

Gull Island:

Why not develop Gull Island first?

Key Factors

For years the province has tried to proceed with the Gull Island development. Without transmission access through Quebec the project is not yet feasible. Gull Island's 2,250 megawatt (MW) generating capacity is far greater than Newfoundland and Labrador will require in the near future. Therefore, export sales through Quebec are essential for project success. These and other issues are considered in greater detail in this paper and are highlighted below:

- Since development of the Upper Churchill project, there have been various Lower Churchill Project configurations studied and commercial negotiations attempted without success.
- Gull Island represents a significant hydroelectric resource with 2,250 MW of generating capacity.
- The Ontario market is currently the best prospect for Gull Island exports. Ontario needs new sources of electricity and is in the midst of making important decisions about long-term supply. Gull Island power could be part of Ontario's supply if Quebec would allow fair access to its transmission.
- Domestic Newfoundland and Labrador load growth, as currently forecast, would not be sufficient to fully use all of Gull Island's output. There is potential for major expansion in Labrador mining that could consume a significant portion of Gull Island power, but that potential must progress to firm power purchase commitments in order to justify developing Gull Island.

Introduction

After nearly 40 years of unsuccessful development attempts the Lower Churchill Project is at a turning point. The right conditions finally exist for developing Muskrat Falls. Gull Island remains a vital energy asset for the province but viable sales and market access arrangements have yet to be put in place.

The story of the Lower Churchill (Gull Island and Muskrat Falls) really began as the 5,428 MW Upper Churchill development neared completion. As the 1973 oil crisis pushed energy prices higher and made Lower Churchill development more attractive, Newfoundland and Labrador turned its attention downstream on the Lower Churchill. With nearly three times more electricity generating potential than Muskrat Falls, Gull Island attracted most of the attention as the place to begin developing the Lower Churchill (except for a 1980 Muskrat Falls development proposal from Newfoundland and Labrador Hydro, as discussed below). The result of all that attention on Gull Island is that this project was the first to be well studied, such that when viable sales and market access arrangements are finally in place, this project will be a very attractive energy export development for the province.

Figure 1 – Lower Churchill Potential Markets & Routes



Source: Newfoundland and Labrador Energy Plan, Sept 2007

Since 1972, every Premier of Newfoundland and Labrador has considered one project configuration or another to finally tap the wealth of the Lower Churchill. In fact, the province invested \$118 million from 1972 to 2003 to develop the Lower Churchill without achieving success. These various attempts to develop the resources are outlined in a March 2003 research paper on the Churchill River prepared for the Royal Commission on Newfoundland and Labrador's place in Canada. This paper illustrates Newfoundland and Labrador's unyielding focus on Lower Churchill development, the importance of exports to Gull Island viability and Quebec's refusal to deal fairly with Newfoundland and Labrador.¹

During Frank Moores' tenure as premier from 1972 to 1979, the Government of Newfoundland and Labrador considered a number of development options. For example, there was a proposal from Brinco in 1972 to develop the Gull Island and Muskrat Falls sites. However, the Moores administration refused to accept the idea of being tied into a long-term contract with Hydro-Quebec (HQ). Moores' government also considered a Federal Government financial commitment toward a Gull Island project in 1975, but this option later collapsed as inflationary pressures increased project costs and issues related to transmission access were not addressed. All negotiations were also affected by the refusal of the Government of Quebec to address the inequities of the 1969 Upper Churchill contract.

In 1978, the Lower Churchill Development Corporation (LCDC) was established with 51% ownership by Newfoundland and Labrador Hydro (NLH) and 49% by the Federal Government. That effort ended with the curtailment of LCDC operations in the early 1980s amid complaints from the Peckford administration that the Federal Government was offering no assistance to help secure transmission access through Quebec.² The Peckford government also attempted various actions including legal challenges such as the *Water Rights Revision Act*, which failed at the Supreme Court of Canada in 1984. Likewise, Newfoundland and Labrador successfully pushed to include electricity in section 92A of the 1982 Canadian Constitution which granted provinces the right to make laws related to the development, conservation and management of sales and facilities in the province for the generation and production of electrical energy. The province has explored the use of section 92A to recall Upper Churchill power but the risk inherent in the process and the long timelines would not allow for the use of section 92A to meet Newfoundland and Labrador's present energy needs. Movement by Quebec in 1984 on making changes to the Upper Churchill contract also promised to open the way for development but ultimately produced no breakthrough.

