

Date : 10/30/2010 9:54:27 PM

From : "Bown, Charles W."

To : "Thompson, Robert"

Subject : RE: Gate 2 Report

Attachment : Gate 2 Decision Report - cwb.doc;

Ed is headed off to make our offer on cost risk; doc is attached. I hope we finish tonite before the bars close

From: Thompson, Robert

Sent: Saturday, October 30, 2010 9:23 PM

To: Bown, Charles W.

Subject: Re: Gate 2 Report

Punchy, I'd say. Pls attach a copy.

Sent Via BlackBerry

From: Bown, Charles W.

To: Thompson, Robert

Sent: Sat Oct 30 21:20:07 2010

Subject: Gate 2 Report

Robert;

I've completed a re-write of the executive summary to better articulate the story. Please take a read to see if it holds together. I'm getting a little punchy and can't make sense of this anymore.

CWB

October 2010

DRAFT – OCT 27, 2010



Lower Churchill Project

Decision Gate 2 Summary Recommendation



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1.0 Executive Summary

Nalcor Energy ("Nalcor" or the "Company") is recommending, to the Board of Directors and Shareholder, the Province of Newfoundland and Labrador, approval to proceed through Gate 2 of Nalcor's decision gate process for the following ~~project~~-configuration of the Lower Churchill development: to proceed through Gate 2 of Nalcor's decision gate process.

~~Phase 1—such configuration now referred to as Phase 1 of the Lower Churchill development:~~

- Muskrat Falls generating facility;
- associated AC transmission in Labrador
- HVdc transmission link from Labrador to the Island of Newfoundland; and
- HVdc Maritime transmission link from the Island of Newfoundland to Nova Scotia.

Phase 2

- Gull Island generating facility
- Associated AC transmission in Labrador

Insert

What are the criteria for going through gate 2, what is the next step

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Proceeding through Gate 2 for the Phase 1 portion of the Lower Churchill development will immediately result in bidding and awarding major engineering and construction contracts, commencement of detailed engineering, increased project staffing, placement of procurement contracts for long lead items, finalization of detailed agreements for export sales and domestic consumption, and fulfilling the necessary environmental approvals and processes in preparation for Gate 3 ~~(Project Sanction)~~, targeted for Q3 2011. The estimated budget for this phase, up to Project Sanction, is xxx dollars.

The Phase 2 Phase 2 portion of the Lower Churchill development will follow the completion of Phase 1. Proceeding through Gate 2 will result in continued work toward the completion of is now defined as Gull Island and associated transmission, and it is also recommended that work continue to prepare Phase 2 to proceed. The primary focus of this continued Phase 2 work is to fulfill environmental approvals and processes, addressing open access transmission issues in Quebec, and finalization of e arrangements for domestic requirements and export sales. A decision on proceeding with dDetailed engineering and procurement contracts for long lead items will occurcommence when markets for domestic and export sales are concluded. Nalcor will report to the Board of Directors and Shareholder prior to making this decision. The estimated budget for Phase 2, up to Project Sanction, targeted for no earlier than 2014 is xxx dollars.

~~Proceeding with the Lower Churchill Project is a cornerstone of the Government of Newfoundland and Labrador's Energy Plan and builds on years of evaluation and assessment as well as a confluence of events and circumstances that have created the conditions for the Project to move forward. These conditions are both internal to Nalcor Energy, including the Project's readiness to proceed in such time to meet the Province's domestic needs, as well as external, including market demands for renewable energy and the securing of transmission access.~~

The phased development of the Lower Churchill is consistent with commitment made by the Government in Newfoundland and Labrador Energy Plan. The first priority is ensure that the project meets the current and future power needs of the province. In considering this, the Energy Plan explicitly states that the development of the Lower Churchill Project can not be done in isolation; rather it must be considered in the context of Nalcor's broader Integrated Resource Planning initiatives. This assessment has been completed and Nalcor's subsidiary Based on its Integrated Resource Planning activities, Newfoundland and Labrador Hydro (NLH) has submitted a Generation Planning Issues report to the Public Utilities Board. This report which signals that a generation planning decision must be made by December 2010 if the appropriate planning, approvals and construction can take place to meet anticipated demand. A significant part of that planning involves the future of the Holyrood Thermal Generating Station and how best to meet the Province's domestic energy needs. Through its Integrated Resource Planning activities, Nalcor Energy has determined that a decision for meeting the domestic needs of the Island must be made by the end of 2010. Nalcor has evaluated all practical supply options for generation sources to meet the Island's long term electricity needs and it has determined that Muskrat Falls with a transmission link to the Island provides the least cost and most environmentally friendly solution to meet this need. Supplying the needs of the Island with power from Muskrat Falls via a transmission link from Labrador is a financially viable stand-alone proposition and is the most economic long term solution for both rate payers and the Province.

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The Energy Plan also states that, if a decision is made to proceed with the Lower Churchill project then the Holyrood thermal generating facility will be replaced with electricity from Lower Churchill. The replacement of this facility will reduce GHG emission in the province by 1.3 million tonnes annually and will eliminate the province's dependence on the supply of import fuel and the volatility of world fuel prices.

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The development of Phase 1 of the Project means that the forecast domestic and industrial energy will meet the energy requirements for both Labrador and the Island will be met for the foreseeable future and the Holyrood facility will be decommissioned. Phase 1 will also have sufficient capacity to provide surplus power for future industrial developments throughout the province. However, the capacity of generation at Muskrat Falls is greater than that which the domestic market can absorb. This surplus presents an opportunity for Nalcor to monetize the available power. In the absence of selling to other markets, water that would have been used to generate the power will be spilled over the dam and an incremental value opportunity would be lost.

