Dear [Name] :

Re: Your request for access to information under Part II of the Access to Information and Protection of Privacy Act (File # NR-162-2018)

On September 24, 2018, the Department of Natural Resources received your request for access to the following records/information:

For the last twelve months please provide a copy of all records in the possession of the Department of Natural Resources relating to the Holyrood Thermal Generating Station including but not limited to any comments on DAFOR. Please include any records relating to HTG1, HTG2 and HTG3.

On October 16, 2018, the department has received approval from the Information and Privacy Commissioner to extend the timeline for your request by 20 business days.

I am pleased to inform you that a decision has been made by the Department of Natural Resources, confirmed by the Deputy Minister, to provide access to the requested records. The records are attached.

We are providing access to the most information possible but have made redactions in accordance with Sections 22(1)(a), 29(1)(a), 35(1)(d), 35 (1)(f) and 35(1)(g) of ATIPPA, 2015 as follows:

22. (1)(a) The head of a public body may refuse to disclose a record or part of a record that is published and is available to the public whether without cost or for purchase;

29. (1)(a) The head of a public body may refuse to disclose to an applicant information that would reveal advice, proposals, recommendations, analyses or policy options developed by or for a public body or minister;
35. (1) (d) The head of a public body may refuse to disclose to an applicant information which could reasonably be expected to disclose information, the disclosure of which could reasonably be expected to result in the premature disclosure of a proposal or project or in significant loss or gain to a third party;

35. (1) (f) The head of a public body may refuse to disclose to an applicant information which could reasonably be expected to disclose positions, plans, procedures, criteria or instructions developed for the purpose of contractual or other negotiations by or on behalf of the government of the province or a public body, or considerations which relate to those negotiations;

35. (1) (g) The head of a public body may refuse to disclose to an applicant information which could reasonably be expected to disclose information, the disclosure of which could reasonably be expected to prejudice the financial or economic interest of the government of the province or a public body.

There is one record, 122 pages, withheld in full in accordance with the sections previously listed.

Please note the following documents can be found through the link below:

The Atlantic Regional Electricity Cooperation and Strategic Infrastructure’s (RECSI) final report from July 2018, which was created for Natural Resources Canada and can be obtained directly from them at the following website: https://www.nrcan.gc.ca/node/21294/.


Newfoundland and Labrador Hydro 2017 General Rate Application http://www.pub.nf.ca/applications/NLH2017GRA/index.htm

As set out in section 42 of the Act you may ask the Information and Privacy Commissioner to review the department’s decision to provide access to the requested information. A request to the Commissioner must be made in writing within 15 business days of the date of this letter or within a longer period that may be allowed by the Commissioner. Your request should identify your concerns with the department’s response and why you are requesting a review.

The request for review may be addressed to the Information and Privacy Commissioner is as follows:

Office of the Information and Privacy Commissioner
Pursuant to section 52 of the Act, you may also appeal directly to the Supreme Court Trial Division within 15 business days after receiving the department’s decision.

Please be advised that responsive records will be published following a 72 hour period after the response is sent electronically to you or five business days in the case where records are mailed to you. It is the goal to have the responsive records posted to the Completed Access to Information Requests website within one business day following the applicable period of time. Please note that requests for personal information will not be posted online.

For further details about how an access to information request is processed, please refer to the Access to Information Policy and Procedures Manual at http://www.atipp.gov.nl.ca/info/index.html.

If you have any questions, please feel free to contact me at 709-729-0463 or rhynes@gov.nl.ca.

Sincerely,

Rod Hynes
ATIPP Coordinator
Title: Summaries of Key Expert Evidence

Issue: Key expert evidence submitted to the Board of Commissioners of Public Utilities (PUB) in relation to the Off-Island Purchases Deferral Account proposed as a rate mitigation tool in Newfoundland and Labrador Hydro’s (NLH) 2017 General Rate Application (GRA).

Background and Current Status:
- As part of NLH’s ongoing GRA, the utility has submitted expert evidence from JT Browne in support of its GRA proposal for an off-island purchases deferral account to aggregate savings to offset Muskrat Falls Project-related rate increases in 2020.
- In the JT Browne submission, the expert states his opinion relied on information from NLH about the Muskrat Falls Project (MFP) and the deferral account and that he was not asked to verify this information and did not provide a professional opinion on its validity.
- NLH’s consultant says the deferral account would benefit NLH customers and be consistent with the cost of service standard and principles of rate stability, predictability, intergenerational equity (i.e. costs and benefits for customers affected rather than past or future customers).
- The Office of the Consumer Advocate (CA) submitted expert evidence from C. Douglas Bowman who agreed that deferral accounts can be part of good utility practice and beneficial in the circumstances facing Newfoundland and Labrador Island customers, but questioned the mechanics of how NLHs proposed deferral account would work.

Analysis:
- The primary objection the CA expert expressed on the deferral account is that its valuation is premised on the PUB approving a cost of service in the current GRA that does not reflect NLH’s best forecast of costs in the test year. Meaning, the cost of service that is proposed is intended to reflect greater use of Holyrood than is actually expected to be the case.
- The CA expert notes that NLH “believes” it has demonstrated regulatory precedence for collecting costs upfront to mitigate pending rate increases in citing the Manitoba (MB) Public Utilities Board’s approval of an interim rate increase related to Manitoba Hydro’s Bipole III transmission project. The CA expert notes that the MB approach was to add a fixed percentage increase over a rate that reflected an actual cost of service whereas the approach proposed by NLH is based on implementing a rate that is based on an inflated cost of service, allowing an over-collection of revenue by an unknown and unknowable amount.
- Ultimately, the CA expert recommends that Newfoundland and Labrador follow MB’s approach where ratepayers are clearly informed of what costs their rate reflects and what is being added to that rate in order to fund future rate mitigation.
• The CA expert notes that NLH has not proposed aggressive cost-cutting or cost-control to mitigate pending rate increases and questions the appropriateness of fixing NLH's rate of return in legislation (OC2009-063). The CA expert asserts that this can lead to inefficiency and less attention to regulatory commitments and directives, reduced customer satisfaction, reliability of service and cost control. The testimony concludes that with customers facing a "near triple digit rate increase", consideration should be given to repealing OC2009-063 in an effort to "reduce Hydro's return and spread the pain."

• The testimony ultimately concludes there are, "...far too many gaps in the record for the Parties and the Board to make an informed decision on this Application," and that a "more complete picture of the rate mitigation plan is needed."

• The CA expert report is attached as Annex 1 with key sections highlighted on the off-island deferral proposal.

• It is unknown how the PUB will weigh the NLH expert opinion against that of the CA expert's opinions that NLH has not provided sufficient information on costs relating to the off-island deferral proposal or on its rate mitigation plans. The PUB could ultimately accept or reject the off-island deferral account proposal.

Action Being Taken:
• NR will continue to monitor the process pertaining to NLH's 2017 GRA.

• The public hearing portion of the GRA, including NLH and expert testimony and cross examination will begin January 30, 2018.

• The PUB will begin writing its GRA order following the hearing. The order can be expected to be implemented July 1, 2018.

Prepared by/Reviewed by: M. Janes/C. Snook/J. Cowan
Ministerial Approval: Received from Hon. Siobhan Coady

December 14, 2017
Annex 1:

Expert Evidence - CA - C. Douglas Bowman - 2017-12-04
Office of the Consumer Advocate

PO Box 23135
Terrace on the Square
St. John's, NL Canada
A1B 4J9

December 4, 2017

Via Email and Courier

Board of Commissions of Public Utilities
120 Torbay Road, P.O. Box 2140
St. John's, NL A1A 5B2

Attention: G. Cheryl Blundon, Director of Corporate Services / Board Secretary

Dear Ms. Blundon:

RE: Newfoundland and Labrador Hydro- 2017 General Rate Application

Further to the above-captioned, enclosed please find enclosed the original and thirteen (13) copies of the Expert Evidence Report of C. Douglas Bowman.

Yours truly,

Dennis Browne, Q.C.

Encl.

/bb

α
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THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

IN THE MATTER OF
the Electric Power Control Act, 1994, SNL 1994,
Chapter E-5.1 and the Public Utilities Act,
RSN 1990, Chapter P-47 (the "Act");

AND

IN THE MATTER OF
a General Rate Application (the "Application")
by Newfoundland and Labrador Hydro to

PRE-FILED EVIDENCE
OF
C. DOUGLAS BOWMAN

December 4, 2017
PRE-FILED EVIDENCE
OF
C. DOUGLAS BOWMAN

Evidence Outline

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2. Issues for the Board's Consideration .............................................. 5
3. Recommendations ............................................................... 17

List of Exhibits

Exhibit CDB-1-C. Douglas Bowman Background and Qualifications
THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

IN THE MATTER OF the Electric Power Control Act, 1994, SNL 1994, Chapter E-5.1 and the Public Utilities Act, RSN 1990, Chapter P-47 (the "Act");

AND

IN THE MATTER OF a General Rate Application (the "Application") by Newfoundland and Labrador Hydro to establish customer electricity rates for 2018 and 2019.

