitoring Plan – Lower Churchill Project

Nalcor has developed a comprehensive aquatic monitoring program for the Muskrat Falls Project. Water quality sampling in 2015 showed that parameters sampled have remained comparable to past programs. We performed sampling of water quality using the real-time water quality network established by Nalcor and the Department of Environment and Conservation, Water Resources Management Division.

As part of the Fisheries Act authorization for Muskrat Falls, Nalcor has developed a Freshwater Fish Habitat Compensation Plan (FHCP) and Environmental Effects Monitoring Plan. The FHCP includes an outline of physical compensation works, monitoring methodologies and timelines. We have been conducting baseline sampling on the lower Churchill River since 1998.

Fish Relocation Project – Exploits Generation

During the winter of 2015, ice extensively damaged Goodyear’s Dam on the Exploits River in Central Newfoundland. While making repairs in summer 2015, the environment team at Hydro transported by truck nearly 24,000 salmon around the breached dam during the annual summer run, without losing a single fish.



Removal of fish in the fishway – Exploits Fish Relocation.

Hydro employees trucked about 30 to 40 fish at a time under continuous monitoring. The team made roughly 700 trips in total to move all the fish.

The team worked with an independent fish biologist and the Environment Resources Management Association, which described the fish transfer operation as a huge success and a testament to the care and effort of the team involved. When we move live fish, there is always an inherent risk for loss. We took precautions every step of the process to help the fish make a safe journey.

The transfer of fish upstream started mid-July. The team caught the fish in the fishway area in Grand Falls and transported them by truck about six kilometres upstream to bypass Goodyear’s Dam. We trucked about 30 to 40 fish at a time under continuous monitoring. The team made about 700 trips in total to move all the fish.



Transport and release of fish – Exploits Fish Relocation.

Our work was very labour intensive: we measured temperatures, we considered the weather, we aerated the water in the tank, and we released the fish upstream through a pipe attached to the tank in the truck to avoid overhanding. After we completed the repairs to the dam, we tagged ten salmon with radio telemetry in a makeshift fish hospital on the shore. We then returned them to the river to make sure the salmon could get through the fishway and back on their natural migration pattern.

This project is the most recent example of Nalcor's long history of active stewardship to protect and enhance the salmon run on the Exploits River. Over the years, Nalcor has worked with partners for the betterment of the salmon species and we continue to work with various groups to maintain the excellent results of the fish diversion system. The work completed on the Exploits River to increase salmon stocks is unique and is a cooperative effort between Nalcor, the scientific community, federal government, and the environmental conservation community.

Keeping our communities safe

For many years, Nalcor Energy has closely studied and monitored methyl mercury (MeHg) as it relates to the Muskrat Falls hydroelectric facility.

When we create the reservoir at Muskrat Falls in 2016, our research predicts increases in methyl mercury levels downstream. We anticipate peaking about 10 to 15 years

Exploit's Generation facts

- Every year, spring runoff brings with it adult salmon that have migrated downstream from the spawning grounds. Some of these adult salmon will enter the power canal at the Grand Falls hydroelectric plant.
- An Atlantic Salmon enhancement project started in the late 1960s has seen the natural salmon adult run grow from 1,200 to an adult incoming run in the range of 30,000 today.
- In 1996, we built a fish diversion system to facilitate the passage of young salmon on the Exploits River.
- Our focus is to reduce the number of smolt – young salmon in the stage of its first migration to the sea – from going through the power generation turbines.
- We built another fish diversion system at the Bishop's Falls hydroelectric plant in 2002.
- The salmon passage on the Exploits River is a success story. When this system was first introduced in 1997, approximately 27,000 smolt bypassed the turbines. As a result of the diversion systems coupled with extensive monitoring and scientific study, more than 60,000 smolt bypass the power generation turbines today.
- About 65 per cent of smolt go through the opening in the main dam in Grand Falls, thus avoiding the power canal entirely, to continue their journey down the river.
- More than 95 per cent of the smolt survive their pass through the Grand Falls and Bishop's Falls operations.

later and then a return to current levels over time. This pattern is consistent with other hydro developments around the world.

As part of the Environmental Assessment (EA) for the Lower Churchill Hydroelectric Generation Project, we carried out an interim human health risk assessment of methyl mercury exposures. During the EA, the project team committed to completing a baseline human health risk assessment to measure baseline methyl mercury levels in communities next to the lower Churchill River before we create the reservoir at Muskrat Falls.

In support of the baseline human health risk assessment, Nalcor conducted dietary surveys on country and store bought foods in fall 2014 and winter 2015. We also collected hair samples from 293 residents who live next to the lower Churchill River. We also conducted research in Sheshatshiu, North West River, Happy Valley-Goose Bay, Churchill Falls and Mud Lake. Before conducting the baseline program, Nalcor consulted with Aboriginal groups, the provincial ethics approval board, and provincial and federal regulators. We will use the results of the baseline program as inputs to the human health risk assessment we are currently preparing.

Nalcor continues to conduct comprehensive assessments and implement monitoring programs to evaluate methyl mercury levels in the project area. Nationally-recognized technical experts have carried out environmental studies for the project, and the project staff continue to consult with key regulatory authorities, including the provincial departments of Health and Community Services and Environment and Conservation, as well as federal staff with Health Canada, Fisheries and Oceans and Environment Canada.