Nalcor is committed to forming long term, positive strategic relationships with willing entities to purchase power and enable transmission access to key markets. One such relationship is with Emera Energy, a publicly traded entity based in Nova Scotia which is the parent company of Nova Scotia Power, Bangor Electric and Northern Maine Electric. Nalcor and Emera have reached on an agreement on Phase 1 that includes an equity investment by Emera, power sales to Nova Scotia Power, construction of a maritime transmission link between provinces, and

assignment of transmission rights in the Maritime and Maine to Nalcor. agreed to work together in conjunction with other Atlantic Canada and New England entities to establish the necessary transmission infrastructure and access from Newfoundland and Labrador to and through Nova Scotia, to and through New Brunswick to PEI and New England to help all jurisdictions develop their strategic generation assets and effectively transmit associated electricity to markets. Both Nalcor and Emera will provide each other the option to share selected transmission equity stakes in each others jurisdictions over time, in an effort to take the first step in creating an effective Atlantic and NE transmission network to serve the North American North-East markets. In this context, while Nalcor retains all transmission rights for the new Island Link and the Maritime Link, Nalcor (51 per cent) and Emera (49 per cent) are sharing ownership of these new pieces of transmission infrastructure, with Nalcor also retaining the right at its option to revert to 100 per cent ownership of the Labrador Island Link and also under key certain circumstances, 100 per cent of the Maritime Link. No new builds are contemplated at this time in Nova Scotia or Maine, but Nalcor has the option to participate in future new builds in these jurisdictions, if it so desires. This agreement will generate value for both companies and builds on Nalcor's existing relationship with Emera for the marketing of a portion of Recall power from the Upper Churchill in the United States.

A combination of the Churchill Falls recall block as well as Muskrat Falls power will likely be adequate to serve foreseeable mining sector requirements in the near term. That being said, Phase 2 of the Project will provide considerable energy capacity and capacity that could be used in the domestic market for large industrial projects in mining or heavy industry. These developments could be in existing industries, including expansion of iron ore projects in Labrador West, underground expansion of the Voisey's Bay nickel mine and development of the Aurora Energy uranium mine or by new, yet to be identified power-intensive industries that may be interested in bringing business to the province as a result of the availability of predictably priced electricity. Phase 2 will also provide significant energy and capacity that could be made available to markets in eastern and central Canada and the northeast United States. Nalcor has been advancing two distinct market access options; one via access to Quebec's transmission system and the other via a subsea link between Newfoundland and Nova Scotia for a large portion of of the power from Phase 2. Markets have been identified in Ontario, Maritimes and north eastern United States and interest is high to purchase blocks of power from the project. In the spring of 2010 Quebec's Regie d'Energie (Regie) announced a transmission access rendered a decision - decision which has temporarily delayed transmission denying access to markets through Hydro Quebec's system. Nalcor has commenced an appeal of the decision and will pursue all other means to access the Hydro Quebec transmission system. Work will continue on market identification.

Newfoundland and Labrador's competitive advantage in the electricity sector is the quality and quantity of its hydro and wind generation sources. Meeting the province's domestic needs is

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the first priority for these generation assets, followed by export sales into neighbouring markets hungry for renewable, dependable electricity. Nalcor has been advancing two distinct market access options; one via Quebec's transmission system and the other via a subsea link between Newfoundland and Nova Scotia. In the spring of 2010 Quebec's Regie d'Energie (Regie) announced a transmission access decision which has temporarily delayed transmission access to markets through Hydro Quebec's system. In anticipation of all outcomes and being prepared for all eventualities, Nalcor has also been aggressively pursuing a subsea route to Nova Scotia.

Nalcor is committed to forming long term, positive strategic relationships with willing entities to enable transmission access to key markets. One such relationship is with Emera Energy, a publicly traded entity based in Nova Scotia which is the parent company of Nova Scotia Power, Bangor Electric and Northern Maine Electric. Nalcor and Emera have agreed to work together in conjunction with other Atlantic Canada and New England entities to establish the necessary transmission infrastructure and access from Newfoundland and Labrador to and through Nova Scotia, to and through New Brunswick to PEI and New England to help all jurisdictions develop their strategic generation assets and effectively transmit associated electricity to markets. Both Nalcor and Emera will provide each other the option to share selected transmission equity stakes in each others jurisdictions over time, in an effort to take the first step in creating an effective Atlantic and NE transmission network to serve the North American North East markets. In this context, while Nalcor retains all transmission rights for the new Island Link and the Maritime Link, Nalcor (51 per cent) and Emera (49 per cent) are sharing ownership of these new pieces of transmission infrastructure, with Nalcor also retaining the right at its option to revert to 100 per cent ownership of the Labrador Island Link and also under key certain circumstances, 100 per cent of the Maritime Link. No new builds are contemplated at this time in Nova Scotia or Maine, but Nalcor has the option to participate in future new builds in these jurisdictions, if it so desires.

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In addition to having a viable transmission access route and identified markets, significant work has been undertaken to assess the feasibility of both the Muskrat Falls and Gull Island generation facilities and Nalcor Energy is ready to move to the next step of the Project's development. The Phase 1 project that Nalcor is recommending for approval through Gate 2, is viable and supports the business risk. Strategic support from the Shareholder in the form of an equity investment is critical and is key achieving the commitments government made in the Energy Plan respecting the development of the Lower Churchill and the decommissioning of the Holyrood facility. The strategic agreement achieved with Emera will open the door to the North American market place for power sales to other jurisdictions and demonstrates that projects can be developed with a partner while maintaining control of our resources.

In this report, Nalcor demonstrates that in the Phase 1 project, it has a viable generation and transmission project in the province, a transmission project and access route to and through Nova Scotia and New Brunswick to Maine and identified markets for power sales. While additional market access work is necessary for the Phase 2 project to proceed, significant work has been completed to assess the feasibility of both Phases and Nalcor Energy is ready to move to the next step of development.

Proceeding with the Lower Churchill Project is a cornerstone of the Government of Newfoundland and Labrador's Energy Plan and builds on years of evaluation and assessment by Nalcor. Through diligent planning and foresight, as well as a confluence of events and circumstances that have created the conditions for the Project is now in a position to move forward. These conditions are both internal to Nalcor Energy, including the Project's readiness to proceed in such time to meet the Province's domestic needs, as well as external, including market demands for renewable energy and the securing of transmission access.

