Electricity Rates Forecasting:

Muskrat Falls Will Stabilize Rates for Consumers

Department of Natural Resources

November 2012

Newfoundland Labrador

Key Findings

- Historically, Newfoundland and Labrador residents have paid less than the Canadian average for their electricity. Jurisdictions with the lowest rates typically have large hydroelectric generation.
- Electricity rates between 2001 and 2011 for the average ratepayer on the Island have increased 32% or approximately $45 per month, reflecting an annual average increase of approximately 2.8%.
- Electricity rates between 2011 and 2016 for the average ratepayer on the Island are projected to increase by an additional 16% or approximately $30 per month. These increases have nothing to do with the development of Muskrat Falls.
- Hydroelectric power generated from Muskrat Falls will result in lower and more stable electricity rates.
- From 2016 to 2030 without Muskrat Falls, electricity rates for the average ratepayer would increase by 38% or approximately $82 per month over the same period. From 2016 to 2030 with Muskrat Falls, electricity rates for the average ratepayer will increase by 18% or approximately $38 per month. Without Muskrat Falls, the increase to electricity rates will double for the average ratepayer.
- Without the development of Muskrat Falls, Holyrood will have to be used more and the cost of operating Holyrood will increase with rising world oil prices. On average, Holyrood supplies 15-25% of the Island's electricity needs. At peak, the plant burns 18,000 barrels of oil a day and in 2011 fuel costs were $135 million.
- Ratepayers are vulnerable to price volatility and uncertainty with respect to supply and demand related to global oil markets. Crude oil prices are predicted by experts to stay above $100 per barrel.
- Muskrat Falls will reduce the province's dependence on oil. With Muskrat Falls, revenue that Newfoundland and Labrador Hydro previously used to purchase oil will be used to cover the cost of Muskrat Falls. Billions of dollars that would go to international oil companies would be used to pay for a provincially owned revenue-generating asset.

Introduction

The primary objective in delivering electricity to customers in Newfoundland and Labrador is to do so at the lowest possible cost. In the Energy Plan, the Provincial Government identified that, in meeting this objective, its priority was to meet current and future electricity needs with environmentally friendly, stable and competitively-priced power and to maximize the value of any surplus power with export to other markets.

The majority of electricity currently supplied to the Island and Labrador comes from hydroelectric power while wind and thermal sources such as the 490 megawatts (MW) oil-fired plant at Holyrood, gas turbines and diesel generation provide the remainder. The Holyrood plant is a major component of the province's generation fleet and historically, it has generated, on average, 15% to 25%[1] of the electricity on the Island. However, during the winter period when demand is at its highest, the facility provides up to 30% of the Island's electricity needs. As the operation of the facility is ultimately tied to the price of oil, this means that the cost of operating Holyrood has increased with rising world oil prices. This source of generation is expensive and oil prices are forecast to continue to increase into the future.

New electricity generation is required when the current supply is identified as not being sufficient to meet forecast demand. A separate paper, "Electricity Demand Forecast: Do We Need the Power?" establishes that increasing demand for electricity on the Island will necessitate new generation. That paper concludes that electricity demand is strongly linked to economic growth and that continued forecast growth in the provincial economy will result in increased residential, commercial and industrial demand.

This paper discusses the factors currently affecting electricity prices and compares the average monthly electricity bills for residential customers under two generation expansion scenarios. The analysis of electricity costs clearly demonstrates that, in order to meet new electricity demand on the Island and at the same time ensure stable electricity rates for customers, constructing the Labrador Island Link (LIL) and delivering Muskrat Falls power to the Island, is the least-cost alternative compared to continuing our dependence upon the Holyrood oil-fired thermal plant.

Electricity Rates

How Electricity Rates are Set

Electricity rates in this province are designed to ensure that the province's electrical utilities, Newfoundland Labrador Hydro (NLH) and Newfoundland Power (NP), are able to recover the costs of generating and distributing power to ratepayers. For example, NLH's revenue requirement to cover costs includes both its capital and operating costs plus an allowed rate of return on rate base,

(i.e. the rate base includes the physical assets purchased through capital such as power plants, transmission lines, substations, and buildings). Rates are then set at a level that will provide the total required revenue[2].

