Date : 11/11/2010 9:15:59 PM
From : "Bown, Charles W."
To : "'LeonaBarrington@nalcorenergy.com'" , "Paul Harrington"
Subject : RE: Gate 2
Attachment : LCP DG2 Support Package - CWB- NOV 10.doc;

Paul;
I have made edits in the DG2 report following my conversation with Ed on the scope of project advancing through Gate 2. I've also some other edits that I missed in my previous revision. I am uncertain on where we should proceed wrt Financing/Risk. If this is going to be a public document then there are statements that must be adjusted to acknowledge that certain approvals have not been received.
Charles

From: LeonaBarrington@nalcorenergy.com [mailto:LeonaBarrington@nalcorenergy.com]
Sent: Thursday, November 11, 2010 1:39 PM
To: Bown, Charles W.; Paul Harrington
Subject: Re: Gate 2

Hi Charles,

Spoke with Ed and to ensure we are appropriately following the process for formal Gate passage, Paul will be finalizing all Gate 2 materials.

That being said, I've copied Paul on this email. He will be the point of contact moving forward.

Tks:)
Leona Barrington
Sr.Communication Specialist
Nalcor Energy - Lower Churchill Project
t. 709 737-1837 c. 709 693-7398 f. 709 737-1985
e. LeonaBarrington@nalcorenergy.com w. nalcorenergy.com

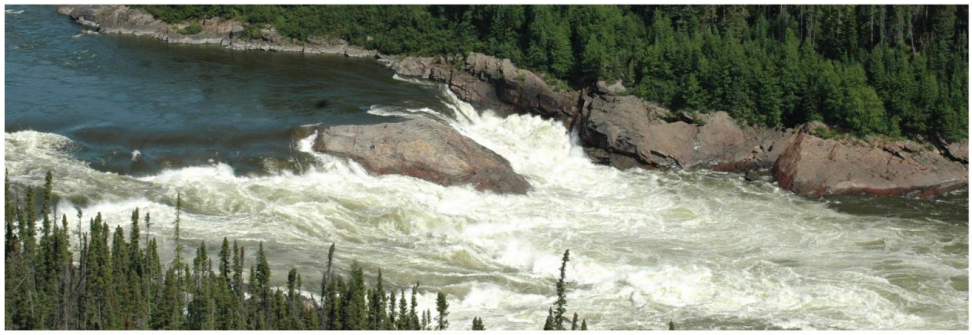
From: "Bown, Charles W." [cbown@gov.nl.ca]
Sent: 11/11/2010 01:32 PM NST
To: Leona Barrington
Subject: Gate 2

Discussed with Ed; Gull Island will not go through Gate 2. I'd alreadt predrafted some edit that I will insert in the layest draft a will forward to you shortly

Sent Via BlackBerry

October 2010

DRAFT – November 8, 2010



Lower Churchill Project

Decision Gate 2 Summary Recommendation

nalcor energy
LOWER CHURCHILL PROJECT

Table of Contents

1.0 Executive Summary

Nalcor Energy ("Nalcor" or the "Company") is recommending the Board of Directors approval to proceed through Gate 2 (Finalized Development Scenario and Commencement of Detailed Design) of Nalcor's decision gate process for the following configuration of the lower Churchill River development:

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Phase 1:

- 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;~~
- ~~associated transmission to market.~~

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The Gateway Process (Appendix 1) is a staged or phased decision-gate assurance procedure that is used to guide the planning and execution of the Lower Churchill Project from identification through to operation. All key deliverables associated with Gate 2 have been achieved and a business case has been confirmed.

Proceeding through Gate 2 for the Phase 1 development of the Lower Churchill Project will immediately result in 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 fulfillment 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, will range between $100-150 million dollars.

