

Date : 7/29/2012 6:27:32 PM

From : "Scott, Paul G."

To : "Bown, Charles W."

Cc : "Snook, Corey"

Subject : FW: TRIM DOCUMENT : DOC-17015 : Electricity Imports (Muskrat Debate)

Attachment : Electricity Imports (Muskrat Debate).DOC;Electricity Imports (Muskrat Debate).tr5;  
Charles,

Further to my last email. With this, you should be up to date on all papers with the exception of the legal one, which we do not have yet.

-----Original Message-----

From: McGrath, Rob

Sent: Thursday, July 26, 2012 4:58 PM

To: Scott, Paul G.

Cc: Carroll, Diane F.

Subject: TRIM DOCUMENT : DOC-17015 : Electricity Imports (Muskrat Debate)

Paul,

New draft imports paper based on information provided by Nalcor.

Rob

-----<TRIM Record Information >-----

Record Number : DOC-17015

Title : Electricity Imports (Muskrat Debate)

# Electricity Imports

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Department of Natural Resources  
July 2012

## Introduction

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One of the main principles of the 2007 Energy Plan was that the people of Newfoundland and Labrador would take ownership of the province's energy resources and would be the primary beneficiaries of its development. In order to meet the province's energy needs with, "environmentally friendly, stable, competitively priced power", and to secure a source of long-term revenue for the province, Government committed to developing the Lower Churchill Project (a separate discussion paper on the Energy Plan is available).

However, as an alternative to developing the province's resources to meet the its electricity demand and displace thermal production at the Holyrood Generating Station, Newfoundland and Labrador Hydro (NLH) could construct a transmission interconnection to regional electricity markets and import electricity.

At the present time, electricity on the Island is generated on an isolated system and as such, does not have the transmission capability to access power from other jurisdictions. Therefore, the two options for importing electricity to the Island would be:

1. A transmission interconnection from Upper Churchill to the Island with the view to importing electricity from or through Quebec (QC);
2. A transmission interconnection from the Maritimes to the Island with the view to importing electricity from or through the Maritimes.

In either scenario, the transmission link would end at Soldiers Pond on the Avalon Peninsula.

Following a summary of the markets and associated transmission/distribution systems, this paper will provide an analysis of the options for importing electricity and a summary of why importing electricity is not a viable solution to meet the province's long-term electricity needs.

### Key Findings:

- Importing power to meet the province's long-term electricity needs is not a viable alternative.
- There are significant issues related to: insufficient transmission capacity in New England/Maritimes; lack of long-term transmission rights in New England and New York markets; and reliability concerns.
- There is a concern about security of supply for both the Maritimes and the New England and New York markets.
- As electricity prices in both New England and New York are historically tied to natural gas prices, imported electricity from either market would be subject to price volatility.
- In addition to paying the market price for the electricity, other costs would be factored in to the final price including transmission tariffs and a premium to secure a long-term contract.

- As compared to the Muskrat Falls alternative, Nalcor estimates that the QC import option is \$1.4 billion more expensive, and the Maritime import option is \$1.5 billion more expensive.
- Importing electricity from another jurisdiction would provide limited benefits to the people of the province in terms of employment, income, and business opportunities; particularly when compared with the Muskrat Falls alternative.

## Electricity Imports as a Supply Alternative

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### 1. Electricity Imports through Quebec:

Under this scenario, the construction of a transmission link would be required to enable electricity imports from QC to the Island system. This transmission link would be built from the Upper Churchill to Soldiers Pond.

#### *Supply*

Over 97 percent of QC’s electricity is generated by hydropower. Hydro-Quebec (HQ) owns 59 hydroelectric generating stations and three thermal generating stations representing an installed capacity of 36.8 GW. Other sources of electricity include nuclear power, wind and thermal generation.

#### *Distribution System*

TransÉnergie, HQ’s transmission division, operates the largest electricity transmission network in North America. It acts as the independent system operator (ISO) and reliability coordinator for the QC interconnection of the North American Electric Reliability Corporation system, and is part of the Northeast Power Coordinating Council (NPCC).

TransÉnergie's network stretches over 33,630 km through a network of 514 substations. In addition to its connections to Newfoundland and Labrador via Upper Churchill, its network is connected to neighbouring provinces of Ontario, New-Brunswick (NB) and the U.S. Northeast (New York and New England) by 17 connections.

#### Overview of QC Interconnections

Neighboring system	Import mode (MW)	Export mode (MW)
New York	1,100	2,000
Ontario	1,945	2,705

New England	1,870	2,260
New Brunswick	785	1,029
Newfoundland and Labrador	5,150	0

Source: Hydro-Quebec : December 31, 2011

HQ sells some of its surplus electricity to the neighboring systems under long-term contracts; however, most of its exports are short-term transactions. In 2010, the value of HQ exports totaled approximately \$1.5 billion.

Currently, HQ has no export capability into NL in terms of physical transmission lines. Consequently, importing through QC could be achieved through a reduction of the electricity delivered from Upper Churchill to HQ. Under this scenario, electricity that is currently sold to from the Upper Churchill to HQ for \$2.50/MWh (reducing to \$2.00/MWh in 2016) would be sold to NLH for considerably higher prices – potentially up to 40 times as high.

**2. Electricity Imports through Nova Scotia**

Under this scenario, the construction of the Maritime Link would be required to provide electricity imports through Nova Scotia to the Island portion of the Province.

