



Labrador-Island Transmission Link

Environmental Impact Statement

Plain Language Summary



Nalcor Energy has written this Plain Language Summary, in accordance with the Environmental Impact Statement Guidelines, to provide a short description of the transmission project and to describe how the transmission project will affect the environment. It also explains what Nalcor plans to do if it receives approval from the Government of Newfoundland and Labrador and the Government of Canada to build the transmission project. The summary is available in: English, French, Innu-aimun (Labrador and Quebec dialects), Naskapi and Inuktitut.

For a more detailed and technical summary of the Environmental Impact Statement, please refer to the Executive Summary of the Environmental Impact Statement.



Glossary of Terms

Adaptive management – learning from experience and improving things like mitigation and processes to make them better.

Alternating current (ac) – most common form of electrical current or power; this is the type of power that people use in their homes.

Biophysical – physical and biological components of the environment, such as air quality, aquatics, wildlife on land and in water, etc.

Converter station – equipment used to convert alternating current to direct current (or direct current back to alternating current). Converter stations are part of High Voltage direct current (HVdc) transmission systems.

Direct current (dc) – direct current can be used to transmit power over long transmission lines to customers for their use. It must still be changed back to alternating current power before it's delivered to people's homes.

Electrode – high capacity grounding system used to allow HVdc systems to still operate when one electrical conductor is out of service. Electrodes are important for reliability and safety on large HVdc transmission systems.

Environmental Impact Statement (EIS) – a report prepared and submitted under the environmental assessment process that provides a description of the proposed project, its likely environmental and socioeconomic effects, and planned measures to avoid or reduce negative effects and enhance benefits. An EIS is subject to public and governmental review, and is used to inform eventual environmental assessment decisions about whether and how the project can proceed.

Fording – crossing a stream at a shallow place. Fording is an activity that requires a DFO issued permit.

High Voltage direct current (HVdc) – direct current boosted up to high voltages for long distance transmission. This form is sometimes used to carry large amounts of power over long distances and for transmission under water.

Landfall site – The location where the submarine cable will begin / end on land.

Listed species – species which are legally protected (including their habitat) by the provincial and/or federal government to prevent them from becoming extinct. Depending on the situation, the species may be listed as Endangered, Threatened, or Vulnerable/Special Concern.

Management area – an area where the number of resources (e.g., salmon, moose, and caribou) harvested is regulated by the provincial and federal governments.

Transmission project area – the area in which the transmission project related activities will occur. This includes the 2 km study corridor from within which the 60 m right of way will be located, the submarine cable corridor, shoreline electrode sites, converter station, quarries, access trails and roads, etc.

Route – an area around transmission and distribution lines that is cleared of any bushes and trees (vegetation) that may cause problems with operation of the line. Sometimes called the transmission right-of-way (ROW).

Submarine power cables – cables that carry electrical energy, but are electrically-insulated and physically protected from the environment so that they can be buried under ground or water.

Vegetation – bushes and trees on the transmission and distribution line right-of-way which may present a hazard for crews working on lines. Larger vegetation is cut or removed for reliability and safety reason.

List of Acronyms

Acronym	Description
ac	alternating current
ATV	all-terrain vehicle
CEA Agency	Canadian Environmental Assessment Agency
dc	direct current
EIS	Environmental Impact Statement
EMF	electromagnetic field
EPP	Environmental Protection Plan
HDD	horizontal directional drilling
HVac	High Voltage alternating current
HVdc	High Voltage direct current
km	Kilometre
kV	Kilovolts
m	Metre
Nalcor	Nalcor Energy
TCH	Trans-Canada Highway
the island	the island of Newfoundland
the transmission project	Labrador-Island Transmission Link
TLH3	Trans-Labrador Highway Phase 3

Table of Contents

INTRODUCTION.....	1
NEED AND PURPOSE OF THE TRANSMISSION PROJECT	3
THE TRANSMISSION PROJECT.....	5
Converter Stations.....	5
Transmission Line.....	6
Underwater Cable Crossing	7
Electrodes.....	9
BUILDING THE TRANSMISSION PROJECT	11
Converter Stations.....	11
Transmission Line.....	11
Underwater Cable Crossing	12
Electrodes.....	12
Reclamation	13
Construction Activities	13
Construction Schedule	13
OPERATING AND MAINTAINING THE TRANSMISSION PROJECT	14
Operation	14
Maintenance	15
Emissions.....	15
ENVIRONMENTAL ASSESSMENT	16
CONSULTATION	18
NATURAL ENVIRONMENT TODAY	20
The Air.....	20
The Land.....	21
The Streams, Rivers and Lakes.....	23
The Sea.....	24
HUMAN ENVIRONMENT TODAY	27
Historic and Heritage Resources	27
Communities.....	28
Economic Development.....	28
Land and Resource Use	29
Tourism.....	30
Visual Aesthetics.....	31
Marine Fisheries.....	31

EFFECTS OF THE TRANSMISSION PROJECT ON THE NATURAL ENVIRONMENT	33
The Air	33
The Land.....	34
The Streams, Rivers and Lakes.....	36
The Sea.....	37
EFFECTS OF THE TRANSMISSION PROJECT ON THE HUMAN ENVIRONMENT.....	38
Historic and Heritage Resources	38
Communities	38
Economic Development.....	39
Land and Resource Use	40
Tourism.....	40
Visual Aesthetics.....	41
Marine Fisheries.....	43
MONITORING AND FOLLOW-UP	44
CONCLUSION	45

LABRADOR-ISLAND TRANSMISSION LINK





Introduction

Nalcor Energy (Nalcor) is an energy company owned by the province of Newfoundland and Labrador. Nalcor plans to build the Labrador-Island Transmission Link (the transmission project) from the lower Churchill River in central Labrador to Soldiers Pond on the island of Newfoundland (the island). The transmission link will deliver a reliable and clean supply of electricity to people and businesses on the island of Newfoundland. It will also enable the delivery of electricity to markets in the Maritime Provinces and United States.

Nalcor is committed to providing safe, reliable and dependable electricity to electricity consumers and to maintaining a healthy environment for future generations. Nalcor respects the environment, avoids pollution, disturbs the environment as little as possible, and follows all environmental laws and regulations.

Before the transmission project is built, Nalcor will prepare Environmental Protection Plans (EPPs) that workers must follow. These EPPs explain to the workers how to protect the environment.

Nalcor cannot build the transmission project unless the Government of Canada and the Government of Newfoundland and Labrador say that the transmission project can go ahead. The governments asked Nalcor to do an environmental assessment of the transmission project and directed Nalcor what to include.

Nalcor prepared an Environmental Impact Statement (EIS) with the information the governments need to decide if the transmission project should go ahead. The EIS

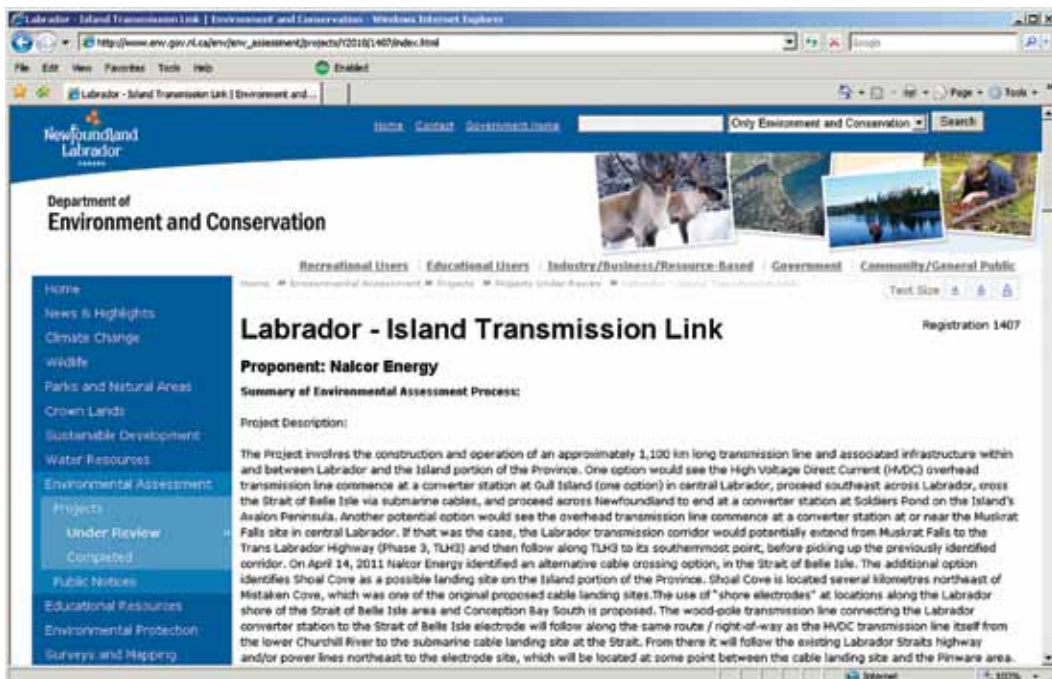
will be reviewed by the Government of Canada, the Government of Newfoundland and Labrador, Aboriginals, and many other organizations and people.

Environmental assessment is an important part of Nalcor's planning because it helps improve the benefits of the transmission project and reduce harm to the environment.