~~Proceeding through Gate 2 for~~T ~~t~~he Phase 2 development of the Lower Churchill Project will include the Gull Island Generating facility, associated AC transmission in Labrador and required transmission to market. This project is scheduled to proceed three years after sanction of Phase 1 and will pass through Gate 2 at an appropriate time. Planned project activities in the interim will include~~result in continued work toward~~ the completion of environmental approvals and processes, conclusion of open access transmission issues in Quebec, and finalization of arrangements for domestic requirements and export sales. A decision on ~~proceeding with detailed engineering and procurement for long lead items~~procceding through Gate 2 will occur when markets for domestic and export sales are concluded. ~~Nalcor will report to the Board of Directors prior to making this decision.~~

The phased development of the Lower Churchill Project is consistent with commitments made

in the Government in Newfoundland and Labrador's Energy Plan. The first priority is ensuring the current and future power needs of the province are met with environmentally friendly, stable, competitively priced power. In considering this, the Energy Plan states that the development of the Lower Churchill Project must be considered in the context of Nalcor's broader Integrated Resource Planning initiatives. This assessment has been completed and Nalcor's subsidary, Newfoundland and Labrador Hydro (NLH) has submitted a Generation Planning Issues Report (Appendix 2) to the Public Utilities Board. This report signals that a generation planning decision must be made by ~~December~~ the end of 2010 if the appropriate planning, approvals and construction can take place to meet anticipated demand. 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.

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 the Lower Churchill Project. Nalcor plans to proceed with this commitment and supply the displaced capacity with power from Phase 1. The replacement of this facility will reduce GHG emissions in the province by 1.3 million tonnes annually, eliminating the province's dependence on the supply of imported fuel and remove future volatility in electricity prices.

The development of Phase 1 of the Project means that the forecasted domestic 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 provide sufficient capacity 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 this power to other markets, water that would have been used to generate the power would be spilled over the dam and an incremental value opportunity would be lost.

As a means to monetize the excess power, 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 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 provinces and Maine to Nalcor. 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.

Phase 2 of the Project will provide considerable energy 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 access to Quebec's transmission system for a large portion of of the power from Phase 2. Markets have been identified in Ontario, the Maritimes and Northeastern 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) rendered a decision 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 in conjunction with the Project's development of Phase 1.

The development approach for Phase 1 being recommended by Nalcor, is viable and is supported by a business case. Strategic support from the Shareholder in the form of an equity investment is critical and is key in achieving the commitments government made in the Energy Plan respecting the development of the lower Churchill River resource 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 the Province's resources.

In this report, Nalcor demonstrates the Phase 1 development is financially attractive, generates~~ing~~ a positive rate of return and ensures~~ing~~ long term price stability. The optimization of Phase 1 through an agreement with Emera for transmission and access to and through Nova Scotia, New Brunswick to Maine and identified power sales, and the subsequent Phase 2 development of Gull Island including 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.

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, the Project is now in a position to move forward. If approved, it is recommended that this Decision Document be forwarded to the Shareholder to obtain alignment with the Project plan.

2.0 Purpose

This document outlines the recommendation to Nalcor Energy's Board of Directors to proceed with the phased 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, is comprised of the Gull Island generating facility, required transmission within Labrador and associated transmission to market. It is expected that Phase 2 will commence no earlier than three years after the sanction of Phase 1 and will not proceed through Gate 2 at this time. Proceeding with Pahse 2 will require approval of the Board of Directors before final decisions on proceeding with detailed engineering and procurement of long lead items.

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 and an understanding of cost, schedule and risk have been undertaken for both Muskrat Falls and Gull Island. 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 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 Project planning is affirmed within 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 Nalcor[1]
- 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]

The Energy Plan also stated~~s~~ that constructing the Labrador-Island 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 Project through the link would not be subject to external factors such as world oil market pressures.

Acknowledging that this statement was made in 2007, an~~This assertion was made in 2007 and required an~~ assessment of generation supply options to confirm whether the Energy Plan statement was undertaken~~still hold true~~. 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.

[1] Energy Plan, Page 32.
[2] Energy Plan, Page 38.
[3] Energy Plan, Page 44.

5.0 Scope

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

1. Indentifying the next generation source required to meet Newfoundland and Labrador's domestic needs and identifying the timing of those needs
2. Indentifying the optimum configuration and sequence for sales of power from the Lower Churchill Project 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 2019[5].

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~~process 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 ~~.~~

[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).

~~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;
- 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~~E~~-~~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 Worth[6] basis.

Cumulative Present Worth is a common method used in integrated resource planning to compare multiple generation sources. The method calculates the discounted cumulative cost stream of a particular generation source and identifies the least cost generation source as that having the lowest CPW.

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

[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.