There are a number of factors that influence electricity prices in the province; chief among these is oil prices. Other factors include maintenance costs on generation plants and transmission lines to keep assets operating safely, efficiently and reliably as well as unforeseen maintenance caused by equipment failure or weather conditions such as freezing rain and high wind.

In many countries, consumers have been required to pay a carbon tax based on the amount of fossil fuels used by their generation utility.[3] This tax is either paid directly by the consumer or indirectly through increased fuel costs. Canada has not yet imposed a carbon pricing model. However, pending regulations for coal-fired electricity plants and policy discussions surrounding oil-fired plants suggest that the costs of generating electricity with oil will likely increase as a result of new environmental regulations.

Factors Influencing Rates in Newfoundland and Labrador

Global Oil Markets

The world currently consumes approximately 90 million barrels of oil a day. This level of consumption is expected to increase due to the development of emerging economies in places such as China and India. Approximately one third of the oil which meets the demand of these, and other large economies such as the United States, comes from the Middle East. Due to the fact that the oil which supplies these economies is located largely in a politically unstable region, and controlled by a small number of oil-producing countries, “events” in the Middle East, such as the Arab Spring or the war in Iraq, can have short term impacts on both the supply and price of oil. History demonstrates that there is an “event” every three years on average.

It is important to note that despite these short-term anomalies, the long-term price of oil is forecast based on market fundamentals of supply and demand. Long-term forecasts indicate that the price of Brent crude oil will most likely be above $100 per barrel.[4] This is largely because demand is increasing, especially from the global middle class – a group which is growing at a rate of 80 million people each year. At this rate, there will simply not be enough supply to meet this demand and new supply is required. However, new supply is now more expensive to bring online, including deepwater offshore, oil sands[5], and shale oil. This means that as the cost of finding new sources of supply goes up, the price of oil will also go up, resulting in higher prices for customers.

Based on these factors, experts agree that oil prices will continue to rise over time[6], resulting in higher prices for consumers. PIRA Energy Group[7] forecasts that in the long term, global oil prices will rise, due to increasing demand requiring new supply at a higher cost. PIRA estimates that overall oil demand will grow by 1.5% per year over the 2012-2025 period with all of the net growth in the developing world, particularly China, India and the oil-exporting nations. From just under 90 million barrels per day today, oil demand will reach 110 million barrels per day by 2025.[8]

Holyrood

The oil-fired thermal plant at Holyrood represents the biggest challenge for the supply of electricity in the near future, as it requires the burning of heavy fuel oil and is over 40 years old when many similar plants require replacement or refurbishment. The cost of operating Holyrood has increased along with world oil prices, resulting in a large portion of the rate increases for Island and rural diesel customers in recent years. From 2001 to 2011, electricity costs for customers on the Island have risen 32%, on average, or approximately $45 per month. Despite this, the operation of Holyrood is necessary to meet demand.

Holyrood is a major generating facility and provides electricity to meet winter demand and system voltage support. At peak capacity, the 490MW Holyrood plant can supply approximately 30% of the Island's current electricity needs. Holyrood is also necessary to supply electricity during dry periods when there is less water available to generate clean hydropower at Bay d'Espoir and other hydroelectric generating facilities on the Island. During these times, Holyrood is used significantly, burning up to 18,000 barrels of oil per day to ensure consumers needs are met.

An increase in consumer electricity consumption will also increase the amount of time that Holyrood is needed to meet demand. As electricity consumption rises with an increase in the number of residential, commercial and industrial customers, Holyrood will have to be used more than ever to ensure consumer needs are met. This means that electricity ratepayers will be more reliant over time on oil and oil prices.

The price of oil is very volatile and the price that customers in this province pay for their electricity is ultimately tied to the price of oil. In an environment where the price of oil is expected to continue increasing, the cost to electricity ratepayers will also increase.