PRE-FILED EVIDENCE OF C. DOUGLAS BOWMAN

My name is Doug Bowman. This document was prepared by myself, and is correct to the best of my knowledge and belief. I have been retained by the Government appointed Consumer Advocate to provide expert advice and evidence to the Consumer Advocate in response to Newfoundland and Labrador Hydro's ("Hydro's") 2017 General Rate Application.

A summary of my background and qualifications is provided in Exhibit CDB-1. I have both a B.S. and an M.S. in Electrical Engineering from the State University of New York at Buffalo and 39 years of experience in the electricity services and consulting industry.

My primary expertise includes electricity services costing and pricing, and power sector restructuring, regulation and market design. I am an independent Energy Consultant working out of my office located in Warrenton, Virginia.

Prior to becoming an independent consultant, I was employed by KEMA Consulting, Nexant Inc., Pace Global Energy Services, International Resources Group, CSA Energy
Consultants and Ontario Hydro. I have taken part in the regulatory process in the Province of Newfoundland and Labrador on behalf of the Consumer Advocate since 1996, and have submitted testimony before this Board ten times previously as an expert witness on cost of service and rate design at Newfoundland Power's 1996 Application by Petition for Approval of Certain Revisions to its Rates, Charges and Regulations, at Newfoundland and Labrador Hydro's 2001 General Rate Proceeding, at Newfoundland Power's 2003 General Rate Application, at Newfoundland and Labrador Hydro's 2003 General Rate Application, at Newfoundland and Labrador Hydro's 2006 General Rate Application, at Newfoundland Power's 2007 General Rate Application, at Newfoundland and Labrador Hydro's 2009 Application concerning the Rate Stabilization Plan components of the rates to be charged Industrial Customers, at Newfoundland and Labrador Hydro's 2013 General Rate Application, at Newfoundland and Labrador Hydro's Amended 2013 General Rate Application, and at the Board’s Investigation and Hearing into Supply Issues and Power Outages on the Island Interconnected System. I have also appeared twice before the Nova Scotia Utility and Review Board as an expert witness on cost of service and rate design, and while at Ontario Hydro, I was involved with the regulatory process in the areas of generation and transmission planning, demand/supply integration, operations, rate design and customer service.

Section 1 of my Pre-filed Evidence includes summary of the key points in the Application relating to rates and cost of service; Section 2 includes a summary of issues for the Board’s consideration, and Section 3 includes my recommendations.
1. Application

The cover letter accompanying Hydro's 2017 General Rate Application indicates that a primary purpose of the application is to manage cost increases for customers (page 2 of cover letter). Hydro states "It is well known that the impact of the Muskrat Falls Project on customer rates will be significant. Hydro has been working with its parent company, Nalcor Energy (Nalcor), and the Government of Newfoundland and Labrador, to determine potential options to help mitigate and manage these cost increases for customers" (pages 1 and 2 of cover letter). Hydro proposes that its revenue requirement and rates be based on "the continued supply of power to the Island Interconnected System from existing Island generation" (page 2 of cover letter), and that an Off-Island Purchases Deferral Account be established to include savings resulting from off-island purchases relative to the costs that would have occurred had the energy been supplied from Holyrood.

Hydro proposes that the savings that accumulate in the deferral account be used to "mitigate future rate increases after the full commissioning of the Muskrat Falls project" (page 2 of cover letter).

Hydro indicates that rates are expected to almost double as a result of the Muskrat Falls project (Application Volume 1 (rev 3), page 5.6, lines 4-6). Few, if any, jurisdictions have had to deal with such a large rate increase brought on by a single project (CA-NLH-196), so there is little in the way of regulatory precedence to guide the Board and the Parties on what has worked or not worked in other jurisdictions facing a challenge of this magnitude.

Hydro acknowledges that its cost of service study for the 2018 and 2019 test years does not account for off-island purchases over the new Labrador-Island and Maritime Links, so
does not reflect its best forecast of costs in the 2018 and 2019 test years (LAB-NLH-8).

Under Hydro’s best forecast of costs in the 2018 and 2019 test years, the availability of off-island purchases over the new transmission links is “anticipated to keep rates flat, or potentially reduce rates slightly” (Application Volume I (rev 3), page 1.11, lines 19-20).

Hydro received a rate increase just five months ago on July 1, 2017 (NP-NLH-1 65, rev 1).

Hydro states (LAB-NLH-36) “The Provincial Government has indicated that it plans to keep rates at par with the forecast Atlantic Canada average of 17 cents per kWh.” It is not clear what the Atlantic Canada Provinces average of 17 cents per kWh means for Island residential customers, but it appears the rate increase would be much lower than the post-Muskrat Falls figure of 22.89 cents/kWh (exclusive of HST) estimated by Nalcor (Application Volume I (rev 3), page 5.6, lines 4-6). Currently, Island residential customers are paying 11.7 cents/kWh (exclusive of HST) (Application Volume I (rev 3), page 5.6, lines 4-6).

Neither Nalcor nor the Provincial Government have endorsed Hydro’s proposed rate mitigation plan, but neither is there correspondence indicating their disagreement with Hydro’s proposed plan (CA-NLH-186). Further, Hydro indicates that it (CA-NLH-6) “has been informed that rate mitigation actions or plans beyond what Hydro has proposed in the 2017 GRA Hydro will be a policy decision of government.” Hydro states that the Off-Island Purchases Deferral Account is “one component of a number of rate mitigation initiatives that will be required to limit the required increase in customer rates” (NP-NLH-245).

\footnote{CA-NLH-25, rev 1 states that the use of Recapture Energy on the Island in 2019 provides $78.1 million in savings, equating to 12.0% of the 2019 Island revenue requirement of $648.7 million.}
2. Issues for the Board’s Consideration

1) It would appear that the Provincial Government and the Atlantic Provinces, rather than the Board, may be setting rates for island customers both pre- and post-Muskrat Falls given that "The Provincial Government has indicated that it plans to keep rates at par with the forecast Atlantic Canada average of 17 cents per kWh" (LAB-NLH-36), and given that "rate mitigation actions or plans beyond what Hydro has proposed in the 2017 GRA Hydro will be a policy decision of government" (CA-NLH-6). If this is the case, it might be better to divert time from this Application to the numerous other regulatory filings that Hydro has on its plate as outlined in CA-NLH-161.

2) Hydro forecasts that the amount that will accumulate in the Off-Island Purchases Deferral Account by August 31, 2020 is $174.3 million (NP-NLH-115, rev 1). However, this amount may be understated as it:

   a. Includes LILILTA transmission costs of $27.3 million in 2018 and $52.9 million in 2019 (CA-NLH-50). This equates to 7.0 cents/kWh in 2018 and 5.8 cents/kWh in 2019 (CA-NLH-177), and compares to the proposed 2019 wheeling rate of 0.9 cents/kWh for the entire Island Interconnected transmission system (CA-NLH-82, rev 1). The current rate for Island residential customers of 1.1 cents/kWh (exclusive of HST) (Application Volume 1 (rev 3), page 5.6, lines 4-6) includes the cost of generation, transmission and distribution. The LILILTA estimate includes only O&M costs (no capital-related expenses), so appears to be extraordinarily high.
Hydro indicates (CA-NLH-177) that it is "currently reviewing the forecast operating and maintenance costs for LIL and LTA."

b. Excludes purchases over the Maritime Link (CA-NLH-193) owing to "the confidential nature of negotiations" (CA-NLH-65).

c. Excludes sales of power and energy to off-island purchasers over the Maritime Link because "the focus of Hydro's market activities in 2018 and 2019 will be to displace thermal generation at the Holyrood Thermal Generating Station (CA-NLH-179)."

3) The scenario that Hydro has modelled in the cost of service study will result in rates that are expected to substantially over-collect the revenue requirement. The "savings" that Hydro indicates would accumulate in the Off-Island Purchases Deferral Account are not savings at all, but rather the difference in costs between the actual cost of supply and the cost of supply under a fictitious scenario that does not reflect the future operation of the system. The cost of service study clearly does not reflect the lowest cost of supply consistent with maintaining reasonable levels of supply reliability. Hydro could make its so-called savings look even greater if it were to base the cost of service study on an even more costly supply scenario; i.e., if it were to assume that Holyrood would operate at full availability over the entire 2018 and 2019 test years.

4) Hydro has provided what it believes is regulatory precedent for collecting costs up-front to mitigate upcoming rate increases. Hydro states (Application Volume 1 (rev

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*2 It is not clear if Hydro intends for profits from sales over the Maritime Link to be included in the Off-Island Purchases Deferral Account.*
In Order 73/15, Manitoba's Public Utilities Board approved an interim rate increase for Manitoba Hydro of 3.95%. The revenues from 2.15% of that rate increase are to be placed in a deferral account to mitigate expected rate increases from when the Bipole Transmission Reliability Project (Bipole III) comes into service in 2018/19. In Order 73/15, the Manitoba regulator stated that, "Because very significant rate increases will be needed at that time, the Board sees a compelling policy reason to gradually increase rates to avoid rate shock for consumers three years from now. The funds set aside in the Board-ordered deferral account will be used to smooth the significant rate increases that may otherwise be required when the Bipole III is completed, helping to mitigate the resulting rate shock." In the Manitoba example, a fixed rate adder of 2.15% was approved for funding rate mitigation. As stated in CA-NLH-45, "Based on Hydro's interpretation of Order 73/15, the funds set aside to smooth future rate increases were derived based on a fixed percentage rate increase over and above the amount determined to be required to provide reasonable cost recovery for Manitoba Hydro". Hydro on the other hand is proposing that the Board approve a cost of service study that does not reflect its best forecast of costs in the test year along with an open-ended deferral account to fund rate mitigation. The two approaches are not the same.