In 1998, under the Liberal Government of Brian Tobin, NLH began negotiations with HQ for the development of 3,200 MW of additional power from the Churchill River system. The proposal included diversion of two rivers from Quebec into the Smallwood Reservoir in Labrador; an additional 1,000 MW of generation at Churchill Falls; a 2,200 MW generating station at Gull Island and associated transmission lines in Labrador and Quebec. The Muskrat Falls generation site was considered as a future option. The project included a transmission line to the Island of Newfoundland from Labrador, but the Provincial and Federal Governments could not reach agreement on that component and the project fell apart.

In August 2002, Premier Roger Grimes announced that his Liberal Government had reached an agreement with Quebec on Gull Island development principles. The core elements of the agreement included a long-term contract to sell Lower Churchill power to HQ; limited rights for Newfoundland and Labrador to recall power for its own use; maximization of economic and employment benefits for both Newfoundland and Labrador and Quebec; and HQ as project banker and financier. As with all previous development attempts, negotiations progressed and then collapsed.

In “Our Place in Canada,” the Commissioners (Vic Young, James Igloliorte and Sister Elizabeth Davis) make the following comments on the Grimes deal, which highlight the difficulty of reaching a deal with Quebec:

In the fall of 2002, Newfoundland and Labrador and Quebec were nearing the end of negotiations to develop the Gull Island project. While no deal was concluded, and little detailed information on the negotiations was provided, there were many concerns expressed by the public. In particular, one of the main concerns related to possible financing was that Hydro-Quebec would be the financial backer of the project. The concern, at its most fundamental level, was that if Hydro-Quebec would be both the major purchaser of power and the major lender for the project, Newfoundland and Labrador therefore would be negotiating from a position of significant weakness. Such a potential imbalance in negotiating power was offensive to many Newfoundlanders and Labradorians, particularly given the history and outcomes of the Churchill Falls development. In the view of the Commission, proceeding in this manner in the future would be a recipe for failure.³

As noted above, there was one notable exception to Gull Island being the primary focus of Lower Churchill development. In 1980, LCDC, with Vic Young as chairman of NLH and LCDC, recommended developing Muskrat Falls in a scenario much like the present Muskrat Falls project without a Maritime Link. The recommendation included the development of Muskrat Falls and a transmission link to deliver its power to the Island of Newfoundland via submarine cable across the Strait of Belle Isle.⁴ That proposal eventually fell by the wayside with Premier Peckford expressing frustration about transmission access to Quebec and the lack of Federal Government support on the issue.

While Gull Island possesses nearly three times the generation capacity of Muskrat Falls, its greater size has actually limited its potential for development. Gull Island can produce far more energy than the province presently requires or reasonably expects to require in the immediate future. Therefore, the project can only proceed with access to secured long-term customers in external markets such as Ontario and other northeast markets including the United States via Quebec. The story of the Lower Churchill to date has been about the tremendous Gull Island power resource with no access to external markets.

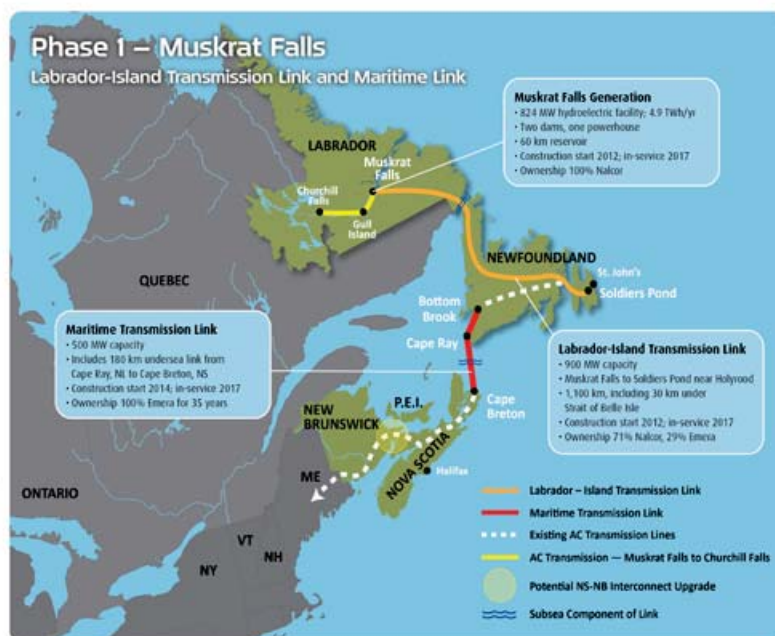
The following sections explain why Gull Island is such a compelling project for Phase Two of Lower Churchill development and why Muskrat Falls is the right project for Phase One.