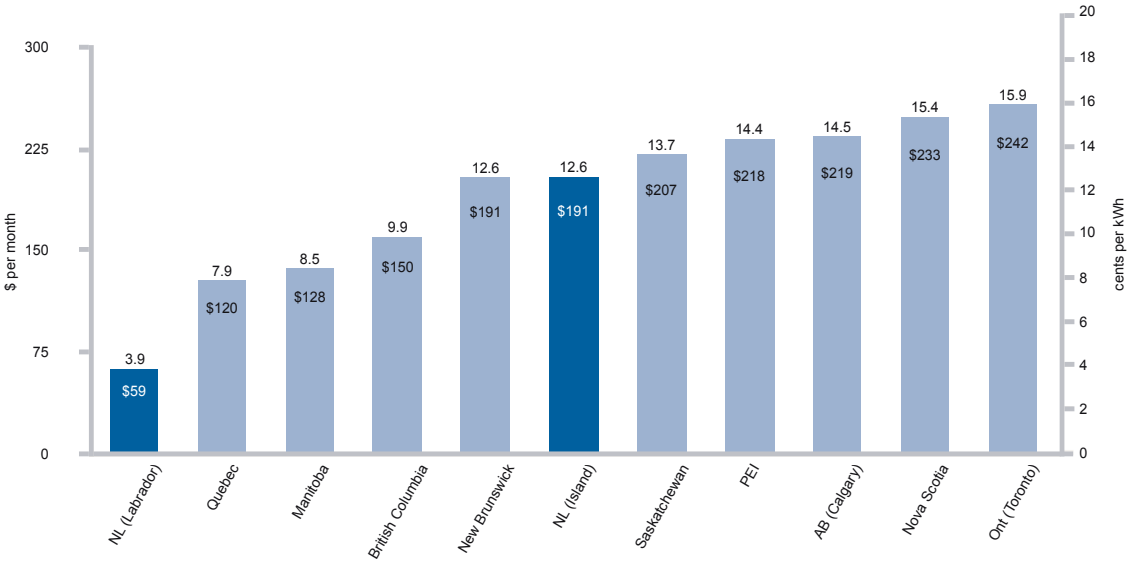
The forecasted increase in the cost of oil, combined with increases in consumption across all sectors in the province, is expected to result in significant rate increases on the Island over the long term. Replacing Holyrood will ensure that ratepayer electricity costs are no longer affected by the volatility of oil prices to meet electricity needs on the Island.

Other Jurisdictions

Historically, residents of Newfoundland and Labrador have paid less than the Canadian average for their electricity, largely due to investments made in hydroelectricity. The trend of below-average prices is forecast to continue with the development of Muskrat Falls. The jurisdictions with the lowest rates in the country are typically those who source their electricity from large hydroelectricity generation such as Manitoba, British Columbia and Quebec. These rates are based on 2012 data and over time rates in both Newfoundland and Labrador and the other provinces are expected to increase.

The NL (Island) rate of 12.6 cents per kWh represents the blended cost of all generation sources on the Island including Holyrood and lower cost hydroelectricity. Also included are distribution costs for Newfoundland Power and sales tax.

Figure 3: Domestic Electricity Rates Across Canada based on 1,517 kWh consumption per month as of September 1, 2012



