

Date : 10/15/2010 3:38:47 PM

From : "Parsons, Paul O"

To : "Collins, Gerard"

Subject : presentation

Attachment : Future Island Supply Oct 2010.ppt;

# Future Island Electricity Supply

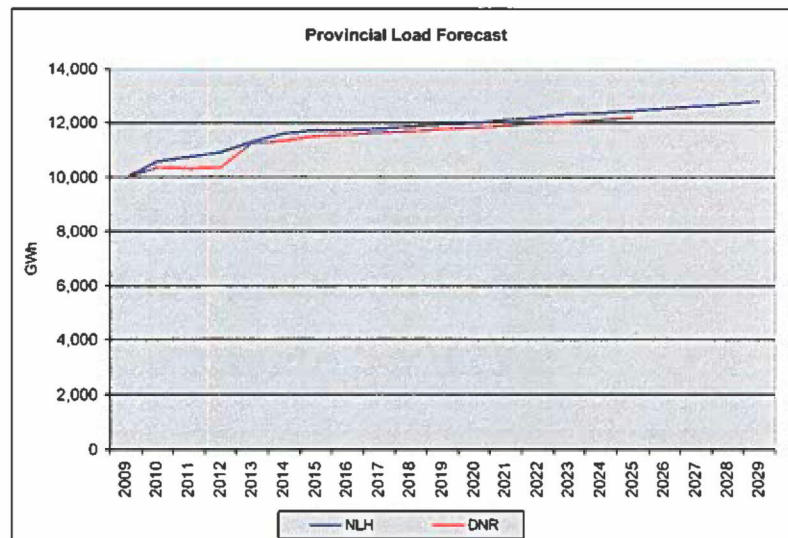
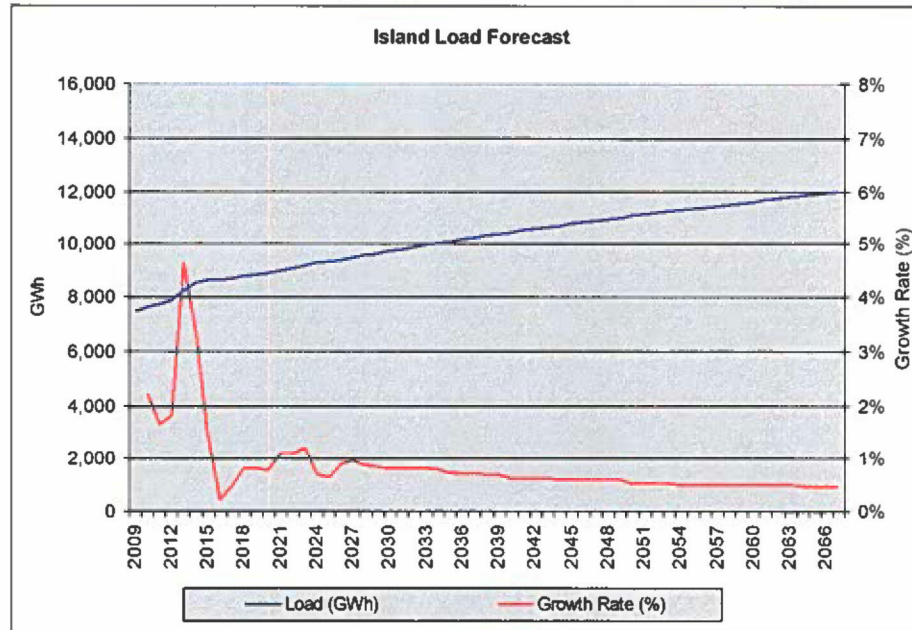
October 2010

## Overview

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- Island Electricity Forecast
- Generation Expansion Scenarios
- Revenue Requirement
- Fuel Costs
- Next Steps

# Island Electricity Forecast



- Island energy load forecast:
  - 2010 7,585 GWh
  - 2020 8,872 GWh
  - 2041 10,493 GWh
  - 2067 11,979 GWh
- Growth Rates:
  - 2010 to 2041 1.1% annual avg.
  - 2010 to 2067 0.8% annual avg.
- Efficiency & Conservation not explicitly incorporated in forecast. NLH models technological change variables (trend variables with negative coefficients) in domestic & commercial to capture overall trends.
- The more material requirement for a Labrador supply future is to meet the objectives of the Energy Plan and displace exiting Holyrood thermal production, which is the cornerstone of the isolated system. Moreover, under an Island Isolated system, Holyrood will require replacement in the 2033-2036 period.
- Electric space heating is a key driver for domestic & commercial.
- DNR does not have separate forecast for Island Interconnected. DNR & NLH total NL forecasts are consistent for total provincial.