The EIS, as well as other studies that Nalcor has submitted to governments, are thousands of pages long. The Government of Newfoundland and Labrador, Department of Environment and Conservation website www.env.gov.nl.ca/env/ contains these documents.

More information about the transmission project is available at: nalcorenergy.com/lowerchurchillproject.

The full EIS and other related reports can be found at: http://www.env.gov.nl.ca/env/env_assessment/projects/Y2010/1407/index.html.



The screenshot shows a web browser displaying the website for the Department of Environment and Conservation in Newfoundland and Labrador. The page title is "Labrador - Island Transmission Link". The main heading is "Labrador - Island Transmission Link" with a registration number of 1407. Below this, it states "Proponent: Nalcor Energy" and "Summary of Environmental Assessment Process:". The "Project Description:" section begins with "The Project involves the construction and operation of an approximately 1,100 km long transmission line and associated infrastructure within and between Labrador and the Island portion of the Province. One option would see the High Voltage Direct Current (HVDC) overhead transmission line commence at a converter station at Gull Island (one option) in central Labrador, proceed southeast across Labrador, cross the Strait of Belle Isle via submarine cables, and proceed across Newfoundland to end at a converter station at Soldiers Pond on the Island's Avalon Peninsula. Another potential option would see the overhead transmission line commence at a converter station at or near the Muskrat Falls site in central Labrador. If that was the case, the Labrador transmission corridor would potentially extend from Muskrat Falls to the Trans Labrador Highway (Phase 3, TLHG) and then follow along TLHG to its southernmost point, before picking up the previously identified corridor. On April 14, 2011 Nalcor Energy identified an alternative cable crossing option, in the Strait of Belle Isle. The additional option identifies Shoal Cove as a possible landing site on the Island portion of the Province. Shoal Cove is located several kilometres northeast of Mistaken Cove, which was one of the original proposed cable landing sites. The use of "shore electrodes" at locations along the Labrador shore of the Strait of Belle Isle area and Conception Bay South is proposed. The wood-pole transmission line connecting the Labrador converter station to the Strait of Belle Isle electrode will follow along the same route / right-of-way as the HVDC transmission line itself from the lower Churchill River to the submarine cable landing site at the Strait. From there it will follow the existing Labrador Straits Highway and/or power lines northeast to the electrode site, which will be located at some point between the cable landing site and the Pinware area."



NEED AND PURPOSE OF THE TRANSMISSION PROJECT

The need for electricity in the province is growing. The transmission project will help meet this need by carrying electricity to residents and industries on the island from central Labrador. This electricity will be clean and renewable. Carrying this electricity to the island will help reduce the amount of electricity needed from fuel-fired power plants that use non-renewable resources.

Climate change has been linked with the release of greenhouse gases to the air. There is concern the earth's temperature is increasing too quickly, so the provincial and federal governments want to reduce their greenhouse gas emissions. Once the transmission project is built, and less electricity is needed from fuel-fired plants, there will be almost no greenhouse gases emitted while producing electricity on the island.

The electricity carried by the transmission project will be cheaper in the long term than it would be with the current electricity system on the island, and the price of electricity will be more stable. This will benefit the people who live and do business in Newfoundland and Labrador. It will also help attract new businesses and jobs to the province.

The transmission project will also have important economic benefits during construction and operation and will create many jobs. There will also be many opportunities for businesses that supply goods and services.

Need and Purpose of the Transmission Project

Nalcor has considered alternatives to the transmission project, including development of resources such as wind and small hydro on the island. Nalcor has concluded that the least cost alternative to meet the electricity needs of the island includes the transmission project.

Alternative means of carrying out the transmission project have also been considered. Alternatives considered include:

- How to cross the Strait of Belle Isle - using a tunnel or placing cables on the seafloor.
- Alternate routes for the transmission line.





THE TRANSMISSION PROJECT

The transmission project will be built in the Province of Newfoundland and Labrador. The transmission project includes building and operating:

- a converter station at Muskrat Falls (Labrador) to change alternating current (ac) power into direct current (dc) power.
- an overhead high voltage direct current (HVdc) transmission line from the Muskrat Falls converter station to the Strait of Belle Isle at Forteau Point.
- underwater cable crossing from Forteau Point, Labrador across the Strait of Belle Isle to Shoal Cove, Newfoundland.
- an overhead HVdc transmission line from Shoal Cove to Soldiers Pond, Newfoundland.
- a converter station at Soldiers Pond to change the dc power back into ac power for distribution using the island's electricity grid.
- electrodes, or ground systems, in the ocean at L'Anse au Diable (on the Labrador side of the Strait of Belle Isle) and at Dowden's Point (in Conception Bay, Newfoundland).

Converter Stations

Converter stations for the transmission project will be built at each end of the system. The converter stations will be built on a gravel surface with concrete foundations and steel structures to support the electrical equipment. The converter station will be fenced to keep people safely away from the electrical equipment.

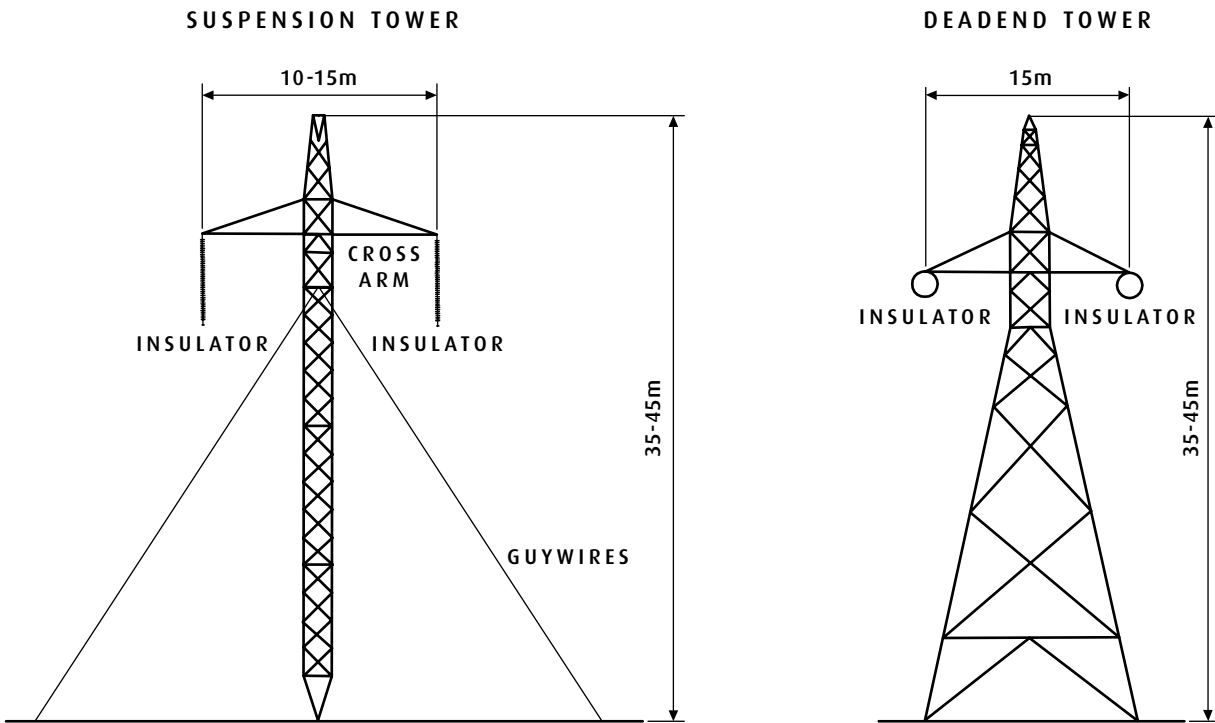
The Muskrat Falls converter station will convert ac power to dc power. The Soldiers Pond converter station will change dc power from the transmission line back to ac power. The ac power will be added to the island's electricity grid and delivered

to homes and businesses. The Soldiers Pond converter station will connect to the existing transmission lines in the area. A one kilometre (km) road will be built from the Trans-Canada Highway (TCH) to the Soldiers Pond converter station.