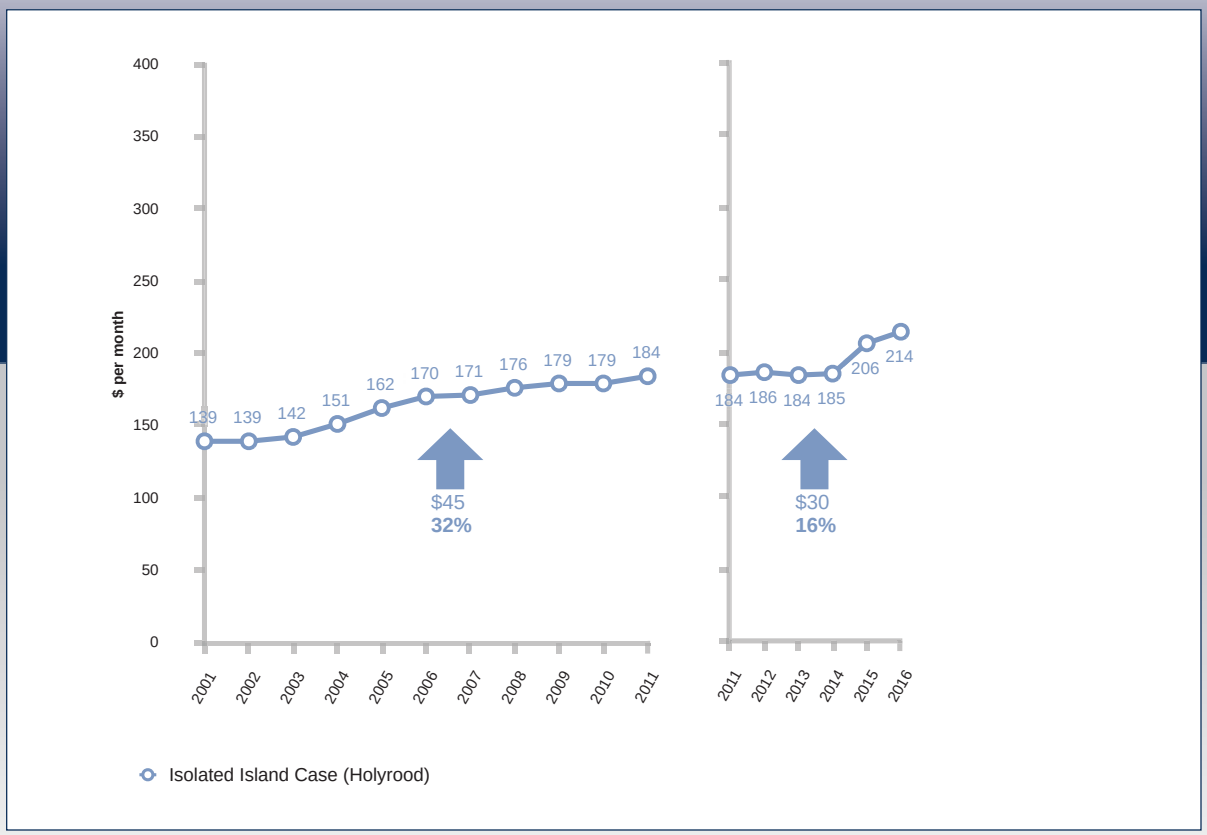
Rates represent average costs and include all taxes and rebates.

Source: The Department of Natural Resources with data from Canadian utilities.

Electricity Cost Growth

The cost of electricity production on the Island is directly linked to electricity demand and oil prices. The chart below shows that ratepayers in this province have experienced significant cost increases over the past decade. The average monthly residential customer bill has risen from $139 per month in 2001 to $184 per month in 2011, and is forecast to rise to $296 per month in 2030 with the continued use of the Holyrood Thermal Generating Station. This means that the average annual increase in electricity rates from 2001-2011 was nearly 2.8% and from 2011-2016 it is forecast to average approximately 3%. Muskrat Falls will put a stop to this increase in rates. In the following section, it will be demonstrated that electricity rates will be more stable with Muskrat Falls and increase only by approximately 1.3% per year up to 2030.[9]

Figure 2: Average Customer Monthly Electricity Bills from 2000 - 2016 (in $ per month)



Electricity Rate Projections

Nalcor has provided two generation expansion options to meet future electricity demand on the Island: Muskrat Falls (Interconnected Island) and the continued use of Holyrood supplemented by wind, small hydro and additional thermal (Isolated Island). In the charts and analysis that follow, the average monthly electricity bill for Island residential customers will be compared for the two generation expansion options.

To illustrate the effects of the Holyrood and Muskrat Falls cases on the 234,000 ratepayers on the Island Interconnected system, average monthly bills were calculated, based on data obtained from Nalcor Energy and NLH, for three unique residential demand profiles.

