

1 Q. Has Hydro undertaken a review of its criteria to determine the appropriate reserve?
2 If yes, outline the scope of the review and the date of completion. If not, why not?

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5 A Hydro has not recently undertaken a review of its generation planning criteria.
6 However, the methodology, tools, assumptions and inputs used in the generation
7 planning process have been reviewed as part of the following recent reviews:

- 8 • Independent Supply Decision - Navigant Consulting Ltd. September 2011
9 (Excerpt of key findings, refer to PUB-NLH-010 Attachment 1); and
10 • Report on Two Generation Expansion Alternatives for the Island
11 Interconnected Electrical System - Manitoba Hydro International January
12 2012 (Excerpt of key findings, refer to PUB-NLH-010 Attachment 2).

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14 Both of these reviews found that Hydro's generation planning analysis was being
15 performed consistent with generally accepted utility practice.

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17 As part of its ongoing internal review of the recent events, Hydro is undertaking an
18 additional external review of the generation planning and load forecasting process
19 including an assessment of the planning criteria. Hydro expects this external review
20 to be complete by the end of the first quarter of 2014.

NAVIGANT

Independent Supply Decision Review

Prepared for:



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September 14, 2011



13. Nalcor would have the capacity to integrate significantly more than 200 MW of wind only in the Interconnected Island alternative given the performance characteristics of Muskrat Falls.
14. Nalcor appropriately excluded biomass from both generation expansion alternatives because of the relatively limited biomass accessible through NL's existing forestry infrastructure.
15. Nalcor appropriately excluded solar photovoltaic (PV) generation in both generation expansion alternatives because of Newfoundland's low insolation rates and the cost of power from solar PV installations.
16. Nalcor appropriately excluded wave and tidal generation in both generation expansion alternatives because of its unproven commercial viability.
17. Nalcor appropriately included the continuation of oil-fired generation in both generation expansion alternatives because it is a proven resource in the Island's generation supply mix.
18. Nalcor appropriately excluded natural gas generation in both generation expansion alternatives because natural gas is not commercially available on the Island and there are, as yet, no firm development plans to bring natural gas to the Island.
19. Nalcor appropriately excluded liquefied natural gas (LNG) generation in both generation expansion alternatives because there is no clear economic advantage to using LNG given the required capital for LNG-related facilities, coupled with the linkage of long term LNG pricing to oil.
20. Nalcor appropriately excluded coal-fired generation in both generation expansion alternatives because of its significant environmental risks.
21. Nalcor appropriately excluded nuclear generation in both generation expansion alternatives because of provincial legislation, project capital costs and risk factors.
22. Nalcor's forecast methodology is consistent with generally accepted utility practice and the base forecast for demand and energy growth is reasonable.
23. Absent new supply, the Island will experience a capacity deficit in 2015 and an energy deficit in the 2020 timeframe
24. Nalcor could consider the impact of a longer term CDM initiative.
25. Nalcor's risk assessment analysis for Muskrat Falls and the Labrador-Island Link project was thorough and comprehensive.

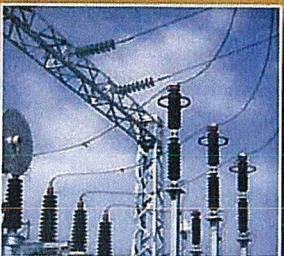
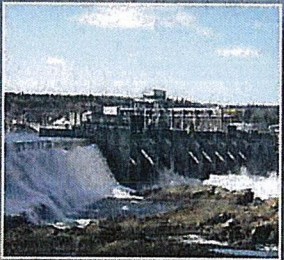
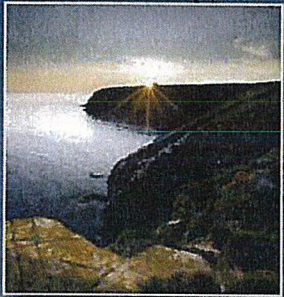
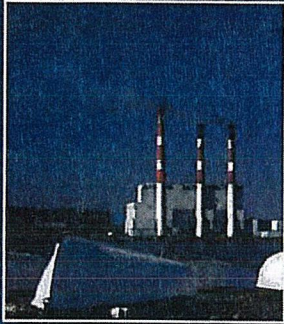
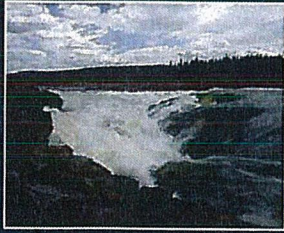