Hydro states (Application Volume 1 (rev 3), page 5.6, lines 22-25) "The Board's approval of the proposed Off-Island Purchases Deferral Account will begin the transition to customer rates that will provide an opportunity to achieve reasonable recovery of Muskrat Falls Project costs. The current proposal is a critical step to
set the foundation for the broader approach for rate mitigation to be successful."

However, Hydro did not survey customer preferences on its proposed rate mitigation plan (CA-NLH-27). Hydro indicates that it "values the opinions of its customers", and that a survey into customer preferences could be conducted, but "believes that this present matter can be well addressed in the present proceeding, which includes intervenors representing a range of customers" (CA-NLH-222).

Since it is the customers who are facing a near doubling of rates, a survey on customer preferences on rate mitigation would provide valuable insights to the Board and the Patties to this Application.

6) Hydro states that the objective of the Off-Island Purchases Deferral Account is to (Application Volume 1 (rev 3), page 56, lines 22-25) "begin the transition to customer rates that will provide an opportunity to achieve reasonable recovery of Muskrat Falls Project costs". However, Newfound land Power is forecast to receive a cumulative rate increase of 50.9% over the 18-month period from July 1, 2017 to January 1, 2019, while Island Industrial Customers are forecast to receive a 20.3% rate increase over the same period (NP-NLH-165, rev 1). Both customer classes are served from the same generation and transmission system, so it would seem that rate increases for the two customer classes should be comparable. Otherwise, it has the appearance that rate mitigation is being funded on the backs of Newfoundland Power customers.

7) While the Parties might be amenable to rate mitigation, they may have difficulty granting Hydro an open-ended deferral account that is expected to accumulate hundreds of millions of dollars (NP-NLH-115, rev 1) including purchases over the
Maritime Link that are sourced from confidential negotiations (NP-NLH-115, rev 1) lacking transparency, and negotiated by an entity, Nalcor Energy Marketing, that is apparently not under Board jurisdiction (LAB-NLH-37). Neither has Hydro proposed a methodology for re-allocating the funds to mitigate rate impacts on the different customer classes. When asked what guidance Hydro can provide the Board on how to allocate the proceeds of the proposed Off-Island Purchases Deferral Account (CA-NLH-190) Hydro responded “The Board has broad power with respect to deferral accounts; in this case to determine a reasonable approach to allocate the net savings among customer classes.” Apparently, Hydro is leaving it up to the Board to decide at some future date how best to allocate funds to the different customer classes for rate mitigation. Hydro has indicated a willingness to discuss alternative approaches to rate mitigation with interveners (CA-NLH-47), and suggests that this take place during the settlement discussions scheduled in January 2018 as part of this GRA (CA-NLH-185). The Board and the Parties need more details before a decision is rendered on Hydro’s proposed Off-Island Purchases Deferral Account, so the settlement discussions are likely to prove useful.

8) The new transmission lines that are coming into service, the Labrador-Island Link (LIL) and the Maritime Link (ML), open the door to imports that could provide significant benefits to customers (NP-NLH-115, rev 1). However, even though the Maritime Link is expected to be in service less than two months from now:

a. A power procurement plan for purchases over the Maritime Link does not appear to be in place (NP-NLH-115, rev 1),
b. A plan for sales of capacity and energy over the Maritime Link does not appear to be in place (CA-NLH-179),

c. A regulatory review process for power procurement and sales that ensures customers are gaining optimal value from the interconnections is not in place (CA-NLH-176), and

d. An open access transmission tariff has neither been filed, nor approved (CA-NLH-161). Hydro states (PUB-NLH-109) "Based on the current in-service date of the Labrador-Island Link (LIL) and the Labrador Transmission Assets (LTA), anticipated to be July 1, 2018, in order to obtain the full benefits of LIL and the LTA, the necessary processes for the open access regime will need to be proposed for approval by July 1, 2018."

Further elaboration of this statement is necessary as it is not clear what additional benefits are gained from an approved open access regime both with respect to LIL-LTA and the Maritime Link, particularly during the pre-Muskrat Falls period.

As stated in the Liberty report to the Board dated August 19, 2016 (Page 113, VI-12) "Given that the Maritime Link will be in service in about one year, there does not appear to be suitable progress in resolving issues relating to market transactions, such as responsibility, rate treatment, open access, and avoidance of conflicts between marketing and operations." More than a year later, this statement remains relevant, except there is greater urgency now since the scheduled in-service date for the Maritime Link is less than two months away (PUB-NLH-17).
9) The response to CA-NLH-34 indicates that Nalcor is not required to pay for transport of power and energy on the Maritime Link, but other entities might be so required. The response to CA-NLH-181 indicates that the Maritime Link will not be included in Hydro's open access transmission tariff because it is owned by Emera, so who pays for the Maritime Link, and how, falls "within the purview of the Nova Scotia Utility and Review Board". The response to CA-NLH-182 indicates that Nalcor does not have "free access" to the Maritime Link- Nalcor is in effect paying for use of the Maritime Link as part of the "broad suite of Muskrat Falls/Maritime Link agreements between Nalcor and Emera". In the same response, Hydro indicates that there is "no violation of FERC open access principles and Nalcor has not been given an unfair competitive advantage". While this may not violate FERC principles, it may be detrimental to Island customers. For example, Nalcor would have a competitive advantage for supply to Hydro if other marketers were required to pay for use of the Maritime Link. The advantage would be significant if the tariff for use of the Maritime Link is comparable to the costs Hydro has submitted for use of the ULLTA transmission that are likely more than 6 cents/kWh when capital is included (CA-NLH-177). For comparison purposes, the real-time spot market price at the New York ISO on Friday, December 1, 2017 averaged about 3.2 cents/kWh.\(^3\) It may be that Hydro is "required" to purchase energy through Nalcor Energy Marketing, but in any case, it does not bode well for Island customers as Hydro would be more or less "stuck" buying from

\(^3\) Average price of 2.5 US cents/kWh converted using an exchange rate of 1 Can$ = 0.79 US$. See http://www.nyiso.com/public/markets_operations/market_data/graphs/index.jsp
Nalcor Energy Marketing, thus reducing both its competitive options and transparency owing to the confidential nature of negotiations and the fact that Nalcor Energy Marketing is not under Board jurisdiction (LAB-NLH-37).

10) It seems Hydro has expended a great deal of effort defending the assumptions in a cost of service study that does not reflect its best forecast of costs. For example, Hydro provides justification for Holyrood fuel costs and the Holyrood fuel conversion factor used in the cost of service study when it plans to place Holyrood in standby mode beginning the second quarter of 2018 (PUB-NLH-68). Standby mode means the station will not operate for energy production purposes, but rather for capacity purposes only; i.e., during emergencies such as the failure of a transmission line. In fact, Holyrood Unit 3 will not be producing energy at all, being relegated to synchronous condenser mode of operation as of April 1, 2018 (PUB-NLH-68).

4 In the cost of service study, the assumed Holyrood capacity factor in the 2019 test year is 38.2%, (CA-NLH-168), but owing to the availability of off-island purchases over the Labrador-Island Link, the actual Holyrood capacity factor in 2019 is forecast to be 16.7% (CA-NLH-168), and this may be overstated since it does not incorporate purchases over the Maritime Link that would result in further decreases in Holyrood production. Holyrood fuel costs and conversion factor are of less consequence than the power procurement plan and regulatory review process for off-island purchases over the Maritime Link for which very little information is on the record.

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4 It is not clear why Hydro has committed to taking Holyrood Unit 3 out of service before exploring the possibility of capacity sales over the Maritime Link (CA-NLH-179).
II) Basing the revenue requirement on a fictitious future means that cost allocations to customer classes are unfair because the cost of service study is not reflective of the costs that the different customer classes are expected to impose on the system. For example, by setting rates to over-collect revenues from Newfoundland Power customers while setting rates to collect the correct forecast amounts from Labrador Interconnected Customers, an inappropriate amount of the rural subsidy is allocated to Newfoundland Power Customers. Further, since Rural and Isolated Customer rates are pegged to Newfoundland Power rates which would be over-collecting, they would also be over-charged and the rural subsidy deficit amount would be less than it would be if Newfoundland Power rates reflected the costs it is expected to impose on the system.