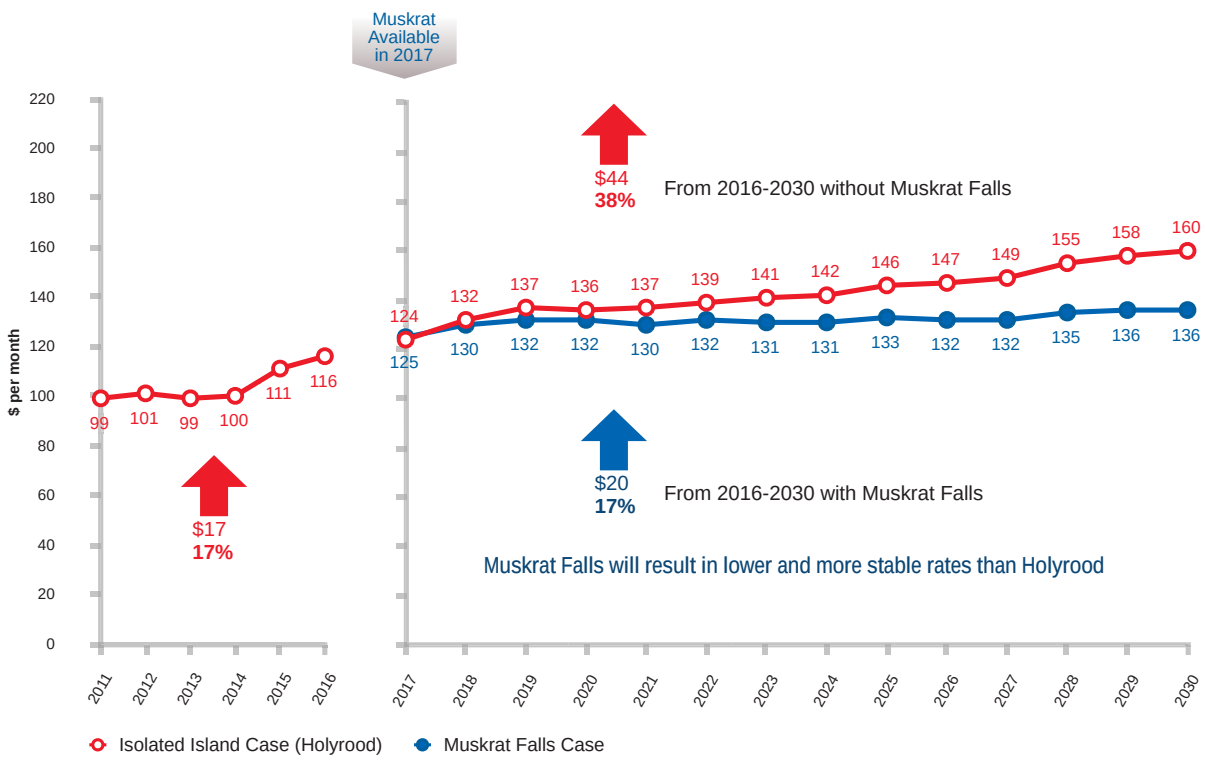
Profile 1: represents an average residential customer who does not use electric space heating. About 90,000 of Island electricity customers, or 38%, meet this definition. Average household consumption is 775 kWh per month.

Profile 2: represents the average residential customer with electric heat. About 144,000 Island customers, or 62%, fall in this category. Average household consumption is 2,058 kWh per month.

Profile 3: represents the average consumption level across all residential electricity accounts (with and without electric space heating) on the Island. Average household consumption is 1,517 kWh per month.