We will continue the project's comprehensive program to monitor mercury levels in the environment as long as necessary to ensure the protection of the health and safety of those living in the Muskrat Falls project area.

Environmental considerations: from artifacts to rare plants

A key environmental consideration in any project is protecting historic and heritage resources. In the summer of 2015, during a field assessment of a proposed route for the new transmission line between Bay d'Espoir and Western Avalon, staff made a wonderful discovery. As the Hydro team assessed the area for environmental sensitivities, they uncovered a portage trail and a garden dating back to the 1920s.

An external consultant found there were ten sites along the route with a high potential for historic resources, such as artifacts or historic dwellings, to be present, and 27

sites with medium potential for historic resources to be present. We engaged an archaeologist to conduct a field assessment of all 37 sites.

The field assessment uncovered two historic sites along the route including a portage trail that dates back to 1907. Jackie Wells, Environment Lead with the Lower Churchill Project, says "It's always exciting to discover historic sites, but protecting them is of utmost importance. So, in these areas, a no-go zone will be established to prevent any disturbance to the sites."

Rare Plants

Two protected plant species, the Boreal Felt Lichen (*Erioderma pedicellatum*) and the Blue Felt Lichen (*Degelia plumbea*) often grow in areas where we propose to build new transmission lines. In November,

an external consultant with a Doctorate in Lichenology identified several occurrences of Boreal Felt Lichen within the proposed route. Wells says, "Based on these results, Hydro will now determine the appropriate mitigation approach. Relocation of the lichens to a similar habitat is one proven method we've seen work elsewhere."

Historic Resources Recovery Program

Nalcor is committed to preserving the historic resources in a project area through a comprehensive assessment and recovery program. In close consultation with the Provincial Archaeology Office, Nalcor completed a comprehensive program to preserve the rich history at Muskrat Falls. Throughout construction, Nalcor continues with this program to ensure historic resources are properly managed and protected.



Recovery of an over 2,000 year old hearth feature along a portage trail at Muskrat Falls.

Case Study: Preserving the History of the Lower Churchill River

A number of different archaeologists and folklorists have studied the history of the lower Churchill River for more than 40 years. The area was a key travel route to the Canadian interior for different groups, such as nomadic aboriginal peoples and the Hudson's Bay Company (HBC). The great work of the project's lead archaeologists, Roy Skanes and Fred Schwarz, with their exceptional team of archaeologists and local assistants has preserved this rich history since 2012. Skanes and Schwarz originally started working on the project in 1998 when they completed a historic resources assessment of the project area to identify the locations in the river valley where past users of the river frequented.

The program focused on the Muskrat Falls area in 2012 and 2013, where campers located a series of campsites along the north and south side ancient portage trails. The team recovered about 75,000 artifacts at 30 sites ranging from 150 to 2,000 years in age. Some examples of the artifacts include the remains of these campsites, fireplaces, tent structures, and stone tools, such as hide scrapers, spear points, arrow points, and knives left behind by the campers. Archaeologists believe one of the structures may have been used to build canoes.

The work in 2014 and 2015 shifted upriver to sites within the future Muskrat Falls Reservoir. In 2015, the teams enjoyed working at the two largest sites included in the program at Sandy Banks and Gull Lake in locations which

river users have frequented as recently as 50 years ago or as long as 2,000 years ago in the past.

In 2015, the team discovered the actual location of the HBC outpost at Sandy Banks, half way between Muskrat Falls and Gull Lake. This highly interesting site has yielded an eclectic array of artifacts, including refined earthenware and stoneware ceramics, the remains of two wooden buildings, a clay tobacco-pipe, glass fragments (both window-glass and bottles), a number of iron nails and spikes, metal barrel hoops, components of animal-traps, gun flints fabricated from a black flint, and cut copper sheeting. The archaeologists initially thought these finds suggest the site held at least two buildings, one for accommodations with a large ornate cast iron woodstove and the other a store with a cellar.

It is not hard to understand why many river travelers settled down for the night at the Gull Lake historic site. This sheltered inlet provides remarkable views down the Churchill River and out over the lake. As with the camp sites previously unearthed downriver, indigenous peoples used these sites more than 2,000 years ago. What makes this site particularly interesting is the remnants of a 150 year old earth-walled tent ring which is unique to the Innu culture. This same site contains artifacts such as a musket barrel, copper strips, a thimble, and animal bones. The archeological program has collected more than 150,000 artifacts to date and the work will continue into 2016, with recovery at the HBC site and at other identified camp sites in the future reservoir.



Stone Tool over 2,000 years old.



Gull Lake Camp Sites.



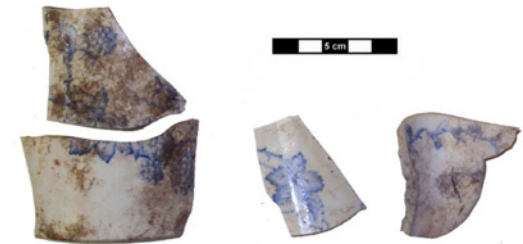
Hudson's Bay Company Trading Post at Sandy Banks.



