AIMS Commentary

Atlantic Institute for Market Studies

Electricity Market Integration

Newfoundland Chooses Monopoly and Protectionism

James Feehan, PhD
Atlantic Institute for Market Studies

November 2013

The multi-billion dollar Muskrat Falls Project has proven controversial in Newfoundland and Labrador (NL) and in Nova Scotia. There has been debate about whether the project is the least-cost electricity supply option in each of those provinces. Still, one of the potential benefits of the project is the enhancement to the electricity grid, which is especially significant for the island of Newfoundland. For the first time, the island would be connected to the North American grid.

Basic microeconomics predicts that if markets are competitive then mutually advantageous gains will occur whenever an isolated market is integrated with others in which the same commodity is traded; and, furthermore, if the previously isolated market is relatively small then its share of the overall gain will be relatively larger. However, on the Newfoundland side, its provincial government has enacted legislation that will deny its own people those potential gains from trade. The legislation keeps competitors out of the island market and strengthens existing monopoly power there.[1]

These anti-competitive policies were introduced when independent reviews of the project were long past and just before officially sanctioning the project in late 2012. Other than asserting that these measures are needed to "advance" the project, the NL government gave no rationale for them.

This paper reviews the key elements of the restrictive legislation and investigates the underlying reasons for them. It also argues that these policies will serve to increase the burden on island ratepayers, stifle business innovation, and discourage entrepreneurship in the electricity sector.

The Project

The map in **Figure 1** illustrates the location and components of the project. The Muskrat Falls site is located on the eastern end of the Churchill River in the Labrador region of Newfoundland and Labrador. The generating plant to be built there will have a capacity of 824 Megawatts (MW) and produce an average of 4.9 million MW hours of electricity annually.

[1]On the contrary, the newly elected provincial government in Nova Scotia has pledged to make that province's electricity market more competitive. Hence, this paper focuses on the Newfoundland situation.

The project includes extensive transmission investments: lines running 250 kilometres from Muskrat Falls westward to the existing and massive Churchill Falls generating plant (5,428 MW); 400 kilometres of lines from the Muskrat Falls plant south-east to the Strait of Belle Isle; 35 kilometres of undersea cables from there to the Northern Peninsula of the island of Newfoundland; transmission lines extending 700 kilometres across the island to its Avalon Peninsula; and an additional 300 kilometres of transmission on the Island's west coast, which will connect to subsea cables crossing 180 kilometres under the Cabot Strait to Nova Scotia.[2]

There are two partners in this project: Nalcor Energy and Emera Inc. The former is a Newfoundland and Labrador Crown corporation and owns 100% of the provincial public utility, Newfoundland and Labrador Hydro Corporation (NL Hydro), which in turn owns most of the island's generation and high-voltage transmission infrastructure. Emera is a Nova Scotia based publicly-traded private corporation and the owner of the private utility, Nova Scotia Power Inc.

Nalcor will develop and own the Muskrat Falls generation facility including the transmission link to Churchill Falls. Emera will develop and own the interprovincial cable across the Cabot Strait and the associated transmission infrastructure, the combination of which is known as the Maritime Link. The remaining extensive infrastructure running from Muskrat Falls to the Avalon Peninsula will be completed jointly through a partnership agreement, with Nalcor as the majority owner. The capital cost of the project is quite substantial. As of early 2013 it was an estimated $7.7 billion; critics are skeptical and expect much higher cost.

In late 2012 Nalcor, with the approval of the provincial government, and Emera agreed to sanction the project. Under their agreement, for 35 years Emera will receive 20 percent of the generating plant's capacity, known as the Nova Scotia block, in exchange for building the Maritime Link. Nalcor will retain the remaining capacity. Its plan is to sell enough to its subsidiary, NL Hydro, to meet domestic market demand. The sale will be through a long-term power purchase agreement with Nalcor, or fully owned subsidiary of it that will own the plant. That would leave a sizeable surplus for quite some time, and Nalcor plans to export it. Indeed, the agreement includes access by Nalcor to Emera's transmission infrastructure to carry exports to New England.

