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November 6/12

MHI LOAD FORECAST

Summary of MHI Report on Load Forecasting (pp. 16-23)

p. 16 - 2012 load forecast compared to 2010 Load forecast - higher over 20 year forecast period (charts on pp. 16-17)

p. 17 - total Island energy and peak requirements will be greater than 2010 load forecast

p. 18 - by 2029 there will be more total customers (34496)
- 2010 more reasonable re general service forecast and representative of the economy with moderate, consistent growth

p. 19 - 2012 PLF will be 22MW greater than 2010 forecast

p. 19 - Total Island energy and peak requirements expected to grow at a steady rate over the next 20 years
- forecasted growth levels very similar to historical growth over last 40 years
- one concern that forecasts over extrapolation period (2021-67) are too low
- reductions in future growth are significant and may be overly conservative
- * to show of annual peak growth can be achieved by adding only 1565 electric space-heating homes per year

p. 20 - MHI considers 20 year forecast rate for domestic sector be reasonable
- 2010 forecast for general service sector, expected to grow over 20 year, now reasonable
- 20 year forecast for industrial sector expected to grow

pp. 22-23 - Summary - increased domestic load in 2012
- lower forecast for commercial business investment conservative
- industrial forecast does not include any potential increase
- Interconnected Island more sensitive to large increase in load

p. 23 - MHI finds that Interconnected Island forecast is well-founded and appropriate as an input in DGS process

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NLH REPORT – LOAD FORECAST / DEMAND (Ch. 2)

p. 16 – was 2012 load forecast conducted w/ due diligence, skill and care
– compares 2010 Load Forecast to 2012
– 2012 energy and peak forecasts are higher over the 20 year forecast period (2012-2031) – Figures 4 and 5

p. 17 – Comparison of 2012 and 2010 forecasts – Table 1
– 2012 – total Island energy and peak requirements will be greater than 2010 Load Forecast by 184 GWh and 10 MW
– 2029 – greater than 2010 by 222 GWh → increase due to higher domestic sector forecast, which is result of higher customer forecast and higher average use forecast

p. 18 – By 2029 more total customers (3,496) and electric space-heating customers, primarily due to higher actual customers growth in 2010/11 than forecast

TABLE 2 – key economic assumptions and domestic consumption variables
→ higher personal disposable income and population forecasts

– general service forecast – visually an increase in # of domestic customers and relative prosperity will lead to increase
– NLH considers general service forecast in 2010 more reasonable and representative of an economy of moderate, consistent growth

p. 19 – By 2029, 2012 MF option predicts that total Island interconnected peak will be 41 MW than 2010 Load Forecast
– By 2020, 2012 PLF predicts that total Island energy and peak requirements will be greater than 2010 PLF by 144 GWh and 22 MW, respectively

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Comparing of 2012 Interconnected Option of Historical Growth

p. 19 - Total Delivered energy and peak requirements are expected to grow at a steady rate over the next 20 years
- forecasted growth levels are very similar to historical growth over last 40 years
- no concern that forecasts over extrapolation period (2031-2061) are too low
- reductions in future growth are significant and may be overly conservative
* - to show if annual peak growth can be achieved by adding only 1565 electric space-heating customers per year, which lower than average of 3551 per year over last 10 years (2001-2011)

p. 20 - Comparing to Historical Growth - Table 3
- 20 year forecast growth for domestic sector (56 GWh) is expected to be less than 10 year historical growth → most electric space-heating conversions have already occurred
- economy is expected to outperform historical period
- MHI considers 20 year forecast rate for domestic sector to be reasonable.

- 20 year forecast rate for general sector similar to 20 year historical growth
- 2012 forecast for general service sector appears to be conservative
- 2010 forecast, which MHI considers to be more reasonable, predicts that general service sector will increase over 20 year period

- 20 year forecast growth rate for industrial sector expected to grow (due to consumption of continued operation of CBPPL)

- 20 year forecast for other sector similar to 40 year historical growth rate
- total Delivered energy similar to 40 year (117/155)
- total Delivered peak 16% lower than 40 year (25/21)

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p. 24 - Forecast Accuracy
- Past domestic forecasts have been reasonable but have under-predicted future energy needs

- In the past industrial sector forecast has not performed well
- Assumption of contracted capacity at Stevile & CFW makes overly optimistic
- Total Diesel energy forecast is prepared by summing the 4 sector forecasts and therefore the industrial forecast has affected results for total Diesel energy requirements.