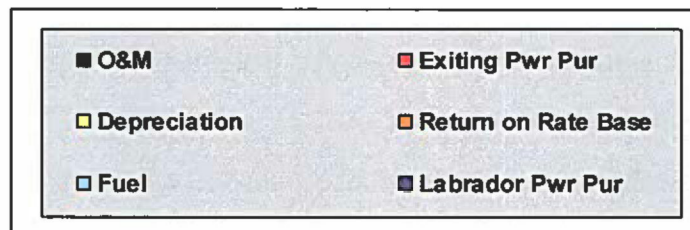
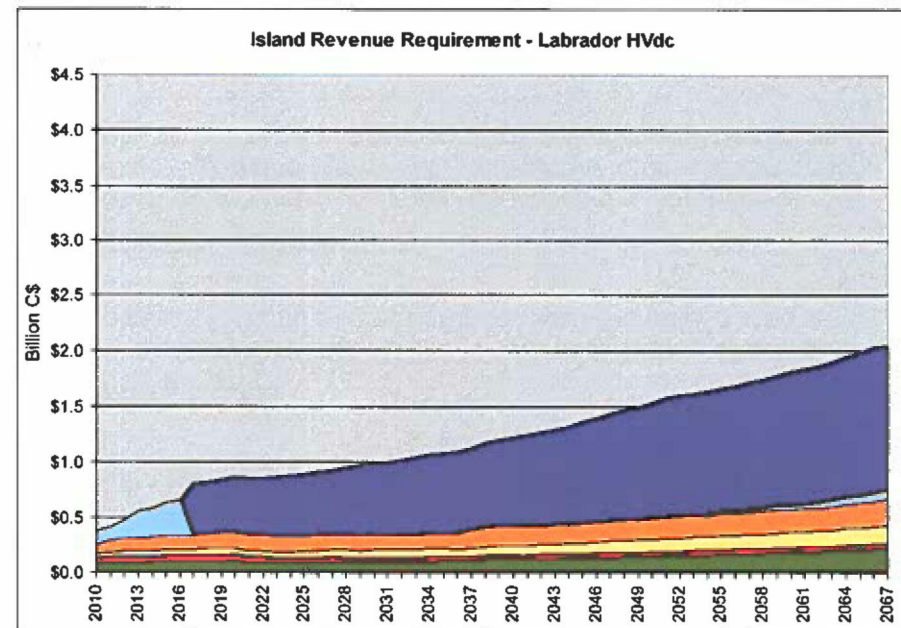
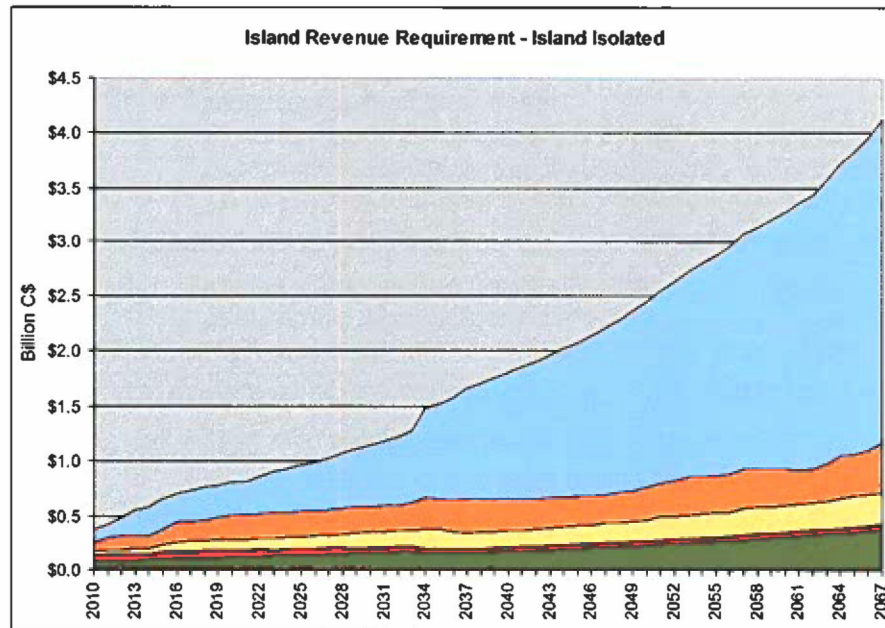