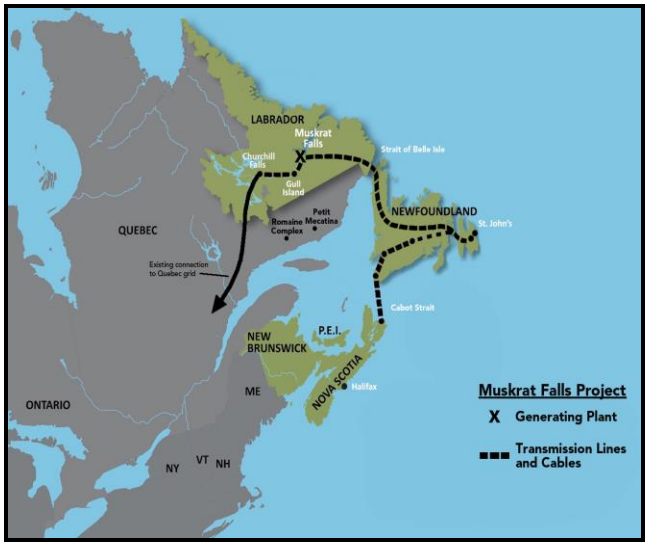

Figure 1: *Muskrat Falls and Related Infrastructure*
Source: *Adapted from Nalcor Phase I map, http://www.nalcorenergy.com/uploads/file/Phase%201%20-%20Muskrat%20Falls%20TL&ML%20-%20Oct2012.JPG*

Muskrat Falls was not Nalcor's first choice. The Newfoundland and Labrador (NL) government's 2007 Energy Plan envisioned the development of the much larger Gull Island site (see **Figure 1**), with Muskrat to follow some time later. While there would be a link to Newfoundland Island, a prerequisite for Gull Island was access to Quebec's large power grid in order to sell the massive amount of surplus power into North American markets. However, by mid-2010, after difficult talks and failed appeals to Quebec regulators, it was clear that the terms and conditions of Quebec's open access transmission tariff (OATT) were unacceptable to

[2]See http://muskratfalls.nalcorenergy.com/project-overview

Nalcor.[3] Not long thereafter, in November 2010, the NL government announced that through Nalcor it had a Muskrat Falls agreement with Emera; a deal that the Nova Scotia government under Premier Dexter also actively supported.

With the NL government its strongest proponent, Nalcor offered a number of rationales for the deal. Bringing power to the island would meet its growing demand. It would also permit the elimination of oil-fired thermal generation, which at present accounts for about 12% of all the electricity generated annually on the island; the remaining near 88% comes from the island's substantial hydro resources and a tiny amount of wind.[4]

Nalcor argued that oil prices will rise substantially over time and that practically all the increase in island load would have to be met by further reliance on thermal generation unless Muskrat Falls was built. Additionally, since Muskrat would produce about four times the thermal electricity that it would initially displace, the Maritime Link component would allow the excess energy to be exported to the Maritimes and New England until island demand grows to absorb it. To complete its case, Nalcor argued that this project, even with no value assigned to such exports, would still be the lowest cost option for meeting the island's electricity needs to 2067.

Still, the project has been controversial in Newfoundland and Labrador. Two independent public bodies reviewed the project; a Federal-Provincial Environmental Review Panel, which reported in August 2011, and the Provincial Public Utilities Board, which reported in March 2012. Neither would endorse it as the best option. Also, criticisms and suggested alternatives came from a number of groups and citizens and from opposition parties. In response, the provincial government and Nalcor cited their own studies and those of their consultants to defend their decision. In the midst of this, the NL government was re-elected in the October 2011 general election. Then in December 2012, with a strong majority in the legislature and buoyed by a federal loan guarantee, as had been promised by the Conservative Party in the May 2011 federal election, the NL government sanctioned the project.

The Legislation and its Implications

Also in December 2012, the provincial government passed legislation that it described as needed to advance the Muskrat Falls project. That legislation imposes two measures that restrict interprovincial trade and consumer choice. These came in the form of amendments to the Electric Power Control Act.

One of the legislated provisions states that…

> A retailer or an industrial customer shall not develop, own, operate, manage or control a facility for the generation and supply of electrical power or energy either for its own use or for supply directly or indirectly to or for the public or an entity on the island portion of the province.

This action marks a dramatic break with past practice. The major retailer on the island of Newfoundland is Newfoundland Power Inc. It is a private corporation that provides most of the residential and commercial consumers with distribution and retail services.[5] Newfoundland Power buys most of its electricity (approximately 90%) from NL Hydro but owns various small hydro plants that supply the remainder. That

[3] It is possible that Quebec as well as British Columbia and Manitoba have categorized some of their infrastructure as transmission rather than generation in order to have a higher OATT, a move which would discourage competition; see Jan Carr, Power Sharing: Developing Inter-Provincial Electricity Trade, C. D. Howe Commentary No 306, July 2010. http://www.cdhowe.org/pdf/commentary_306.pdf

[4] Most on-Island electricity is produced by NL Hydro but a newsprint mill and Newfoundland Power, the main retailer/distributor, have significant own-use capacity and a few small private-sector generating companies operate under power purchase agreements with NL Hydro. Excluding those assets, the ratio for NL Hydro alone is closer to 85% and 15%.