A possible pre-contact hearth feature at Sandy Banks.



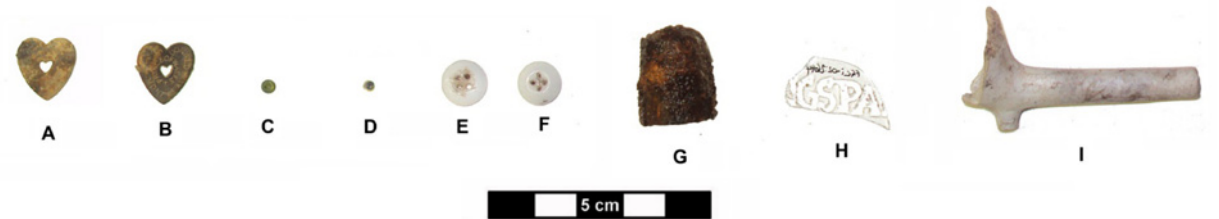
Overhead view of the dispersed cast-iron woodstove components.



Ceramic artifacts recovered near Gull Island rapids.



Recovery method referred to as a "block-lift" where the entire block of sand is excavated in the laboratory, due to the fragility of the artifacts.



Historic Innu Artifacts: various pieces showing that the Innu families who camped here over 100 years ago were involved in the fur trade. **A-B:** MacDonald Tobacco Brands; **C-D:** Glass Beads; **E-F:** Glass Buttons; **G:** Thimble; **H:** Piece of "Essence of Peppermint" Medicine Bottle (the same type as found at the Sandy Banks HBC Post); **I:** Piece of Clay Tobacco Pipe Marked "I.F." These were made for the HBC and identical ones were found at the Sandy Banks HBC Post.



Earth-walled tent-ring feature.



Greater than 2,000 year old projectile points discovered at an ancient campsite near Muskrat Falls.

PART 4 - WASTE MANAGEMENT AND POLLUTION PREVENTION

2015

Spill Prevention and Response

The very nature of Hydro and Nalcor Energy Churchill Falls' work is to generate and transmit electricity. This requires the safe handling and use of a variety of potential environmental contaminants such as fuel oils, lubricating oils, and chemicals. Each year, Hydro uses about 300 million litres of fuel to generate electricity. The company takes every precaution to avoid and prevent leaks and spills.

Nalcor's six lines of business had a total of 13 reportable oil spill and leak incidents in 2015: Hydro reported 10; Churchill Falls reported three. The approximate volume for all reportable spills was 5,628 litres. In addition, Churchill Falls reported a release of refrigerant.

Nalcor staff responded to all spills and leaks promptly with spill response equipment. The response team collected contaminated materials in suitable containers for appropriate disposal. We also carried out appropriate



River Spill Response Training Churchill Falls.

sampling, where applicable, to ensure we completed adequate clean-up. In some incidents, we engaged independent site professionals to manage the spill clean-up, soil sampling, and spill closure.

Improving River Spill Response in Churchill Falls

Nalcor takes every precaution to avoid and prevent spills and leaks. Being prepared for such for a spill or leak is critical to mounting a quick and effective response to minimize the



Additional Booms for River Spill Response Churchill Falls.

effects on people and the environment. Nalcor Energy and all of its lines of business have developed Environmental Emergency Response Plans (EERPs) to quickly, effectively and safely deal with such incidents.

Managing the potential for a spill or leak at the Churchill Falls facility is especially important given its closeness to the river and the potential for a release in a fast-moving river environment.

Since 1999, the Churchill Falls facility has taken several measures to prevent spills to the river including installing controls, alarms and sump skimmers, and equipping the sumps with oil water separators.

As part of the work on spill prevention, the Churchill Falls facility also took steps to improve its spill response capabilities in 2015. The team made several improvements to the available spill response tools and resources. These improvements included the purchase of additional booms, anchors, and two spill response boats especially designed and equipped for river spill response.

Essential to a successful spill response is a trained and prepared team. The Churchill Falls spill response team has 30 members of varying skillsets (labourers, plumbers, mechanics, heavy equipment operators, welders, and recreational fishermen who know the river). In 2015, the team successfully carried out a spill response exercise using the new tools available.