12) With one exception, Hydro proposes no changes to the cost of service allocations (IC-NLH-108). In CA-NLH-90, the Consumer Advocate asks Hydro to show the impact on cost allocations and rates if 10%, 20%, 30%, 40% and 50% of the costs of the new TL267 transmission line were classified as energy. Hydro responds "The approach since the implementation of the cost of service methodology approved in the 1993 Cost of Service Report by the Board, is that all functionalyzed transmission assets are classified as 100% demand related." Hydro indicates in its October 19, 2017 letter to the Board (challenging a number of requests for information submitted by the Consumer Advocate) that issues relating to the cost of service methodology are more efficiently addressed in the proposed 2018 hearing on the cost of service methodology (page 2). However, as the Board states (page 4, lines 27-31, P.U. 36(2017) "TL267 is a significant asset which is being added to the rate
base as of 2018 for which customers will begin to pay in rates arising from this proceeding. As such the Board acknowledges that the fair classification and allocation of costs for the TL267 transmission line may be an issue which the parties may wish to argue should be addressed in this proceeding in advance of the scheduled cost of service hearing." The Board goes on to direct Hydro to provide a response to the question (page 4, lines 42-44). In spite of Hydro's belief that cost of service issues are more efficiently addressed at the proposed hearing on the cost of service methodology, Hydro proposes to change the methodology for allocation of specifically-assigned operating and maintenance costs on the Island system. Hydro makes this proposal without referencing another jurisdiction that uses its proposed methodology (NP-NLH-161). CA-NLH-84 indicates that "while other utilities utilize approaches with some features similar to Hydro's methods, none can be said to utilize Hydro's current or proposed methods". Hydro indicates it intends to start tracking actual operating and maintenance costs for specifically assigned assets beginning in 2018, but several years of history are needed before the new methodology can be properly implemented (PUB-NLH-78). It is not clear why Hydro is proposing a change to the methodology for allocating specifically-assigned operating and maintenance costs when the existing methodology has been vetted before the Board, but opposes changes to the classification of the costs of a new transmission line that it expects to recover in this Application, and that has never been vetted before the Board. This is especially concerning because the proposed methodology transfers costs from the Island Industrial Customers to Newfoundland Power whose rates are proposed to increase 50.9% over the 18-
month period from July 1, 2017 to January 1, 2019, compared to 20.3% for Island
Industrial Customers over the corresponding period (NP-NLH-165, rev 1). It is not
clear why Hydro is proposing any changes at all when the cost of service study does
not reflect the expected supply scenario and its best estimate of future costs (LAB-
NLH-8).

13) Hydro proposes a tail-block energy rate for Newfoundland Power of 14.141
cents/kWh in 2019 based on a forecast No. 6 fuel cost of $87.11 per barrel (%Can)
for the 2019 Test Year (Application Volume I (rev 3), page 5.18, lines 3–11).
Hydro's justification for this approach is that it is consistent with the currently
approved method, and it can be given further consideration at a rate design review
scheduled to occur subsequent to this GRA (Application Volume I (rev 3), page
5.17, lines 8–23). However, the proposed rate is expected to be in place through
2020, a period during which Holyrood production costs will no longer reflect
marginal costs owing to the availability of off-island purchases. In CA-NLH-81,
Hydro indicates that the annual average marginal energy cost forecast for 2019 is
5.0 cents/kWh. Therefore, Hydro is proposing that Newfoundland Power respond
to a price signal of 14.141 cents/kWh when it should be responding to a price signal
of 5.0 cents/kWh. Clearly, this will not promote efficient consumption decisions,
and is inconsistent with Board direction with respect to the Newfoundland Power
rate that "marginal costs should be considered in the future design of the wholesale
rate" (Application Volume I (rev 3), page 5.17, lines 10–11).

14) Hydro has not proposed aggressive cost-cutting or cost-controlling measures as a
means for mitigating the upcoming rate increases. For example, Hydro proposes to
continue with the capacity assistance agreements even though the new transmission
lines will address any capacity concerns in the 2018/19 winter. The table in CA-
NLH-165 shows a reserve margin of 306 MW without the capacity assistance
agreements, well above the 240 MW reserve requirement (if it were short capacity,
Hydro would not be relegating Holyrood Unit 3 to synchronous condenser
operation). Further, Hydro’s rate of return continues to be fixed by legislation via
OC2009-063. This can lead to inefficiency and less attention to regulatory
commitments and directives, and reduced customer satisfaction, reliability of
service and cost control. With customers facing a near triple digit rate increase,
consideration should be given to repealing OC2009-063 in an effort to reduce
Hydro’s return and spread the pain.

15) The average cost of supply to Rural and Isolated Customers in 2016, the last year
for which actual data are available, was about 23.0 cents/kWh (based on a cost to
supply of $117.2 million (NP-NLH-55, rev 1) and total energy sales of 508,418
MWh (NP-NLH-58)). This rate is comparable to Nalcor’s forecast cost of supply
to Island residential customers of 22.89 cents/kWh (compared to 11.7 cents/kWh
today) following commissioning of Muskrat Falls (figures exclusive of HST. See
Application Volume 1 (rev 3), page 5.6, lines 4-6). This draws into question the
desirability and ability of Newfoundland Power customers to continue funding the
Rural Deficit post-Muskrat Falls (and perhaps pre-Muskrat Falls depending on the
rate mitigation plan, if implemented). Hydro indicates it has recently provided
information on the costs of the rural deficit to Department of Natural Resources
officials, but does not say if any action was recommended, or likely to be pursued
(CA-NLH-199).

3. **Recommendations**

With respect to rate mitigation for Island customers, Hydro indicates it "believes that this
present matter can be well addressed in the present proceeding, which includes intervenors
representing a range of customers" (CA-NLH-222). I make my recommendations within
the context of this statement.

There are far too many gaps in the record for the Parties and the Board to make an informed
decision on this Application. A more complete picture of the rate mitigation plan is needed.
I therefore recommend that the Board direct Hydro to undertake the following:

a) File a cost of service study for the Island system for the 2019 test year based on its
best forecast of costs including off-island sales and purchases over the Labrador-
Island Link, as well as sales and purchases over the Maritime Link; i.e., based on
ISO New England spot prices. Only those changes to the cost of service allocations
that are necessary to perform the cost of service study should be made; i.e.,
functionalization of LIL and LTA operating and maintenance costs, and allocation
of the costs of off-island purchases (CA-NLH-169).

b) Propose a deferral account to protect Hydro from the uncertainties brought on by
variations in hydro generation, fuel costs and off-island purchases and sales.

c) Propose a rate mitigation plan based on the format referenced in Manitoba with a
fixed rate adder over and above any required rate increase (if a rate increase is
indeed required). The rate mitigation plan should explain how the funds that
accumulate in the rate mitigation account will be applied to different customer
classes and over what period of time; i.e., 50% in the first year post-Muskrat Falls, 35% in the second year and 15% in the third year. The proposed rate mitigation plan should address implications relating to allocation of the rural deficit.

d) Propose a power procurement plan for off-island purchases and explain how the regulatory vetting process will work to ensure customers are receiving optimum value.

e) Propose a plan for sales of capacity and energy surplus to the needs of the Island customers and explain how the regulatory vetting process will work to ensure customers are receiving optimum value.

f) Propose an open access transmission tariff(s) including an explanation of the facilities included in the tariff, how Hydro foresees the open access regime will work, which entities will be under Board jurisdiction, and how open access can be leveraged to provide optimum value to Island customers.

g) Propose a wholesale rate for Newfoundland Power that better reflects the marginal cost forecast.

h) Provide justification for the continued offering of capacity assistance and curtailable load.

The enormous cost escalation brought on by the Muskrat Falls Project and its resultant burden on Island customers requires that these matters receive top priority. I suggest that the settlement negotiations proceed as scheduled in January 2018 with intervenors working

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1 Hydro intends to file its open access transmission tariff with the Board before the end of the first quarter of 2018 (CA-NLH-161).
with Hydro to expedite and improve the efficiency of the undertaking in order to bring the
2017 GRA to a successful and timely conclusion.

This concludes my pre-filed evidence.
Information Note  
Department of Natural Resources

Title: Newfoundland and Labrador Hydro 2017/18 Winter Readiness Planning Report

Issue: To summarize Newfoundland and Labrador Hydro’s (NLH) Winter Readiness Planning Report (the Report) filed with the Board of Commissioners of Public Utilities (PUB) on December 8, 2017.

Background and Current Status:
- The Report advises that NLH expects a peak load of 1,808 MW for winter 2017/18, with available peak capacity of 1,963 MW plus 111 MW of capacity assistance resulting in a reserve margin of 266 MW or 16%. Capacity assistance refers to NLH’s agreements with large industrial customers who have agreed to reduce their demand when NLH requests it. Accordingly, NLH states “it will be ready for winter in the critical areas of generation and transmission availability.”

- However, the Report notes some of NLH’s annual work plan for winter readiness was not complete by the December 1, 2017 winter readiness target date and work on those components will continue.

- NLH has committed to track all required winter readiness activities, manage identified risks, and provide an update to the PUB on January 19, 2018 for those winter readiness items extending beyond the filing date of the Report.

Analysis:
- The degree to which uncompleted work plan items could impact available peak capacity, if at all, is not detailed in the Report. Further, if there is an impact, there is no indication as to the potential duration of this impact.

- The Report notes Bay d’Espoir units 1 and 2 (153 MW combined generation capacity) were offline as of the date of filing, but repairs were scheduled to be complete on that same day. NLH has informed NR subsequently that these have been repaired and returned to service.

