

IMPACT OF MASSIVE HYDROELECTRIC INFRASTRUCTURE PROJECTS ON ELECTRICITY RATES IN NEWFOUNDLAND and LABRADOR, MANITOBA AND BRITISH COLUMBIA.

Three large and expensive hydroelectric infrastructure projects are currently under construction in Newfoundland and Labrador (Muskrat Falls), Manitoba (Keeyask) and British Columbia (Site C). Two of the projects are significantly behind schedule and over budget, while the Site C project is facing a financial review by the new government of British Columbia.

The new government of BC plans to review the finances of BC Hydro, but the decision as to proceed or suspend the \$8.8 billion Site C dam project requires immediate action to minimize future costs. Regardless of the review, which will help quantify the cost of the suspension/cancellation option, customers of the publicly-owned power utility will be facing a significant increase in their electricity rates to pay for the losses.

I had previously estimated that either option will result in a rate increase of some 7% for the first decade of operation to cover an \$300 million net increase in operating costs.¹ This estimate depends on many assumptions, including the demand forecast for the additional 5,100 GWh of power.

Opponents of the Site C project cite several reasons for their belief that this expensive project is either premature or entirely unnecessary. These include the loss of agriculture land, aboriginal rights, less expensive alternatives, and a distrust of BC Hydro's demand forecasts.

A recent Angus Reid public opinion survey found that 40% of those questioned believe that the project should proceed, while 29% said the project needs further study and 20% supported immediate cancellation (without knowing the cancellation cost).²

This paper provides a high-level review of the two other hydroelectric infrastructure projects currently under construction, with an emphasis on the impact on the finances of the public hydro corporations, and the rates that will face future customers.

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http://www.bcpolicyperspectives.com/media/attachments/view/doc/occasional_paper_no_33_cost_estimates_of_site_c_24_june_2017/pdf

² https://www.scribd.com/document/351803973/06-20-17-Angus-Reid-Institute-Poll-Snap-Elections#from_embed

MUSKRAT FALLS and the MARITIME LINK

The Churchill River in Labrador is the location of the massive 5,400 MW Upper Churchill hydroelectric dam, which was commissioned in 1974 to supply electricity to Hydro Quebec. Under the terms of the joint funding agreement, Hydro Quebec found itself in the enviable position of purchasing inexpensive power for 65 years, while the price realized on the sale of the power to users (including power exported to the United States) rose dramatically.

During the following decades, the government of Newfoundland and Labrador has failed in its repeated attempts to force Hydro Quebec to re-negotiate the original deal to share in the windfall profits.³ In 2016, for example, the power from Upper Churchill comprised 11% of Hydro Quebec's total power capacity, and the utility paid the Quebec government approximately \$2.15 billion as a dividend on a net income of \$2.86 billion.⁴

Danny Williams, the premier of Newfoundland and Labrador from 2003 to 2010, saw the development of the balance of the Churchill River potential (some 3,000 GWh capacity) as an opportunity to stabilize power rates and to generate revenue from the export of surplus power. The Muskrat Falls project, in conjunction with transmission lines to the island of Newfoundland and to Nova Scotia, would allow this concept to become a reality.

In 2010, a joint agreement between Nalcor Energy (the province's power generator) and Emera Power (the owner of Nova Scotia Power) provided the financing arrangement for the 824 MW Muskrat dam, and the transmission lines linking the power to the island and to connect by the Maritime Link to the Nova Scotia and New England grid. Premier Williams hailed the agreement to develop the hydroelectric potential of the Lower Churchill River, "on our own terms and free of the geographic stranglehold of Quebec which has for too long determined the fate of the most attractive clean energy project in North America."

In exchange for contributing about half the capital cost of the transmission link to the island, Nova Scotia Power would receive 20% of the 4,500 GWh annual power for 35 years. The construction of the \$1.6 billion Maritime Link to Nova Scotia was the responsibility of Nova Scotia Power.

The federal government helped to make the project financially viable by agreeing to guarantee the loans of Nalcor and Nova Scotia Power, which substantially reduced the cost of borrowing (and of the increase to future electricity rates faced by the consumers of both utilities).

For a variety of reasons, the initial construction estimates of the Muskrat Falls project proved to be highly optimistic. By June 2016, Nalcor revised the total cost estimate to

³ <http://www.releases.gov.nl.ca/releases/1996/exec/1119n06.htm>

⁴ <http://www.hydroquebec.com/publications/en/docs/annual-report/annual-report-2016.pdf>

\$11.4 billion. The new Liberal federal government subsequently increased its loan guarantee by \$2.9 billion in the fall of 2016.⁵ This again proved beneficial to the new Liberal government of Newfoundland and Labrador, which had defeated the Progressive Conservatives in December 2015 after 12 years in power.⁶

The latest revision to the project estimates came on June 23, 2017, when Nalcor stated that the project would cost \$12.7 billion, and full power would not be available until early 2020.⁷ The Maritime Link, built and financed by Emera Power, was generally on time and on budget.