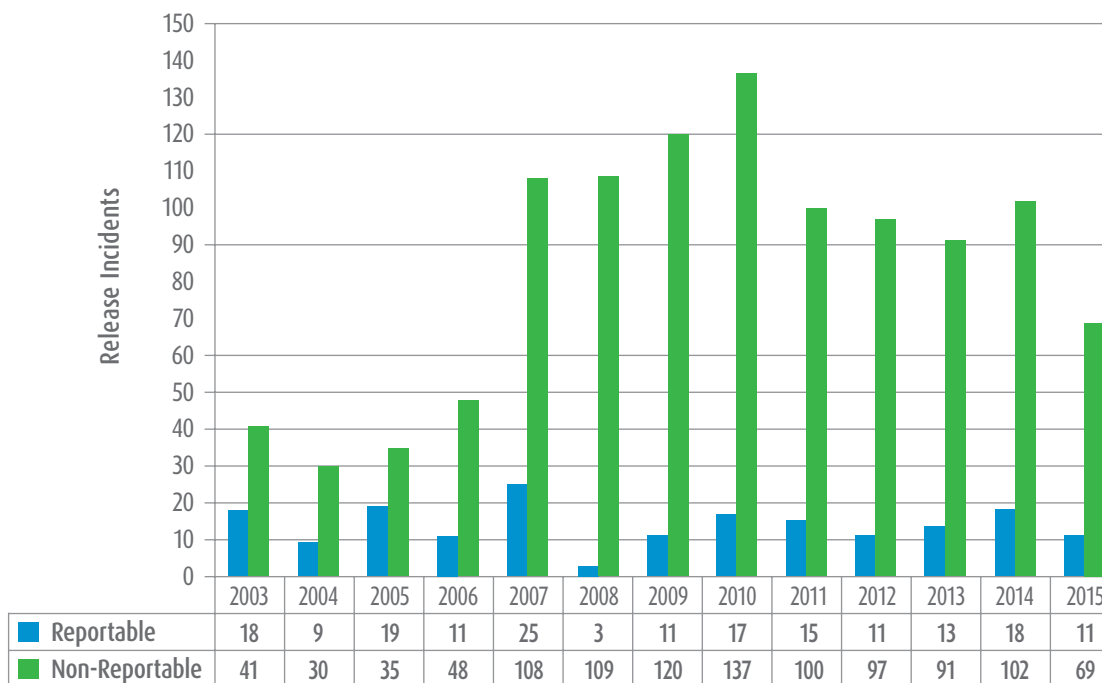
Spill Analysis

As part of Nalcor’s commitment to continual improvement, staff prepared a comprehensive spill analysis report in 2015 to analyze existing spill data and to identify any possible trends. Through this process, Nalcor aims for better insights into the root cause of spills and easier identification of areas for improvement. In this way, the company can take further action to reduce the company’s impact on the environment. The spill review process

provided an opportunity to evaluate the established practices within spill reporting by all Nalcor lines of business. This review includes the effectiveness of the safe workplace observation program (SWOP) for the reporting of release incidents and the quality and consistency of the information being recorded by each operational area regarding release incidents.

The following graph provides an overview of the number of reportable and non-reportable spills that occurred within all applicable Nalcor lines of business from January 2003 to September 2015. The majority of spills were non-reportable with very low/no impact on the environment. We documented 181 reportable spills and 1,087 non-reportable spills. Even if a spill is non-reportable

Reportable & Non-Reportable Release Incidents Within All Management Areas (2003-2015)



Reportable and Non-Reportable Release Incidents within All Management Areas (2003-2015)
(*Data for 2015 is recorded up to and including September)

(not reported to the provincial government), we still report the incident internally as part of our SWOP process.

Based on the Spill Analysis Report, staff made several recommendations to improve further spill reduction, response and recording. These form the EMS Targets for 2016.

One notable takeaway from the analysis was the low percentage of polychlorinated biphenyls (PCB) releases originating from in service equipment. These low percentages highlight Hydro's effectiveness to increase inspection of equipment in high corrosion areas and to prioritize corroded and known PCB contaminated equipment for replacement. Also, there is an even smaller percentage of release of PCB from out of service equipment and storage, even though parameters for a reportable release originating from out of service equipment are more stringent. We attribute the low percentage of incidents associated with out of service equipment to employees properly handling and monitoring stored and out of service equipment.

Waste Reduction Strategy at the Lower Churchill Project

During 2015, the implementation of a wood waste segregation and re-use program at the Muskrat Falls site diverted more than 3,000 tonnes of wood waste from the local municipal landfill and saved the project approximately \$2 million in related fees (such as transportation and tipping).



Lower Churchill River.

Oil Waste Management

Nalcor has a waste oil management system for handling and disposing of used oil. Facilities record the amounts of used oil generated and new oil purchased on an annual basis. At Hydro's central maintenance facility in Bishop's Falls, staff bring in insulating oil from transformers for servicing. We store the used oil in oil storage tanks and then process for recycling, if suitable. In 2015, we collected 105,014 litres of insulating oil from transformers. We reused or recycled 98,960 litres of this oil and we properly disposed of only 6,054 litres as waste. This represents 62 per cent reuse of insulating oil at the central maintenance facility in 2015. We store used oil in either 205 litre drums or storage tanks and a certified waste oil handler collects the oil for either recycling or reuse.

Development of Waste Management Program for Exploits

In 2015, Nalcor set up a waste management program for Exploits Generation. We developed this initiative to provide

personnel with adequate detail around appropriate waste handling and disposal requirements for identified waste streams. We completed a field survey to identify the various waste streams generated and to gather information about the volumes generated. Using this information, we developed guidance documents for each stream showing the handling and temporary storage requirements before final disposal. Not only will this initiative keep waste streams segregated for better management of final disposal, we will also realize year end cost savings.

PCB Phase-Out Program

PCBs are the most significant waste management issue for electrical utilities. This substance was commonly used in electrical equipment before the late 1970s, when legislators succeeded in banning PCB production. The effect of this ban on Hydro and many other utilities was two-fold. The amount of PCB equipment in-service declined as we installed new PCB-free equipment, and inventories

of PCB-contaminated wastes increased as we retired older equipment.