*Market Structure*

Nova Scotia Power Incorporated (NSPI) is the utility that provides 97% of the generation, 99% of the transmission, and 95% of the distribution in the province of NS. The remaining distribution is owned and operated by NS’s six municipal utilities. NSPI was privatized in 1992, and is now owned by Emera Inc., a publicly-traded company.

NSPI has a generating capacity of 2,368 MW and operates a variety of generating stations using various sources of energy including coal, natural gas and renewables. NSPI also purchases energy from independent power producers who generate electricity using wind, hydro, and biomass.

New Brunswick Power (NB Power) is an electrical utility wholly owned by the Government of NB. NB Power operates 14 generating stations and serves over 370,000 direct customers. The generation fleet uses a variety of energy sources, including hydro, nuclear, heavy fuel oil and coal.

NB is interconnected to neighbouring power systems in QC, New England, NS, Prince Edward Island (PEI), Northern Maine, and Eastern Maine. NB’s Open Access Transmission Tariff (OATT) allows NS and PEI to have access to the U.S. markets due to the possibility of wheeling power through NB. For example, NS currently exports electricity through NB and receives backup power from that province.

**Overview of NB Interconnections**

Interconnection Transfer Capability Neighbouring System	Transfer Capability to New Brunswick (MW)	Transfer Capability from New Brunswick (MW)
Québec	1,000	720
New England	550*	1,000
Nova Scotia	350**	300**
Prince Edward Island	124	222
Eastern Maine	15	15

\*Transfer capability from New England varies according to Maritimes Area largest contingency, load levels in Maine, status of area 345 kV MVAR resources, and the generating status of large generators near Bangor, Maine.

\*\*Transfer capability to and from Nova Scotia is constrained by the import and export limits of the Nova Scotia electricity system.

**Analysis**

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Importing electricity as a solution for the province’s long-term energy requirements raises a number of significant issues that resulted in Nalcor determining that this alternative was not viable.

*Transmission*

- 1. Insufficient existing transmission capacity in New England/Maritimes:** the current import capacity from NB to NS is limited to 350 MW. Similarly, the connection between New England and NB has a maximum of 300 MW of firm capacity. NL requires 500+ MW of firm capacity to meet its peak demand. Thus, it is technically not possible at this time to meet the Island’s demand solely with imported electricity from New England or the Maritimes.

2. **No long-term physical transmission rights in New England/New York markets:** there are currently no long-term physical transmission rights (beyond 1 to 2 years) in the New England and New York markets. This presents considerable risk with respect to securing supply to meet the province's energy needs.
3. **Reliability concerns:** to allow imports through NS, the Maritime Link would likely be required to reverse power flow direction on demand to compensate for generation variability on the Island. While this is technically possible, neither the NS nor NL systems have the ability to absorb these swings; consequently, outages would be likely. Additionally, importing electricity through NS via the Maritime Link to the load centre on the Avalon Peninsula would require the construction of additional transmission lines on the Island to ensure reliability.

#### *Supply*

1. **Uncertain security of supply:** similar to NL, both NS and NB are winter peaking systems. This means that they consume the most power in the winter months, which is when NL also would require the most power. Therefore, surplus capacity in those jurisdictions is not expected to be available to import into NL. Additionally, beyond 2015, both New England and New York are potentially facing significant plant retirements due to the age of the generation fleet and because a significant proportion of generation in the regions is carbon-fuelled (coal and gas in particular). The New York Independent System Operator predicts that almost 24,000 MW of generation capacity will be impacted by more stringent Environmental Protection Agency regulations; similarly, the New England System Operator estimates that between 5,800 and 8,700 MW of generation capacity will be impacted. The uncertainty of future generation sources in New England and New York presents considerable risk with respect to securing supply to meet the province's energy needs.

#### *Price*

1. **Price volatility:** there is a strong correlation between electricity prices and natural gas prices in both New York and New England markets. As such, the imported electricity from either market would be subject to gas price volatility.
2. **Additional costs:** in addition to the market price for electricity in either scenario, there are a number of additional costs that would have to be factored into the final price to deliver the electricity to the province. Examples of these costs include: transmission tariffs; and, a premium for securing long-term contracts.
3. **Comparison with Muskrat Falls:** when all costs are taken into account, including the market price, transmission tariffs, and premiums for securing long-term contracts, both import options are significantly more expensive than the Muskrat Falls alternative. Using the New York market price, Nalcor estimates that importing electricity from QC is \$1.4 billion more expensive. Using the New England market

price, Nalcor estimates that importing from the Maritimes is \$1.5 billion more expensive.

### *Benefits*

1. **Limited long-term benefits:** importing electricity from other jurisdictions to meet the province's long-term electricity needs would provide limited benefits to the people of the province in terms of employment, income, and business opportunities; particularly when compared with the Muskrat Falls alternative.

## Conclusion

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As an alternative to developing the province's resources to meet its electricity demand and displace thermal production at the Holyrood Generating Station, Newfoundland and Labrador Hydro (NLH) could construct a transmission interconnection to regional electricity markets and import electricity.

The two options for importing electricity to the Island would be:

1. A transmission interconnection from Upper Churchill to the Island with the view to importing electricity from or through Quebec (QC);
2. A transmission interconnection from the Maritimes to the Island with the view to importing electricity from or through the Maritimes.

In addition to technical limitations, there are a number of risks and uncertainties associated with either option related to transmission, security of supply, and price. Additionally, importing electricity to meet the province's long-term electricity needs would provide limited long-term benefits to the people of the province as compared with the Muskrat Falls options. Consequently, the reliance on electricity imports as a long-term supply option for the province is not viable.