26. Nalcor's focus on time, tactical and strategic risks for the Muskrat Falls and Labrador-Island Link is consistent with best practices and provides a high level of confidence in the integrity of capital cost estimates.
27. Nalcor's estimated capital costs and escalation methodology for the various supply options considered in the two generation expansion alternatives was reasonable.
28. The fuel cost forecast used by Nalcor in its analysis of the generation expansion alternatives was reasonable.
29. The heat rates, operating and maintenance costs, operating lives, projected retirements, and outage rates used by Nalcor in its analysis of the generation expansion alternatives were reasonable.
30. Nalcor could consider how future environmental legislation, such as limits on the unit emission rates for fossil-fuel fired generation that could force the closure of Holyrood or the introduction of carbon pricing that would increase thermal production costs, would affect its supply alternatives.
31. The Muskrat Falls pricing approach used by Nalcor was appropriate and sufficiently well defined for the purposes of 1) estimating the Muskrat Falls power purchase price, and 2) informing the DG2 decision.
32. Nalcor's use of the Strategist model in developing the two generation expansion alternatives is consistent with generally accepted utility practice.
33. The CPWs for the generation expansion alternatives fairly represent the costs that would be incurred under the alternative supply futures. Therefore, the \$2.2 billion CPW preference for the Interconnected Island alternative is a reasonable estimate of the expected cost difference between the two alternatives.
34. The sensitivity cases run by Nalcor and Navigant capture the key risks in the assumptions for, and the impacts of potential refinements to, the generation expansion alternatives.
35. All of the sensitivity cases maintained the CPW preference for the Interconnected Island alternative. This clearly indicates that the DG2 decision preference for the Interconnected Island alternative was robust given the underlying risk and uncertainty in key assumptions in the generation expansion alternatives.
36. The CPW preference for the Interconnected Island alternative is maintained after adding more wind or CDM to the Isolated Island alternative.



Report on Two Generation Expansion Alternatives for the Island Interconnected Electrical System

Volume 1: Summary of Reviews



January 2012

Key Findings

MHI found that Nalcor's work and that of the consultants they engaged is well-founded and generally in accordance with industry practices as of DG2 with certain significant exceptions noted in these key findings. The key findings of MHI's review are summarized below.

Load Forecast Findings

1. **Forecast Preparation** – A detailed analysis of Nalcor's load forecasting practices and methodologies confirms that the load forecast has been performed with due diligence and care using generally accepted practices, except as noted in key finding #2.
2. **Load Forecast Accuracy** – The domestic forecast methodology is acceptable, but consistently under-predicts future energy needs at a rate of 1% per future year. The domestic forecast is entirely prepared using econometric modeling techniques. Although these techniques are acceptable, they are not the best utility forecast practices for this sector. Best utility practices would incorporate end-use modeling techniques into the forecasting process so that electricity growth can be quantified for all major domestic end-uses.

The general service forecast methodology used by Nalcor is based on a combination of regression modeling and linear extrapolation techniques that have performed extremely well in the past. The general service forecast has produced accuracy levels within 1-2%, as far as 8-9 years into the future.

The industrial forecast is prepared on an individual, case-by-case basis, with direct customer contact concerning future operational plans. This methodology is reasonable considering the small industrial customer base on the island, but, in hindsight, the assumption of continued operation of two pulp and paper mills was too optimistic and has adversely affected the industrial forecast accuracy. The assumption of continued operation of the one remaining pulp and paper mill throughout the forecast horizon is optimistic and the assumption of no new industrial load additions after 2015 is pessimistic. The amount of variability due to potential load changes is high and could materially impact the results of the cumulative present worth analysis.

Generation Resource Planning Process Findings

3. **Options for Review** – Nalcor has an exhaustive process for reviewing generation options that is in keeping with leading North American utilities. The *Strategist* software used by Nalcor to evaluate and select a preferred generation development scheme is appropriate. It should be noted that the addition of a large industrial load on the island or in Labrador could result in a different generation expansion plan.