- The report also indicates that NLH’s hydro reservoirs were lower than normal in the fall of 2017 and in order to raise them to a higher level, it has been operating its thermal generation at Holyrood above the minimal level in order to reduce water usage for hydro generation. NLH notes this activity has no impact on reliability.

- NLH provided additional information on this issue in its December 15, 2017 Near-term Generation Adequacy Report, noting that:
  - It does not anticipate reliability issues to arise from the current planned level of Holyrood generation as the plant’s maintenance is completed with the expectation it could have to operate to the maximum possible capability;
  - The planned generation levels for the Holyrood units in response to current reservoir conditions are consistent with the normal operating limits; and,
  - Operating Holyrood at higher load levels can actually reduce certain forms of maintenance, thus potentially increasing reliability.
• The *Near-term Generation Adequacy Report* did not discuss whether increased thermal production could impact rates, but did note that the analysis presented to date does not include energy available over the Maritime Link (ML), and that this could provide a cost effective solution to off-set Holyrood generation. How this could impact the value of the Off-Island Purchases Deferral account that is proposed as a means of funding future rate management efforts is not discussed in the report.

**Action Being Taken:**
• NR is following up with NLH to seek more information on the potential impact of uncompleted work-plan items and any potential impact of existing and continued low reservoir levels.

**Prepared/Approved by:** M. Janes / C. Snook / J. Cowan  
**Ministerial Approval:** Received from Hon. Siobhan Coady  

**December 27, 2017**
Information Note
Department of Natural Resources

Title: Newfoundland and Labrador Hydro December 2017 Energy Supply Report


Background and Current Status:

- In February 2016, the PUB requested NLH file a bi-weekly report containing: (1) System Hydrology Report, (2) the thermal plant operated in support of hydrology, (3) production by plant/unit, and (4) details of current or anticipated long-term de-rating. In July 2016, the PUB indicated a monthly report would be sufficient. The Report covers data for December 2017.

- The Report notes that due to the trend of drier than average conditions, inflows into NLH’s reservoirs were approximately 32 per cent below average in December. In turn, aggregate reservoir storage levels as of December 31 were 1239 GWh, which is 49 per cent below the seasonal maximum operating level and 8.5 per cent above the minimum storage level.

- Thermal generation above minimum continued through December (beginning in November) to reduce the hydro generation required to maintain reservoir levels.

- The Report advises that the operation of three Holyrood units were required in December to meet customer and system reliability requirements. Stand-by units were also required during the month; however, the Report states that no stand-by generation was used specifically for water management.

- On unit de-ratings for December, the Report states that Holyrood Unit 1 was operating at a capacity of 150 MW with the unit load limited by high furnace pressure; Holyrood Unit 2 was limited to 160 MW for the month of December due to high furnace pressure; and Holyrood Unit 3 was available for full load until December 13 when the unit was de-rated to 130 MW to replace a fuel pump. From December 13-30 the capability of the unit decreased further to 105 MW due to ongoing fouling of the air heaters. After maintenance on December 31, the unit’s load improved to 131 MW, still limited by maintenance/operating issues.

- The de-rating of Unit 3 in December 2017 represents a change from NLH’s 2017/18 Winter Readiness Planning Report (filed with the PUB on December 8, 2017), which stated that Unit 3 was available for full load at 150 MW.

- The Report notes that NLH is working to restore the full load on Unit 1 and 2 but that additional outage work is required to achieve full capacity. NLH is weighing the benefits and risks of completing an outage in the coming winter.

- The Report is appended as Annex 1.

Analysis:

- NLH’s Winter Readiness Report noted that some of NLH’s annual work plan for winter readiness was not completed by the December 1, 2017 winter readiness target date and work on those components will continue with an update to be provided to the PUB on
January 19, 2018. Follow-up with NLH will be required to determine whether any of the maintenance issues noted above will have a material impact on the overall maintenance schedule and thus system reliability.

The Winter Readiness Report also indicated that hydro reservoirs were lower than normal in fall 2017 and that it had been operating its thermal generation at Holyrood above the minimal level in order to reduce water usage for hydro generation. At the time, NLH noted this activity had no impact on reliability.

- NLH has advised NR of the following based on the Report:
  - The minimum storage level (currently 8.5 per cent above as of December) ensures water availability to meet electricity requirements should there be three consecutive years of very dry weather (of which is not currently the case);
  - There is currently no need for additional energy through gas turbine operations due to water availability (noting that it would be a number of weeks of precipitation potential before a decision would be required);
  - Significant rainfall and warm temperatures forecasted are expected to result in increased water in storage (an update provided by NLH to NR has confirmed this is the case); and,
  - The availability of the Maritime Link in the coming weeks will allow NLH to purchase off-island energy should be required and economic to do so.

- It is not known whether the conditions described in the Report, specifically increased thermal production, how or if they will impact rates.

**Action Being Taken:**
- NR will continue to engage with NLH to seek more information on the maintenance and reliability issues noted above, and on the potential impact of existing and continued low reservoir levels.

**Prepared/Approved by:** L. MacDonald / M. Janes

**Ministerial Approval:**

January 15, 2018
Information Note
Department of Natural Resources

Title: Board of Commissioners of Public Utilities Decision on the Consumer Advocate’s Application for NL Hydro to refile its 2017 General Rate Application

Issue: To explain the Board of Commissioners of Public Utilities (PUB) January 26, 2018 Order with respect to the Consumer Advocate’s (CA) application to delay NL Hydro’s (NLH) 2017 General Rate Application (GRA).

Background and Current Status:

- On January 26, 2018 the PUB issued Order PU-2-2018 ("the Order") in response to the CA’s January 4, 2017 application to delay NLH’s GRA pending NLH refileing the GRA. Background information on the CA’s application and intervenors' responses to it is provided in Annex 1.

- The PUB ordered NLH to file forecast 2018 and 2019 revenue requirements and cost of service studies based on the expected supply scenario, setting out the basis and support for the forecasts and assumptions used, including information related to customer rates and the updated fuel price forecast.

- The Order stated the PUB shares the concerns of NLH, Newfoundland Power (NP), and the Industrial Customer Group in relation to delaying the GRA, but stated that additional information relating to the expected supply scenario would be helpful in assessing the reasonableness of NLH’s proposals.

- The PUB noted 2018 and 2019 are transition years with Newfoundland and Labrador (NL) interconnecting via the Maritime Link (ML) and Labrador Island Link (LIL), thus making it challenging for NLH to provide a cost of service study reflecting the expected supply scenario of offsetting Holyrood thermal generation with off-island supply via the Labrador Island Link. However, the PUB is satisfied that reasonable assumptions can be made by NLH to reflect the circumstances anticipated.

- The PUB did not, however, grant the CA’s request to seek further information in other areas, including a procurement plan for off-island purchases, a plan for sales over the LIL and ML, or a vetting program for sales and purchases over the LIL and ML. The PUB said this information would not assist evaluating the GRA proposals.

- The PUB noted that information filed with regard to the 2018 and 2019 revenue requirement and cost of services studies should reflect:
  - purchases and sales over the LIL and ML;
  - the allocation of the operating and maintenance costs of the LIL and the LTA;
  - the classification and allocation of off-island power purchases;
  - the Holyrood fuel conversion rate;
  - the Holyrood capacity factor; and,
  - Holyrood fuel inventory used in rate base.

- The PUB also noted NLH should provide information in relation to customer rates and whether deferral accounts or other mechanisms would be necessary or appropriate to address uncertainties related to expected supply costs in 2018 and 2019.
The PUB noted that that a process and schedule for the hearing of the GRA can be established which will minimize delays. For example, the hearing may be scheduled to begin before the additional information is filed to address the issues which are not directly related to the new information. In addition, the PUB noted that questions and evidence related to the new information can be addressed in the hearing thereby avoiding the significant delays associated with additional Requests for Information and written expert evidence.

Once NLH files the additional information, intervenors will have opportunity during the hearing to address their issues with NLH’s proposal to base the 2018 and 2019 test year revenue requirements and cost of service studies and rates on an isolated island scenario, including whether OC2013-343 prohibits NLH from incurring LIL or ML costs.

Analysis:
- It is unknown how the PUB may rule on the proposed off-island purchases deferral account. While the PUB has indicated it is sympathetic to the challenges of preparing cost of service studies for 2018 and 2019 that reflect the use of the ML and LIL to source off-island power, it is also clear that the PUB expects NLH to be able to supply such information based on 'reasonable assumptions'.

- The PUB has not indicated it opposes using a deferral account for off-island supply savings. However, it is not clear how this would provide more certainty for ratepayers or NLH over what NLH has currently proposed, which has been a consistent intervenor criticism off-island purchases deferral account.

- It is not certain that if NLH were to submit a cost of service study for 2018 and 2019 that was satisfactory to the PUB, that the PUB would indeed permit NLH to collect revenue based costs that reflect the use of Holyrood and not off-island purchases. It is conceivable the PUB could order that any reduction in costs should be passed immediately on to ratepayer during the period in which the savings accrue. If this were to occur, there would be no revenue for savings accumulated to fund future rate management.

Action Being Taken:
- The Department of Natural Resources (NR) will consult with the PUB to determine how the schedule for the GRA will be affected.