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2.0 Purpose

This document outlines the recommendation to Nalcor Energy's Board of Directors and Shareholder, the Province of Newfoundland and Labrador, to proceed with development of the lower Churchill River hydroelectric resource. Phase 1 of the Development is comprised of the Muskrat Falls generating facility, associated AC transmission in Labrador and an HVdc transmission link from Labrador to the Island of Newfoundland and an HVdc Maritime transmission link from the Island of Newfoundland to Nova Scotia. Phase 2, which is expected to start no earlier than three years after the start of Phase 1, includes the Gull Island generating facility and associated transmission requirements.

The report is comprised of two key sections:

1. Summary of the decision criteria and analysis supporting the decision, and
2. Summary of the readiness of Phase 1 to proceed

3.0 Project Description

The Churchill River in Labrador has significant hydroelectric potential. The existing 5,428 MW Churchill Falls generating station, which began producing power in 1971, harnesses about 65 per cent of the river's potential generating capacity. The remaining 35 per cent is located at two sites on the lower Churchill River at Gull Island and Muskrat Falls. Combined, these two installations will have a capacity of over 3,000 megawatts, the potential to produce almost 17 terawatt hours (TWh) of electricity annually; equivalent production from coal fired generation would emit approximately 16 megatonnes (Mt) of carbon dioxide annually.

Extensive pre-feasibility work, such as the progression of the environmental assessment process, finalization of a Water Management Agreement; negotiations for an Impacts and Benefits Agreement (IBA) with Innu Nation of Labrador; determination of a Benefits Strategy as well as a Gender and Diversity Strategy; extensive engineering studies and field work, development of a financing approach strategy and an understanding of cost, schedule and risk

have been undertaken for both Gull Island and Muskrat Falls. Based on the review and analysis summarized in this report, development is recommended to be structured as follows:

Phase 1 of the development will include:

- A. the 824 MW Muskrat Falls generating facility with AC transmission facilities between Muskrat Falls to Churchill Falls;
- B. the Labrador-Island Transmission Link; and
- C. the Maritime Link from the Island of Newfoundland to Nova Scotia.



Figure 1 - Muskrat Falls Hydroelectric Generating Station

Phase 2 of the development will consist of:

- A. the 2,250 MW Gull Island generating facility;
- B. any necessary transmission upgrades and infrastructure



Figure 2 - Gull Island Hydroelectric Generating Station

Two market access alternatives are being advanced: one is an HVdc transmission system through the Island of Newfoundland and into the Maritime Provinces and the other is through Hydro-Québec TransÉnergie's (HQT) system. Due to the wealth of surplus energy that will be available as a result of the development of Muskrat Falls and Gull Island along with other significant renewable hydro and wind resources throughout the province as outlined in the Energy Plan, both routes are expected to be required in the long term.

4.0 Energy Plan Directives

Two core objectives of the Energy Plan, being environmental sustainability and economic self reliance for the best long-term interests of the people and the Province, define the need, purpose and rationale for development of the lower Churchill River. Released in 2007 the Energy Plan makes meeting the Province's current and future electricity needs with environmentally friendly, stable and competitively priced ~~energy and~~ power a priority, and endorses the development of the lower Churchill River as a cornerstone public policy action to fulfill this obligation.

The Energy Plan itemizes the Province's Energy Warehouse, which includes a considerable amount of both non-renewable and renewable energy resources. The Province has committed to

leveraging its short term non-renewable oil and gas wealth into a renewable future by investing a significant portion of its non-renewable resource revenues in long term renewable energy assets.

Nalcor's direction to proceed with planning is affirmed within the release of the Energy Plan and includes the following relevant policy directives:

- The Government of Newfoundland and Labrador will lead the development of the Lower Churchill Hydroelectric Project, through Nalcor¹
- The Government of Newfoundland and Labrador has committed to replace thermal generation from Holyrood in the event that development of the lower Churchill advances.²
- Export focus will be on achieving direct access to both long and shorter-term customers in a number of markets, including Ontario, New Brunswick, Quebec, Nova Scotia, P.E.I., New England and New York. Achieving direct access is necessary to ensure:
 - a) A fair share of the economic upside potential of developments over the long term is secured.
 - b) Proper positioning for realizing the long term value of the Upper Churchill development.³

Development of the lower Churchill is aligned with these directives as it can offer the Province long term economic and environmental sustainability. The Energy Plan states that constructing the transmission link, and delivering Lower Churchill power to the Island, is a more cost effective alternative to an isolated Island grid increasingly dependent upon oil-fired thermal power resources. It is also consistent with the goal of energy security in the province, as the cost of electricity from the Lower Churchill through the link would not be subject to external factors such as world oil market pressures.

The Energy Plan itemizes the Province's Energy Warehouse, which includes a considerable amount of both non-renewable and renewable energy resources. The Province has committed to leveraging its short term non-renewable oil and gas wealth into a renewable future by investing a significant portion of its non-renewable resource revenues in long term renewable energy assets. The revenue forthcoming to the provincial government from its non-renewable oil revenues provides the Province with the financial strength to undertake a project such as the lower Churchill River development.

5.0 Scope

The development of the lower Churchill is driven by two fundamental drivers:

¹ Energy Plan, Page 32.

² Energy Plan, Page 38.

³ Energy Plan, Page 44.

1. Identifying the next generation source required to meet Newfoundland and Labrador's domestic needs and identifying the timing of those needs
2. Identifying the optimum configuration and sequence for sales of power from the lower Churchill in excess of domestic needs

Both of these drivers are inter-related and have been under parallel assessment. The need for new generation capacity for the Island is part of Newfoundland and Labrador Hydro's Integrated Resource Planning for the Province and is currently driven by load growth and the displacement of the Holyrood Thermal Generating Station.⁴ For the past several years, an electrical "capacity" deficit has been forecast for the Island system beginning as early as 2015 with electrical "energy" deficits expected to start in 2019⁵.