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

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 Demand

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**

   This scenario assumes that Holyrood remains in operation until the end of its life and includes options for additional generation capacity whereby the Island remains an isolated system with no interconnection either through Labrador or the Maritimes. The next supply options in the least-cost generation expansion scenario are the indigenous hydroelectric plant so of Island Pond (36MW) in 2015, Portland Creek (23MW) in 2018 and Round Pond (18MW) in 2020 followed by a 170MW CCCT plant in 2022, and 50MW of CTs in 2024 and 2027. Further additions of thermal-electric plants can be expected post 2029.

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

   Additional power to meet increased demand is satisfied by the completion of the Muskrat Falls generating facility (824MW; 4.9 TWH) and the transmission link from Labrador to the Island (AC ~250km and HVDC ~1100km). In this case, Nalcor will initially supply 2.0 TWH growing to 3.9 TWH until 2041 after which additional demand will be met by power from

the Upper Churchill. For the purposes of this analysis, unused power is assumed to be lost in the form of spilled water.

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

   Additional power to meet increased demand is satisfied by the completion of the Gull Island generating facility (2250MW; 11.9TWH) and the transmission link from Labrador to the Island (AC ~250km and HVDC ~1100km). In this case, Nalcor will initially supply 2.0 TWH growing to 3.9 TWH until 2041 after which additional demand will be met by power from the Upper Churchill. For the purposes of this analysis, unused power is assumed to be lost in the form of spilled water.

4. **Imports via Hydro Quebec**

   Additional power to meet increased demand is satisfied by the completion of an HVdc transmission link from the Labrador border to the Island (~ xxxxkm) with no new generating capacity in Labrador. Energy needs are met by importing energy and capacity via Hydro Quebec ("HQ"). The power would be procured on the open market.

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

   Additional power to meet increased demand for the Island is satisfied 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 3.

6.1.3 Summary of Options Considered and Results: Meeting Domestic Need

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 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 4). 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 each have a higher CPW and involve significant capital investments in the aging Holyrood Thermal Generation Station. The inclusion of new thermal generation in the isolated island case would result in a long term reliance on fossil fuels and their inherent pricing volatility. The Gull Island option has a much higher capital cost and contains a significant water spill assumption with an inherent loss of value. Both of the power import cases, Quebec and New England present risks on price and reliability that are unacceptable.

From an environmental perspective, moving forward with development of Phase 1, including the decommissioning of Holyrood will 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.

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 stand alone 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.

Equally important, this option is consistent with the Energy Plan objective to ensure that 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.

6.2 Step Two: Monetizing Excess Power

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 provides an assessment and recommendation on the opportunities to monetize the available power resulting from the decision above to proceed with Muskrat Falls via the Island Link to meet our requirement for domenstic demand. In the absence of selling this power 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. The Section is 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

The options Nalcor identified that would monetize the excess power were evaluated using the following criteria:

1. Value Creation

The value creation criteria is based on which option provides the highest Net Present Value (NPV) and Internal Rate of Return (IRR) on a "risked" economic basis when selling any unused power resulting from the Step One decision. "Risked 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 for monetization enhances Nalcor´s future strategic options and flexibility by providing market access for other electricity generation. These include Gull Island, Upper Churchill, and other potential future generation including Labrador wind and small hydro.

6.2.2 Options Considered: Monetizing Excess Power

Three alternatives were assessed to monetize power available after Provincial needs are met:

1. **Sales through Quebec to the Maritimes, New England, Ontario and Quebec markets (Quebec Option)**
   In this option, available Muskrat Falls power would be sold via surplus transmission capacity on the Hydro-Quebec (HQ) transmission system 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 booking[7] used for marketing of Recall power from the the Churchill Falls facility. Based on expected Recall sales, approximately XX GWh of production from

[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.

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 (Appendix 5).

In the Maritime Link Option, Nalcor may market available power that is, in excess of Island requirements and the Emera entitlement, to other third parties via the Maritime Link. 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 to new and existing industrial developments in Labrador and on the Island

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 discussions took place with three different proponents and achieved 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.

Available power could also 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.