Since the early 1980s, Hydro has had a PCB management program in place to reduce the risks associated with in-service equipment containing PCBs. The earlier focus of this program was to remove from service all equipment with a high-concentration (greater than 10,000 milligrams per kilogram (mg/kg)) of PCBs and to reduce the concentration of PCBs in larger volume oil filled equipment to less than 50 mg/kg. In 2015, Hydro continued with a program to test unsealed oil-filled equipment such as reclosers, voltage regulators, tap changer compartments, oil circuit breakers and station service transformers.

Federal PCB Regulations brought into effect in 2008 focused on removal of higher concentration PCB equipment from service by planned dates, and implemented more restrictive handling of PCB waste. The regulations also lowered the limit for identifying high-concentration PCBs to any equipment having a PCB concentration greater than 500 mg/kg. In 2015, Hydro's Transmission and Rural Operations (TRO) Division continued to follow their PCB phase-out plan for sealed equipment submitted to Environment Canada in 2010 under a Section 33(2) extension permit.

Nalcor Energy Churchill Falls continued in 2015 to refine its PCB phase-out program, which kept its annual PCB training program for all personnel who handled and transported PCBs. The program ensures all personnel are

aware of the many requirements under the Transportation of Dangerous Goods Regulations, PCB Regulations, Storage of PCB Wastes Regulations, Certificate of Approval for the PCB Storage Building, Equivalency Certificate and local EMS Standard Operating Procedures.

Nalcor submitted its seventh year of online PCB reports under the PCB Regulations for the year 2014 for the Bishop's Falls PCB Storage Facility and the Churchill Falls PCB Storage Facility.

Hydro operates one approved PCB waste storage facility and one inventory storage yard at its Bishop's Falls area office.

Contaminated Sites Management Program

In 2000, Nalcor implemented a contaminated sites management program. The program applies methods and criteria based on the Guidance Document for the Management of Impacted Sites as prepared by the provincial Department of the Environment and Conservation to identify properties and facilities with risks and liabilities associated with contamination resulting from past or present processes and activities. The program uses standardized methods on all properties owned or occupied by Nalcor.

The contaminated sites management program is intended to provide corporate assurance of compliance with the Environmental Protection Act, 2002 as these relate to

contamination of properties resulting from past practices and uses that are owned or operated by Nalcor. The program provides for the identification of liabilities resulting from contaminated properties the company may need to consider for corporate financial planning. It also allows for appropriate response to annual requests from the Provincial Controller General for documentation of property contamination liabilities associated with Crown Companies in the province.

Nalcor maintains an inventory of all our contaminated sites and submits a status update to DOEC on an annual basis. In 2015 the contaminated sites program included sites related to Churchill Falls, Hydro and Exploits.

PART 5 - TAKING ACTION 2015

Energy Conservation

Hydro's commitment to environmental sustainability also includes energy conservation. During 2015, Hydro continued to implement measures to achieve energy savings at its own facilities while also pursuing initiatives to help Hydro's residential and commercial electricity customers and provincial industrial customers conserve energy.

In 2015, we completed internal energy efficiency projects at various Hydro facilities across Newfoundland and Labrador, which resulted in total annual energy savings of 5,414 MWh. These savings are equal to the annual energy consumption of 215 electrically heated homes. Common energy efficiency initiatives include completing upgrades to lighting and heating controls at several of Hydro's facilities across the province, and acquiring significant energy savings from the second phase of a motor speed control project at the Holyrood Thermal Generating

Station. Below is a list of some of Hydro's Internal energy efficiency initiatives:

- installed automatic temperature set-back controls for space heaters at several sites (an accommodation building for a hydraulic generation site, Whitbourne Garage, Port Saunders Line Shop, Quartzite Control Building).
- replaced inefficient interior and exterior fixtures with more efficient LED fixtures at our hydraulic generation sites, and installed more efficient controls for heaters. Converted exterior lighting to LED at our Bishop's Falls and Post Saunders offices.
- re-designed the compressed air system at the Bay D'Espoir hydroelectric generating plant to optimize efficiency and reduce maintenance costs.
- installed Variable Frequency Drives (VFDs) on Unit 2 forced-draft (FD) fan motors at the Holyrood Thermal Generating Station. The FD fans are very large motors,

and supply combustion air to the steam boilers. Staff completed this project in two phases starting in 2014 and finishing in 2015. We expect the combined impact of both phases of the VFD project to produce 11,000 MWh in annual electricity savings; this is equal to the annual consumption of 440 electrically heated homes.

Hydro pursued an LED street light pilot in the Town of Nain, a community powered by a diesel generation plant. We replaced 125 high pressure sodium (HPS) street light fixtures with LED fixtures. We expect the street light retrofit to reduce electricity consumption on the system by approximately 45,000 kWh annually, which equals 12,000 litres of diesel fuel. Hydro will continue to evaluate further implementation of LED street lighting in other communities.