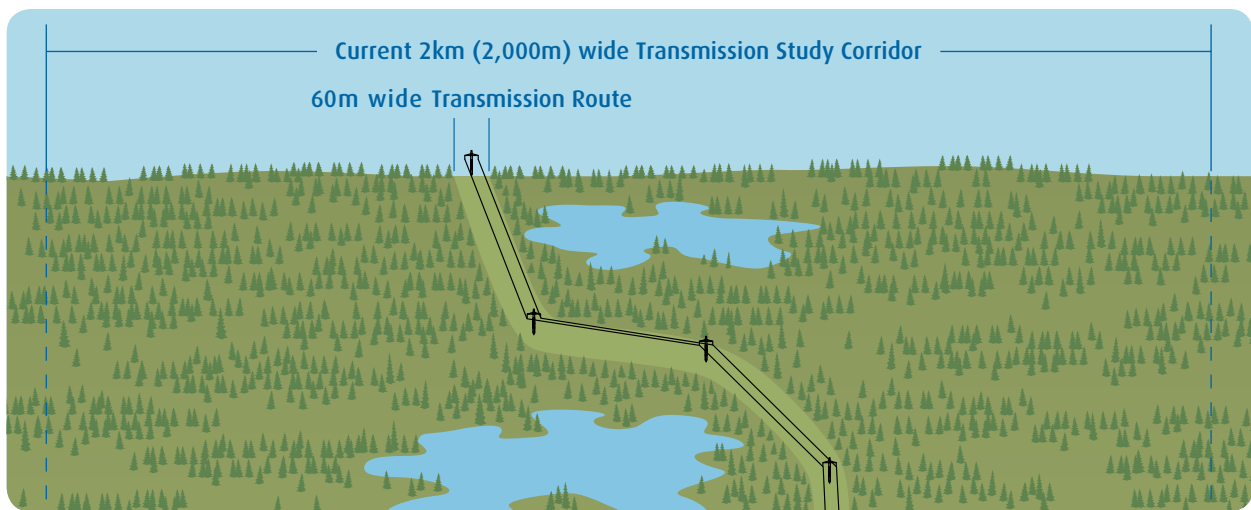
Transmission Line

The transmission line will be HVdc instead of HVac like other lines in Newfoundland and Labrador. HVdc transmission lines are more effective for carrying large amounts of power over long distances, as well as underwater. About 400 km of overhead HVdc transmission line will be built between Muskrat Falls and Forteau Point, and about 700 km will be built between Shoal Cove and Soldiers Pond. The on-land transmission line will have two wires on steel towers between 35 metre (m) and 45 m tall. These wires will transmit electricity from the Muskrat Falls generating facility to the island. It will also have a smaller wire that protects it from lightning strikes.

TYPES OF TRANSMISSION TOWERS



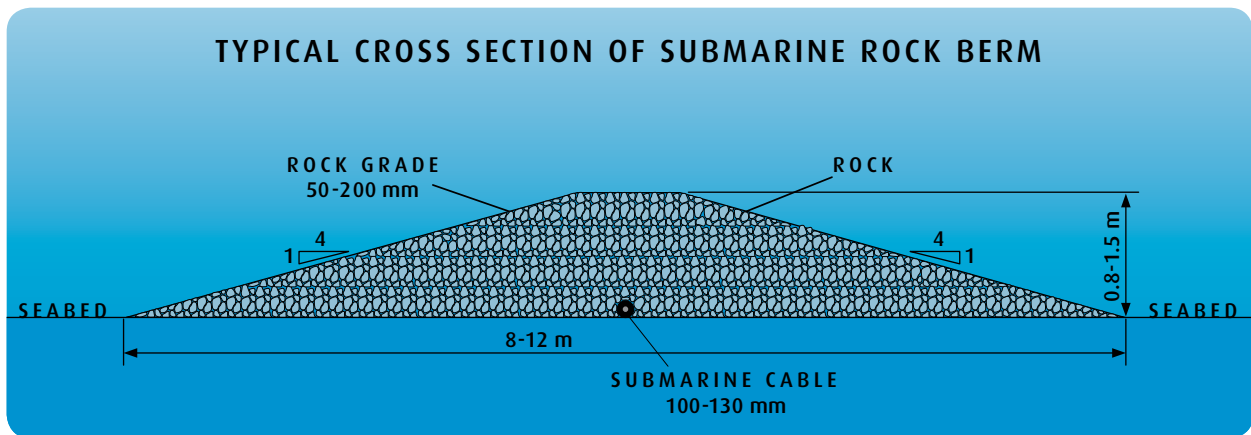
Nalcor has identified a two kilometre wide area called a corridor. This corridor is the study area for the transmission line. The specific route for the transmission line will be chosen from within this corridor during the final transmission project design. The eventual transmission route, called the right-of-way, will be 60 m wide. The right-of-way location will consider environmental concerns and issues heard through consultation.



At Forteau Point and at Shoal Cove, the overhead transmission line will go into a transition compound, a concrete building about one kilometre from the shoreline. From this building, cables will be buried in trenches that are connected to the submarine cables that cross the Strait of Belle Isle.

Underwater Cable Crossing

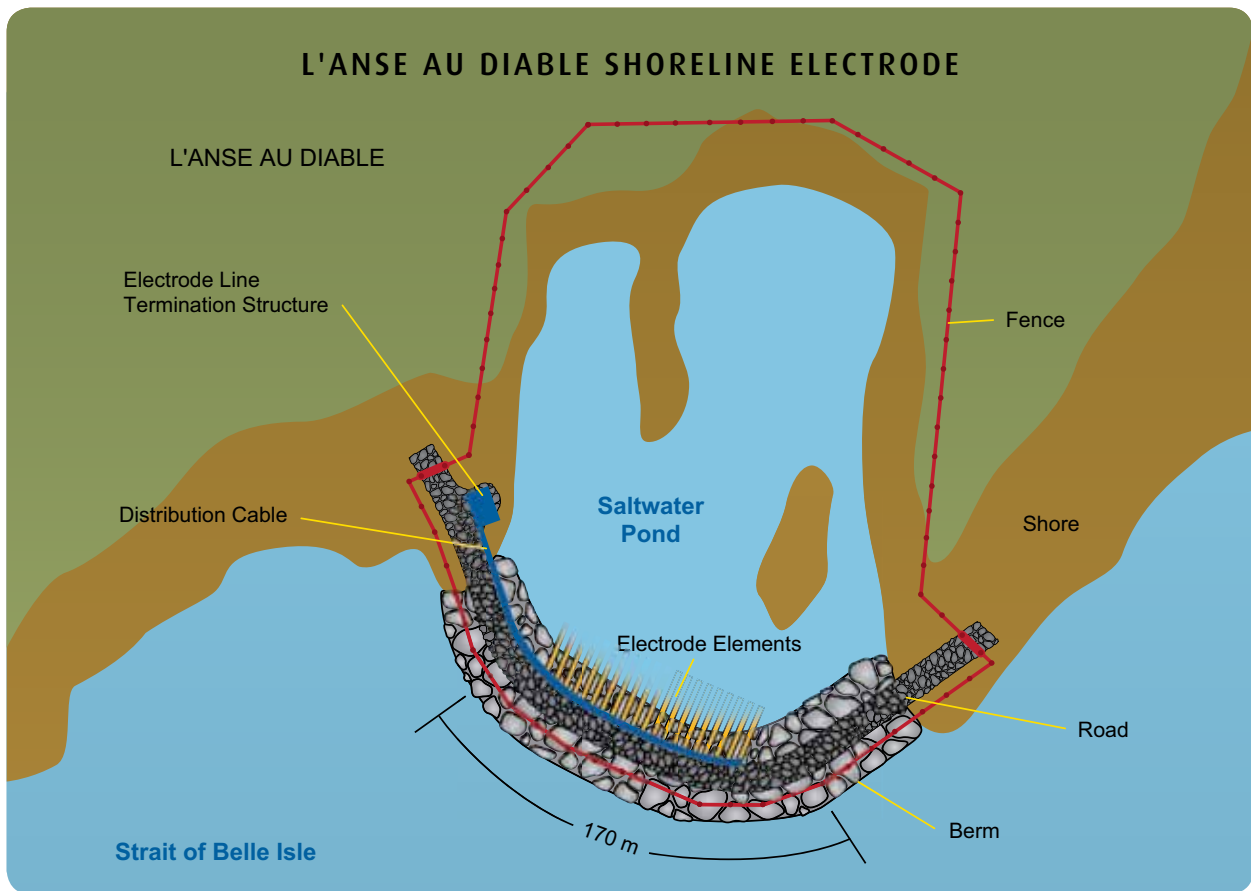
Three cables will be placed underwater across the Strait of Belle Isle between Forteau Point and Shoal Cove. The cables will be pulled through small holes that will be drilled under the ground, out to about two kilometres into the Strait of Belle Isle. The cables will then be placed on the sea floor, about 150 m apart. Each will be protected by a pile (berm) of rocks about 10 m wide and one metre high. Two cables will be used to carry electricity. The third cable will be a spare and only used if one of the other two cables is damaged.