- NR will consult with NLH to determine how it intends to comply with the PUB’s Order.

Attachments: Annex 1 – Background Information

Prepared/Reviewed by: M. Janes / C. Snook / J. Cowan
Ministerial Approval: Received from Hon. Siobhan Coady

January 28, 2018
Annex 1 – Background

- On January 4, 2018, on the basis of its concerns with the proposed cost of service study, particularly as it related to the off-island purchases deferral account, the CA applied to the PUB for an Order to delay the schedule for the GRA (including settlement discussions, negotiations, the filing of issues lists and witness lists, the motions day, and the commencement of public hearings) until additional information is provided by NLH. The public hearing portion of the GRA had been scheduled to begin January 30, 2018.

- The CA’s Application included the following concerns, that the:
  - Deferral account is not a rate mitigation plan but a proposal to over-charge customers by basing rates on a cost of service study that NLH forecasts will over collect revenues (and when and how the funds are to be allocated to customers in the future);
  - Deferral account lacks transparency as NLH has not submitted a procurement plan for off-island purchases;
  - Deferral account lacks a definition, (including whether NLH can legally collect these costs prior to the commissioning of the Muskrat Falls Project);
  - Costs for using the Labrador Transmission Assets (LTA) and the Labrador Island Link (LIL) appear “exorbitant”;
  - GRA does not specify how deferral account funds will be allocated to the various customer classes.

- In order to address these concerns the CA sought to have NLH file:
  - A 2019 test year cost of service study based on the expected supply scenario with off-island purchases over the LIL and ML;
  - A proposal for a supply cost adjustment mechanism to complement the cost of service study (given the uncertainties brought of the off-island purchases);
  - NLH’s power procurement plan for off-island purchases over the LIL and ML;
  - NLH’s plan for sales of power over the LIL and ML;
  - A vetting program for both sales and purchases over the LIL and ML to assist parties and the PUB in determining if customers are receiving optimum value;
  - An open access transmission tariff including how the open access regime will work;
  - A Newfoundland Power (NP) wholesale rate better reflecting forecast marginal costs.

Newfoundland Power’s (NP’s) Response

- NP’s January 15, 2018 response noted that it agrees with certain CA points, including the fact that the evidence filed in support of the off-island purchases deferral account does not appear to be sufficient. NP however, also noted that “the Board should, in the circumstances, give due regard to Hydro’s assertion of its right to proceed with its 2017 GRA as filed.”

Island Industrial Customers’ Response

- Island Industrial Customers’ January 15, 2018 noted their primary concern is rate certainty and delaying the current GRA would raise the “prospect of an extended period under interim rates and consequent rate uncertainty in 2018 and likely extending into 2019.”

- This group also noted that if the deficiencies in NLH’s GRA evidence asserted by the CA are borne out in the GRA hearing, it is NLH that bears the risk of its off-island purchases deferral account proposal not being approved in the PUB’s ultimate GRA order.
CA's Reply to Intervenors

- In its January 18, 2018 reply, the CA maintained its position that the GRA should be delayed until NLH files additional information supporting its off-island purchases deferral proposal.

- The CA has also stated that OC2013-343 stipulates that no costs "in respect of each" of Muskrat Falls, the Labrador Transmission Assets (LTA) or the Labrador-Island Link (LIL) "shall be included as costs, expenses or allowances in [NLH's] cost of service calculation or in any rate application or rate setting process, and no such costs, expenses or allowances shall be recovered by [NLH] in rates...until such time as the project is commissioned or nearing commissioning and Newfoundland and Labrador Hydro is receiving services from such project." OC2043-343 in its entirety is appended as Annex I.

- In the CA's view, which NP shares, OC2013-343 may prevent NLH from recovering costs associated with use of the LTA/LIL to source off-island purchases, such as recall power. NLH's proposed off-island purchases deferral account proposes that operating and maintenance costs associated with the use of the LIL would be charged to ratepayers, thus reducing the potential deferral account savings balance. (It is important to note that NLH has not proposed capital cost recovery from the LIL/LTA.)

- A January 22, 2018 media article stated, "Newfoundland Power says cabinet order 2013-343 specifically says the LIL's owners can't charge ratepayers for using the link until the Labrador power project is completed." In fact, NP's response to the CA application was less unequivocal, which stated "...it is unclear whether the [off-island purchases deferral account] conforms to provincial Cabinet directives. Order in Council OC2013-343, which governs recovery of Muskrat Falls project costs, specifically prohibits the recovery of Labrador Island Link ("LIL") costs until the project is "commissioned or near commissioning." The article did not acknowledge that NP disagreed with the CA's request to delay the entire GRA to address deferral account questions.

- The CA has noted it was unable to fully examine the deferral account issues in the context of a rate hearing as it did not have the information required to undertake a thorough examination. The CA has noted, "a comprehensive assessment of rate mitigation plans for Muskrat Falls is an important matter, but one that should be undertaken separately [from the current NLH GRA] and involve Hydro, NP and all intervenors."
Information Note
Department of Natural Resources

Title: Newfoundland and Labrador Hydro 2018 Rate Stabilization Plan Adjustment Application

Issue: To summarize Newfoundland and Labrador Hydro’s (NLH) 2018 Rate Stabilization Plan (RSP) adjustment application.

Background and Current Status:
- On April 13, 2018, NLH will file its annual RSP adjustment application with the Board of Commissioners of Public Utilities (PUB). The application proposes rate changes effective July 1, 2018 including RSP fuel cost adjustments and additional interim rate changes in relation to delays in implementing NLH’s last 2017 General Rate Application (GRA).

- The GRA process establishes base electricity rates that utilities can charge customers in to recover costs. Utilities typically submit GRAs every two to three years as costs change. NLH’s 2017 GRA is currently before the PUB with hearings to begin on April 16, 2018.

- Between GRAs, rates may be adjusted each year on July 1 based on NLH’s actual versus forecast fuel costs for generating electricity at the Holyrood Thermal Generating Station, which is a function of the price per barrel of fuel, the amount of electricity used by customers, and annual rainfall that determines hydroelectric generation. This mechanism is the RSP, which was created to ensure that rates reflect actual costs of generation from year to year, rather than risk much larger rate changes over longer periods between GRAs.

- NLH’s 2017 RSP adjustment application forecasted the annual RSP adjustment to increase more than 18 per cent for most customers due to the costs associated with the amount of fuel used at Holyrood. A PUB response to the application noted that the annual rate impacts for retail customers associated with the RSP have historically been in the range of +/-10 per cent and that the proposed 18 per cent increase could be argued to cause customer rate shock. The PUB ordered NLH to look at options to mitigate such an increase.

- NLH put forward several rate mitigation options. Following a full review, the PUB order NLH to transfer its RSP Load Variation balance (a balance of approximately $50.7 million that accumulated as a result of over recovery in relation to the operation of Holyrood since 2013) to mitigate the 2017 RSP adjustment rate increase. The PUB approved a final rate increase of 9.1 per cent with additional costs to be recovered by NLH at a future date.

- Given this, NLH’s 2018 RSP factors in the additional costs that were not recovered by NLH in 2017 in addition to the fuel, hydrology and oil price normally factored into the RSP.

- NLH’s 2018 RSP adjustment application also requests interim electricity rates for 2018. NLH notes that Additional Cost of Service Information was filed with the PUB on March 22, 2018, and that the continuation of 2015 Test Year base rates is forecast to result in a revenue deficiency between $43.4 and $53.8 million.

- If increased base rates are not implemented in 2018, the revenue deficiency for the 2018 calendar year would need to be recovered from customers upon the establishment of final customer rates in 2019. NLH’s RSP application also notes that as the GRA hearing process may not be completed until late summer or early fall, it is possible that final rates resulting from the 2017 GRA may not be implemented until later than January 1, 2019. Given this, future rates would need to include recovery of both 2018 (full year) and 2019 (part of the year) revenue deficiency.
In total, NLH's 2018 RSP application requests a July 1, 2018 rate increase of 7.5 per cent (4.7 per cent of this increase is due to the RSP adjustment and the remaining 2.8 per cent accounts for NLH's request for an interim rate) or an additional 0.9 cents/kWh. For the average homeowner on the island, this would be an increase of about $13/month on their electricity bill (based on average consumption of 1,517 kWh/month).
Action to be Taken
• NR staff will monitor media reports and intervener filings on the application, and attend the upcoming GRA hearings.

Prepared/Approved by: L. MacDonald / C. Snook / J. Cowan

Ministerial Approval:

April 16, 2018
Title: Overview of the proposed Off Island Purchases Deferral Account

Issue: To provide an overview of Newfoundland Hydro's (NLH) proposed Off Island Purchases Deferral Account as a tool for Rate Management

Background and Current Status:
- Nalcor estimates the Muskrat Falls Project (MFP) will increase residential electricity rates from 11.7¢/kWh in 2017 to 22.89¢/kWh in 2020. Given negative impact on ratepayers, efforts are underway to identify and implement methods to reduce this increase.

- NLH’s ongoing 2017 General Rate Application (GRA) to the Board of Commissioners of Public Utilities (PUB) proposes a rate management mechanism referred to as the Off-Island Purchases Deferral Account. (The PUB oversees the independent regulatory process for setting electricity rates.)