Table 1 shows the capital cost estimates for the dam, the transmission lines to the Upper Churchill and the link to the island, as well as the financing and other costs.

Table 1 MUSKRAT FALLS CAPITAL COST ESTIMATES (\$=billion)

	Generation	Transmission	Finance Etc.	Total
2012 Sanctioned	2.9	3.3	1.2	7.4
2015 August	3.7	3.9	1.2	8.6
2016 June	4.8	4.3	2.3	11.4
2017 June	5.5	4.6	2.6	12.7
Percent Increase	90%	39%	117%	72%

Source: Nalcor Energy project updates.

Impact on Rates

Electricity pricing in Newfoundland and Labrador is regulated based on the cost of service model, where Nalcor is entitled to rates that cover its prudently incurred expenditures plus a return on investment. In 2016, the residential cost was \$119.60 per GWh (compared to \$72.30 per GWh for Montreal).⁸

In 2012, Nalcor estimated that residential rates would increase to \$158.40 per GWh by 2030 to finance the Muskrat Falls infrastructure project. The latest estimate now forecasts the 2030 residential rates jumping to \$253.40 per GWh, and increase of 60% over the 2012 forecast. The rate projected for 2030 would be more than double the 2016 rate.

⁵ The Quebec government, having recently exercised the option to extend the highly profitable Upper Churchill agreement until 2039, objected to the federal decision and asked for compensation.

⁶ The drop in oil prices had a devastating effect on the provinces finances, forcing the Dwight Ball government to bring in an austerity budget in April 2016.

⁷ http://muskratfalls.nalcorenergy.com/wp-content/uploads/2017/06/Muskrat-Falls-Project-Update-Presentation-June-23_Final.pdf

⁸ http://www.hydroquebec.com/publications/en/docs/comparaison-electricity-prices/comp_2016_en.pdf

This has prompted some to suggest that the financial burden of the Muskrat Falls project, when combined with the much lower oil and gas royalties, is too great for the province or its ratepayers, and that some form of federal bail-out will be required.⁹

KEEYASK and BIOPOLAR III

Unlike the situation in Newfoundland and Labrador and Nova Scotia, Manitoba does not rely on oil or coal to generate most of its electricity. In fact, in 2016 Manitoba Hydro reported that approximately 97% of its electricity production (30,000 GWh) was produced by clean hydroelectric sources. Manitoba Hydro also operates a natural gas distribution system within the province.

Exporting electricity, mainly to the midwestern United States, has been an important source of revenue for the public power utility.¹⁰ The New Democratic government, in power from 1999 to 2016, saw the generation and transmission of hydroelectric power as a way to profit from the desire to reduce greenhouse gas emissions in the midwestern United States.

The Keeyask dam project would provide 695 MW of additional capacity (about 4,400 GWh annually). In partnership with four northern first nations, Manitoba Hydro began construction in July 2014, with completion expected in late 2019. Construction costs were estimated at \$6.5 billion.

The Bipole III (east) transmission line, estimated at \$4.6 billion, was intended to add reliability to Manitoba Hydro's electricity grid, and to facilitate the transmission of more power to southern markets, including the United States.

Construction cost overruns added to the estimated price and extended the completion date. The sharp decline in the price of natural gas made gas fired generated electricity cheaper than hydro-generated power, which significantly altered the economics of exporting the electricity to the American market.

In May 2016, the Progressive Conservatives were elected, and immediately dismissed the president of Manitoba Hydro, and replaced the board of directors as well. The Boston Consulting Group (BCG) was hired to review both capital projects to determine whether cancellation would be a viable option.

The BCG report, released in September 2016, concluded that the decision to build Keeyask was imprudent, but the cost of proceeding with both projects was less than the

⁹ <http://www.cbc.ca/news/canada/newfoundland-labrador/doubling-electricity-rates-no-way-to-pay-for-muskrat-falls-mun-economist-1.3696024> and <http://www.cbc.ca/news/canada/newfoundland-labrador/muskrat-falls-will-need-bailout-says-professor-1.3925582>

¹⁰ In 2007/08 electricity export revenue accounted for 41% of all revenue; this fell to 19% for 2009/10 and 18% for 2015/16.

cost of cancellation or suspension.¹¹ The total cost of the Keeyask project was estimated at \$7.8 billion, and the completion date was delayed by 21 to 31 months. Based on the report, the government of Premier Brian Pallister agreed to proceed with the two projects.