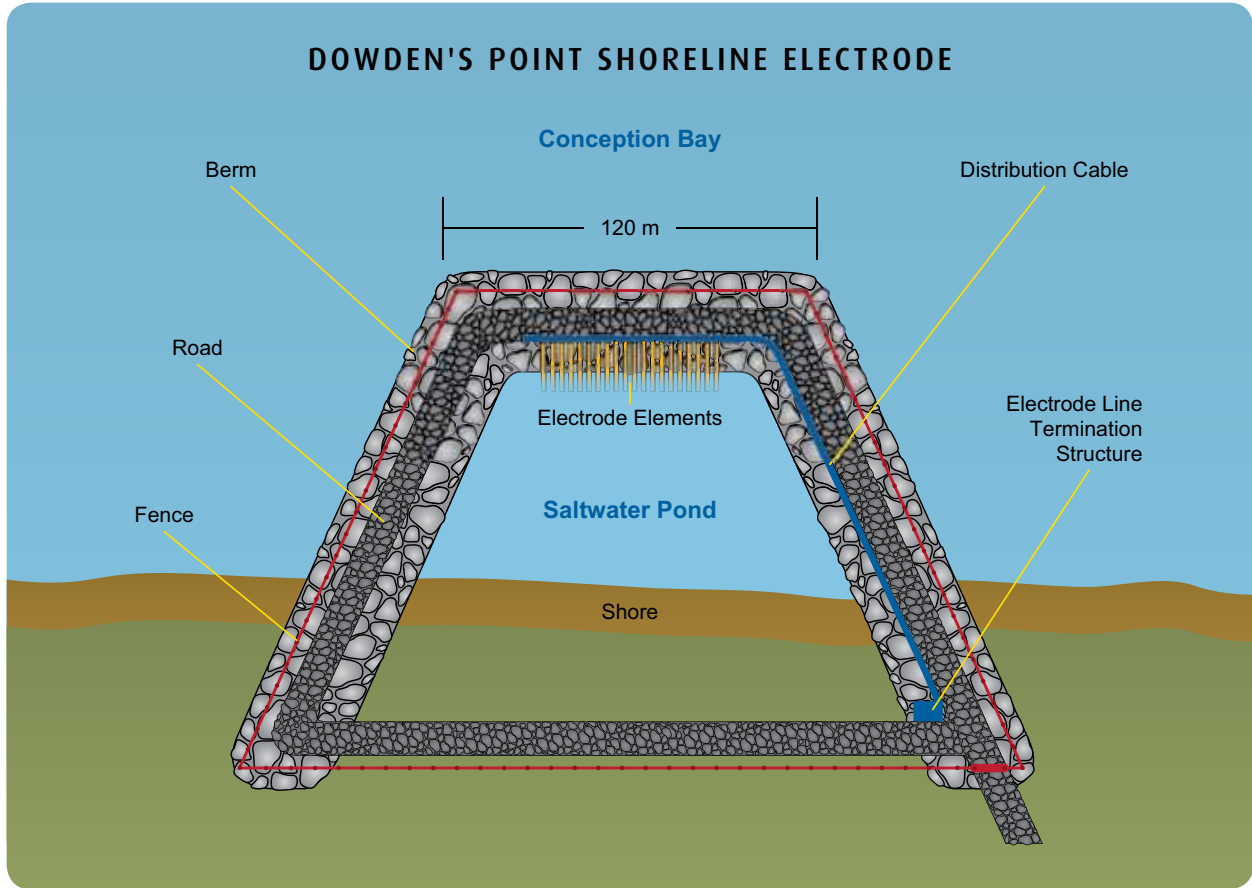


Electrodes

Electrodes, or ground systems, will be built at two locations: one in the Strait of Belle Isle at L'Anse au Diable (Labrador) and one in Conception Bay at Dowden's Point (Newfoundland).

The electrodes, which are made up of several rods placed in the ocean, are needed to help balance the voltage of the HVdc transmission system. The electrodes will be separated from the ocean by a pile of rocks about 15 m high. The L'Anse au Diable electrode will be connected to the Muskrat Falls converter station and the Dowden's Point electrode will be connected to the Soldiers Pond converter station. They will be connected by power lines on wooden poles.







BUILDING THE TRANSMISSION PROJECT

It will take about four years to build the transmission project. Nalcor will hire experienced contractors and workers to build the transmission project. Where possible, Newfoundlanders and Labradorians will be hired. Nalcor also wants Aboriginal people, women, visible minorities and persons with disabilities to work on the transmission project.

Converter Stations

It will take about two years to build the Muskrat Falls and Soldiers Pond converter stations. The sites for the converter stations will be cleared and access roads built. The buildings will then be built and the electrical equipment will be installed. The equipment will be tested before it is used.

Transmission Line

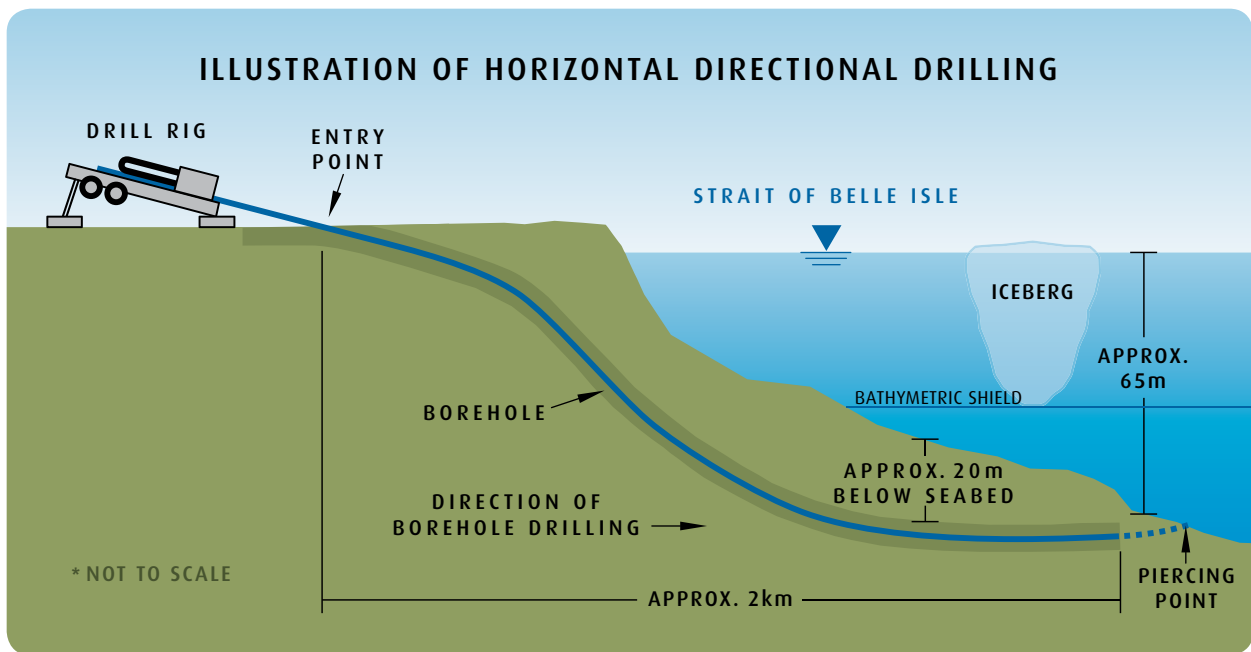
It will take about four years to build the on-land transmission line. Access roads and bridges, temporary storage areas, and construction camps will be built first. The transmission line right-of-way will then be cleared and tower locations will be marked. The tower foundations will be built, the towers assembled and raised, and then the wires will be strung between the towers. The on-land transmission line will be tested before it is used.



Underwater Cable Crossing

It will take about three years to complete the underwater cable crossing. Drill rigs on the shore will drill three small holes, one for each cable, out into the Strait of Belle Isle. This will be done from both sides of the Strait of Belle Isle. A ship will be used to lay the cable. A cable will be pulled through each of the holes and joined with a cable on the opposite side of the Strait of Belle Isle.

A rock berm over each cable will then be built using a ship with a long pipe that can reach the seafloor. The vessel will use the pipe to place the rocks directly on the cable.



Electrodes

It will take about one year to build the electrode sites. A saltwater pond will be created by placing large rocks in the ocean near the shoreline. The electrode will be built in the saltwater pond and connected to the converter station with a wood pole transmission line.

Reclamation

Once the transmission project has been built, leftover material will be cleaned up. Areas will be levelled back to the way they were so plants can re-grow.

Construction Activities

Access roads and trails will be needed to move workers, equipment and materials safely to the work sites. Existing roads and trails will be used, where possible.

Construction workers will stay in small, temporary camps. When construction activities are finished in an area, crews will move to another camp. Eleven temporary construction camps are planned for the transmission project.



Five temporary storage areas or marshalling yards will be needed to store equipment and materials: two in Labrador and three on the island. These areas will be used to temporarily store fuel and materials and to assemble transmission towers.

Gravel and rock needed for construction will come from existing rock quarries or will be bought from local suppliers.

Construction Schedule

Project Components	Start	Finish	Duration
Muskkrat Falls converter station	Year 1	Year 4	40 months
Soldiers Pond converter station	Year 1	Year 4	38 months
L'Anse au Diable electrode	Year 3	Year 4	17 months
Dowden's Point electrode	Year 3	Year 4	13 months
Transmission line in Labrador	Year 1	Year 5	43 months
Transmission line in Newfoundland	Year 1	Year 4	34 months
Horizontal Directional Drilling in Newfoundland	Year 1	Year 3	30 months
Horizontal Directional Drilling in Labrador	Year 1	Year 3	24 months
Underwater cable installation and rock berm installation	Year 4	Year 4	6 months



OPERATING AND MAINTAINING THE TRANSMISSION PROJECT

During transmission project operation and maintenance, Nalcor will hire about 30 people. They will look after the transmission line, converter stations, underwater cables, and electrodes. Contractors will be hired for some special activities.

Operation

During operation, electricity will be changed from ac power to dc power at the Muskrat Falls converter station. It will then travel through the on-land transmission lines and underwater cables to the Soldiers Pond converter station, where it will be changed back to ac power. The power will then be added to the island's electrical system.

During normal operation, small amounts of electrical current will flow through the electrodes. The electrodes help balance the system. If the underwater cable or on-land transmission line stops working, the full current may flow through the electrode. This will allow the system to continue working until the problem is fixed.

The system will be monitored by employees at the Energy Control Centre at Hydro Place in St. John's. People at this centre monitor most of the island's electrical system.



Maintenance

The transmission line will be inspected every year. Crews will use all-terrain vehicles (ATVs), snowmobiles or a helicopter. Maintenance may include minor repairs or part replacement.

The underwater cables will be inspected for the first two years by using a remotely operated vehicle. If the rock berms remain in good condition after two years, inspection will not continue. Repairs to the cable are not expected.