In order to ensure the Island has sufficient capacity and energy into the future, a decision has to be made by the end of 2010 on which of the available alternative generating sources best meets the Province's requirements. Awareness of this decision has been an integral part of Nalcor's lower Churchill development planning and preparation. The lower Churchill development Phase 1 is now positioned to be the viable alternative generating source to meet the Province's needs and provide power export opportunities.

6.0 Decision Process, Criteria and Summary

The decision reflects the two fundamental drivers, and is divided into two sequential steps;

- Step One: Determine the next generation source to meet Newfoundland and Labrador's domestic needs
- Step Two: Determine how to most effectively optimize the value of any excess power available as a result of the Step One decision

6.1 Step One: Meeting Domestic Need – Muskrat Falls via the Labrador-Island Link

This step focuses on selecting the right alternative to meet domestic needs first.

This section describes the recommendation that Muskrat Falls and the Labrador-Island Link be developed as the preferred means to serve Island requirements, and has been structured as follows:

- Decision criteria used;

⁴ Refer to Appendix [X], 2010 Integrated Resource Plan

⁵ Capacity refers to the amount of generation capability available to meet electricity requirements at a point in time and is measured kilowatts (KW). Energy is the ability to do work and represents an amount of electricity over a period of time. Electrical energy is measured in kilowatt-hours (kWh).

- Options considered; and
- Summary of options considered and results

6.1.1 Decision Criteria for Step One

The decision criteria for Step One are a combination of reliability, cost and security of supply.

1. Reliability

The requirement is that each option build in the infrastructure necessary to meet the minimum system reliability standards required for operation of the Provincial electricity grid. Each is then measured by a “pass” or “fail” rating. In this context each option is expected to obtain a “pass” rating for reliability, as the system design is adjusted until reliability requirements are met.

2. Cost

The lowest cost option is considered most favourable. Lowest cost is measured on a Cumulative Present Worth⁶ basis.

In order to simulate worst case economic conditions, excess power which is not used in the early years is assumed to be lost, by spilling water over the dam and gaining no monetary value from the electricity that the excess water could generate. This approach of “spilling” unused water can significantly burden options, however in the context of generation planning to meet the power needs of Newfoundland and Labrador, it was deemed prudent not to be dependent on a third party purchasing the excess power to make one option more attractive than another.

3. Security of Supply

The “security of supply” criteria in the evaluation process accounts for the risk of depending on power purchases from a third party for the Province’s basic generation needs. Potential third party purchases from other jurisdictions were included as options to ensure a comprehensive analysis.

The criteria is based on an assessment of which options best provide an alternative that results in generation and transmission for domestic needs being controlled solely within the provincial boundaries and subject to Newfoundland and Labrador laws and regulations, versus outside the Province.

4. Other Considerations

⁶ This approach considers the present value of the costs, both capital and operating, to meet forecasted requirements. The alternative that demonstrates the lowest Cumulative Present Worth, or in other words, whose costs have the lowest present value, is preferred. This is a standard methodology for selecting preferred generation alternatives.

In addition to the three main criteria there are other considerations which have not been included in the formal criteria, but merit consideration, particularly in the event there is not one clearly preferred option based on the three main criteria. These considerations are;

- a. overall benefits to the Province and the Provincial Treasury,
- b. level of GHG reduction and associated potential monetary value, and
- c. long term strategic value to the Province in the context of Energy Plan goals and objectives.

6.1.2 Options Considered Meeting Domestic Need – Muskrat Falls via the Labrador-Island Link

Once the decision criteria have been summarized, the next step is to identify the alternatives considered to meet the Province's energy requirements. Five alternatives were considered:

1. Isolated Island

Represents options for additional generation capacity whereby the Island remains an isolated system with no interconnection either through Labrador or the Maritimes. Generation options include new thermal capacity, natural gas, small hydro, and wind.

2. Lower Churchill Development – Muskrat Falls first with associated AC transmission in Labrador and an HVdc Island Link

Additional power for the Island is met in this case by the completion of the Muskrat Falls generating facility and the HVdc transmission link from Labrador to the Island. For the purposes of this analysis, unused power which is assumed to be lost in the form of spilled water at this step of the evaluation.

3. Lower Churchill Development – Gull Island first with associated AC transmission in Labrador and an HVdc Island Link

Additional power for the Island is met in this case by the completion of the Gull Island generating facility and the HVdc transmission link from Labrador to the Island. For the purposes of this analysis, unused power is assumed to be lost in the form of spilled water at this step of the evaluation.

4. Imports via Hydro Quebec

Additional power for the Island is met in this case by the completion of an HVdc transmission link from Labrador to the Island with no new generating capacity in Labrador; rather energy needs are met through the importation of power via Hydro Quebec ("HQ").

5. Imports from New England Independent System Operator (NEISO) via an HVdc Maritime Link

Additional power for the Island is met in this case by the completion of an HVdc transmission link from Nova Scotia to the Island with no new generating capacity on the Island; rather energy needs are met through the importation of power via Nova Scotia.

A detailed description of Nalcor's evaluation of Island supply options is provided in Appendix XX.

6.1.3 Summary of Options Considered and Results: Meeting Domestic Need – Muskrat Falls via the Labrador-Island Link

Based on the identified criteria and a comprehensive analysis of all alternatives, Nalcor Energy has concluded that the domestic needs of the Province are best met by developing the lower Churchill in two phases, beginning with Phase 1 - Muskrat Falls generating facility with associated AC transmission in Labrador and an HVdc transmission link from Labrador to the Island.

This approach provides the necessary system reliability and is the most economic long term solution for rate payers (see economic summary in Appendix XX). It is interesting to note that although lowest cost is the required hurdle for generation planning, this option still provides a return greater than the cost of debt.