# Generation Expansion Scenarios

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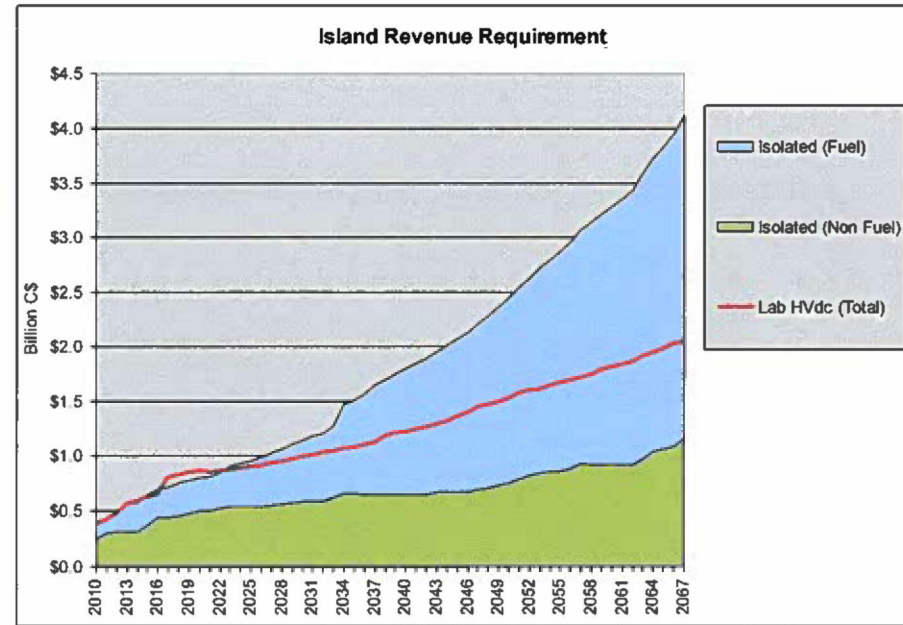
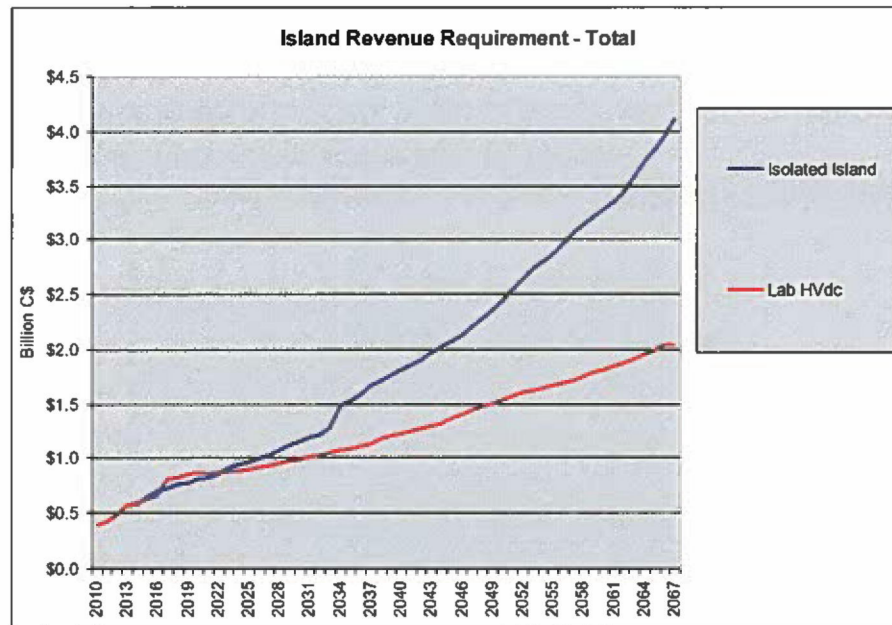
- **Island Isolated:**
  - Primarily an oil-based thermal generation plan with feasible indigenous small hydro and wind resources.
- **Labrador HVdc:**
  - Muskrat Falls with HVdc Island link. Some small hydro short term and longer term thermal for system reliability. Holyrood retired by 2021.
- **Impact of federal/provincial environmental mitigation strategies**
  - For Island Isolated, pollution control equipment (scrubbers ESP and related investments) take place for the Holyrood facility to address SO<sub>2</sub> and particulate emissions. For carbon emissions, these uncertain costs (due to ongoing regulatory and pricing uncertainty) have not been included. Such costs could materially increase Island Isolated utility costs.
- **Have other future Island Isolated supply scenario options been considered**
  - The Island Isolated scenario includes known and feasible indigenous hydroelectric and wind resources.
  - NL offshore gas is not yet a realistic option for current utility system planning.
  - LNG with a regasification facility at Holyrood is being evaluated.
- **Consideration of a Maritime link for purposes of purchasing power**
  - A Maritime link with supply (effectively) from NEISO, has been evaluated as an alternative to Labrador supply and has been found to be higher cost. A maritime link scaled for the purposes of finding a market for surplus Muskrat Falls power supply above Island needs is under active investigation.
- **Options/technologies to improve dispatchability of intermittent sources**
  - To the extent that future technology enables a higher penetration of wind resources on an isolated grid, such gains would occur where warranted. In general, however, a real time generation expansion plan would not speculate on a specific, but future, technology change. An additional consideration for a hydro based system is the increase in water spillage risk as wind penetration increases.
- **Does Labrador HVdc link to Island eliminate Island thermal?**
  - An Island Link scenario eliminates the need for Holyrood (total shut down 2021) and any additional future baseload thermal generation. While there will be some combustion turbines added over the course of the operating life of the Island link in order to preserve standard utility reliability criterion, there is no thermal energy production as such from these facilities. These are there more to maintain an adequate reserve relative to demand in case of emergencies.
- **Island Isolated improved technology case**
  - Know efficiencies gains in new thermal plant relative to existing is incorporated in the expansion plan (ie replacing straight cycle baseload plant with combined cycle plant.)