[5] In the remaining areas, which are rural and relatively isolated, NL Hydro serves as the distributor and retailer.

capacity was developed over many years and much of it pre-dates the existence of NL Hydro.

A similar observation applies to some large industrial customers, notably newsprint mills which developed substantial hydro resources early in the 20th century.[6] Not only is this ban on self-generation at odds with past policy, it is out of step with practice elsewhere in North America.

The 2012 legislation also provides that…

> Newfoundland and Labrador Hydro shall have the exclusive right to supply, distribute and sell electrical power or energy to a retailer or an industrial customer in respect of the business or operations of that retailer or industrial customer on the island portion of the province; and a retailer or an industrial customer shall purchase electrical power or energy exclusively from Newfoundland and Labrador Hydro in respect of the business or operations of that retailer or industrial customer on the island portion of the province.

One of the implications of this exclusivity provision and the ban on self-generation is clear. NL Hydro's monopoly will be greatly strengthened in a number of ways. First, the ban means that NL Hydro's industrial customers must purchase electricity from NL Hydro with no right to buy from another party or self-generate. This is an anti-innovation policy. Customers would self-generate only if they could do so at a lower cost than purchasing; this policy eliminates the incentive to develop such cost-saving innovations.

Next, the exclusivity law leaves little incentive for independent power producers to establish on the island. They would have no domestic market. Their only option would be to sell to NL Hydro, which would have no obligation to buy, would have disproportionate market power as the only legal purchaser, and would be buying Muskrat Falls power to support its parent. Perhaps independents could attempt to export but that would require access to NL Hydro transmission lines, access which it is unlikely to provide. Also, the law makes electricity imports impossible for retailers and industrial consumers since they are required by law to purchase solely from NL Hydro.[7]

Thus, they cannot substitute away by self-generating, by buying from on-island power producers or by purchasing from suppliers outside the island. The NL government has made the island market completely captive to its monopoly corporation.

Another implication is that access to the American electricity market will be compromised. In the United States, the Federal Energy Regulatory Commission (FERC) is the key governing agency for wholesale electricity markets. Its on-going goal is to foster inter-state competition in wholesale electricity markets in the United States. According to its Strategic Plan, FERC supports such competition because "it encourages new entry among supply-side and demand-side resources, spurs innovation and deployment of new technologies, improves operating performance, and exerts downward pressure on costs."[8]

To that end, one of FERC's main instruments is the requirement that owners of transmission systems allow others to use their systems on a non-discriminatory basis. There must be open-access transmission tariffs (OATT) that allow electricity generators to use transmission systems to send their electricity to the wholesale market.

FERC has no authority in Canada but it does impose a reciprocity rule; if Canadian firms use states' OATTs to export to the US then, in return, they must also make OATTs available to whomever wishes to use their transmission

[6]The legislation exempts generating facilities that were in place prior to 2012.

[7]NL Hydro itself could import electricity but it intends to do so only for system reliability and in emergencies.

[8]FERC, The Strategic Plan, FY-2009-2014, Revised March 2013, p.7; http://www.ferc.gov/about/strat-docs/FY-09-14-strat-plan-print.pdf

systems. As a result, all major transmission owners in every province except Newfoundland and Labrador currently have OATTs. With the Muskrat Project, if Nalcor wants direct access to the US wholesale market, and it has indicated that it sees the US northeast as a potential buyer, then it will be obligated to have an OATT.

However, the legislation is completely at odds with allowing electricity buyers and sellers, from within and outside the island, access to the island's transmission system under an OATT arrangement. While FERC is focused on fostering competition in US wholesale markets, the utter rejection of both the open-access principle and the notion of wholesale market competition by the NL government will make selling into the US difficult if not impossible.

Why?