- Diesel energy requirements would be under-forecast if industrial forecasts were accurate

Summary - pp 22-23
p. 22 - increased domestic load by 326 GWh by 2029 → increase reasonable and improvement over 2010 load forecast
- lower forecast for commercial business investment conservative
p. 23 - industrial forecast does not include any potential increase for new industrial customers after expansion of Voisey's is completed ∴ industrial forecast should contain some allocation for potential future industrial loads

- Other than over-prediction as a result of help and paper closures the total Diesel energy and peak forecasts have performed extremely well
- Primary concern is that forecasts over extrapolation period are too low
- Interconnected Diesel option is more sensitive to large increase in load

x - Note finds that Interconnected Diesel forecast is well-founded and appropriate as an input into DG3 process.

DG3 #s

Capital Cost Summary DG2 to DG3
$2012 Billion*

	Newfoundland and Labrador Nalcor Energy		Nova Scotia Emera	Overall Project Total
DG2 Concept Selection Estimate November 2010	Muskrat Falls Generating Plant & Labrador Transmission	Labrador Island Link & Strait of Belle Isle Crossing	Maritime Link	$6.2
	$5.0		$1.2	
DG3 Sanction Estimate October 2012	Muskrat Falls Generating Plant & Labrador Transmission	Labrador Island Link & Strait of Belle Isle Crossing	Maritime Link	$7.4
	$6.2		$1.2 *Cost not final and are expected to change. Maritime Link is still under review prior to Nova Scotia Utilities and Review Board Filing*	

*Excludes IDC or Interest during Construction

Cumulative Present Worth (CPW) Summary DG2 to DG3

CPW represents the estimated cost in today's dollars to construct, operate and maintain each system proposed until 2067. This standard utility analysis determines which generation option is the least cost option. The analysis concluded that the CPW for the Interconnected Island option is approximately $2.4 billion less than the Isolated Island option which verifies Muskrat Falls as the least-cost option for meeting energy demands in the province and the option which will provide consumers with lower electricity bills.

	Interconnected Island (Muskrat Falls)	Isolated Island (Holyrood)	CPW Difference
DG2 November 2010	$6.6	$8.8	$2.2
DG3 October 2012	$8.4	$10.8	$2.4

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Oct 30/12 — TECHNICAL BRIEFING — NALCOR
DG3 #s

p.3 - Heritage Link of $1.2B (NW 110) → numbers expected to change
- Sanctioning decision in 2013
p.4 - costs increases for both Hydro and MF (from 5% in DG2 to currently over 50%)
p.5 - engineering work for MF
- costs have increased w/ greater project definition but much greater confidence in estimate
- design enhancements since DG2 → much more robust & reliable design
p.6 - DG2 vs DG3 Chart ($6.2B to $9.4)
p.7 - MF ($5.0B - $6.2B) - DG2 vs DG3

pp. 8-9 - DG3 costs as a result of
- greater definition and design improvements w/ engineering over 50% complete
- overlay transmission more robust and reliable
- transmission voltage optimized to reduce line losses
- MF powerhouse reorientation to maximize energy output
- MF excavation & concrete quantities increased
- total project period have increased from 15m to 20m
p.10 - cost estimate chart
- HVdc Transmission - $481m (p.11) DG2 base estimate - 3.9B
- MF Structures - $267m (p.12) (out of $5.0B)
- Engineering & Project Management - $166m (p.13)
- Site Services - $121m (p.14) DG3 base estimate - 5.4B
- HVac Transmission - $90m (p.16) (out of $6.2B)
- Other (Converters, SOBI, MF Site, Land) - $192m (p.17)
- 2010-12 Adjustment - $176m
- Contingency & Escalation - $130m
- Switchyards - $126m (p.14)