In early March 2017, Manitoba Hydro increase its forecast of the Keeyask project to \$8.7 billion, including a \$900 million contingency fund.¹²

Impact on Rates

Manitoba Hydro customers have enjoyed some of the lowest electricity rates in North America. In 2016, the residential rate at 1,000 KWh per month was \$8.43 per MWh. But many observers became nervous about the impact of the Keeyask and Bipole III on future rates.

The new board of Manitoba Hydro asked the provincial government for financial aid, but when this was rejected it announced the layoff of 900 staff and other operating reductions. The board was concerned about the financial condition of the public utility, where the 2015/16 debt to equity ratio had climbed to 83/17 (it was 74/26 in 2011/12). The debt of Manitoba Hydro was expected to rise to \$25 billion (from \$13 billion) by 2020.¹³

The high debt threatened a further downgrade in the province's credit rating¹⁴, and the board believed that double digit rate increases would be needed to meet the 75/25 debt to equity target.¹⁵

On May 5, 2017, Manitoba Hydro asked the Public Utilities Commission for a 7.9% rate increase for 2017 and 2018, and indicated that the same level of increase would also be required for the next three years. If approved, the five-year cumulative increase would be 46%. The board chair blamed the steep increases on cost over-runs at Keeyask and Bipolar III, coupled with lower demand for electricity and sluggish electricity prices in the export market. He said that it was necessary for Manitoba Hydro to become more financially stable to avoid future rate shocks.¹⁶

LESSONS FOR BRITISH COLUMBIA?

The Liberal government of BC gambled that the new power from Site C would be required for domestic use within a few years of it augmenting BC Hydro's capacity. The provinces of Newfoundland and Labrador and Manitoba also gambled that clean,

¹¹ <http://s3.documentcloud.org/documents/3111718/Bipole-III-Keeyask-and-Tie-Line-Review-Report.pdf>

¹² <https://www.hydro.mb.ca/NewsReleases/GetDetail?hdnID=252>

¹³ <http://www.cbc.ca/news/canada/manitoba/manitoba-hydro-bipole-transmission-line-1.3811316>

¹⁴ Moody's downgraded the province's credit rating in July 2015.

¹⁵ <http://www.cbc.ca/news/canada/manitoba/manitoba-hydro-rate-increase-pallister-business-low-income-1.3969221>

¹⁶ <http://www.winnipegssun.com/2017/05/05/hydro-seeks-significant-rate-hikes>

renewable hydroelectric power could be provided to help meet provincial and federal emission requirements, and provide new revenue from sales to the American market.

Cost overruns and the growth in natural gas-fired generators changed the economics, leaving the domestic customers facing massive rate increases to keep the public power utilities solvent.

Site C is an expensive project which will probably result in net losses during the first 10 to 20 years of operation. But given the relative size of the populations and economies of the three provinces, the anticipated losses from Site C are more manageable. A rate increase of 7% to 8% may be required to fund the Site C loss, but the increases planned in the other two provinces pose a significant threat to their economic future, not to mention the longevity of the current governments.

The BC government can minimize the potential rate increase by dedicating a portion of the new carbon tax increase to cover BC Hydro's operating deficit when Site C becomes operational.¹⁷

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The writer is a retired senior BC government public servant whose paper describing the BC government's manipulation of the finances of BC Hydro from 2008 to 2014 was published by *BC Studies* in November 2016. *BC Studies* published his paper on the 40-year financial history of ICBC in 2013. He has been an intervener in the BC Utilities Commission's recent reviews of ICBC's rate requests, and is an intervener in the Commission's current review BC Hydro's rate requests.

¹⁷ The NDP government has said that the tax will increase by \$20 from 2018 to 2021. A \$300 million Site C deficit would require approximately \$7.50 of this \$20 increase, while a \$400 million deficit would require about \$10 dollars.

APPENDIX

RESIDENTIAL ELECTRICITY RATES (BASED ON 1,000 KWh/month)

	<u>-2012-</u>	<u>-2016-</u>	<u>Increase%</u>
Montreal	6.76	7.23	7.0
Winnipeg	7.46	8.43	13.0
Vancouver	8.78	10.70	21.9
St. John's	11.80	11.96	1.4
Halifax	15.01	15.88	5.8
Toronto	13.57	17.81	31.2
Chicago	12.13	15.19	5.9
Boston	16.45	27.69	68.3
New York	22.57	29.52	30.8
San Francisco	22.26	31.05	39.5

Source: Hydro Quebec, *Comparison of Electricity Prices in Major North American Cities*, 2012 and 2016.