Angeline Scott - CFL vs Incandescent.

takeCHARGE

Hydro continued to partner with Newfoundland Power to deliver the takeCHARGE program, which offers rebate programs to assist residential and commercial customers in reducing their electricity usage. The utilities work together to bring energy efficiency awareness and rebate programs to everyone in Newfoundland and Labrador. takeCHARGE is the one-stop-shop for everything customers need to know about energy efficiency. Energy efficiency is important for our whole province, as it helps reduce fuel burned at our thermal generating plants and demand on the electricity

In 2015, Hydro's activities for residential and commercial customers through takeCHARGE achieved total annual energy savings of 2,733 MWh. These savings are comparable to the amount of energy used by 110 electrically heated homes in a year.



Todd Penney, NL Hydro with his Product Cart.

system, all of which contributes to reduced emissions and lower operating costs.

In 2015, Hydro's activities for residential and commercial customers through takeCHARGE achieved total annual energy savings of 2,733 MWh. These savings are comparable to the amount of energy used by 110 electrically heated homes in a year.

Also in 2015, Hydro offered four energy savings programs in partnership with the province's utilities. These programs included rebates for insulation, thermostats, heat recovery ventilators, and a Small Technologies-Appliance-and-Electronics program. Hydro continued to advertise in local retailer flyers to promote the takeCHARGE programs and technologies. We will continue to use local advertising and strong local partnerships with retailers to build awareness of these customer rebate programs.



Arlene Ikkusek and Lavinia Jararuse - Incandescent vs CFL.

Hydro also provides an Isolated Systems Community Energy Efficiency Program. This is a direct install program specifically for residential and commercial customers in Hydro's Isolated Diesel systems. The objective is to help customers save energy by providing outreach, education, and energy efficient products free of charge to residential and business customers in remote diesel-system communities within Newfoundland and Labrador. The program also focuses on building knowledge and capacity in the communities by hiring and training local representatives. These representatives work

In 2015, 965 residential and business customers received a direct install of 22,469 products consisting of water saving technologies and specialty bulbs for lighting needs, including chandelier, vanity, and flood lamps.

within their own communities to promote the program, provide useful information on energy use, and provide direct installation of energy efficient products.

In 2015, 965 residential and business customers received a direct install of 22,469 products consisting of water saving technologies and specialty bulbs for lighting needs, including chandelier, vanity, and flood lamps.

Business Efficiency Programs

Hydro's business customers in the company's interconnected and isolated area also received support in 2015 from the company's Business Efficiency Programs. The business programs include a prescriptive component offering discounted high performance lighting and product rebates for heating and lighting controls.

In 2015, we processed almost 3,000 product rebates under the prescriptive component. A custom component offers incentives based on economical energy saving improvement projects specific to individual customer facilities. The custom program provides technical support to help commercial customers identify economical energy efficiency opportunities, and provide financial support for capital upgrades. Our goal is to engage customers in the business efficiency programs by facilitating opportunity identification, technical analysis, and project completion. In 2015, eight of Hydro's business customers used the available energy efficiency technical support, with four businesses completing capital upgrades and receiving

Lighting up the Past

With assistance from the takeCHARGE Business Efficiency Program, the Grenfell Interpretation Centre in St. Anthony, NL was able to improve their services through energy efficiencies. The Centre's museum replaced all its lighting with LED bulbs. The new bulbs have a much longer life than the traditional incandescent bulbs which makes things easier for staff. The LED bulbs also offer the appropriate lighting levels needed to showcase displays in the interpretation centre, not to mention substantial energy and cost savings.

Cynthia Randell, Manager of the Grenfell Historical Society says the group knew there were more efficient lights it could be using at the centre. "We reached out to takeCHARGE to discuss our options," Randell says. "We are now saving about 50 percent on our annual museum lighting costs and we no longer need to keep changing hard-to-reach bulbs on a regular basis. We couldn't be happier." The total energy savings for this project are about 16,524 kWh per year.



The Grenfell Interpretation Centre, St. Anthony, NL.

financial support through the Business Efficiency Program custom track.

Industrial Energy Efficiency Program (IEEP)

Since 2010, Hydro has delivered an Industrial Energy Efficiency Program (IEEP) which provides industrial electricity customers with financial assistance and technical support to complete feasibility studies and capital upgrades to achieve electricity savings. The IEEP was relaunched in 2015 with emphasis on direct communications with customers, greater emphasis on maintaining communications with active customers, and documenting initiatives in which they are interested.

In 2015, the company directly engaged with each of its five industrial customers regarding their interest in energy efficiency, and we surveyed them to understand their future plans for efficiency improvements. One industrial customer completed a compressed air optimization study, which was supported by funding through the Industrial Program, while another customer identified capital funds to undertake efficiency improvements over the next two years. Hydro continues to engage with industrial customers to encourage and support improvement projects.

PART 6 - MAKING A DIFFERENCE IN OUR COMMUNITY

2015

Celebrating Environment Week in Churchill Falls

Nalcor employees in Churchill Falls celebrate Environment Week in a big way every year. The town has showcased its passion for environmental awareness since 2006 with displays and themed fun days and events around the topics of recycling, composting, community litter cleanup, trashless lunches at school, and so on.