The Off Island Purchases Deferral Account:
- NLH anticipates that the Labrador-Island Link (LIL) and the Maritime Link (ML) will be available in 2018 and 2019 to provide off-island power purchases and surplus capture power from Churchill Falls to reduce the generation required from the Holyrood Thermal Generating Station. This presents an opportunity to reduce the use of costly Holyrood generation by using lower-cost off-island supply in 2018, 2019, and 2020. The estimated value of this approach, as presented by NLH is appended as Annex 1.

- NLH has proposed to establish the Deferral Account as a means to manage future rate increases. Through the proposed Deferral Account, NLH proposes to continue charging customers rates based on Holyrood generation costs, but to actually source cheaper off-island electricity, in part, via the LIL/LTA to serve a portion of customer electricity demand that would otherwise be served by Holyrood. The difference between the higher price that customers would pay and the lower cost NLH would actually incur would fund the proposed Deferral Account, which would be used later to fund rate management efforts when MFP comes online, and its costs become payable by island electricity ratepayers.

Regulatory Precedent:
- In expert evidence submitted in support of its 2017 GRA, NLH indicated that Manitoba Hydro had recently used a similar deferral account. In Order 73/15, Manitoba’s Public Utilities Board approved an interim rate increase for Manitoba Hydro of 3.95%. The revenues from 2.15% of that rate increase are to be placed in a deferral account to mitigate expected rate increases from the Bipole III Project.

Analysis:
- Intervenors in the 2017 GRA hearing have broadly opposed the deferral account. The Consumer Advocate (CA) argues that the mechanics of Manitoba Hydro's deferral account, presented as regulatory precedent, are different than the NLH proposed Deferral Account.

- The CA has argued that OC2013-343, the Muskrat Falls Exemption Order, may preclude the proposed Deferral Account, given that the account, in the CA's view, is accumulating funds before the commissioning of the MFP that will ultimately be used to pay MFP costs.
• It is unknown how the PUB may rule on the proposed off-island purchases deferral account. While the PUB has indicated it is sympathetic to the challenges of preparing cost of service studies that reflect the use off-island power, it is also clear that the PUB expects NLH to be able to supply such information based on 'reasonable assumptions'.

• If the PUB ultimately does not approve the proposed Deferral Account, any savings realized through off-island supplies would likely be passed on to rate payers in the year in which the savings are realized. This would cause electricity prices actually drop before MFP costs come to affect rates in 2021, if indeed the off island purchase scenario is less costly than Holyrood. In this case, the savings would not be available to assist with future rate increases and there would be an even wider gap between rates pre- and post-MFP entering service.

Key Messages:
• The proposed Deferral Account has been a publicly announced part of the Nalcor's plan for rate management.

• Government is satisfied that this proposal is being fully tested and examined by the PUB, the Consumer Advocate, and other intervenors.

• This is an appropriate process for matters that affect electricity rates.

• Whether or not the proposed Deferral Account is appropriate and useful for its intended purpose is an important question for the PUB to consider.

Action Being Taken:
• This note has been provided for information purposes only.

Approved by: Received from Hon. Siobhan Coady

May 11, 2018
Annex 1

Table 1: Off Island Purchase Deferral Account (OIPDA) Estimated Net Credit & Balance 2018 through 2020 ($,000) \(^1\)

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<th>Year</th>
<th>2018</th>
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<th>2020</th>
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<td>Fuel Cost Savings</td>
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<td>Impact on Return From Lower Fuel Inventory</td>
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<td>Total</td>
<td>40,497</td>
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<td>Cost of Off-Island Purchases</td>
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<td>OpEx LTA/LIL</td>
<td>27,300</td>
<td>52,900</td>
<td>35,700</td>
</tr>
<tr>
<td>Total</td>
<td>28,186</td>
<td>54,846</td>
<td>35,960</td>
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<tr>
<td>Return on Average Balance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12,311</td>
<td>75,257</td>
<td>76,182</td>
</tr>
<tr>
<td>Net Credit to OPDA</td>
<td>407</td>
<td>2,860</td>
<td>7,323</td>
</tr>
<tr>
<td>Net Balance in OPDA</td>
<td>12,717</td>
<td>78,117</td>
<td>83,504</td>
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\(^1\)Newfoundland and Labrador Hydro Off Island Purchases Deferral Account Expert Evidence by John T, Brown Consulting
Information Note
Department of Natural Resources

Title: Newfoundland & Labrador Hydro’s Near-Term Generation Adequacy Report

Issue: To provide an overview of Newfoundland & Labrador Hydro’s (NLH) semi-annual generation adequacy report on Island Interconnected System to the Board of Commissioner of Public Utilities.

Background and Current Status:
- Following power outages and supply issues on the Island Interconnected system (IIS) in late December 2013 and early January 2014 the Board of Commissioner of Public Utilities (PUB) began an investigation and hearing into causes of the outages.

- The PUB has the authority to conduct an investigation into the service provided by a utility, of its own motion, where it determines that it is appropriate, or where a duly constituted complaint has been filed. Sections 82, 84 and 87-89 of the Electrical Power Control Act specifically address investigations and complaints. This investigation has been conducted in accordance with the Board’s authority under these provisions.

- In its February 19, 2014 order (P.U. 3(2014)) the PUB identified the intervenors and set out the two phased investigation process to be followed in the matter. Phase one dealt with the immediate reliability issues for the IIS prior to interconnection with Muskrat Falls. Reliability issues post Muskrat Falls interconnection would be addressed in Phase Two.

- NLH’s generation planning and supply were key issues throughout the investigation and the PUB has expressed concerns on its generation capacity to meet customers demand and adequate reserve capacity in the next few years. The PUB will continue to evaluate NLH’s generation planning and supply as part of Phase Two of the investigation. The PUB has directed NLH to immediately commence its supply review recommended by a third party consultant, and advised NLH to file its generation adequacy report semi-annually.

- To comply with the PUB’s directives, NLH files its Near-term Generation Adequacy Report on May 15 and November 15 each year. This (May 15) report addresses NLH’s capacity to provide adequate supply to its IIS customers by meeting peak demand and energy requirements.

- The report is structured with an introductory “IIS Overview” section. A second section called “System Planning Criteria” discusses the planning criteria. The next section called “Asset Reliability” details the factors affecting asset reliability and current state of assets. For discussion, the assets are grouped by facility types of Hydraulic, Thermal and Gas Turbine. There is a fourth section called “Load Forecast” followed by another section on “System Constraints and Future Supply Risk”. The last section concludes the report.

- In the “Overview” section NLH reports on its statutory mandate given by section (5)1 of the Hydro Corporation Act to generate electricity in the province. It informs of its transmission, distribution, operation and maintenance activities comprising of 3,500 KM of transmission and 3,400 KM distribution lines and serving utility customer Newfoundland
Power (NP), five regulated industrial customers and 38,000 direct residential customers on the island.

- The next section, lays out NLH’s System Planning criteria which includes load forecasting, criteria for generation and transmission planning. The Generation planning criteria is as follows:
  - Capacity: The IIS should have sufficient generating capacity to satisfy a Loss of Load Hours (LOLH) expectation target of not more than 2.8 hours per year, and The IIS should have sufficient generating capacity to maintain a minimum reserve of 240 MW at the P90 system peak (See Annex 1 for details on LOLH and P90)
  - Energy: The Island Interconnected System should have sufficient generating capacity to supply all of its firm energy requirements with firm system capability.

NLH’s Transmission Planning criteria addresses power flow for normal operations, transmission element failures and emergency situations.

- In the "Asset Reliability" section of the report, NLH states that it reports to the PUB on the rolling 12 month performance of its assets, detailing any reliability issues in the previous 12 months period.

- Following is a summary of the issues with the assets identified in the report.
  - NLH undertook significant work in 2016 and 2017 to address deteriorated welds in Penstocks 1 and 2 at Bay d’Espoir. In May 2018, cracks were confirmed in Penstock 3 and works is underway with funding from the "Allowance for Unforeseen Item Account" to address the issue. Penstock 4 was inspected in 2014 and found healthy. NLH plans to inspect penstocks at Upper Salmon, Paradise River, Snook’s Arm and Granite hill in the coming years.
  - Cracked rotor key welds observed on the generation unit at Upper Salmon plant. The 2018 capital plan includes upgrades to address these issues.
  - One existing cooler has been repaired and additional one was purchased for Hinds Lake plant.
  - NLH plans to replace the spherical valve controls in 2018 at Cat Arm.
  - Boiler tubes at the Holyrood Station (HTGS) were replaced in 2016.
  - Variable Frequency Drives at Holyrood were modified throughout 2016-17, but continue to have issues. NLH is closely monitoring the status.
  - Supplemental Capital Budget Application is being prepared to replace air heating equipment at Holyrood.
  - The turbine control system at Holyrood had issues and has been addressed.
  - Two exciter control systems at HTGS were installed in 1999, 2000 and another one was replaced in 2013 to ensure reliable operation.
  - Flanges on Unit 1 and 2 at HTGS experienced issues. One is replaced while the replacement of the other is planned for 2018.
  - A stop Valve in Unit 1 boiler at HTGS failed in January 2018. Originally supplied in 1969, the valve was replaced.
  - NLH plans to provide current assets condition and long term plans for the Stephenville and Hardwood gas turbine in its 2019 Capital Budget application to the PUB, after identifying issues. Some work has been completed on the turbines.
  - NLH has evaluated the health of generating units across all classes. Annex 2 – table 1 summarizes the projected availability of its generating assets from a
reliability perspective. Estimated value of the five year Capital expenditure on generation assets is presented in table 2.