As Nalcor moves forward with Phase 2 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 Available Power

The decision to proceed with the Phase 1 development of the Lower Churchill Project as the preferred option to meet domestic demand, results in a situation whereby there is an opportunity for Nalcor to monetize available power. In the absence of selling this power 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. The amount of available power decreases over time as demand grows 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.

Based on the identified criteria for Step Two, and comparative analysis, Nalcor has concluded that the most effective manner to monetize the value of the available power from Muskrat Falls, and avoid spilling water, is to conclude an agreement with Emera that would include 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. 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.

This option creates the highest value on a risked basis as measured by Net Present Value and Internal Rate of Return. The selected option also provides the highest increase in system reliability of the two options. 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 also creates significant strategic value, including:

1. Establishment of 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.

2. Opportunity to supply clean renewable energy to the Maritime Provinces and enabling a significant reduction in the regions GHG's.

3. Contribution in a significant way, toward the fulfilment of the Atlantic Energy Gateway initiative.

4. Forging of strategic energy partnerships in the Maritime provinces. An agreement with Emera provides Nalcor with a strategic partner in key markets and an opportunity to establish long term relationships in other Maritime Provinces.

5. Establishment of Nalcor as an alternative renewable energy provider in North American electricity markets in a way that would be difficult if transmission were only available only via Quebec.

6. Optimization of the supply of skilled labour and contractors as a result of the sequencing of generation and transmission projects. Moving resources from one project to another rather than peaking all resource requirements at one time is reflective of prudent construction management. This approach minimizes resource availability concerns and adds value to Gull Island by applying experience gained on Muskrat Falls.

7. Optimization of cash flow allowing revenues to be invested into the construction phase of Gull Island as a result of sequencing the developments.

6.3 Summary of Results: Decision Process and Criteria

The analysis of the generation expansion decision and the monetization of available power has lead to a complete decision that satisfies the criteria applied.

Nalcor has concluded that the domestic and economic development needs of the Province are best met by developing the Phase 1 of the Lower Churchill Project, including decommissioning of the Holyrood facility, and the completion of an agreement with Emera. This development approach is the most economic long term solution for both rate payers and the Province. The alternative generation options each have a higher CPW and include the continued operation of the Holyrood facility. This facility is past its mid-life and would require significant capital investments. Island ratepayers would also have a continued long term reliance on fossil fuels and their inherent pricing volatility. Further, from an environmental perceptive, 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 financially attractive, generating a positive rate of return and ensuring long term price stability. The optimization of Phase 1 through an agreement with Emera, and the subsequent Phase 2 development of Gull Island including 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 market access options;
- determination of a Benefits Strategy as well as a Gender and Diversity Strategy
- development of a financing approach;
- 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.

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 backgrounds[8] 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:

Commented [A2]: If this is going public, then we need to consider how best to describe the process; in particular FIN would need to review and approve.

I'd prefer a summary section that covers all the considerations in financing.

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:

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

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

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~~T ~~t~~he Provincial Department of Finance was~~ere~~ consulted with respect to the ~~proposed equity requiremen~~ potential for participation by Government as the sole shareholder in Nalcor.~~t 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 an~~the~~ equity ~~requirement~~ contribution (including contingent equity) as outlined above, can be appropriately funded, although they indicated that variability in future resource revenues is a critical consideration.

Commented [A3]: We cannot say this until Govt approves project financing;

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 of Phase 1 through Gate 2, ~~and into Gateway Phase 3 (Project Sanction),~~ work will continue 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. Phase 2 of the project will not pass through Gate 2 at thi time. Detailed engineering and procurement activities will commence on Gull Island no earlier than three years after the sanction of Muskrat Falls.

Commented [A4]: I though we would be awarding this contract ….

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 and the final business case. 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 Phase 2 - 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

In this report, Nalcor demonstrates the Phase 1 development is financially attractive, generat~~sing~~ a positive rate of return and ensur~~sing~~ long term price stability. The optimization of Phase 1 through an agreement with Emera for transmission and access to and through Nova Scotia, New Brunswick to Maine in conjunction with identified power sales, and the subsequent Phase 2 development of Gull Island including 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.

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.

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, the Project is now in a position to move forward. If approved, it is recommended that this Decision Document be forwarded to the Shareholder to obtain alignment with the Project plan.

11.0 Recommendation

Nalcor Energy recommends proceeding with development of Phase 1 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