On the surface it is puzzling that the NL government has enacted such an anti-competitive law. First, NL Hydro, as a crown corporation, has a lot of advantages that cushion it from competitive market forces. It is exempt from federal and provincial income taxes; its cost of debt is indirectly subsidized by a provincial government guarantee (and a federal loan guarantee as well in this case); it typically has preferred access to generation sites; and it is immune from take-over bids and shareholder revolts. Secondly, it is a well-established economic principle that if a market is competitive then the result is economic efficiency in that market, i.e., the amount produced will coincide with what's needed to maximize the economic gains generated by market interaction. Thirdly, allowing wholesale competition, at least to the point of having an OATT, meets FERC reciprocity requirement for access to US markets.

In short, NL Hydro is cushioned from competition; competition is good for the economy; and allowing wholesale competition ensures access to the US market.[9] So, why legislate against competition? The NL government has not answered that question.

The answer has to do with cost. Muskrat Falls is expensive. **Table 1** compares it to the Romaine River Project, which is currently being developed by Hydro-Quebec on the Quebec North Shore not far from Muskrat Falls (see **Figure 1**). As shown in the table's last column, the Romaine project, which is expected to produce first power in late 2014, has an estimated capital cost that is only about 8% more than Muskrat's. However, the Romaine cost estimate includes interest-during-construction while the figure for Muskrat does not.[10] Therefore the Romaine may be about the same or lower cost. On the other hand, as shown in the same column, the Romaine will have almost 90% more capacity and produce almost two-thirds more energy.

	Muskrat Falls Project	Romaine River Complex	Romaine Compared to Muskrat
Estimated Capital Cost	$7.7 billion	$8.3 billion	7.8%
Capacity	824 MW	1550 MW	88.1%
Annual Energy Production	4.9 million MWhs	8.0 million MWhs	63.3%

Table 1: *Muskrat and Romaine Hydro Projects Compared*
Source: *NL Hydro, Hydro-Quebec, Emera*

Another way of gauging the cost of Muskrat Falls is by looking at the levelized cost per MW hour. That figure is at least $150 per MW hour.[11] This is quite high and once it is blended in with the cost of existing on-island sources, the island

[9]For more elaboration on the benefits of integrating electricity markets see Richard Pierce, Michael Trebilcock and Evan Thomas, Beyond Gridlock: The Case for Greater Integration of Regional Electricity Markets, C.D. Howe Institute Commentary, No. 228, March 2006.
[10]Hydro-Quebec considers the cost of interest-during-construction as confidential and has not released it.
[11]This figure is based on the information provided by Emera to the Nova Scotia Utilities and Rates Board (UARB). The Maritime Link is estimated at 20% of the cost and Emera would receive 20% of the power, resulting in the $150 estimate of the levelized cost per MW hour. Given the proportionalities, this implies the same per-unit cost for the entire project.

"wholesale" price will increase substantially. This blending will mitigate the overall price increase somewhat, just as now happens whenever the cost of oil-fired thermal generation goes up. Nevertheless, a sizable increase is anticipated when Muskrat is incorporated into the system even though it will displace thermal generation.

While export earnings may offset some of the increase, this effect will probably not be substantial. That is because market conditions are unlikely to support exports at high prices. **Table 2**, below, shows the annual average prices of electricity in the New England, New York and Ontario wholesale markets in 2012. These are not high prices and, following the increase in availability of cheap natural gas, are significantly lower than a few years ago. Indeed, in 2012, NL Hydro's exports, which are possible through its limited access to the Quebec grid, sold at only about $30 per MW hour.[12]

Wholesale Market	Price Per MW Hour
Ontario	Can $24.10[13]
New England	US $40.72
New York	US $46.57

Table 2: *Annual Average Wholesale Prices, 2012*
Source: *US Energy Information Agency (www.eia.gov/todayinenergy/detail.cfm?id=9510) and Ontario IESO*

While these wholesale prices may be expected to rise over time, the gaps between each of them and the levelized cost of Muskrat Falls' electricity are huge. Thus, a disproportionate share of the project's cost will show up in island ratepayers' electricity bills.

In the past, these factors, i.e., the cost of electricity projects and wholesale prices in other areas, were not especially relevant to electricity supply questions in Newfoundland. That was because it was physically isolated. The Muskrat Falls project, with its interconnections, will be a game-changer. The combined capacities of the cable links to Newfoundland will be 1,400MW, which roughly matches the island's peak demand. Thus, without legislated barriers, these gateways can accommodate significant quantities of imports.