Muskrat Falls Overview

At 824 MW, Muskrat Falls is being proposed for development first because its smaller generation capacity allows it to economically supply the province with the power it needs over the long term.

The Muskrat Falls project includes exporting some electricity to Nova Scotia as part of the Maritime Link Agreements. It also provides access to export power to the Atlantic Canadian provinces and to the U.S. However, the main purpose of the project is to meet the current and forecasted energy demands of Labrador and the Island.

Figure 2 – Lower Churchill / Muskrat Falls Project



Source: Nalcor Energy

Gull Island Project Overview

Gull Island Generation Facilities

Gull Island is located on the Churchill River in Labrador, 225 km downstream from Churchill Falls and approximately 300 km from the Labrador/Quebec border. The Gull Island hydroelectric project would include development of a 2,250 MW generation facility (approximately 2.7 times the capacity of Muskrat Falls) and associated transmission infrastructure required to deliver power to potential markets in Newfoundland and Labrador and/or beyond to external markets such as Ontario. The transmission configuration would depend on the location of the best market opportunities and how to

get the power to them. The expected annual average energy output from Gull Island is estimated to be in the range of 11.9 terawatt-hours (TWh).

Figure 3 – Gull Island Project Concept



Source: Nalcor Energy

Nalcor Energy's Lower Churchill development plan continues to include development of Gull Island following Muskrat Falls, but no commercial in-service date has currently been determined. If Muskrat Falls is sanctioned, the province expects to be in a position to further consider developing Gull Island.

Gull Island Considerations

The key factors to consider in developing Gull Island are Newfoundland and Labrador's electricity demand forecast and transmission access to deliver power to export markets. With more than twice the output of Muskrat Falls, Gull Island must access transmission to export markets in order for the project to be economic. A Gull Island development scenario could require approximately 1,500 to 2,000 MW of transmission capacity in addition to the Labrador Island Link to access external markets in the initial decades following in-service. Muskrat Falls, by comparison, does not require external transmission to be an economic proposition. There will be approximately 300 to 500 MW of surplus energy available for export which will gradually decrease as Newfoundland and Labrador load growth increases.

Provincial Load Forecast

As discussed in a separate paper on Newfoundland and Labrador electricity demand (*Electricity Demand Forecast: Do We Need the Power?*), NLH's current demand forecast does not demonstrate sufficient demand growth to consume Gull Island's energy output. NLH's Long Term Planning Load Forecast (PLF) indicates total provincial load growth of 1.2% annually, on average, driven primarily by growth on the Island interconnected system which represents about 75% of the total provincial load. The PLF estimates that annual load will grow 1.4% on the Island interconnected system and 0.8% on the Labrador interconnected system.

Opportunity for Industrial Load Growth in Labrador

New proposals for mining operations in Labrador and expansions in the region as highlighted in a separate paper on mining (*Labrador mining and power: how much and where from?*), has implications for electricity demand. Current mining operations in Labrador have a combined electrical power requirement of nearly 300 MW and include the Iron Ore Company of Canada (IOC) and Wabush Mines iron ore operations in Labrador West. As well, there are mining operations near Nain at Vale's Voisey's Bay project and the Labrador Iron Mines project in the Menihek region. The combined new Labrador mining proposals, if all projects proceeded, could increase Labrador demand requirements by 750 MW to 1,125 MW. These potential mining expansions could create significant new generation requirements in Labrador. At present, there are insufficient firm power requests by proponents to justify large new investments in generation or transmission including the development of Gull Island.

Implications for Gull Island Supply Option

As discussed in a separate paper on electricity demand (*Electricity Demand Forecast: Do We Need the Power?*), the Island Interconnected system requires a new supply option to meet the forecast load growth and to retire the aging, oil-fueled Holyrood plant. This would collectively put the power requirement in approximately the 500 MW range initially and increase with load growth. This requirement would be variable through the year given the significant seasonal load swings with the space heating requirement in winter. Simply put, only 22% of the Gull Island output would be consumed by the existing customers of Newfoundland and Labrador. Therefore, other firm domestic or export market opportunities would be required in order for Gull Island to be an economic proposition.

The potential mining sector growth noted above could be an additional Gull Island consumer. However, the commitments from new mining proponents are not firm enough to cause a shift from the Muskrat Falls and Labrador Island Link projects, or to rely on for effective electricity system planning. Nalcor and/or NLH cannot switch to the development of Gull Island without having signed agreements from the potential Labrador mining industrial loads as there would be a significant over-build of the electrical system if the Labrador mining loads currently being considered were not to materialize.