The alternative generation options would involve significant capital investments in the aging Holyrood Thermal Generation Station and would result in a long term reliance on fossil fuels and their inherent pricing volatility. From an environmental perspective, moving forward with development of the lower Churchill will also result in the Province's electrical generation system being >98% greenhouse gas emissions free which will exceed any potential national or international GHG reduction targets for the electricity sector. The displacement of generation at Holyrood will also eliminate emissions of other atmospheric pollutants from that facility. In addition, this option provides a solution which ensures generation and transmission for internal provincial needs is controlled solely within the provincial boundaries and subject to Newfoundland and Labrador laws and regulations, achieving the highest rating from a security of supply perspective.

Proceeding with the Muskrat Falls resource first with associated AC transmission in Labrador and using the HVdc transmission link to the Island is a financially viable development option on a standalone basis. It will generate a positive rate of return and ensure long term price stability and certainty. In the shorter term rates are projected to increase under any scenario; however the projected long term increase in rates will be attenuated with the development of the lower Churchill. The monetization of unused power from Phase 1 of the Development is a further economic enhancement which has been excluded from this Step One analysis, and is assessed in Step Two of the decision process.

6.2 Step Two: Monetizing Excess Power – Maritime Link plus Emera Partnership

This step focuses on how to best optimize the value of any available power in excess of internal Newfoundland and Labrador needs resulting from a Step One decision.

This section describes the recommendation that the Maritime Link and an Emera Energy partnership opportunity be pursued to add further value to Muskrat Falls via the Island Link,

and has been structured as follows:

- Decision criteria used;
- Options considered; and
- Summary of options considered and results

6.2.1 Decision Criteria for Step Two: Monetizing Excess Power– Maritime Link plus Emera Partnership

Options to add value to Muskrat Falls via the Island Link by realizing revenue from excess power were evaluated using the following criteria:

1. Value Creation

The value creation criterion is based on which option provides the highest Net Present Value (NPV) and Internal Rate of Return (IRR) on a “riskied” economic basis when selling any unused power resulting from the Step One decision. “Riskied basis” is the revenue and cost projections used in the NPV analysis that have to reflect the expected probability of actually achieving reasonable transmission access and service from third party transmission providers in other jurisdictions. |

2. Reliability Improvement

The degree to which an option further enhances prospective system reliability through additional North American electrical grid interconnection.

3. Strategic Value

The strategic value criteria is based on the degree to which an option enhances Nalcor’s future strategic options and flexibility by providing market access for Gull Island, the upper Churchill, and other potential future Newfoundland and Labrador-based generation developed in accordance with the Energy Plan.

6.2.2 Options Considered: Monetizing Excess Power – Maritime Link plus Emera Partnership

Three alternatives to optimize the value of any unused power available after Provincial needs are met have been analyzed;

1. Sales through Quebec to the Maritimes, New England, Ontario and Quebec markets (Quebec Option)

In this option, Muskrat Falls power not required for Island use would be sold via surplus transmission capacity on the HQ transmission system ~~via HQ~~ to markets adjacent to Quebec as Quebec itself does not have a proven liquid market into which to sell. Given recent developments, a new long term firm transmission booking is not expected prior to Phase 1

approval. For evaluation purposes, the Quebec Option transmission access is assumed to be equal to the existing HQ transmission booking⁷ used for marketing of Recall power from the the Churchill Falls facility. Based on expected Recall sales, approximately XX GWh of production from Muskrat Falls may be sold on a firm basis. In theory it is possible that additional power could be sold by purchasing non-firm transmission rights on a short-term basis in the future.

2. Sales into the Maritime Provinces and through to New England via a Maritime Link connecting the Island of Newfoundland with Nova Scotia (Maritime Link Option)

In this option, the Maritime Link is constructed, in conjunction with the Emera transaction as set out in the attached Term Sheet. The principal elements of the Emera transaction are:

- Emera invests [20%] of the total capital cost of Phase 1 (including the Maritime Link), and is responsible for [20%] of the operating costs in return for an entitlement to 20% of the capacity and annual energy produced from Muskrat Falls for a period of (X) years;
- Nalcor obtains all access rights to the Maritime Link in excess of that required to deliver the entitlement above; and
- Nalcor obtains firm transmission rights from Emera in Nova Scotia, New Brunswick, and Maine.

In the Maritime Link Option, Nalcor may market excess power (that is, in excess of Island requirements and the Emera entitlement) to Nova Scotia, New Brunswick, and/or New England markets via the Maritime Link. Nalcor may also market power via HQTE using the available portion of the existing booking, as in the Quebec Option. For purposes of evaluation and in the absence of bilateral arrangements currently in other jurisdictions, all remaining sales of otherwise spilled power are sold at spot prices projected to be available at the time of sale as follows:

- To NEISO Maine via New Brunswick using firm transmission rights available as per the Term Sheet; and
- To New York Independent System Operator (“NYISO”) via Quebec as in the Quebec Option.

The analysis takes into account all costs, including transmission losses and incremental tariffs.

3. Sales of surplus power to new industrial developments in Labrador and on the Island

⁷ Nalcor acquired 250 MW of firm transmission service in 2009 in order to transmit the 300 MW “recapture” or “recall” availability from Churchill Falls to export markets. This booking is not fully utilized at all times, particularly during periods when loads in Labrador are high.

In conjunction with exploring export markets, Nalcor also has actively pursued the potential for an aluminum smelter for the Province using power from the Lower Churchill Project. These advanced discussions with three different proponents were at varying stages of advancement, up to and including the negotiation of draft term sheets. Consistent with the directives of the Energy Plan that any industrial customers pay rates for power that provide an appropriate level of value to the Province, these negotiations were discontinued because the value returned for the price contemplated was not deemed to add appropriate value. As Nalcor moves forward with Phase Two of the Project, it will continue to consider industrial development opportunities from new industries or from existing resource industries in Labrador and on the Island.

6.2.3 Summary of Options Considered and Results: Monetizing Excess Power – Maritime Link plus Emera Partnership

The Step One decision to build Muskrat Falls first with associated AC transmission in Labrador and an HVdc transmission link to the Island creates a situation whereby there is significant unused energy in the early years. The amount of unused energy decreases over time as demand is expected to grow in both Newfoundland and Labrador. Generation from Muskrat Falls is expected to meet normal demand growth in the Province until the 2037-2041 time-frame, at which time the Upper Churchill power will be available for use. The unused power over the years results in spilled water “over the dam” which is value lost, forever.