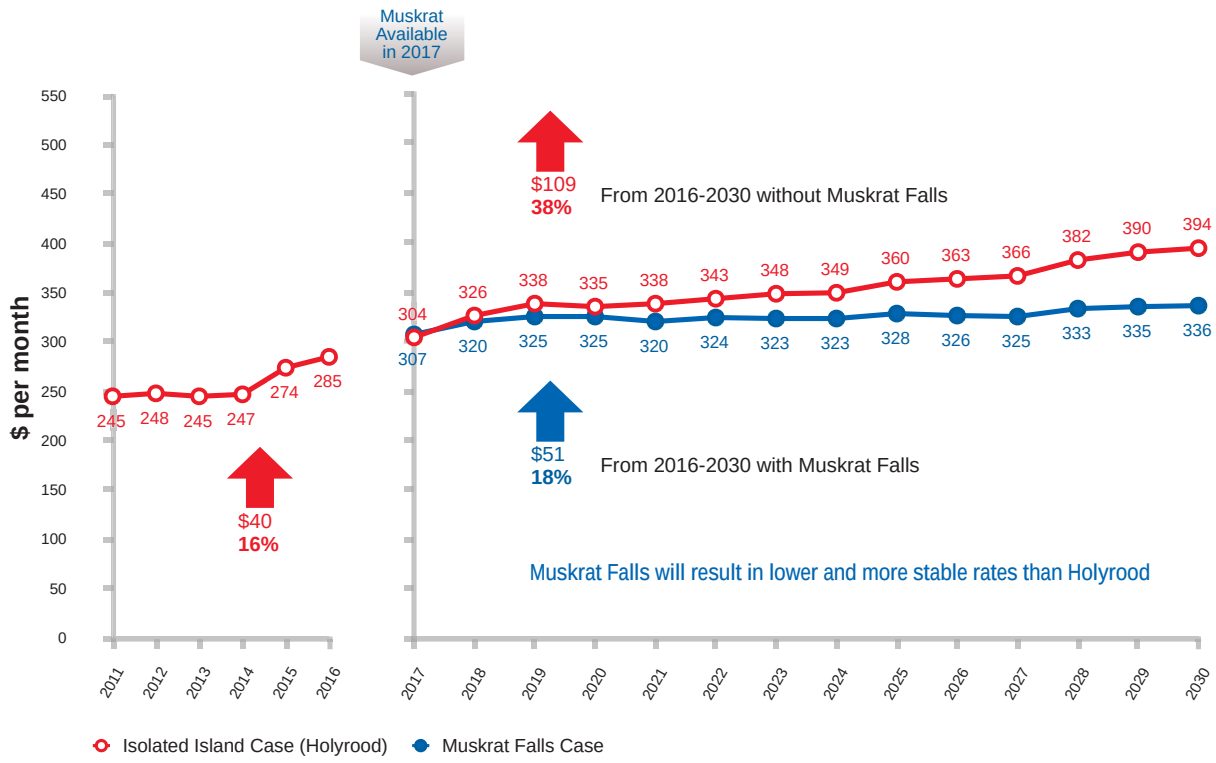
The average monthly bill for each of these customer profiles by year is shown in the following charts based on the latest available information for both the Isolated Island/ Holyrood case (in light blue) and the Interconnected Island/Muskrat Falls case (in dark blue).[10] This data demonstrates that the Muskrat Falls case will result in the lowest-cost power for customers. These projections go to 2030, and are meant to be illustrative and not definitive. The rates until 2012 are based on actual numbers.

Profile 1: Average monthly bill of 90,000 residential customers without electric heat (in $ per month)



