Key Factors

- The Holyrood Thermal Generating Station generates, on average, 15 to 25% of the Island's electricity and provides up to 30% of the Island's electricity needs at peak.
- The plant burns up to 18,000 barrels of oil per day during the winter heating season. The cost of operating the plant has increased along with world oil prices, resulting in rate increases for Island and rural diesel customers. In 2011, burning fuel at the Holyrood plant cost ratepayers $135 million. Looking ahead to 2017, the annual cost of oil to generate electricity at the plant is projected to be $324 million without Muskrat Falls.
- Retiring the Holyrood plant is the equivalent of taking 300,000 cars off the road and will help to eliminate the release of greenhouse gas and sulphur dioxide emissions. Greenhouse gas emissions contribute to climate change and global warming, which leads to polar ice melt, sea-level rise and intensification of extreme weather events, among other harmful effects. Sulphur dioxide in the atmosphere interacts with water to produce acid rain.
- Retiring the Holyrood plant will address environmental and health concerns expressed by residents of Conception Bay due to the release of greenhouse gas and sulphur dioxide emissions. From 2000 to 2010, the plant emitted an annual average of approximately 1.1 million tonnes of greenhouse gas emissions and an annual average of 11,610 tonnes of sulphur dioxide.
- The Holyrood plant is 40 years old. Continued use of the facility means escalating maintenance costs, significant capital investments and upgrades, emissions control equipment, and continued dependency on fossil fuel generation.
- The installation of emissions control equipment, including scrubbers and precipitators, will cost approximately $600 to $800 million in addition to annual operating costs of $12 to $15 million. Emissions control equipment will help reduce sulphur dioxide emissions, but will not reduce greenhouse gas emissions.
- As electricity consumption rises with an increase in the number of residential, commercial, and industrial customers, the plant will have to be used more to ensure consumer needs are met. This means that ratepayers will be more reliant on oil.
- Retiring the Holyrood plant will help Newfoundland and Labrador and Canada meet their respective greenhouse gas reduction targets.
- With the development of Muskrat Falls, Newfoundland and Labrador will be powered by 98% clean, renewable energy.

Introduction

The province's Energy Plan and the Climate Change Action Plan demonstrate Government's commitment to the environment, and the importance of environmentally and economically sustainable resource development in Newfoundland and Labrador's energy sector. Government's approach includes efforts to reduce greenhouse gas emissions and manage the potential impacts of climate change in the province.

Newfoundland and Labrador has significant renewable electricity generation assets including hydroelectric projects at Bay d'Espoir, Cat Arm, Upper Salmon, Hinds Lake, and Upper Churchill. The province also has undeveloped hydroelectric potential from the Lower Churchill. The development of clean energy resources is the cornerstone of government's efforts to reduce greenhouse gas emissions. There is also significant potential for more energy efficiency efforts to reduce emissions, improve air quality and lower electricity costs for households and businesses.

Government Policy Commitments

The Energy Plan charts a strategic course forward and promises economically-responsible and environmentally-sustainable resource development in the best interest of Newfoundland and Labrador. This approach supports the principles of environmental and economic sustainability and ensures that benefits from the province's oil and gas resources are shared with future generations.

Renewable resources like hydroelectricity and wind are free of greenhouse gas emissions and are relatively stable from a long-term cost perspective. This makes the development of these energy resources important assets for the province in environmental and economic terms. A central tenet of the Energy Plan is the commitment to strategically invest a portion of the province's non-renewable resource revenue into renewable energy infrastructure such as hydroelectric developments and wind generation. This will help to ensure that Newfoundland and Labrador will have a cleaner environment powered by renewable energy sources, and an electricity industry with a secure supply of competitively-priced electricity for domestic use and economic development.

The Climate Change Action Plan recognizes the long-term global challenge of climate change and the opportunities and risks it presents for the province. The Action Plan focuses on the reduction of greenhouse gases, as well as measures to prepare for, and adapt to, the impacts of climate change in the province.