Taking into account the current provincial load forecast, the transmission capacity required to export surplus power from Gull Island could be in the range of 1,500 to 2,000 MW. Even in a more optimistic forecast of an additional 1,125 MW of new mining industrial load by 2020 in Labrador would still result in a need for approximately 375 to 875 MW of available export capacity in the initial decades following Gull Island development and this would require an export route through Quebec.

Export Market Opportunities

Export Markets

Markets that have been considered as opportunities for export sales of Lower Churchill power include Ontario, the Maritimes (Nova Scotia and New Brunswick), Quebec, and the northeast United States, New York and New England. Each market presents unique challenges and opportunities, but they all require viable transmission access. The U.S. Federal Energy Regulatory Commission (FERC) open access transmission policies and competitive wholesale markets for electricity make the U.S. northeast markets an open marketplace for electricity imports. Supply that has access to markets can be sold on regional spot markets or in the longer term, bilateral sales arrangements (greater than one year). The competitive markets model has been slower to materialize in Canada. However, many Canadian jurisdictions have adopted open transmission access policies to provide fair access to market participants and meet FERC requirements for Canadian suppliers selling power into U.S. markets.

Ontario is a prime market opportunity for Gull Island if it were sanctioned before Ontario invests in other sources competing to meet its long-term supply needs. As detailed in the sections below, to get to Ontario and the U.S. northeast markets, Gull Island power would require access through Quebec.

Hydro-Quebec Transmission System Access

While transmitting electricity through Quebec would provide the most direct route from the Lower Churchill to many export markets, HQ has frustrated NLH's previous, repeated efforts to access the Quebec transmission system and the province's electricity regulator, the Régie de l'énergie (Regie), has provided NLH with no relief in this regard. To date, Quebec has proved to be a roadblock to the development of Gull Island. NLH has successfully received transmission rights to 265 MW of capacity on the HQ transmission system but this block was already being sold on the HQ system and did not require additional capacity.

Table 1 – Hydro-Quebec TransEnergie Interconnections

System	Import Capability To Quebec (MW)	Export Capability from Quebec (MW)
New York	1,100	2,000
New England	1,870	2,260
Ontario	1,945	2,705
New Brunswick	785	1,029
Newfoundland & Labrador	5,150	0

Source: Hydro-Quebec TransEnergie

HQ's transmission system is one of the most extensive in North America comprising 514 substations and more than 33,630 km of lines at various voltages. The system has multiple transmission connections with neighbouring systems in Canadian provinces and various northeast U.S. states (Table 1). HQ has the geographic location and transmission system to export large amounts of power to major electricity markets in the northeast region.

However, Newfoundland and Labrador's past experience dealing with the Government of Quebec, its electricity regulator and HQ shows that there can be no guarantees that transmission access and/or upgrades for the Gull Island excess power at a reasonable non-discriminatory cost would be forthcoming in the timeframe that would be needed to proceed with Gull Island to meet the Labrador and Island needs.

Despite having an Open Access Transmission Tariff (OATT), non-discriminatory access has not been provided to Nalcor for development of the Lower Churchill Project. HQ continues to routinely block, and delay Nalcor's efforts to obtain fair access to the HQ transmission system and export markets. While the Régie has an appeals process for complaints against HQ, the regulator accepted HQ's arguments against Nalcor and

offered no remedies for Nalcor in the legitimate complaints it has filed in relation to transmission service request for the Lower Churchill development. A judicial review of the Quebec regulator's decisions against Nalcor has been requested and is currently pending before the Superior Court of Quebec. Nalcor has, and will continue to, act in accordance with the transmission open access rules, but this has been a time consuming process.

Maritime Route Transmission Option and Limitations

Transmitting Gull Island power through a Maritime route (Nova Scotia and New Brunswick) and then through the U.S. or Quebec systems to markets such as Ontario, New England and New York could be technically possible, but the current uncertainties and expenses associated with this route make this scenario unfeasible. The Muskrat Falls project includes utilization of existing transmission through Nova Scotia and New Brunswick, and these transmission systems do not require significant upgrades to accommodate Muskrat Falls power. If Gull Island were built instead of Muskrat Falls, the Maritime Link and associated transmission assets would need to be upgraded and re-sized to accommodate the increased loads which would not be economical. Alternatively, a Gull Island project could keep the same Labrador-Island Link and Maritime Link configuration as being proposed for Muskrat Falls and flow surplus power through Quebec and/or use it to power new industrial mining and/or other operations in Labrador should they materialize. Again, as noted above, fair access through Quebec has not been possible to date.