②

p. 18 - Estimate confidence
p. 19 - Schedule - First fuel in 2017
- later units begin to be impacted in 2017

p. 33 - CPW - standard industry metric used in making an apple to apple cost comparison to determine lowest cost generation alternative
- compares alternatives by weighing all future costs (capital cost, operating & maintenance costs, fuel costs, financing costs, cost of nuclear power)

p. 34 - Cost of FLG included - § 2.4 preferred

p. 35 - CPW has changed - decrease in fuel forecast (10-15%) from 082
- increases to capital costs
- discount rate changed from 8-7%
- financing costs decreased
- included of FLG at 063
- adjustment from 2010 to 2012
- inclusion of more wind

p. 39 - Sensitivity analysis

p. 44 - Conclusions
- Natural underlying Brent forecast is $110 US in today's currency
- would have to decrease to $50 US to make MH equal to Keeyask

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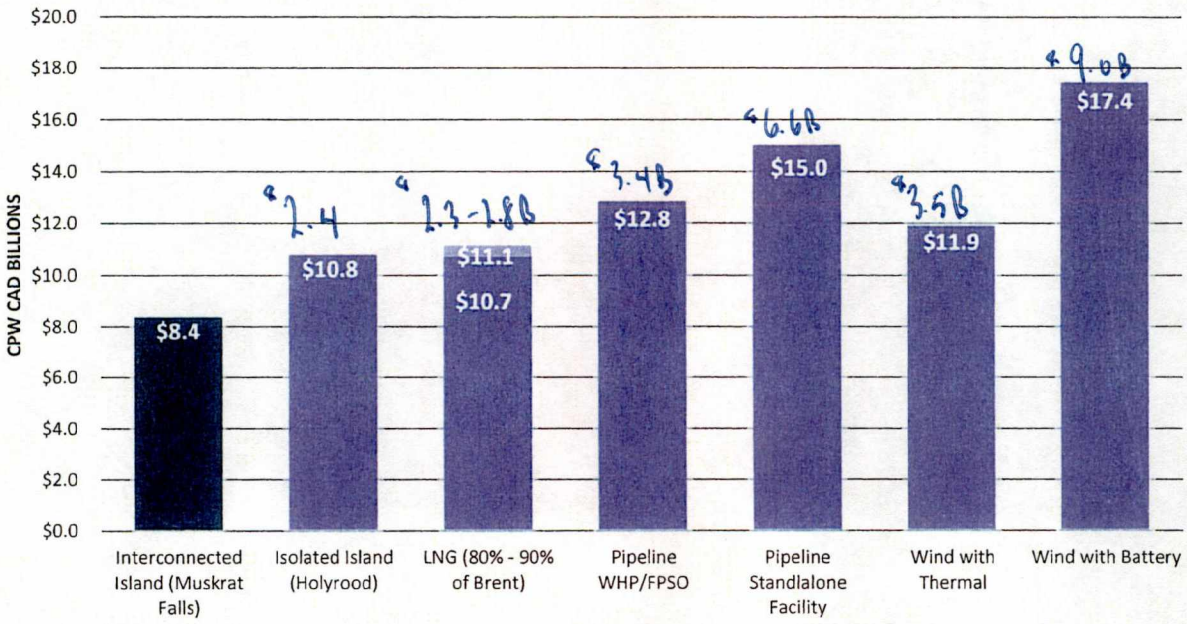
Newfoundland Labrador

CPW

backgrounder

Cumulative Present Worth of Alternatives



Cumulative Present Worth Analysis (CPW) is the industry standard for comparing development opportunities. A CPW analysis compares the alternatives by weighing all future costs, including capital costs, operating and maintenance costs, fuel costs and power purchase agreements. The option that is shown to have the lowest CPW over the project life will have the lowest cost and is therefore the preferred option.

MF – $8.4

Holyrood – $10.8

LNG – $10.7 - $11.2

WIND WITH THERMAL – $11.9

PIPELINE (FPSO) – $12.8

PIPELINE (STANDALONE) – $15.0

WIND WITH BATTERY – $17.4