If Island wholesale rates are higher than those elsewhere then there would be an incentive to import. This appears to be a distinct possibility. In its current application to the Newfoundland and Labrador Public Utilities Board (PUB), NL Hydro is requesting approval for a 2014 wholesale price of $104 per MW hour for the bulk of its energy sold to Newfoundland Power, which is its single largest customer.[14]

It is also proposing to substantially increase its lower energy rates that it charges to industrial customers. A wholesale price of $104 per MW hour is high compared to what has recently prevailed in the wholesale markets as shown in **Table 2**, but it reflects the average cost of generating electricity from existing NL Hydro facilities. When the cost of Muskrat Falls is blended in, these Newfoundland rates will increase further.

If incentives of these magnitudes persisted, if there were no legislated barriers to imports, and if there were no preferential access to the transmission grid then the result would be something the NL government does not want. Nalcor could be faced with the prospect of its exports being turned around and sold back into the province at rates that undercut NL Hydro's. Both gateways to the island offer opportunities for that phenomenon. It is worthwhile to consider each in turn.

The Strait of Belle Isle

The cables across this strait will have a 900MW capacity and connect Hydro-Quebec's massive electricity system to the island via the Labrador

[12] According to Nalcor's 2012 Annual Report, p.23, total revenue from sales of 1.8 million MW hours was $53.6 million. See www.nalcorenergy.com

[13] In Ontario, electricity generators also receive a so-called global adjustment on domestic sales that tops up their wholesale revenues

[14] Newfoundland and Labrador Hydro 2013 General Rate Application, Vol.1, p.4.5, available at www.pub.nl.ca/applications/NLH2013GRA/files/application/Application-VolumeI.pdf

Peninsula. In addition, on the Quebec side of the border the Romaine River complex will tie in to the transmission lines from Churchill Falls to Quebec and so too would the Petite Mecatina River development (1200 MW capacity), also on the Quebec North Shore, if it is eventually developed; see ***Figure 1****.*

Also, under a contract lasting to 2041, Hydro-Quebec has annual access to some 30 million MW hours from Churchill Falls at approximately $2 per MW hour. With that amount of electricity plus additional supply from North Shore developments, Hydro-Quebec would have an incentive to sell into the island market if its export earnings in the New England markets remain soft or it has a domestic surplus.

The Cabot Strait

The Maritime Link connection is rated at 500 MW.[15] *The link will carry the Nova Scotia block and still leave room for an even larger amount of energy. Nalcor plans to use this available transmission capacity to sell all Muskrat Falls' surplus electricity to utilities in Nova Scotia and beyond. In order to sell it, the price must be competitive with other sources available to those potential buyers. In fact the Utilities and Rates Board (UARB) in Nova Scotia announced in July 2013 that it would approve Emera's application for the Maritime Link only if it were tied to the acquisition of the equivalent of the Muskrat surplus supply at attractive prices, at about $50 per MW hour in 2018 and rising slowly but not even exceeding $90 by 2040. Otherwise, the UARB concludes that the Maritime Link would not be the least- cost electricity option for Nova Scotia ratepayers.*[16]

Therefore, in all likelihood, Nalcor will have to sell the extra energy at prices well below the wholesale prices that will be charged by its subsidiary back on the island. If out-of-province wholesale purchasers of Muskrat Falls power, including the Nova Scotia block, experience less demand than anticipated or transmission upgrades give them greater access to cheaper power from Quebec or New England then it could be profitable to sell the energy back into Newfoundland.[17]

In this scenario where there are no barriers to imports, there is the only one option available to NL Hydro to keep Muskrat Falls and Churchill Falls power from entering the island market. It would have to lower its prices to match the competition. This would be to the advantage of island ratepayers. However, it is not what the NL government wants. On the contrary, that government has acted to prevent it.

The exclusivity legislation and the absence of an OATT ensure that competitively priced electricity will be kept out of the island. The existing regulatory regime will set whatever island rates are needed for NL Hydro to pay for its parent's investment in Muskrat Falls; and that parent, Nalcor, is not even subject to review by the PUB. Island ratepayers, with no access to outside markets or alternate on-island suppliers, will be trapped in a highly monopolized market with little choice but to pay.

Of course, it is possible that the purchasers of electricity from Churchill Falls and Muskrat Falls may have more lucrative uses for the power than selling it back into the Newfoundland market. Even then, the legislated barriers would still be damaging. If there were no restrictions there would always be the potential threat of market entry from outside sources if NL Hydro pushed its price high enough. The legislation removes that limitation on NL Hydro pricing. Also, the legislation would still discourage independent

[15]Because of its design, the eastward movement of electricity from Nova Scotia is limited to 250MW. Presumably, additional infrastructure could bring that up to 500 MW. In any case, the capacity determines the net rather than the gross trade. For example, even with that constraint, if 500MW were exported then 750 MW could be imported since only a net exchange of 250MW need take place to support these transactions.