The Nova Scotia system would require significant system upgrades to handle the 1,500 to 2,000 MW that could be exported from Gull Island. Further work would be required to the transmission capacity between Nova Scotia and the New Brunswick transmission system. There are three connections (one 345 kV and two 138 kV lines) between Nova Scotia and New Brunswick with a combined total export capability of 350 MW which currently falls short of Gull Island requirements to access the New Brunswick grid, even if all of this capacity was available for booking. If transmission access is achieved through Nova Scotia or a new subsea transmission line is built to deliver directly to New Brunswick, New Brunswick's power transfer system itself would likely require upgrades. Existing transfer capability with neighbouring systems includes nearly 800 MW into Quebec, 1,000 MW into ISO New England as well as a 100 MW into northern Maine and 15 MW into eastern Maine. The transmission constraints associated with a Maritime route that avoids Quebec for a Gull Island project would represent an economic challenge. Even if the Maritime transmission challenges were successfully resolved allowing Gull Island power to flow through, there are then complex additional challenges to reaching Ontario through the New England and/or New York transmission systems.

A Maritime route, as it could be applied to a Gull Island generation development, currently has uncertainties including the costs of any necessary transmission system upgrades across multiple jurisdictions, the degree to which the Gull Island developer would be responsible for paying these costs and associated multiple tariffs, the timing of interest and the level of demand in the Maritime market for Gull Island power relative to the magnitude of this development.

Conclusion

The Gull Island development has not proceeded to date because of the inability to obtain transmission access across Quebec. The Provincial Government plans to develop Gull Island, but only if Newfoundland and Labrador is the principal beneficiary of development – not another jurisdiction. Without transmission access to export markets, it is not economically viable to develop Gull Island. Higher than forecast electricity demand in Newfoundland and Labrador would improve the prospects for development, but external markets remain critical for the project.

Some of the key points relating to these conclusions are:

- Since development of the Upper Churchill project, there have been various Lower Churchill project configurations studied and commercial negotiations attempted but none have been developed to date. A significant amount of knowledge and insight has been obtained by Newfoundland and Labrador through its attempts to develop the project over that time.
- Gull Island would be a significant hydroelectric resource development with generating capacity of 2,250 MW.
- Domestic Newfoundland and Labrador load growth, as currently forecast, would not be sufficient to fully use all of Gull Island power output. Additional markets/ customers would be required to support the development and investment required.
- Industrial mining growth could create significant new demand for power in Labrador but there are not yet sufficient firm power requests by proponents to justify any change in the development of Muskrat Falls or the large investments required to develop Gull Island.

- If Nalcor developed Gull Island without firm commitments from industrial customers in Labrador and the new Labrador mining load did not materialize due to a downturn in commodity markets or other investment factors, there would be a significant over-build on the electrical system that would be stranded until transmission access can be secured through Quebec. Even in a scenario with significant new power requirements for Labrador mining projects, access to external markets through Quebec would still be required in order to monetize surplus power.
- NLH has successfully received transmission rights to 265 MW of capacity on the HQ transmission system. The far greater capacity and firm transmission rights that Gull Island and/or Muskrat Falls would require through Quebec to Ontario or other markets have not been possible to obtain to date and are fraught with risk and uncertainty. The transmission requirements related to Gull Island are possibly as much as 1,500 to 2,000 MW and firm, long-term transmission rights would need to be booked to ensure long term market access to enable Newfoundland and Labrador to realize full market value over the service life of the project.
- A Maritime route for Gull Island generation development involves significant uncertainty relating to issues such as costs associated with any transmission system upgrades required across multiple jurisdictions, the degree to which the Gull Island developer would be responsible for paying any additional transmission upgrade costs and associated multiple tariffs, and demand for Gull Island power in the Maritime market relative to the magnitude of the generation capacity.

Footnotes

- 1 Jason L. Churchill, "Power Politics and Questions of Political Will: A History of Hydroelectric Development in Labrador's Churchill River Basin, 1949-2002".
- 2 Jason L. Churchill, *supra*.
- 3 Jason L. Churchill, "Power Politics and Questions of Political Will: A History of Hydroelectric Development in Labrador's Churchill River Basin, 1949-2002".
- 4 Royal Commission on Renewing and Strengthening Our Place in Canada, 2003, at p.124.
- 5 Vic Young, Presentation to the Stakeholders of LCDC Limited, Project Recommendation, 1980, at pp.22-23.

Department of Natural Resources
Natural Resources Building
50 Elizabeth Avenue, P.O. Box 8700
St. John's, NL A1B 4J6
709.729.3017