Their efforts played a great part in the community's successful environmental campaigns such as household hazardous waste collection, tree planting, and promoting the use of reusable bags at the grocery store.

In 2015, a few new events were added to the Environment Week calendar including a community yard sale, the day care and Family Resource Centre tree planting, and library activities for toddlers. Also new in 2015 was the "no flyer" sign up at Canada Post and the paperless promotion of Environment Week.

Coastal Monitoring of Seabird Populations

In 2015, Nalcor supported Coastal Monitoring of Seabird Populations with the Newfoundland and Labrador Environmental Association (NLEA). This program conducted coastal wildlife monitoring in the Cape Race and surrounding area. The Coastal Monitoring Program provides much needed data on the year-round distribution of seabirds using nearshore waters, and creates a baseline to determine long-term population trends, which are challenging to collect.

NLEA has a mandate to improve public education and raise awareness of issues arising from coastal resource development. By expanding the coastal-based surveys on the southeast shore of the Avalon Peninsula, NLEA can provide high quality, quantifiable scientific data required to monitor the seabirds in this region of the province.



Stan Tobin, Environmental Monitor with the NLEA.

Nalcor's Partnership with Conservation Corps

Nalcor has a historic partnership with the Conservation Corps' Green Team Program. Over the years, Nalcor has supported numerous Green Team projects across the province. These projects not only provide young people with meaningful employment, but give them an opportunity to work directly on an environmental project within their own communities.

Since 1996, Nalcor has contributed nearly \$396,000, supported more than 25 Green Teams and employed 105 young people throughout the province.

Community Garden with the Hopedale Inuit Community Government

The Hopedale Green Team built community garden beds for plants, flowers, and vegetables, many of which

were used to stock the community freezer. The team also worked to plant spruce trees and flowers to beautify the town of Hopedale. The garden and green spaces will be a welcoming place for members of the community to socialize and to learn basic gardening skills. The team also held a composting workshop for the entire community and placed compost bins around the community, highlighting the importance of diverting waste from the landfill.

Reclaiming Limestone Barrens Habitat and Endemic Plants, Flowers Cove, NL

The Flowers Cove Green Team focused heavily on the protection of the Limestone Barrens Critical Habitat and environmental awareness in their community. Throughout the summer, the team checked Diamond Back Moth traps weekly and evaluated the surrounding areas for the Longs Braya, an endangered plant species. The Green Team also



Jillian White, Green Team participant.

worked with members of the community to organize and facilitate environmental awareness events which focused on educating local residents about the Longs Braya, the Limestone Barrens, and climate change.



Toni Lampe, Jacob Edmunds, Noah Pamak.

Since 1996, Nalcor has contributed nearly \$396,000, supported more than 25 Green Teams and employed 105 young people throughout the province.

The team worked to remove waste and litter from community green spaces and the Thrombolites trails. Residents and tourists alike visit these places. The Green Team's collective efforts helped ensure conservation and environmental protection will continue to be promoted in their community.

Investigating Green Crab with the Qalipu Mi'Kmaq First Nation Band, Stephenville, NL

The Qalipu Mi'Kmaq Green Team worked with partners at the Department of Fisheries and Oceans, Qalipu River Guardians, and Lewis Macdonald Composting to collect a population estimate of Invasive European Green Crab in Port Harmon. Port Harmon area is well-known for fishing, and the sheltered, sandy estuary is an ideal spot for Green Crab to thrive. The Green Crab is an aggressive crab that destroys Marine habitats and feeds on small fish and crustaceans, such as clams and juvenile lobster. It first



Arielle Alexander, Daniel House, Shania Cormier.

appeared in Newfoundland in 2007 and is doing very well in the coastal waters with no natural predators.

During the first week in Port Harmon, the Green Team trapped and tagged more than 3,000 crab. They documented the size, sex, weight, any abnormalities, and the presence of tags. Each day, the team measured the salinity, dissolved oxygen, and temperature in Port Harmon, factors which affect the population study. The team learned how to deploy and retrieve crab pots, properly prepare bait, identify the sex and type of crab, and understand GPS and tide charts. Invasive species are directly related to climate change, and with Newfoundland and Labrador being a fishing province, the Green Crab was a popular subject on the west coast.

Go Green with Michelle Roche, Environmental Coordinator

What's your name and what do you do?

I'm Michelle Roche and I'm the Environmental Coordinator for Operations. I'm also a Go Green Team member.

Why do you like your job?

I have always had a passion for environmental issues and my job allows me to support a wide range of initiatives that reduce or eliminate environmental impacts and improve environmental awareness across our organization. My job and the challenges our organization faces are constantly changing and I feel fortunate to work for a company that echoes my beliefs about the importance of environmental management.



Michelle Roche, Environmental Coordinator.

What's Go Green all about?

Nalcor's Go Green Challenge Initiative is a grassroots approach that provides opportunity for employees to participate individually and collectively towards minimizing our ecological footprint and restoring the natural balance between human activities and nature. This is achieved by motivating our employees to:

- generate less waste
- recycle everything that cannot be reused
- educate and share eco-friendly options
- evaluate understanding of our environmental impact, identify tools we have to minimize or eliminate those impacts
- encourage discussions and activities that integrate environmental education and management into existing policies, programs and procedures.

