

Date : 10/22/2012 11:32:28 PM
From : "Paul Wilson"
To : "Bown, Charles W."
Subject : RE: Update
Attachment : Final MHI DG3 report - Executive summary.pdf;

Hello Charles, please find the revised executive summary up to the Key Findings Section. I have included the contextual statement about MHI's engagement, that we are to find the least cost, and a definition of CPW. The attached PDF document is the same but will show what has been changed.

Regards,
Paul Wilson

Executive Summary

The Government of Newfoundland and Labrador, Department of Natural Resources, retained Manitoba Hydro International Ltd. (MHI) to provide an independent assessment of two generation supply options, as prepared by Nalcor Energy (Nalcor) in preparation for Decision Gate 3, for the future supply of electricity to the Island of Newfoundland. MHI is to determine which option is the least cost based on the updated cost and technical data provided by Nalcor. The least cost metric for each option is computed by application of the cumulative present worth (CPW) method.

The CPW approach is an acceptable method by which to measure the present worth of alternative options. It focuses only on costs, including capital expenditures for the construction of new facilities, operating costs, fuel costs, and the cost of purchased power. The preferred option is the one with the minimal CPW outcome for the costs considered over the study horizon.

Manitoba Hydro International Ltd. has reviewed the selected technical material, cost estimates, and schedules provided by Nalcor to MHI for two power supply options to serve the forecasted load on the Island of Newfoundland until 2067.

One of the options, known as the Interconnected Island option because power would be fed to the Island of Newfoundland, is largely a hydroelectric generation plan, with 824 MW from a hydroelectric generating station and 670 MW from thermal generating stations. The thermal plants are largely used to provide reliability and capacity support to the system and are only used when operational contingencies arose. Power from Muskrat Falls Generating Station on the Lower Churchill in Labrador would be fed to Newfoundland over the Labrador Island Link HVdc transmission line that will cross the Strait of Belle Isle. The cumulative present worth (CPW) of the Interconnected Island option was estimated at \$8,366 million in 2012 dollars, which includes the present worth of the capital costs (\$6,202 million), operating and maintenance costs, fuel purchases, and power purchase agreement costs.

The other option, known as the Isolated Island option because all generation would originate in Newfoundland, is largely a thermal generation plan, with 1,890 MW from thermal generating stations, 77 MW from mini-hydroelectric generating stations, and 279 MW from wind farms. The CPW of the Isolated Island option was estimated at \$10,778 million in 2012 dollars, including \$6,706 million in fuel costs.

The current review of the options was based on material provided by Nalcor since November 2010 in preparation for Decision Gate 3, the milestone to give project sanction. To perform this review, MHI assembled a team of specialists with expertise in load forecasting, risk analysis, hydroelectric generation, HVdc engineering, system planning, and financial analysis. As part of the review process, team members met with Nalcor representatives and their consultants to review the new information available on the options.

Several key findings on Nalcor's work came to light during MHI's current review. They are highlighted here to help convey the depth and extent, and reasonableness, of the refinements made to the two options.

From: Bown, Charles W. [mailto:cbown@gov.nl.ca]
Sent: October-22-12 5:15 PM
To: Paul Wilson
Subject: Update

Good to see you today. Please send the updated paragraph(s) in the Exec Summary when its done rather than wait for a new draft. That will expedite matters.
Safe travels.
Chares

Sent Via BlackBerry

"This email and any attached files are intended for the sole use of the primary and copied addressee(s) and may contain privileged and/or confidential information. Any distribution, use or copying by any means of this information is strictly prohibited. If you received this email in error, please delete it immediately and notify the sender."

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Key Findings

Interconnected Island Option

The Interconnected Island option for Decision Gate 3 has the following component mix: a 900 MW Labrador Island HVdc link, a total of ten 50 MW CTs (combustion turbines) installed of which three are replacements, and one 170 MW CCCT (combined cycle combustion turbines). There was some realignment of the generating station at Muskrat Falls as a result of detailed design modeling. Nalcor also specified the size of the synchronous condensers to support the Labrador Island Link HVdc system.

Load Forecast. The Load Forecast for the Interconnected Island option showed an increase in domestic load for the period to 2029, which was expected due to higher economic forecasts for personal disposable income and population. However, the general service sectors show a decrease, which would appear to be conservative as it normally mirrors domestic load. The industrial load does not include any new accounts over the entire time-span, which is very likely conservative. MHI finds that the Load Forecast for the Interconnected Island option is well founded and appropriate as an input into the Decision Gate 3 process.

AC Integration Studies. MHI's review of the ac integration studies for the Interconnected Island option indicates that Nalcor is in compliance with good utility practices. It also found that there is an opportunity, during detailed design, to optimize final configurations that may enhance system reliability.

HVdc Converter Stations. An assessment of the technical work completed by Nalcor and its consultants on the HVdc converter stations, electrode lines, and associated station equipment showed the work was reasonable as an input to the Decision Gate 3 process. MHI has notified Nalcor of some project improvements which could be made during the detailed design phase, with little impact on the CPW result.

HVdc Transmission Line, Electrode, and Collector System. MHI reviewed the cost estimates, construction schedules, and design methodologies undertaken by Nalcor and its consultants for the HVdc transmission line, electrode, and collector system. In our opinion,