Based on the identified criteria for Step Two and comparative analysis, Nalcor has concluded that the most effective manner to optimize the value of the unused energy from Muskrat Falls, and avoid spilling water and gaining no value, is to construct a subsea transmission link from Cape Ray, NL to Cape Breton Island in Nova Scotia. Transmission access would then be arranged through Nova Scotia to New Brunswick, and through New Brunswick to New England, with sales of energy into Nova Scotia, the Maritime provinces, and New England, or pricing arrangements with a strategic partner, Emera to achieve net revenue as if Nalcor had such transmission access (see Appendix XX – Term Sheet between Nalcor and Emera, dated October X, 2010).

This option creates the highest value on a “risk basis” as measured by Net Present Value and Internal Rate of Return. Appendix YY summarizes the economic assumptions, data and analysis supporting this decision. In summary, the Quebec Option on an “unrisked” basis, yields an expected Internal Rate of Return (IRR) of [10.4%] and an Net Present Value (NPV) of [\$xx]. However, on a “risked” basis, the Quebec Option yields an IRR of [8.3%] and an NPV of [VV] compared to a Maritime Link option which yields an IRR of [9.2%] and an NPV of [\$VV], making the Maritime Link option the preferred option on a “risked” economic basis.

The selected option also provides the highest increase in system reliability of the two options. A Maritime Link provides transmission interconnection of the Island’s electricity grid to two

neighbouring systems, the Maritimes and Quebec. For the first time in history, the Island will no longer be an isolated grid, but instead linked via two routes into the North American grid. This dual link creates the greatest reliability for the Newfoundland and Labrador grid.

The Maritime Link creates significant strategic value. There are a number of factors considered in this analysis;

1. Muskrat Falls at 824MW comprises approximately [8%] of the undeveloped renewable resources in the Province (see Energy Plan, 6,000 MW undeveloped Hydro plus 5,000 MW of undeveloped Wind). Gull Island at 2250MW will comprise Phase 2 of the renewable Energy Warehouse development ([20%] of the total).

It is expected that transmission capacity needs over the long term will require extensive transmission routes through both the Maritime Provinces and Quebec. The Maritime Link establishes the first phase of a longer term plan to establish, in addition to Quebec transmission open access, extensive transmission capacity through multiple cables into the Maritime Provinces and into New England jurisdictions, comprising one of the largest, growing electricity markets in the world. In addition to providing long term renewable energy to the Maritime Provinces, the contribution of this option to the long term fulfilment of the Atlantic Energy Gateway initiative will be significant.
2. The Maritime Link Option enables Nalcor to act on a time-sensitive opportunity to forge strategic energy partnerships in the Maritime provinces. If lower Churchill power is not made available to these markets in the 2015 – 2020 time frame, these jurisdictions will have to meet their needs by other means and the opportunity to form energy partnerships may be lost for an extended period. Nova Scotia, New Brunswick and Prince Edward Island have a need to replace aging and non-renewable generation. Maine and other New England states are also seeking competitively-priced renewable electricity. Emera subsidiaries include Nova Scotia Power and Bangor Electric in Maine. A strategic, fair agreement with Emera provides Nalcor with a strategic partner in key markets. In addition, longer term relationships are also being pursued in other Maritime Provinces.
3. By adopting the Maritime Link Option, Nalcor will establish an independent, large-scale presence in North American electricity markets in a way that would be difficult if transmission is available only via Quebec. This option provides access to the Maritimes and the United States, establishing a Nalcor and Newfoundland and Labrador presence in regulatory jurisdictions which permit fair transmission “open access”.
4. Due to the potential of overlapping with other key mega-project construction phases (eg. Hebron), it has always been the intent to balance labour demands with construction sequencing of the two generation sites with at least a three year interval. This is reflective of prudent construction management, moving resources

from one project to another rather than peaking all resource requirements at one time. Doing so minimizes resource availability concerns and subsequently Gull Island gains value in the form of increased productivity by applying experience gained on Muskrat Falls.

5. In addition, sequencing the developments with an approximately three year interval provides a financing benefit, as the cash flow from one producing project can be invested into the second project during the construction phase.

6.3 Summary of Results: Decision Process and Criteria

The analysis for both steps under concurrent review has lead to a complete decision for meeting both the Island's domestic needs and monetizing the excess power.

Based on the identified criteria and how each alternative was ranked, Nalcor has concluded that the domestic and economic development needs of the Province are best met by developing the lower Churchill in two phases, beginning with Phase 1 - Muskrat Falls generating facility with associated AC transmission in Labrador and an HVdc transmission link from Labrador to the Island and between the Island and Nova Scotia. This development approach is the most economic long term solution for both rate payers and the Province. The alternative generation options would involve significant capital investments in the aging Holyrood Thermal Generation Station and result in a long term reliance on fossil fuels and their inherent pricing volatility. Further, from an environmental perspective, moving forward with Phase 1 will also result in the Province's electrical generation system being 98% greenhouse gas emissions free which will exceed any potential national or international GHG reduction targets for the electricity sector.

The Phase 1 development is in itself financially attractive, by generating a positive rate of return and ensuring long term price stability and certainty after an initial increase in rates. This increase in rates will be required under any scenario; however it is improved under the Phase 1 development scenario. The optimization of Phase 1 and the subsequent Phase 2 development of Gull Island through the sale of additional power to export markets or for domestic industrial opportunities only further enhances the viability of the development and makes this approach the most economic solution over time.

7.0 Project Readiness Assessment

Having a market need and a financially viable development are two components of project readiness. The other components are internal to Nalcors organization and are related to having undertaken adequate levels of front-end evaluation, analysis and assessment. Nalcor Energy has conducted three reviews to test the adequacy of its readiness to proceed to the next phase of development.