The electrode elements can last several years before they need to be replaced.

For safety reasons, vegetation along the right-of-way is not permitted to grow more than two metres tall. Trees that grow to two metres will need to be removed. This removal will be done using chainsaws and/or provincially regulated herbicides every seven years.

Emissions

HVdc systems and electrodes are commonly used in other places for the transmission of electrical power over long distances. Once a HVdc transmission line is built and operating, there is a small amount of emissions and discharges. This can include noise, electromagnetic fields (EMF), electric fields, and chemical emissions. These will be within approved, best industry standard levels. The final routing for the transmission project will avoid communities, where possible.





ENVIRONMENTAL ASSESSMENT

Environmental assessment is an important part of Nalcor's transmission project planning. Nalcor has used the environmental assessment to do three things:

First, environmental and engineering studies were used to make the transmission project better and minimize negative effects on the environment. For example, information collected about the type of habitat has been used to understand the transmission project's effects on plants and wildlife habitat.

Second, Nalcor talked with people who may be affected by the transmission project. By talking with people, Nalcor has learned about individual, community, and Aboriginal concerns.

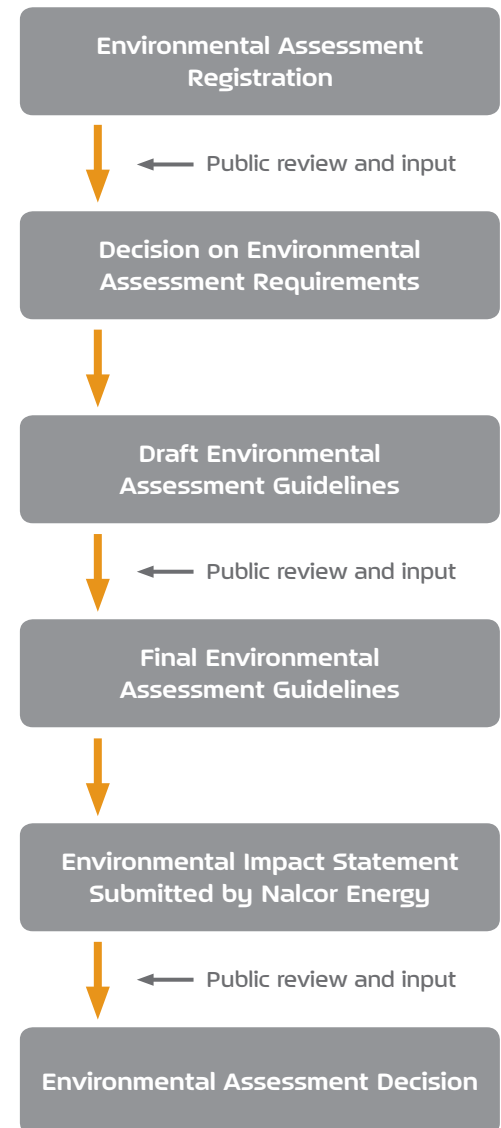
Third, provide information to the people who will make decisions about whether the transmission project can be built, and under what conditions. The EIS is a regulatory requirement. It helps government authorities make decisions about the transmission project to ensure the law is followed and appropriate direction is given.



The environmental assessment process is made up of the following steps:

- **Registration:** In January 2009, Nalcor registered the transmission project with the provincial and federal governments.
- **Environmental Impact Statement Guidelines:** EIS Guidelines were issued by the provincial and federal governments in May 2011. These guidelines told Nalcor what information was required in the EIS.
- **Environmental Impact Statement:** Nalcor submitted the EIS to the governments in 2012.
- **Decision:** Provincial and federal ministers of environment will make a decision about whether the transmission project has been approved and any conditions that will need to be met.
- **Permits and approvals:** If the ministers decide the transmission project may go ahead, Nalcor will need many permits, approvals and authorizations before building and operating the transmission project.
- **Monitoring and follow-up:** Monitoring will be required as a condition of some of the permits, approvals and authorizations. Nalcor will also use follow-up programs to find out if the EIS correctly predicted the effects of the transmission project.

Environmental Assessment Process





CONSULTATION

Nalcor wants to know what people think about the transmission project, how it may affect them, and any concerns they have. Over the past several years, there have been nearly 100 meetings with regulators, businesses and community organizations about the transmission project. Nalcor also held 29 open houses in 2010 and 2011, across Newfoundland and Labrador. During these open houses, Nalcor staff talked with people to give them information, discussed their issues and concerns, and talked about the environmental assessment. Nalcor has also consulted with Labrador Innu, Québec Innu, Labrador Inuit, and the NunatuKavut Community Council to hear their concerns and to provide information on the transmission project. Nalcor will use this information to plan the transmission project.

Nalcor has provided information to people in many ways. These include Nalcor's website (www.nalcorenergy.com/transmission-project.asp), email notifications, newsletters, information sheets, presentations and media releases. Nalcor also participated in many public information sessions and one-on-one meetings where information was shared and received.

The EIS Guidelines required Nalcor to address issues that mattered to people. The EIS Guidelines also requires Nalcor to use local and Aboriginal knowledge. This knowledge has been used by Nalcor to better understand the environment where the transmission project will be built.

Nalcor has, and continues to, consult with Aboriginal and public stakeholder groups. Nalcor will continue to provide opportunities for these groups to participate in consultation.





NATURAL ENVIRONMENT TODAY

The natural environment in the transmission project area has been studied in detail to identify ways to maximize benefits and reduce harmful effects of the transmission project. Nalcor also used Aboriginal and local knowledge to understand the natural environment.

The Air

Air quality is important for living things, including the health and well-being of humans, wildlife and vegetation.

Climate change has been linked to the release of greenhouse gases to the air. Greenhouse gas emissions from Newfoundland and Labrador represent about two per cent of Canada's total greenhouse gas emissions, meaning that Newfoundland and Labrador's contribution to global climate change is small.

The air along most of the transmission corridor is clean, and is typical of a rural or remote area. Near populated areas and industrial activity, the air is not as clean as in the remote and rural areas, but this difference is small.

The natural sounds heard along the transmission corridor include wind blowing through the trees, animal sounds,



and the sound of running water or waves. In places where there are more people and businesses, noise levels are higher.

The Land

The climate of the province varies from cold winters and mild summers in central Labrador to mild winters and cool summers on the island's Avalon Peninsula. A variety of weather patterns occur along the Strait of Belle Isle during all seasons.

The rocks that lie beneath the surface of the transmission corridor vary a lot. On the surface, the soil varies with the terrain and location. In Labrador, the soil ranges from marine deposits, to till, to sand eskers, to gravel deposits. On the island the soil types include clay, gravel, sand, and rock. Permafrost (soil or rock that is below zero degrees Celsius year-round) only occurs in a few areas in the transmission corridor, such as central Labrador and the Long Range Mountains on the island's Northern Peninsula.



The transmission project crosses southeast Labrador, the Strait of Belle Isle, and the island. The landscape pattern varies from forests, barrens, bogs, creeks and rivers. The landscape pattern determines the type of plants and animals that live there.

Plants play an important role in keeping ecosystems healthy. Much of the transmission corridor crosses remote areas with black spruce and balsam fir forest, with lots of bogs, wetlands, and small streams and rivers. There are barrens on both sides of the Strait of Belle Isle which are windswept and support low growing plants.

Nalcor has mapped and conducted field surveys to identify habitat types along the transmission corridor. Nalcor has also studied wetlands, habitat along rivers, listed and rare plants, and timber. This information was used to help Nalcor understand the habitat in the transmission project area.

Large animals in the transmission project area include moose, woodland caribou, and black bear. Moose populations are increasing in the province, though there are fewer moose in Labrador than on the island. Woodland caribou populations are declining throughout much of the area where they live and are being studied by the provincial government. Black bear, the largest predator in the transmission project area, is found throughout the province. Information on these animals was gathered from many sources, including data from the provincial government.



A variety of animals, including wolf, marten, lynx, coyote, red fox, and beaver may occur in the transmission project area. A variety of small animals including voles, mice, shrews, and lemmings may also occur.

Different birds, including birds of prey, waterfowl, songbirds, and upland game birds live in the transmission project area. Some live in the area year-round and others visit seasonally. Most bird species are migratory and use the area for breeding and rearing of young before flying south for the winter.



The province and/or Canada have listed plant and animal species that need extra protection because there are few of them or their populations are declining. Some of these listed plants are found in the transmission corridor growing on rocks near Shoal Cove. Nalcor has studied the locations of these and will avoid them. These include Long's braya and Fernald's braya. Listed animals that may be in the transmission project area include Newfoundland marten, Harlequin Duck, Olive-sided Flycatcher, Grey-cheeked Thrush, Rusty Blackbird, Short-eared Owl, Barrow's Golden Eye, Ivory Gull, Red Knot,



and Common Nighthawk. There are two listed woodland caribou herds found near the transmission project area in Labrador, the Red Wine Mountains Herd and the Mealy Mountains Herd.

The Streams, Rivers and Lakes

Approximately eight per cent of the province is covered with freshwater. Nalcor mapped the watersheds where the water flows from. Nalcor also studied the rivers and ponds that are crossed by the transmission corridor. Water flow, stream bottoms, and riverbanks were also studied.