Why are projects like Go Green important in the workplace?

Individually, there are several reasons to “go green.” More often than not, these are driven by deep philosophies, a way of living, or simply an understanding of what you want to leave for future generations. As a corporation, Nalcor has committed to being “an environmental leader,” with a focus on effective and environmentally sound practices as part of a promise to be environmentally responsible and sustainable.

The Go Green campaign aims to lead by example and promote environmental stewardship throughout all of Nalcor’s operations. The goal is to minimize Nalcor’s environmental footprint by following five principles throughout daily activities:

- 1) Reduce pollution
- 2) Conserve resources
- 3) Conserve energy
- 4) Reduce consumption and waste
- 5) Protect the earth’s ecological balance.

Do you Go Green at home as well?

Of course! I try and make small manageable changes that my family can achieve. We recycle everything we can at home, compost, primarily use homemade cleaners, and grow our own vegetables. In the past three years, we’ve made several upgrades to our half century old home. This included installing all new Energy Star windows,

Go Green quick facts

- **Go Green environmental initiatives:**
 - involved 820 participants throughout the year
 - supported seven community charities and three corporate initiatives
 - resulted in savings of approximately 2,000 kg of CO₂ emissions or the equivalent of driving 7,663.7 km

choosing a heat pump over electric baseboards, upgrading our insulation to R-20, and purchasing energy efficient appliances. Last year, we started a tradition in our home by trying to purchase more of our Christmas gifts locally; this year, we will be looking to try and purchase more of our food from local sources.

President’s Awards recognize outstanding employees

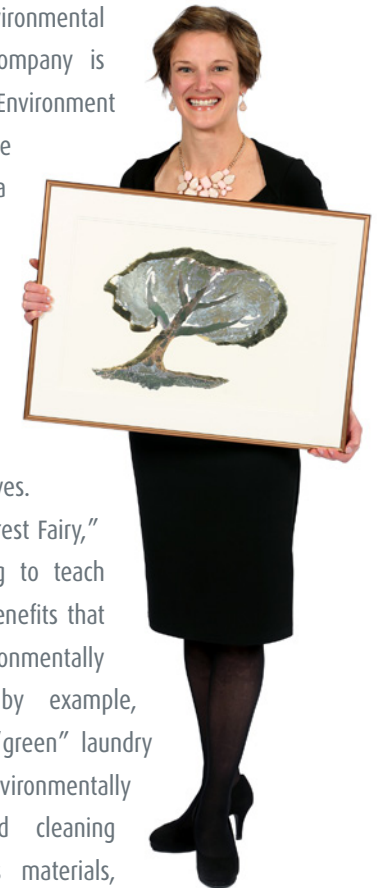
Nalcor Energy’s President’s Awards are the most prestigious form of recognition an employee can receive throughout the company. This year marked the eighth annual President’s Awards ceremony held on November 26 in St. John’s.

The President’s Awards recognize employees who not only support the company’s strategic goals and objectives, but live them each and every day at work, at home, and in their community. The five corporate goals and categories recognized are Safety, Environment, Business Excellence, People and Community. This year, we received nominations for 35 employees from across all lines of business.

Karla Bradbury

As a true environmental steward, Karla is known for her passion and love of the environment. She may not be your typical environmental leader as she spends her days as a Senior Financial Analyst; however, she is known for her genuine commitment to bettering the environment. Her positive energy and knowledge of environmental initiatives is truly an inspiration to others.

One of Karla’s major environmental contributions to the company is her commitment to Environment Week. Seeking out the committee without a formal invitation, the committee members accepted her with open arms when they were quick to realize her true passion for environmental initiatives. Creating the role of “Forest Fairy,” Karla is always looking to teach those around her the benefits that come from being environmentally considerate. Leading by example, Karla makes her own “green” laundry detergent, uses environmentally friendly cosmetic and cleaning products, and recycles materials,



when possible, including wrapping presents in newspaper or recycled paper. In her free time, Karla is an executive member with Clean St. John's, and a volunteer with the East Coast Trail Association and the Salmonid Association. Her commitment to the environment speaks to her true passion and desire to help improve the environment around her.

Her peers look to her for inspiration and strive to become involved with environmental initiatives. She is an environmental champion, not just within the Finance team, but within the company and the community. Karla can always be counted on to support and encourage her colleagues to be environmentally friendly.

Churchill Falls Environmental Stewardship Award

The company recently recognized Elaine Noble for her contribution to environmental stewardship in Churchill Falls. This Award is open to both employees of Nalcor and community residents.

Elaine actively demonstrates many qualities of environmental leadership. In addition to her recycling efforts, she goes out of her way to reduce waste and conserve energy. Whether it's walking instead of driving, growing her own vegetables, or simply turning off lights when not in use, Elaine is a leader in her community. She is also a tireless volunteer, spending hours sorting recyclables



Elaine Noble (pictured on the left) with Cindy Michelin.

with the Lions Club, and she has been instrumental in keeping the local recycling program alive.



Town of Churchill Falls.



ENVIRONMENTAL PERFORMANCE REPORT

2015

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