# Island Revenue Requirement



Cumulative Present Worth (PV @ 8% - Million C\$)		
	2010-2041	2010-2067
Island Isolated	\$9,761	\$12,272
Lab HVdc	\$9,081	\$10,604

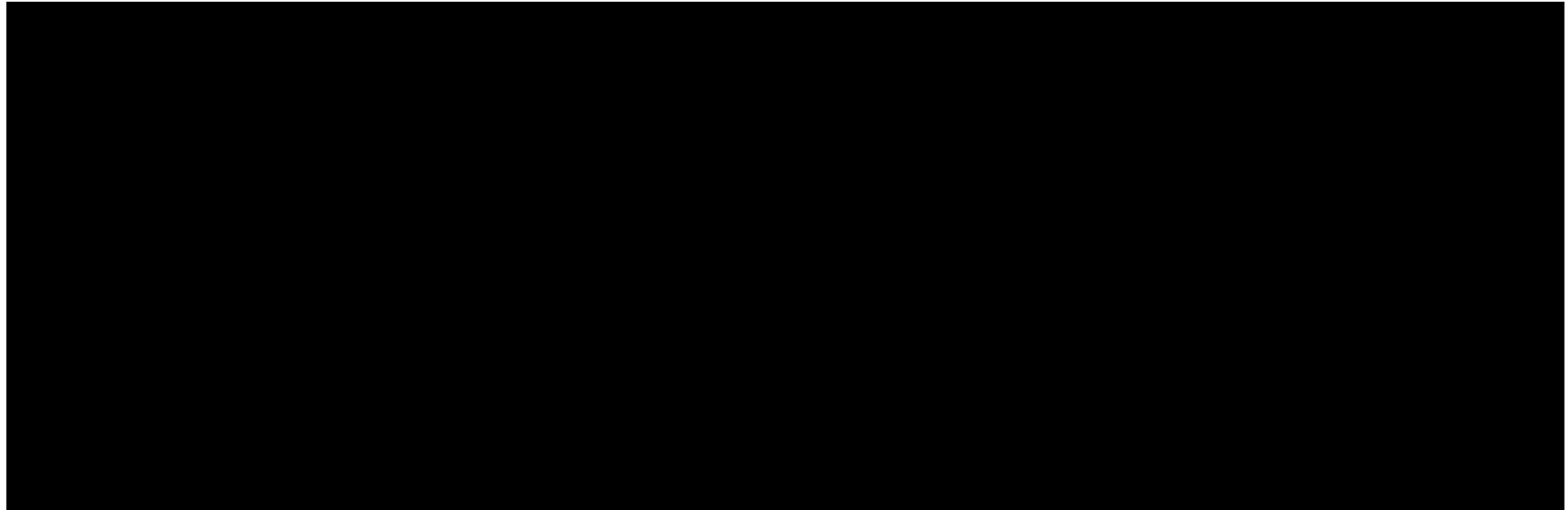
# Island Revenue Requirement





# PIRA Oil Price Outlook Aug 2010

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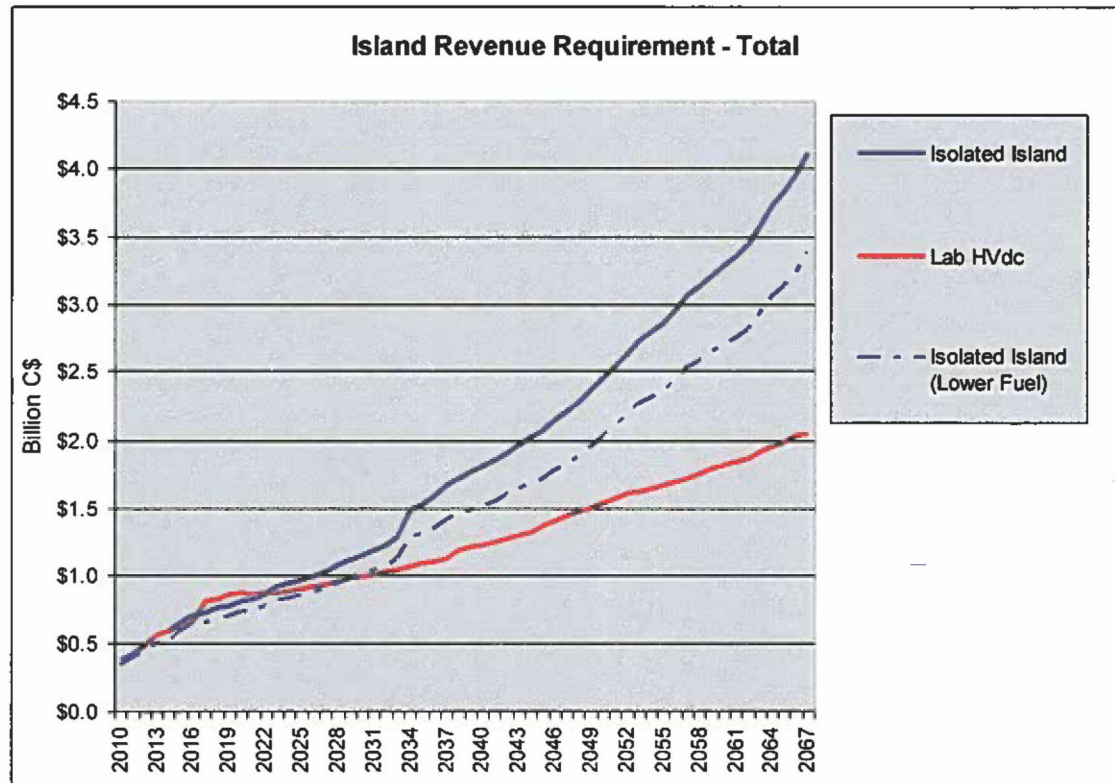


Data in chart from DNR's database of PIRA SPS long term outlook released August 2010. Post 2025 outlook based on assumptions communicated by Nalcor.

PIRA outlook to 2025. Real oil prices are held constant after 2025.

- Long run fuel costs for Holyrood are derived from PIRA Energy 2010 long term WTI crude oil price forecasts (PIRA Scenario Service) based on HFO to crude price relationships. Applying a Bunker Pricing Ratio to WTI crude derives heavy fuel oil prices applicable for Holyrood. For example, the Bunker Ratio for 0.7%<sub>s</sub> HFO is 90%, for 1%<sub>s</sub> HFO is 87% and for 2.2%<sub>s</sub> HFO is 83%. Price projections beyond PIRA's 2025 timeframe are held constant in real terms. A generic 2% inflation rate is used
- The current long run exchange rate assumption is 1CDN\$->\$0.964 US\$.
- A low oil case has been analyzed for generation expansion although CPW analysis but not taken through to a rate analysis.

# Island Isolated Fuel Costs



## Cumulative Present Worth

(PV @ 8% - Million C\$)

	2010-2041	2010-2067
Island Isolated	\$9,761	\$12,272
Lab HVdc	\$9,081	\$10,604
Island Isolated (Low Fuel)*	\$8,673	\$10,749

\* Note: DNR calculation based on simple scalar reduction of fuel costs to 75% of reference case. No other assumed revenue requirement impacts.

## Next Steps

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- Further review of analysis
- Review response to follow up questions
- Update DNR findings
- Other next steps for discussion