In central and southeastern Labrador, the transmission corridor crosses 194 rivers and streams including the Kenamu River and St. Paul River. On the island, 392 rivers and streams are crossed by the transmission corridor. Along the Northern Peninsula, most river and stream crossings will occur in undeveloped areas including the upstream portions of the Main River watershed. In central and eastern Newfoundland, river and stream crossings will occur in both developed and undeveloped areas, including the Humber River watershed, Exploits River, and Gander River. On the Avalon Peninsula, crossings will include Northern Arm River, Southwest Brook, Southwest River, Spread Eagle River, and Witch Hazel Brook.



Nalcor sampled the water of some of the streams along the transmission corridor and also used information collected by the provincial and federal governments. The water quality was compared to Canadian water quality guidelines. Water quality in all regions crossed by the transmission corridor is typical of the province. Some samples had small amounts of some metals such as aluminum and cadmium.

Nalcor studied the fish in some of the rivers and streams crossed by the transmission corridor. The information collected is used to understand the fish habitat in the rivers and streams crossed by the transmission corridor. Twenty species of fish are known

to occur within these rivers and streams. The highest numbers of species are within central and southeastern Labrador. The most common species recorded are brook trout and Atlantic salmon.

The American eel is the only fish species reported to occur in the rivers and streams crossed by the transmission corridor that need extra protection. It was caught during surveys on the Northern Peninsula.



The Sea

The Strait of Belle Isle is about 17 km wide where the transmission project will cross. Nalcor studied the underwater cable corridor to understand the type of habitat and the plants and animals that live there. Nalcor also studied icebergs, currents and weather. Nalcor used sonar, video cameras, and collected water samples and bottom samples, such as sediment and living things.



The coast on the Labrador side of the Strait of Belle Isle rises 300 to 900 m above sea level. The Newfoundland coast is much lower, with shorelines rising to about 30 m above sea level. Water depths in the Strait of Belle Isle vary reaching more than 125 m in places. The seafloor is mostly large rocks with bedrock, shells and

sand in places. Nalcor has mapped out hazards on the seafloor, such as cables and shipwrecks. These areas will be avoided.

The electrode site at L'Anse au Diable has bedrock, boulders, and sand on the bottom. The electrode site at Dowden's Point has mostly large rocks on the bottom. Currents in the Strait of Belle Isle generally follow the Strait and are influenced by the tide and winds. Winds also generally follow the Strait, blowing from the west or north-west during the winter and from the north-east or south-west during the spring. Waves are usually less than 0.5 m high, but in high winds, waves can reach seven metres.

In Conception Bay, the current flow is controlled by the shape of the bay and the seafloor. Winds are usually from the west during fall and winter and from the south-west during spring and summer. Waves have an average height of 3.4 m.

The Strait of Belle Isle usually begins to freeze up in December. In January, pack ice from the Labrador Sea begins to drift into the Strait, and by late May or early June the sea ice melts or breaks up. About 60 to 90 icebergs drift into the Strait of Belle Isle each year in May and June.

Nalcor studied the underwater sounds at three locations in the Strait of Belle Isle. The sound levels recorded are within the limits of normal noise for oceans. Of the 2,890 sounds recorded, 1,910 were marine mammal calls.

A video camera survey helped Nalcor study the types of plants and animals that live in the Strait of Belle Isle. This included plankton, algae, animals that live on the seafloor (e.g., urchin, starfish, Iceland scallop, northern shrimp, snow crab, American lobster) and fish such as Atlantic cod, capelin, lumpfish, Atlantic mackerel, Greenland halibut, and Atlantic herring. Atlantic salmon, Arctic char, and brook trout



may also occur in the Strait of Belle Isle during migration between the freshwater and marine environments.

Fish species that occur in Conception Bay include American lobster, northern shrimp, snow crab, Atlantic herring, Atlantic mackerel, lumpfish, and Atlantic cod.

There are 18 listed fish species that may occur within the transmission project area, including white shark, Atlantic wolffish, northern wolffish and spotted wolffish.

Nalcor studied marine mammals such as whales, dolphins, and seals in the Strait of Belle Isle and Conception Bay. More than 20 species may occur in these areas, mostly during the summer. Listed marine mammals like the blue whale and the fin whale may occur in the area. Leatherback turtles and loggerhead turtles, which are both listed species, may be found in the Strait of Belle Isle and in the waters of eastern Newfoundland, including Conception Bay.



To study the seabirds, Nalcor studied three bird groups based on their habitat, including deep water birds (e.g., fulmars, shearwaters, storm-petrels, gannets), shallow water or coastal water birds (e.g., geese, ducks, loons, terns), and shorebirds (e.g., plovers, sandpipers). Sensitive areas like breeding, nesting and concentration areas were mapped, and migratory patterns were considered. Listed seabird species include Ivory Gull, Harlequin Duck (eastern population), Barrow's Goldeneye (eastern population) and Red Knot.





HUMAN ENVIRONMENT TODAY

The human environment in the transmission project area has been studied in detail to identify ways to maximize benefits and reduce any harmful effects of the transmission project.

Historic and Heritage Resources

Nalcor studied the archaeological (i.e., historic, cultural, spiritual, natural, scientific and aesthetic importance), paleontological (i.e., fossilized traces or imprints of organisms preserved in rocks) and architectural resources (i.e., buildings, monuments or other structures, and land or landscapes considered to be of historical or architectural significance) along the transmission project area. Humans have lived in Newfoundland and Labrador at least 8,000 years. Nalcor, through searches of the records with the provincial government and field surveys on land and underwater, has identified archaeological and paleontological sites along the transmission project area. No architectural resources have been identified in the transmission project area. Nalcor has also mapped areas with high potential to have undiscovered historic sites. During planning, Nalcor used this information to route the transmission corridor around such areas.

There are known archaeological sites near the transmission project area, particularly along the coast in Labrador. Most of these are outside the transmission project area. The HMS Raleigh shipwreck is in the Strait of Belle Isle but not within the transmission corridor. On the island, near Chapel Arm there is an area of small, shelly fossils that is within the transmission corridor. Nalcor has mapped these resources so that they can be avoided.

Communities

The transmission corridor crosses central and southeastern Labrador, the Northern Peninsula, central and eastern Newfoundland and the Avalon Peninsula. There are a few communities that are near the transmission corridor. The transmission corridor overlaps parts of: Forteau, Shoal Cove East, Savage Cove-Sandy Cove, Nameless Cove, Flower's Cove, Grand Falls-Windsor, Port Blandford, Clarenville, Goobies, Sunnyside, Arnold's Cove, Southern Harbour, Norman's Cove-Long Cove, Chapel Arm, Whitbourne, Blaketown, Avondale, Harbour Main-Chapel's Cove-Lakeview, and Holyrood.

To help understand issues important to these communities, Nalcor collected information on populations and demographics; infrastructure and services (e.g., highways, airports, water supply, policing); and health (e.g., health services and facilities, health and well-being, health issues) to understand issues and concerns in these communities. This also included numerous meetings in many of these communities.

Economic Development

For a long time, Newfoundland and Labrador had the slowest growing economy in Canada. In the late 1980s and early 1990s this worsened when the cod fishery collapsed. Newfoundland and Labrador's economy has since improved, mainly because of offshore oil, mining in northern Labrador and iron ore production in western Labrador. Other industries in the province include electricity generation, fishing, forestry and tourism.

In 2009, there were over 15,000 businesses in Newfoundland and Labrador. More than half of these were small businesses, with one to four employees. These businesses include sales, health care, business services, and construction.



Nalcor studied the workforce, the types of jobs available, and the types of businesses that could provide services or materials for the transmission project. This will help Nalcor understand how the transmission project could affect the economy, employment and businesses in the province.

Land and Resource Use

Land and resource use throughout Newfoundland and Labrador includes hunting, trapping, fishing, agriculture, wood cutting, berry picking, ATV and snowmobiling, boating, and hiking. There are also many cabins, cottages and outfitting camps along the transmission corridor. Both Aboriginal and non-Aboriginal people are active land and resource users.



The transmission corridor crosses management areas for caribou, moose, black bear, lynx, small game, and birds. It also crosses scheduled salmon rivers and trout management areas.

There are many parks and ecological reserves in Newfoundland and Labrador. In Labrador, no parks are crossed by the transmission corridor. On the island, the transmission corridor overlaps parts of the Main River Waterway Provincial Park

Reserve, the West Brook Ecological Reserve, the T'Railway Provincial Park, Jack's Pond Provincial Park, Hawke Hills Ecological Reserve, and Butter Pot Provincial Park.

Nalcor studied land and resource use to determine if there were any issues that could be avoided during final routing. Nalcor studied:

- transportation
- hunting and trapping
- recreational fishing
- Aboriginal contemporary land use
- outfitting
- ATV and snowmobile use
- cabins and cottage areas
- recreational activities
- parks, reserves and protected areas
- forestry
- mining and onshore oil and gas activities
- agriculture.

Tourism

Tourism is very important to Newfoundland and Labrador. It brings money into the province and keeps money in the province when residents choose to be a tourist



at home. Tourists enjoy visiting cultural and natural attractions, taking guided tours, hiking, fishing, boating and skiing. In 2010, about 13,000 people in the province had jobs in the tourism industry.

Many people visit Labrador each year to salmon fish or visit popular destinations such as Red Bay and Battle Harbour. The proposed Mealy Mountains National Park and Eagle River Waterway Provincial Park are also expected to attract tourists to Labrador.