1. Internal Review – Gateway Process Deliverables

Nalcor Energy uses an industry accepted method of assessing viability and its readiness to proceed through key milestones known as the Gateway process. The Gateway Process divides the lifecycle of a project into several phases starting at opportunity identification and concluding at start-up of the production facility. Each phase has a list of pre-defined Key Deliverables deemed essential to making a decision at the end of that phase, prior to moving to the next stage. The purpose of Nalcor's rigorous Gateway Process is to ensure a high degree of readiness prior to proceeding to the next phase, which has proven to be a highly effective process that maximizes the probability of meeting cost, schedule and quality targets over the life cycle of a project.

Nalcor's focus has been on getting the data needed, increasing certainty on all fronts and ensuring the overall business case provides the information needed to make a well informed decision on the future of the development. The specific deliverables that have contributed to the company's readiness include:

- finalization of a Water Management Agreement;
- initiation of Environmental Assessment (EA) processes;
- ~~produce and prove~~analysis of market access options;
- determination of a Benefits Strategy as well as a Gender and Diversity Strategy
- development of a financing ~~approach~~strategy;
- ~~finalization~~negotiation of an Impacts and Benefits Agreement (IBA) with Innu Nation of Labrador;
- completion of required engineering design work, studies and field work;
- understanding cost, schedule and risk; and
- determination of the optimum development configuration.

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2. External Review - Independent Project Analysis (IPA)

Consistent with the Gate Decision Assessment Process, an independent verification of readiness was carried out by Independent Project Analysis (IPA) using their proprietary "Pacesetter Evaluation Process." A core element of IPA's assessment of readiness is the quantitative measurement indicator known as the Front End Loading Index. Through a systematic evaluation of both the Muskrat Falls and Island Link projects, IPA concluded that the *"Project is better prepared than a typical megaproject at end of Front-End Loading (FEL) 2,"* and the *"Project has clear objectives and a well-developed project team that has closed the project scope and achieved optimal project definition."*

Quantitatively, the assessment revealed that the generation and transmission projects scored in the optimal range on the FEL Index for a mega project. This confirms, by independent evaluation, that the development is both ready to move to the next phase and is on track to

achieve the business objectives.

External Review - Independent Project Review (IPR)

An IPR is a high-level independent expert assessment conducted by a team of experienced professionals. It is intended to provide Nalcor's decision makers with an understanding of the completeness of the readiness to pass through a particular phase or "gate" and any issues associated with the deliverables required to proceed through to the next phase. The IPR team consisted of four experts with complementary backgrounds⁸ and a combined 150+ years of project execution experience. The review resulted in a recommendation from the IPR team that the Project has completed the steps necessary to support the decision to proceed to the next phase of development.

8.0 Financing Strategy

Financing strategy for the Project has also been examined in phases. At a high level it can be characterized as follows:

Phase I

- Muskrat Falls – 100% equity
- Island Link – 75/25 debt-equity
- Maritime Link – financed by combination of assets included in NSPI rate base and Emera equity

Phase II

- Muskrat Falls – refinanced at 80/20 debt-equity
- Gull Island – use equity funding created from Muskrat refinancing to provide a capital structure of approximately 60/40 debt-equity

The investing and financing requirements for Phase 1 are summarized in Table 1 below:

TABLE 1
Investment and Financing Profile

(\$ billions)	
Investments	
Muskrat Falls	Xx
Island Link	Xx
Maritime Link	Xx
Total Investments	Xx
Financing	
New Equity from NL	Xx
Nalcor Internally Generated Cash	Xx
New Debt – Island Link	Xx
Non Capex funding	Xx
NSPI – Rate Base Funding	Xx
New Equity from Emera	Xx
Total Financing	xx

⁸Members of Nalcor's IPR team had extensive experience in megaproject management, construction management, cost engineering, risk analysis, and electric utility engineering and operations.

A contingent equity commitment of \$300-600M from the Province is also considered prudent and necessary. This would be in addition to the \$xx million in base equity from NL as noted in Table 1.

8.1 Strategy Validation & Findings

In validating the above strategy, the following steps were taken:

- Senior officials from the Provincial Department of Finance were consulted with respect to the proposed equity requirement from the Province.
- Consultations with regard to proposed financing strategy were held with the company's capital markets advisors RBC Capital Markets (RBC) and Scotia Capital Markets (SCM), as well as with the three major credit rating agencies in Canada, namely; Standard and Poors (S&P), Moody's and Dominion Bond Rating Service (DBRS).
- Nalcor's advisor on financing matters for the Lower Churchill Project (LCP), PricewaterhouseCoopers LLP (PWC), was requested to identify considerations regarding the proposed project debt financing strategy.

8.1.1 Provincial Department of Finance

The Provincial Department of Finance considers it reasonable to expect that the equity requirement (including contingent equity) as outlined above, can be appropriately funded, although they indicated that variability in future resource revenues is a critical consideration.

8.1.2 Capital Market Advisors RBC and SCM

RBC and SCM advised that the degree of leverage in the Island Link capital structure will be dependent upon the type of regulation applied. Full cost of service recovery might enable higher leverage of the magnitude contemplated. They consider the means by which construction risk, cost over run risk and completion risk are handled to be keys to the success of the financing strategy. They expressed a level of comfort with the Province's ability to fund the contemplated equity contribution over the construction time period.

8.1.3 Rating Agencies

With respect to the rating agencies, their preliminary comments were provided with the proviso that they were subject to a further review of more detailed information. As a general comment, there was considerable rating agency focus on the Province's ability to fund its equity investment. Only Dominion Bond Rating Service (DBRS) suggested that the size of the Project and in particular, the Province's related equity investment, might result in a downgrade in the Province's credit rating. A key consideration for them would be the degree to which the Province accepts the construction risk associated with the Project. DBRS went on to say that upon Project completion, the removal of this risk would be a positive influence for the Province's credit rating. DBRS did not suggest that a downgrade was a definite outcome, but rather only a possibility and that a more in-depth understanding of the project configuration and the Province's current and forecast financial position would be required before a final determination of rating impact could be determined.