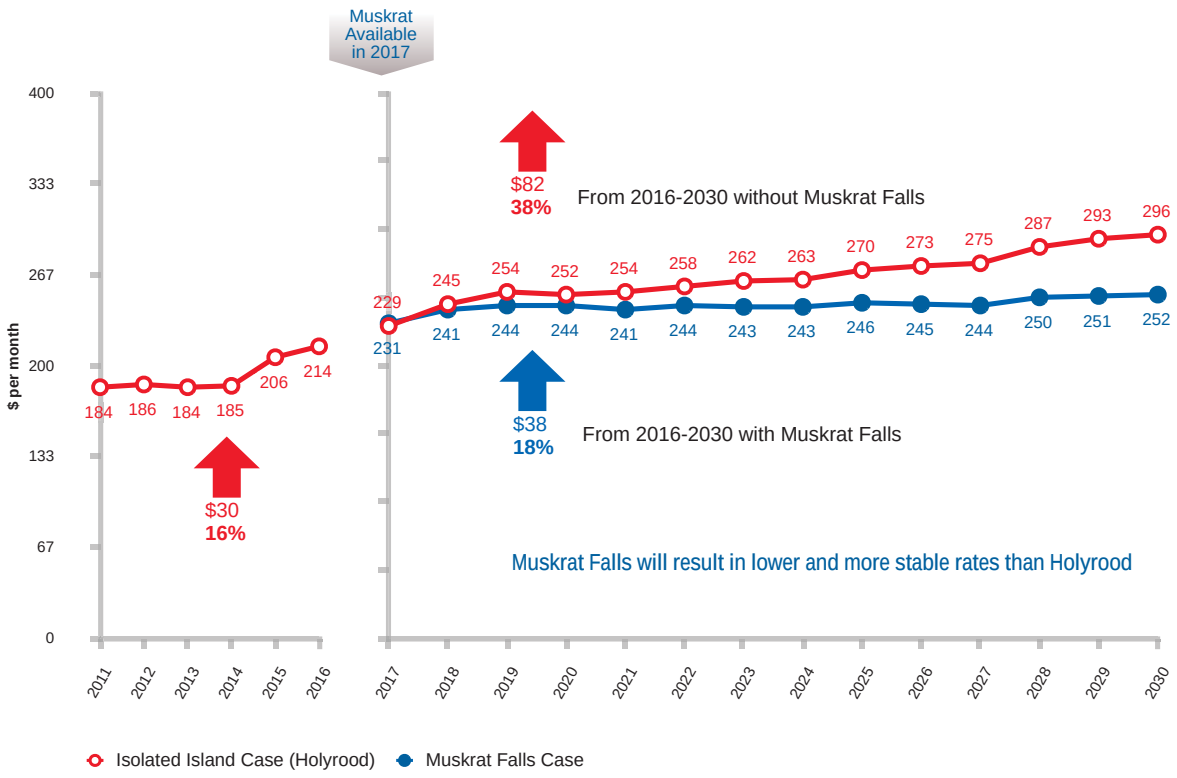
Based on the average monthly electricity consumption of Island customers who do not use electricity as their primary heat source (775 kWh per month); includes taxes; includes provincial HST rebate for years 2011 and beyond; includes estimate for future Newfoundland Power own rate increases for distribution and Newfoundland Power sales growth.; historical bills (2001 to 2011) based on average rates for the entire year as per Newfoundland Power records; data for 2012 and later is based on forecasts as per Decision Gate 3 data.

Profile 2: Average monthly bill of 144,000 residential customers with electric heat (in $ per month)



Based on the average monthly electricity consumption of Island customers who use electricity as their primary heat source (2058 kWh per month); includes taxes; includes provincial HST rebate for years 2011 and beyond; includes estimate for future Newfoundland Power own rate increases for distribution and Newfoundland Power sales growth.; historical bills (2001 to 2011) based on average rates for the entire year as per Newfoundland Power records; data for 2012 and later is based on forecasts as per Decision Gate 3 data.

Profile 3: Average monthly bill across all residential customers (in $ per month)



Based on the average monthly electricity consumption of Island customers (1517 kWh per month); includes taxes; includes provincial HST rebate for years 2011 and beyond; includes estimate for future Newfoundland Power own rate increases for distribution and Newfoundland Power sales growth.; historical bills (2001 to 2011) based on average rates for the entire year as per Newfoundland Power records; data for 2012 and later is based on forecasts as per Decision Gate 3 data.

Analysis

As indicated by the previous charts, all customers will experience an increase in their average monthly heating bills up to 2016. This increase is based on the continued use of Holyrood in both expansion cases until 2016 and is not impacted by Muskrat Falls.

Over the forecast period in the three profile charts, the Muskrat Falls case results in lower electricity bills for consumers compared to the Holyrood case. While the Muskrat Falls case does indicate rate increases over the period, the rate impacts for the Holyrood case are greater and increasing at a faster rate. This means that although rates are going up, Muskrat Falls rates are lower, more stable and more predictable than Holyrood rates. In 2030, under the Holyrood option, the average monthly bill for all Island customers will increase by $82 from $214 in 2016 to $296 in 2030, an increase of 38%. Under the Muskrat Falls case, the average monthly bill for all Island customers will increase by only $38 to approximately $252 in 2030, an increase of 18%.