[16]UARB Ruling, p.136, paragraph 457, at http://nsuarb.novascotia.ca/sites/default/files/documents/electricityarchive/decision_maritime_link_project.pdf

[17]Sales of Nalcor's excess power could be subject to market-restrictions that do not permit re-sale by the buyer but monitoring and enforcing such an arrangement could be problematic

power producers and stop industrial customers from even exploring the possibilities for cost-saving self-generation.

Compounding Difficulties

The anti-competitive act by the NL government is really the third of three compounding problems associated with the Muskrat Falls development. First, it is a well-established economic principle that setting the price of electricity, either by law or the exercise of monopoly power, so as to make it different from the per-unit cost of new supply is economically inefficient. In Newfoundland's case, regulated prices have been kept well below that threshold, especially for industrial customers. The result is economic inefficiency because the demand for electricity is higher at that lower price while the resource cost of making more electricity is greater than the resulting benefit to society.[18]

Adjusting the price would create economic gains and reduce the demand for electricity. There are many ways that this could be done while mitigating the impact on low-income consumers. However, such an approach has not been adopted by the provincial government or its predecessors; indeed the NL government's 2007 Energy Plan endorsed continuation of traditional regulated pricing. Consequently, the anticipated electrical demand of the island is higher than the economically efficient quantity.

The second problem stems from NL Hydro's legislated mandate. It is obligated to invest in capacity so as to meet the current and expected demand for electricity, even though the regulated price leads to demand that is higher than the efficient amount. Through its parent, Nalcor, and with the advocacy support of the NL government, it has chosen the Muskrat Falls project as the means to meet that demand. It has rationalized that choice as its least cost option. Nalcor's position is that it has assessed all other feasible options and they are all more expensive.

Herein lies the second problem. As noted earlier, neither of the two public reviews of that project agreed that it is the least cost option for Newfoundland and there has been considerable public criticism by various parties. Even Nalcor's argument rests on the assumption that the initial surplus of electricity will be available to draw on as domestic consumption grows, but the Nova Scotia's UARB has concluded that the Maritime Link is not the least cost option for that province unless Emera commits to package the Link with extra power in an amount equivalent to that surplus, and at attractive prices.[19]

Just as the second problem–the distinct possibility that the project is not the least-cost option–stems from the first (regulated pricing led to overconsumption creating the need for more capacity), the third problem arises from the second. In light of the high cost and risk of Muskrat Falls, legislation has been enacted to protect it from competitive forces and to ensure that island ratepayers pay for Nalcor's costs. Such a regime discourages innovation and investment by island industrial customers, retailers and independent power producers. And it burdens ordinary customers with higher electricity bills than would prevail in a competitive market. A better policy is to repeal the legislation, adopt an OATT, allow new investments in self-generation, and encourage wholesale market competition.

Conclusion

If the Muskrat Falls project proceeds then it will end the island of Newfoundland's isolation from the North American grid. The Newfoundland and

[18]For the application of these principles to electricity pricing in Ontario see Donald N. Dewees, The Price Isn't Right: The Need for Reform in Consumer Electricity Pricing, C.D. Backgrounder, No.124, January 2010, at www.cdhowe.org/pdf/backgrounder_124.pdf. For a Newfoundland context see James P. Feehan, Newfoundland's Electricity Options: Making the Right Choice Requires an Efficient Pricing Regime, C. D. Howe e-brief, January 11, 2012, at www.cdhowe.org/pdf/ebrief_129.pdf

[19]It is extremely unlikely but conceivable that Emera could obtain that extra electricity on those terms from another source but if that electricity is not tied to the Maritime Link then that would dramatically change the options available to Nova Scotia.

Labrador government has decided to replace that physical isolation with economic protectionism and to enhance NL Hydro's monopoly. By doing so, the potential beneficial side-effect of the project, namely, the potential gains from unimpeded trade and the development of a wholesale competitive market, will be blocked. Island ratepayers will be forced to pay for this risky and expensive project, whatever the cost. It is only in this perverse way that these policies "advance" the project.

Atlantic Institute for Market Studies

287 Lacewood Drive | Halifax, NS B3M 3Y7
Phone: (902) 429-1143 | Fax: (902) 425-1393
Email: aims@aims.ca | Website: www.aims.ca