Moody's stated that if the Province were to borrow its entire equity investment of \$xx billion, such a level of borrowing would be considered "a significant increase in its debt load". The implication was that a credit rating impact was possible, but again not definite at this point.

S&P did not have a representative from their public sector group at the meeting and made no comment specifically on the Province's rating.

8.1.4 Project Financial Advisors PWC

PWC consider the Island Link to have the potential to be credible as a borrower on a limited recourse project finance basis. Key success factors mentioned by PWC were:

- Ratepayer obligation
- Clear revenue "line of sight"
- Achieving in-service

Regarding the future borrowing capacity of Muskrat Falls, they indicate that "project debt financing is potentially viable subsequent to in-service in an amount supported by committed minimum revenues, if satisfactory legal and regulatory frameworks are put in place".

8.2 Risk Analysis

The equity component of the financing strategy is significant. The potential risks to the success of the equity financing component are viewed as significant and include the following:

- Oil price risk - The stability of the equity component is heavily dependant upon market prices for oil. At this point it remains to be determined how much of the market price risk to both the Province and Nalcor associated with oil can be offset through the use of derivative instruments. Production uncertainty may constrain the degree to which hedge instruments can be prudently deployed, thereby compromising the degree to which this exposure can be mitigated.
- Island load risk – A significant gap between anticipated and actual Island load throughout the PPA period will put pressure on the anticipated returns to the Muskrat Falls equity holders unless the NL Hydro PPA specifies a minimum level of take during its term. In view of the potential benefits of the Project to a wide range of stakeholders, some distribution of Island load risk might be possible; e.g. apportioned to Muskrat Falls equity holders, NL Hydro, NL Power and to the Island industrial customers.
- Market Access Risk - The ability of the Muskrat Falls entity to monetize power that is surplus to NL Hydro's needs via sales into US markets could be compromised depending on the degree to which regulatory risk is removed in order to "securitize" the Island Link debt load. However, no part of the business case relies on this monetization.
- Need for a Provincial Guarantee on Island Link Debt - In the event that the debt financing associated with the Island Link requires a Provincial guarantee in order to be economically viable, the presence of such a guarantee may put added pressure on the Province's ability to fund its base equity and contingent equity requirements.
- Return to Equity Holders During Construction - The "non-cash capex funding" as noted in Table 1 relates to the capitalization of equity returns during construction, with an added assumption that such costs will be recoverable from ratepayers. This assumption may be tested in a scenario that contemplates capitalizing Island Link costs outside of the NL Hydro regulated corporate entity.

Each of these risks to anticipated equity returns will need to be clearly understood by the equity investors and incorporated into any communications strategy for the Project.

The financing strategy includes both debt and equity, with a significant proportion of the funding derived from the equity component. While Nalcor Energy has obtained a level of comfort that the financing strategy as proposed is potentially viable, it is recognized that the viability of the equity component is heavily dependant upon market prices for oil.

A greater level of comfort as to the viability of contemplated external debt financing will be obtained during the course of in-depth market sounding, at which time it will be imperative that we demonstrate a clear and plausible strategy with respect to the critical success factors as outlined above, as well as other factors such as aboriginal relations, environmental release, etc.. At this point in time, we are not aware of any such factors that cannot be adequately addressed to the satisfaction of potential Island Link debt holders in the time frames allotted.

9.0 Path Forward

Following passage through Gate 2, and into Gateway Phase 3, work will commence with a concentrated effort towards ensuring readiness to mobilize the successful Engineering, Procurement and Construction Management (EPCM) consultant. This EPCM consultant will work with Nalcor to finalize any remaining feasibility studies for the Muskrat Falls and Island Link, completing all essential engineering and procurement activities to support a start of site infrastructure at Muskrat Falls following the release from environmental assessment. Detailed engineering and procurement activities will commence on Gull Island no earlier than three years after the start of Muskrat Falls.

Gateway Phase 3 culminates at Gate 3, which is predicated upon the release of the Generation Project from Environmental Assessment, and the completion of a sufficient amount of engineering and contracting activity in order to confirm the Project cost and schedule targets. Pending the completion of a due diligence review to support the readiness to move through Gate 3, the Lower Churchill Project will be sanctioned. At this point the Project will transition into a full construction project moving ahead to complete the Project in order to produce and transmit power from Phase 1 of the Lower Churchill Project.

The commencement of Phase 1 of the Project will be a tremendous enabler for the development of Gull Island. Concurrent with Phase 1 of the Project moving into the engineering and detailed design phase, Nalcor will continue with all legal remedies to appeal the Régie's decision regarding its denial of fair access to use Hydro-Québec's transmission system. A team will remain focused on developing business opportunities with potential offtakers, both outside the Province and within the Province with industrial customers, to enable the commencement of the development of Phase 2 of the Project within approximately 3 years.

10.0 Conclusion

The decision to proceed with the recommendations contemplated in this document is an important step towards the fulfillment of the goals outlined in the Government of Newfoundland and Labrador's Energy Plan. It is both a pragmatic decision that meets a short term need and a visionary move towards economic self-reliance. It is a catalyst for the development of Newfoundland and Labrador's Energy Warehouse and sets the stage for 2041

when the immense wealth from the Upper Churchill hydroelectric becomes repatriated. It is one element in achieving Nalcor's vision to build a strong economic future for successive generations of Newfoundlanders and Labradorians.

11.0 Recommendation

Nalcor Energy recommends proceeding with development of the lower Churchill River hydroelectric resource. Phase 1 of the Development is comprised of the Muskrat Falls generating facility, associated AC transmission in Labrador and an HVdc transmission link from Labrador to the Island of Newfoundland and an HVdc Maritime transmission link from the Island of Newfoundland to Nova Scotia. Phase 2, which is expected to start no earlier than three years after the start of Phase 1, includes the Gull Island generating facility and associated transmission requirements.

12.0 Appendices

-Cross reference new appendices created in the revised Decision Criteria Section, including economic evaluations