Muskrat Falls will provide customers with stable rates out to 2030 and beyond, compared with the Holyrood case, and the gap between the two cases, representing the difference in the price of electricity between the two cases, increasingly widens over time.

It is important to point out that not only will Muskrat Falls produce lower electricity rates than the Holyrood case, but it will also put an end to the trend of increasing electricity prices for Island customers which has occurred over the past decade due to the increasing use of Holyrood to meet growing electricity needs.

Conclusion

- Electricity demand in this province will continue to increase over the coming years. It is clear that we need the power. Without the addition of new generation there will not be enough power to meet the demand of homes, business and industries.
- Electricity rates will increase with or without the development of Muskrat Falls but Muskrat Falls will result in lower and more stable rates for consumers compared to the Holyrood (Isolated Island) option.
- To ensure that sufficient power is available and that customers are protected from significant increases in the price of electricity in the future, something must be done.
- Muskrat Falls will mean that the province is no longer reliant on Holyrood to meet demand. Muskrat Falls will eliminate reliance on expensive, foreign oil which has caused an increase in electricity rates in recent years, and will produce rates which are cheaper than rates under the Holyrood case.
- Muskrat Falls will also provide the province with its own revenue-generating asset. With Muskrat Falls, the province will have ownership of a hydroelectric asset that will generate revenue and pay for itself over the lifespan of the project.
- Without the development of Muskrat Falls, customers in this province will continue to experience increases in the rate they pay for electricity. Muskrat Falls will ensure that customers receive a secure and renewable source of power at the least cost possible.

Footnotes

1 Newfoundland and Labrador Hydro, see web page at http://www.nlh.nl.ca/hydroweb/nlhydroweb.nsf/TopSubContent/Operations-Thermal%20Generation?OpenDocument

2 In NL, the rate customers pay for energy includes: a base rate portion based on a forecast of costs for a particular year (Test Year Cost of Service), which is set in the General Rate Application (GRA) and Rate Stabilization Plan (RSP) with the Public Utilities Board (PUB). The RSP is established for NLH's Utility customer, Newfoundland Power, and NLH's retail and Island Industrial customers to adjust rates annually for variations between actual results and Test Year Cost of Service estimates for: hydraulic production; the fuel cost used at NLH's Holyrood generating station; customer load (Utility and Island Industrial); and rural rates.

3 As of July 2012, the following countries have a national carbon tax: Denmark, Finland, France, Ireland, Netherlands, Sweden, UK, Norway, Sweden, Switzerland, Costa Rica, India and Australia.

4 See U.S. Energy Information Administration's Annual Energy Outlook 2012 at http://www.eia.gov/forecasts/aeo/ and PIRA's report prepared for the Government of Newfoundland Labrador, Department of Natural Resources, on October 26, 2012, "PIRA's Forecast Methodology and Assessment of Future Oil Price Trends" at http://www.powerinourhands.ca

5 The threshold price cost to develop new oil sands projects has been estimated at $85 per barrel. See Wood Mackenzie's report, "Oil Sands: margins squeezed by Bakken boom".

6 See footnote 5 above.

7 PIRA Energy Group is an international consulting firm with expertise in energy markets and forecasting, formulates a short and long term forecast based on an outlook of global oil supply and demand.

8 See PIRA's report prepared for the Government of Newfoundland Labrador, Department of Natural Resources, on October 26, 2012, "PIRA's Forecast Methodology and Assessment of Future Oil Price Trends" at http://www.powerinourhands.ca

9 Based on the average monthly electricity consumption of Island customers (1517 kWh per month); includes taxes; includes provincial HST rebate for years 2011 and beyond; includes estimate for future Newfoundland Power own rate increases for distribution and Newfoundland Power sales growth.; historical bills (2001 to 2011) based on average rates for the entire year as per Newfoundland Power records; data for 2012 and later is based on forecasts as per Decision Gate 3 data.

10 All figures include taxes, and reflect the provincial HST rebate for years 2011 and beyond. Historical data reflect actual average rates for the entire year as per Newfoundland Power records; forecast data based on estimates as per DG3 data.

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