On the island, there are many popular tourist attractions, including Gros Morne National Park and L'Anse aux Meadows National Historic Site. Most of the tourism activity takes place during the summer months.

Visual Aesthetics

Most of the transmission project will be built in remote areas where most people will not see it. The transmission project passes through many different landscapes, including forest, barrens, wetlands, and rolling hills. The transmission project also passes along and across roads and highways, and in the vicinity of communities. The cable landfall sites and the electrodes will be on the coast, at the Strait of Belle Isle and Conception Bay. The landscape that the transmission corridor passes through includes lakes and rivers, such as the Kenamu River, Portland Creek, Birchy Lake, and the Exploits River. The transmission corridor also travels across a portion of the Long Range Mountains. People who use the land for travel or recreation enjoy many of the views, particularly those in remote areas that have scenic views (e.g., along the Appalachian Trail).

Marine Fisheries

The marine fishery is very important to people in Newfoundland and Labrador for economic, social and cultural reasons. For many years, people have fished for lobster, cod, capelin, scallop, mackerel and herring. Today, shrimp and snow crab are also fished. In the future, rock crab, toad crab and sea cucumber may also become important to fishers. Seals are also hunted during the winter out on the ice.

The equipment used to catch fish depends on the species. For example, pots are used for snow crab and lobster, and shrimp trawls are used for shrimp. Most groundfish

are caught with gill nets or longlines. Dragners are used for scallop fishing. Most fishing is done in small boats, less than 35 feet.

The Strait of Belle Isle crossing is in an area where lobster, scallops, capelin, herring and mackerel are fished. Fishers from both sides of the Strait of Belle Isle fish in the area around the cable crossing corridor. There are no licensed aquaculture activities near the cable crossing corridor and recreational fishing is mostly for cod.

Nalcor is not aware of any Aboriginal fishery near the corridor.

Fishers in the Dowden's Point area catch capelin, herring, mackerel, lobster, and lumpfish. Recreational fishing in the area includes brown trout and cod.





EFFECTS OF THE TRANSMISSION PROJECT ON THE NATURAL ENVIRONMENT

Nalcor will build and operate the transmission project to meet the needs of people today, and the needs of future generations. Nalcor has planned the transmission project to maximize the benefits and minimize harmful effects. The writers of the EIS used this approach in considering the types and seriousness of effects that the transmission project could have on the environment with all the protection measures used. For example, studies were done to understand how the transmission project could affect fish, plants and wildlife, and whether those effects would last a long time. Nalcor will use proven, best industry methods and approaches to build and operate the transmission project so that the environment is protected.

Based on directions provided to Nalcor in the EIS Guidelines and concerns heard during consultation, the EIS considered the potential for the transmission project to affect the natural environment. The following parts of the natural environment were studied in detail for effects.

The Air

The effects of the transmission project on air quality will be from vehicle exhaust during construction, and possibly dust from vehicle traffic and wind blowing across work sites. Nalcor's contractors and subcontractors will keep vehicles in good working order to reduce pollution. Once the transmission project is in operation, the effects on air quality will be small – mostly related to vehicle operation during transmission line inspection or repairs.

During transmission project construction, noise from traffic and heavy equipment will only be noticeable near work sites and roads. There may be noise from traffic, heavy equipment, and drilling but equipment will have proper mufflers, and most work will be done during the day. During operation, transmission lines make noise when a small amount of electricity within the wire interacts with the surrounding air. This reaction typically makes a crackling or sizzling sound. Noise from the transmission line will meet regulatory standards.

The Land

Vegetation will be cleared so that the transmission line, converter stations, temporary construction camps, temporary storage areas and access roads can be safely built and operated. Timber will be harvested and piled in the right-of-way. Clearing near river crossings will leave regulated buffers. The amount of clearing will be limited to that needed to safely build and operate the transmission project.

Wetlands and known listed plant locations will be avoided, where possible. Before construction, Nalcor will study areas with high potential to have listed and rare plants so that they can be avoided, where possible. Areas cleared for temporary construction activities, such as camps and storage areas will re-grow naturally.

Vegetation along the transmission line right-of-way will need to be controlled during operation to keep it from touching the transmission line and causing a power failure. Plants that could grow taller than two metres will be controlled by using chainsaws and/or herbicides. The use of herbicides is controlled by provincial regulations. Areas that may be more sensitive, such as near streams, rivers, and lakes, will be avoided. The herbicides used are not toxic to wildlife in the amounts used.

Nalcor will work with the provincial government's Wildlife Division to limit disturbance to woodland caribou core habitat. Transmission project construction is not expected to have much of an effect on caribou, as the caribou usually avoid areas with human activity and noise. Once the transmission project is built, however, hunters and predators may have more access



to the caribou along the cleared transmission line right-of-way and access roads. This is of concern for the Labrador herds which are protected under federal law and have been illegally hunted in the past. To limit these effects, Nalcor will use existing access roads and quarries that are already disturbed (e.g., along the Trans-Labrador Highway), where possible. Roads that are not needed during operation will be closed after construction. Plants in these areas will re-grow naturally.

Some animal habitat will be lost or changed as a result of the vegetation clearing for the transmission project. This could also have a small effect on mammals such as the Newfoundland marten which are prey for other animals. Nalcor will avoid Newfoundland marten habitat where possible. In areas with core marten habitat, Nalcor will talk to the Wildlife Division in deciding where the right-of-way should go. Brush piles left in the right-of-way in these core areas will give these animals cover.

To reduce the loss of bird habitat from vegetation clearing for the right-of-way, the transmission line will avoid areas where large numbers of birds breed or gather. Some of the clearing will be done in the winter when the birds have migrated south. Work will not be allowed within 200 m of occupied eagle and osprey nests. Construction activity near wetlands or along the banks of streams, rivers and lakes will be limited where possible, and buffers will be left along the water.



The effect on vegetation and wildlife during construction is expected to be small as the disturbance will mostly occur in the transmission project area.

The effect to vegetation and wildlife during operations and maintenance will mostly be disturbance when people are checking the system or doing repairs and expected to be small.



The Streams, Rivers and Lakes

Nalcor will get the appropriate permits to cross streams by fording, or building bridges or installing culverts. The work done in these areas will be limited, and equipment will be clean with no leaks. Erosion control will be used and regulated buffers will be left. Where the transmission line right-of-way or access trails cross rivers or streams, any soil that enters the water is expected to settle quickly and not have an effect on water quality or fish. Spill kits will be used for unexpected leaks or spills.

During operation, herbicides will be used to control vegetation along the transmission line right-of-way. It will be applied according to provincial regulations by licensed people. Herbicides will not be applied near streams, rivers, or lakes, and are not expected to affect the quality of the water.

The transmission line right-of-way and access roads will make it easier for people to access streams and rivers. This might increase fishing for some species, such as brook trout and Atlantic salmon. To limit the access, Nalcor will use existing access roads, where possible. Roads or trails that are not needed during transmission project operation will be closed after construction and plants will re-grow naturally.

The Sea

The Strait of Belle Isle underwater cable crossing and the shoreline electrode sites will be built in the ocean.

Construction of both the underwater cable crossing and the shoreline electrodes may have an effect on marine water quality near where the construction is occurring. By using small holes to install the cables out into the Strait of Belle Isle disturbance to the shoreline and near shore habitat will be avoided. The drilling noise and vessel activity during construction could disturb marine vegetation and wildlife and cause fish, marine mammals, sea turtles and seabirds to avoid the area for a short time. Rock for the submarine cable berm will be placed in a controlled manner using a long pipe from a rock placement vessel. Rock for the electrode berms will be placed using an excavator from on land to limit the area disturbed. This will help reduce the disturbance to marine wildlife during construction.

During operation, the underwater cable and electrodes will generate a small amount of emissions. The rock berms and electrode berms will keep marine wildlife away from the cable and the electrode elements. This will protect them from the emissions. Electrode emissions will only affect the area very close to the berm, and the effects will be small.

During operation, Nalcor will measure the emissions generated by the submarine cables and electrodes. The findings from this follow-up program will be used to address any concerns that may arise about the marine environment.





EFFECTS OF THE TRANSMISSION PROJECT ON THE HUMAN ENVIRONMENT

Historic and Heritage Resources

Nalcor will avoid known locations of historic and heritage resources. Before construction begins, Nalcor will survey areas with high potential to have historic and heritage resources. All operations and maintenance activities will occur in areas that were disturbed during construction. This means disturbance to historic and heritage resources is not expected when Nalcor checks towers and lines, or has to do repairs.



By avoiding known locations and surveying areas with high potential, the effect of the transmission project on historic and heritage resources is expected to be small, if any.

Communities

All construction workers will live in camps. This means there will be no demands placed on local housing, or other accommodations. No additional demands will be placed on local infrastructure or services such as education, recreation, and social services. There will be paramedics, firefighters and security personnel onsite at the



camps. This will minimize effects on health, fire and security services, except in the case of serious incidents and emergencies.

Interactions between workers and community members will be limited by long work days and through the use of secure camps for the workers. Nalcor studied the transmission project's potential effects on transportation, waste disposal, safety and security, health conditions, and community well-being. Potential effects are not expected to be at a level that communities cannot handle.

The overall effect of the transmission project on communities is expected to be small.