The Muskrat Falls development will deliver clean reliable power to the Island and is a much more cost effective alternative versus remaining on an Isolated Island grid which is increasingly dependent on oil-fired thermal generation. Once Muskrat Falls enters production and the transmission link is

complete, 98% of Newfoundland and Labrador's energy will come from renewable sources. This will ensure a reliable, competitively-priced supply of power for industrial development in the province with the surplus exported to markets in North America to assist in the reduction of global greenhouse gas emissions.

Holyrood

The Holyrood Thermal Generating Station is a three-unit, heavy oil-fired, steam cycle generating plant. The plant was constructed in two stages. Stage 1 entered service in 1971 and included two generating units, while Stage 2 entered service in 1979 and included a third generating unit. Units 1 and 2 at Holyrood have operated for 41 years, while Unit 3 has operated for over 33 years. All three units are operating beyond the typical life expectancy of this type of generator.

The plant has an installed capacity of 490 megawatts (MW) and generates between 15 and 25 % of the Island's annual needs. At peak production, Holyrood generates 30% of total electricity on the Island and burns approximately 18,000 barrels of oil per day.[1] The cost of operating Holyrood has increased along with world oil prices, resulting in a large portion of the rate increases experienced by Island customers in recent years.

On average at peak production, the plant emits approximately 1.1 million tonnes of greenhouse gas emissions and other harmful pollutants. The greenhouse gas emissions from the plant are equivalent to the emissions from 300,000 cars per year on the road. As noted in the province's 2011 Climate Change Action Plan, the release of greenhouse gas emissions is contributing to harmful climate change and global warming. The impacts of climate change are already evident, such as polar ice melt, sea-level rise and intensification of storms.

In addition to greenhouse gas emissions, the Holyrood thermal generation station produces several other types of potentially harmful emissions. The most significant of these non-greenhouse gas pollutants is sulphur dioxide, which can interact with water to produce acid rain that can be harmful to people and the environment. Short-term exposures to high levels of sulphur dioxide have been shown to create adverse respiratory effects, including increased asthma symptoms.

For many years, the residents of Holyrood and surrounding communities have expressed concerns and worry about the air pollution from the thermal generating plant. Newfoundland and Labrador Hydro responded by switching the plant's fuel to a higher cost low-sulphur fuel. However, even with the change in fuel, the plant will

continue to emit local air pollutants unless expensive emissions control equipment is added. This equipment, which includes scrubbers and precipitators, will cost approximately $600 to $800 million to install in addition to annual operating costs of $12 to $15 million. It is important to note that in addition to cost, emissions control equipment will help reduce sulphur dioxide emissions, but will not reduce greenhouse gas emissions.

The replacement of the Holyrood facility with sources of clean energy will contribute to the provincial greenhouse gas reduction target. The province has endorsed the regional greenhouse gas reduction targets set during the Forum of New England Governors and Eastern Canadian Premiers (NEG-ECP) in 2001. The NEG-ECP Plan called for a short-term reduction of regional green house gas emissions to 1990 emissions by 2010; a mid-term reduction of regional green house gas emissions by at least 10% below 1990 emissions by 2020; and, a long-term reduction of regional green house gas emissions to eliminate any dangerous threat to the climate. Muskrat Falls will cover about 60% of the required reduction in provincial greenhouse gas emissions to meet Newfoundland and Labrador's 2020 reduction target.[2]

The Provincial Government has examined long-term options to address environmental concerns and emissions from the Holyrood Thermal Generating Station and is considering replacement of the facility with electricity from Muskrat Falls. As a clean renewable source of energy, Muskrat Falls will allow the province to reduce its emissions by eliminating the need for electricity from oil-fueled thermal generation.

Muskrat Falls

The Provincial Government supports the development of Muskrat Falls to supply electricity to the Island and for industrial development in Labrador. In the event that the project does not proceed, government will require that scrubbers and precipitators be installed at the Holyrood facility.

Muskrat Falls will help supply reliable power to meet the province's growing energy needs, and provide the opportunity to displace thermal generated power. By replacing generation at Holyrood with power from Muskrat Falls the province will significantly reduce its greenhouse gas emissions and other harmful emissions.

Muskrat Falls will eliminate electricity generation at the oil-fired generation station in Holyrood. The project will also allow other jurisdictions such as Nova Scotia to reduce their reliance on thermal generation from coal and oil by varying amounts depending on electricity exports at any given point in time.

The development of Muskrat Falls will essentially recycle water on a river that has already been impacted by an earlier, larger and far more intrusive hydroelectric development 285 kilometres

farther upstream at the Upper Churchill generating facility. The Upper Churchill Reservoir covers 6,527 square kilometres, while the reservoir for Muskrat Falls will be an area of just 101 square kilometres.

Once Muskrat Falls is operational, the capacity of the reservoir and generating station, along with the Water Management Agreement between Nalcor Energy and CFLCo, will ensure a water in – water out flow with little difference in the volume of water entering and leaving the Muskrat facility.[3]

Environmental Regulations

In a national context, the replacement of Holyrood will contribute to the Canadian greenhouse gas reduction target. Canada has agreed, through the 2009 Copenhagen Accord, to reduce emissions by 17% below 2005 levels by 2020. By decommissioning Holyrood, Muskrat Falls will reduce emissions by 1.25 million tonnes, or by about 1%, which is a significant contribution considering that Newfoundland and Labrador as a whole only accounts for about 1.4% of national greenhouse gas emissions.

Governments around the world are implementing new regulations that force or encourage citizens and businesses to reduce their greenhouse gas emissions from electricity generation. To help meet Canada's commitment to reduce its emissions 17% lower than in 2005 by 2020, the federal government announced in 2010 that it would seek to reduce emissions from coal-fired electricity through the *Canadian Environmental Protection Act*.

Coal fired electricity accounts for about 17% of Canadian electricity generation capacity, but 77% of greenhouse gas emissions from the Canadian electricity sector. This is the first industrial sector targeted by the federal government in its new sector-by-sector approach to reducing greenhouse emissions in Canada to meet its Copenhagen Accord target for 2020.

The regulation establishes a greenhouse gas emissions performance standard for coal-fired electricity that is equivalent to a new natural gas facility and would apply, beginning in 2015, to new coal facilities and existing facilities at their current end of life. There are no provisions for alternative compliance mechanisms in the coal regulations such as offsets and contributions to a Technology Fund. Each facility subject to the regulations has to meet the performance standard.

If the federal government extended coverage of this regulation to oil fired electricity generation, it would have significant cost implications for the Holyrood facility in the absence of Muskrat Falls which would flow directly to ratepayers and impact their electricity bills. A regulation of this nature would require the replacement of the Holyrood facility.

Conclusions

- The cost of operating the Holyrood Thermal Generating Station has increased along with world oil prices, resulting in rate increases for Island and rural diesel customers. In 2017, the annual cost of oil to generate electricity at the plant is projected to be $324 million without Muskrat Falls.

- As electricity consumption rises with an increase in the number of residential, commercial, and industrial customers, the Holyrood plant will have to be used more to ensure consumer needs are met and this means that ratepayers will be more reliant on oil and oil prices.

- The Holyrood plant is 40 years old. Continued use of the facility means escalating maintenance costs, significant capital investments and upgrades, emissions-control equipment, and continued dependency on fossil fuel generation.

- Retiring the Holyrood plant is the equivalent of taking 300,000 cars off the road and will help to eliminate the release of greenhouse gas and sulphur dioxide emissions. This will help to address environmental and health concerns expressed by residents of Conception Bay.

- Retiring the Holyrood Thermal Generating Station will help Newfoundland and Labrador and Canada meet their respective greenhouse gas reduction targets.

- With the development of Muskrat Falls, Newfoundland and Labrador will be powered by 98% clean, renewable energy.

Footnotes

1 http://www.poweryourknowledge.com/thermal.html

2 *NL Energy Plan : Focusing Our Energy* (p.52), Government of Newfoundland and Labrador, http://www.nr.gov.nl.ca/nr/energy/plan/pdf/energy_report.pdf.

3 http://www.env.gov.nl.ca/env/env_assessment/projects/Y2010/1305/lower_churchill_panel_report.pdf (p.63)

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