Economic Development

Transmission project construction spending will last approximately four years, with the most spent on construction in year two. This will benefit the local economy, business and employment over this period. These benefits will be felt throughout Newfoundland and Labrador, as well as other provinces in Canada.

Operating and maintaining the transmission project will also benefit the local economy, business and employment. These benefits will



be less than construction but will continue as long as the transmission project is in operation. Again, these effects will be experienced throughout Newfoundland and Labrador, as well as other provinces in Canada.

The effect of the transmission project on economic development is predicted to be positive. Any negative effects (if any) will be small.

Land and Resource Use

There are many types of land users including Aboriginal, recreational, subsistence, and commercial. Construction, operation and maintenance of the transmission project could result in long term loss of land for some of these users. Nalcor will do things to lessen this effect such as avoidance and communication. The right-of-way will be about 60 m wide; this means alternative areas in the local area will be available to all users so they can continue to use the land.

The transmission project will limit the amount of new access created and will use existing access where possible. In some areas such as southeastern Labrador, the transmission project will create new access which some users may consider to be positive.

The transmission project is not expected to affect the opportunity and ability of all land users to continue to use the land for their purpose.

Tourism

Some transmission project construction activities may interact with the tourism industry. To reduce these effects, construction workers will live in temporary camps rather than in local hotels, motels, B & Bs, and lodges. This will avoid booking many of the rooms at these businesses during the tourism seasons. Nalcor will, to the extent possible, avoid heavy seasonal tourism traffic periods and routes. To do this, Nalcor will talk with relevant agencies and tourism industry organizations during planning to discuss ways of reducing any negative effects.

There may be some effect of the transmission project on tourism during operations and maintenance; this includes tourists viewing natural landscapes. Through



transmission project design and planning, Nalcor has avoided, as much as possible, known and key tourism attractions and sites to maintain the natural views.

The overall effect of the transmission project on tourism is expected to be small.

Visual Aesthetics

Visual aesthetics is how someone feels about what they see. It is personal and depends on their opinion. Nalcor has considered visually sensitive areas during the initial planning phases of the transmission project such as avoiding Gros Morne National Park. Nalcor will use existing disturbed areas such as the TLH3, which also helps limit the effect on visual aesthetics. Most of the transmission project will be built in areas that are rarely viewed by people, which greatly reduces the effect.

Clearing of the right-of-way, transmission towers and other transmission project components will change existing views. The changes to existing views depend on what is visible from a location. Trees, hills and other land features will greatly reduce the visibility of the project. The towers are expected to be visible from some locations. Transmission project components such as the right-of-way, transmission towers, and converter stations will be visible throughout the life of the project.

The effect of the transmission project on visual aesthetics is expected to be small. The transmission project will be built in areas where most people will not see it. For visually sensitive areas, Nalcor will talk with relevant agencies and organizations during planning to discuss ways of reducing the effect.



Marine Fisheries

During construction there will be some transmission project-related interaction with fishing activities in the Strait of Belle Isle. Safety zones will be required during this period, but this will be limited to a small area and will only last about six months. Nalcor will commit to consult with fishers in the Strait of Belle Isle area and, where required, develop ways to offset any effects of the transmission project on resource users in the area.

The effect of the transmission project on marine fisheries is expected to be small.





MONITORING AND FOLLOW-UP

The design of the transmission project includes plans to protect the environment, communities and individuals that use the land. Nalcor will monitor and follow-up to make sure these plans are successful. Nalcor has made many commitments about how it will protect the environment. Nalcor, along with various government agencies, will monitor the transmission project to make sure all commitments are fulfilled.

In the EIS, the effects of the transmission project are predicted. Nalcor's follow-up programs will measure the actual environmental effects of the transmission project and compare them to the predictions. The environmental protection measures used by Nalcor will also be evaluated to check that they are successful. If they are not successful, Nalcor will use its adaptive management process to fix the problem.

The details of these programs will be developed by Nalcor in consultation with government agencies and other stakeholders. Plans will be complete before transmission project construction begins.



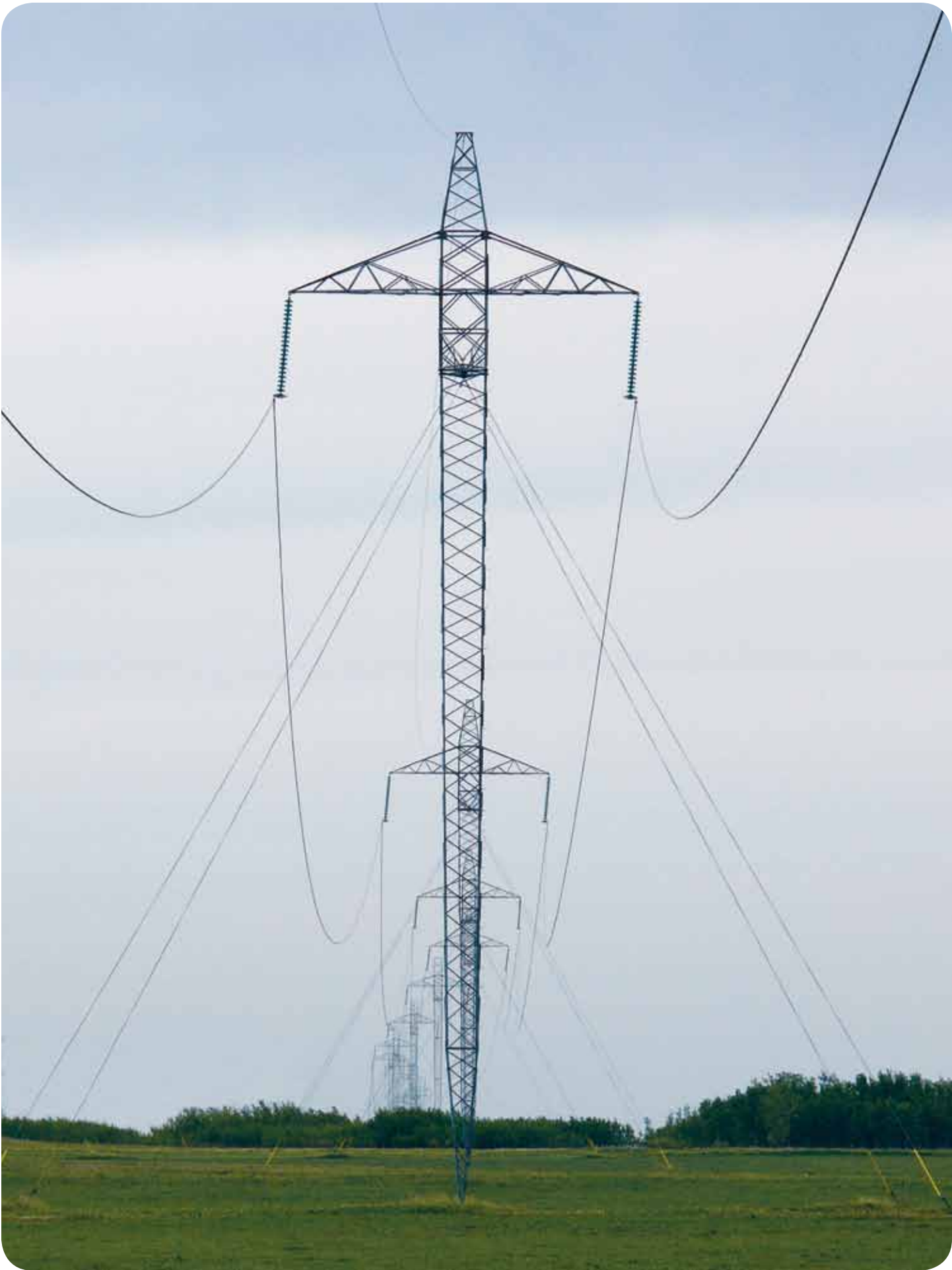


CONCLUSION

The transmission project is being proposed by Nalcor to deliver an adequate, reliable and clean electricity supply. This will meet the current and future energy needs of residents and industries on the island. The transmission project will address the growing demand for electricity by delivering a clean, sustainable source of power. It will reduce the requirement for fuel-fired thermal power generation on the island. The transmission project will result in lower and more stable electricity rates in the province over the long term. The transmission project will also help support economic development and growth in Newfoundland and Labrador.

Nalcor has talked with Aboriginal, regulatory, and public stakeholders to hear project-related issues and concerns. Nalcor has, and will continue to, use this information in planning the transmission project and in the environmental assessment. Nalcor will continue to provide opportunities for the various groups to participate in consultation.

Nalcor has conducted many environmental studies and prepared an EIS to help plan the transmission project. By working with regulatory agencies and stakeholders, Nalcor will design and build the transmission project avoiding serious harmful environmental and social effects. Positive environmental and social effects will be enhanced. With the mitigation Nalcor is proposing, the negative effects of the transmission project will be greatly reduced.







Nalcor Energy

Hydro Place, 500 Columbus Drive

P.O. Box 12800, St. John's, NL

Canada A1B 0C9

T. 709.737.1833 or 1.888.576.5454

F. 709.737.1985

nalcorenergy.com/lowerchurchillproject

twitter.com/NalcorEnergy

facebook.com/NalcorEnergy

youtube.com/nalcorenergy

nalcorleadershipblog.com; nalcorblog.com