- In its load forecast, NLH and NP both do not expect load growth in the next five years consistent with poor provincial economic outlook, however NLH’s peak demand forecast due to severe weather indicates an additional 60MW load requirement.
- NLH notes that capacity may be available on a short-term basis to prevent a shortfall in generation, or to displace more costly sources of generation.
- Availability and capacity of the LIL has the largest impact on the supply adequacy of IIS.

Analysis

- The report noted that there was sufficient generation to meet peak demand.

- Some of the supply scenarios that NLH analyzed, result in violation of planning criteria. NLH continues to increase its operational awareness to proactively respond to any issue that may arise in future.

- NLH has conducted a thorough assessment of its assets to identify potential risks to the reliable operation of its key generation assets. NLH is confident in its ability to meet IIS energy requirements.

- In addition to the base forecast, NLH has constructed three sensitivity demand forecasts to examine the effects of different load growth projections. NLH has also performed analysis on seven cases to determine the effects of different system conditions on its capability to supply customers.

- The 2018 in-service of the Maritime Link and the Labrador-Island Link, combined with recapture energy and contracted supply from external markets, ensure NLH is well positioned to reliably supply customers through Winter 2021-2022 in absence of generation from the Muskrat Falls Generation Station.

Action Being Taken:

- The note is provided for information purposes only.

Prepared/Approved by: Y. Khan/ M. Janes

Ministerial Approval:

May 30, 2018
Annex 1

Table 1: Summarized Asset Reliability Metrics

<table>
<thead>
<tr>
<th></th>
<th>DAUFOR(^1) = 3.85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay D’Espoir Hydraulic Units</td>
<td>DAUFOR = 0.73%</td>
</tr>
<tr>
<td>Remaining Hydraulic Units</td>
<td>DAUFOR = 15%, 18%, 20%</td>
</tr>
<tr>
<td>Holyrood Thermal Units</td>
<td>DAUFOP(^2) = 5%</td>
</tr>
<tr>
<td>Holyrood GT</td>
<td>Base DAUFOP = 30%</td>
</tr>
<tr>
<td></td>
<td>Sensitivity DAUFOP = 50%</td>
</tr>
<tr>
<td>Stephenville GT</td>
<td>Base DAUFOP = 30% Sensitivity</td>
</tr>
<tr>
<td>Hardwoods GT</td>
<td>DAUFOP = 50%</td>
</tr>
</tbody>
</table>

Table 2: NLH Five year Capital Plan (Generation)

<table>
<thead>
<tr>
<th>Expended to</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,017.00</td>
<td></td>
<td>58,397.70</td>
<td>44,627.80</td>
<td>39,873.20</td>
<td>33,126.40</td>
<td>32,287.30</td>
<td>225,229.40</td>
</tr>
</tbody>
</table>

Source: NLH 2018 Capital Budget Application p-83

\(^1\) Derating Adjusted Force Outage Rate (DAUFOR) is a reliability KPI for generation assets that includes NLH’s thermal and hydroelectric generation assets on the interconnected systems. DAUFOR measures the percentage of the time that a unit or group of units is unable to generate at its Maximum Continuous Rating (MCR) due to forced outages. The KPI is weighted to reflect differences in generating unit sizes.

\(^2\) DAUFOP is the probability that a generating unit will not be available due to forced outages or forced deratings when there is demand on the unit to generate. Given DAUFOP as an indication of GT reliability would reflect all periods where GT unit deratings impact available system generation, Hydro has decided to use DAUFOP as the basis for all of the analysis in this report.
Title: Summary of Liberty Consulting Group’s Report on Supply Adequacy for upcoming winter

Issue: To provide a summary of Liberty Consulting Group’s Analysis of Newfoundland Island Interconnected System (IIS) Power Supply Adequacy for the winter 2018-19.

Background and Current Status:
- Liberty Consulting Group (Liberty), at the request of the Board of Commissioner of Public Utilities (PUB), submitted a report to the PUB on August 30, 2018 on the Analyses of Newfoundland Island Interconnected System (IIS) Power Supply Adequacy for the winter 2018-19 (the Report).
- The Report provides Liberty’s analysis of near term power supply adequacy of Newfoundland Hydro (NLH) and observation on the changing operating and supply situation as the Labrador Island Link (LIL) and Muskrat Falls (MF) approach operation.
- The report was critical of Nalcor’s progress in numerous instances noting that exposure to supply related outages persists. Specifically, the Report notes that lack of clarity in the reliable in-service date of LIL and poor performance of the Holyrood Thermal Generation Station (HTGS) will considerably increase the risk of supply related outages on the IIS. The report also raises concerns regarding NLH’s other generation assets, as well as the practicality of using the Maritime Link (ML) to help ensure adequate electricity supply.

Labrador Island Link
- Liberty advises it is uncertain of the in-service date of the LIL and its anticipated impact on supply of recall power. It further noted that Nalcor representatives were unwilling to provide information about LIL schedule to Liberty.
- Liberty concluded that the LIL is unlikely to be “reliably in commercial operation” by the beginning of winter thereby impacting supply of recall power to the island.
- Liberty further noted that even when the LIL enters commercial operation that it will likely prove somewhat unreliable due to the following factors: 1) its planned operation as a monopole in its first year of commissioning; 2) delivery delays on behalf of GE; 3) the limited duration of planned testing to achieve a “minimum successful run” – 20 days versus 60 days for similar projects, according to Liberty; and 4) the typical problems associated with any new facility in its early operation.
- Comparing favorable and unfavorable supply outlook for winter 2018-19, Liberty states that delay of in-service date of LIL results in violation of NLH’s established reliability criteria and resulting heightened risk.
- The Report notes that the current organization structure of Nalcor and Hydro places responsibility for construction of the LIL with Nalcor, but makes Hydro the entity dependent on the LIL entering reliable service. Liberty notes with regard to this situation that it has “observed transparency and accountability concerns in connection with this distinction.”
Liberty recommends an enhanced and more frequent PUB oversight of NLH regarding the LIL in-service date. It also recommends that the PUB direct NLH to develop contingency plans to mitigate the consequences associated with the eventuality that LIL will not be available or will be significantly unreliable, for all or part of the coming winter season.

**NLH Generation Assets**

- The Report notes that issues caused by deteriorating generation assets, such as Holyrood, and the Hardwoods and Stephenville combustion turbines are well known. It also notes, that Holyrood "continues to impose major uncertainty" with regard to electricity supply.

- Liberty also raises concerns about emerging issues at NLH’s hydro generation assets. The report highlights "new and expanding" issues related to penstock (hydroelectric water flow mechanism) deterioration at Bay d’Espoir, along with various other maintenance issues at Upper Salmon, Hinds Lake, and Cat Arm. Liberty advises that "the [PUB] should be concerned about the number of issues [related to hydro assets] and the length of time during which they continue to be unresolved."

- Liberty notes that this deterioration of assets demands action by Hydro management. It also concludes that the "major threat for this winter is the Holyrood TGS" and that this "threat could produce very severe consequences on days when the LIL is unavailable."

**Maritime Link**

- The report notes that while the ML “is indeed producing substantial benefits”, the lack of access to firm capacity is a notable shortcoming, and Liberty expects these existing benefits (primarily off-island purchases and various reliability/protection capabilities) to become less practical in the future due to commercial and operational issues.

**Analysis:**

- With the LIL continuing to be in the project delivery phase, and not in commercial operation, two issues are noted: 1) the inability to source cheaper off-island power; and 2) having an asset that can only be partially used. Liberty judges that three conditions are required to create a major outage: 1) the LIL not being in service; 2) loss of more than one unit at Holyrood; and 3) high electricity demand (ie. a very cold, windy day).

- In response to Liberty’s report, NLH has noted the following:
  - With respect to the continuation of the LIL in the project delivery phase, NLH notes that as with any system constraint NLH faces, it monitors the situation closely and continues to work with Nalcor to ensure NLH understands the reasons for the delay and how it may impact the system. NLH advises that NLH is developing a contingency plan to manage any shortfall in the assumed supply over the LIL, and it is confident that can be done through things like; imports over the ML, capacity assistance agreements, and other items which will be fully outlined in a report to be filed by early October 2018.
  - With respect to questions raised by Liberty regarding thermal and hydro units, NLH advises that it “firmly believes that the right work, and the right level of investment, has been made to ensure reliability this winter.”
Action Being Taken:

- NLH advises that it will file a response to the Report on Friday, September 7 to address questions and the recommendations put forward by Liberty. NLH expects follow up information will be filed with the PUB and Liberty in the weeks subsequent as various initiatives develop and conclude. Such initiatives will further document the coming winter supply planning.

- NR will continue to monitor and advise on these issues.

Prepared/Approved by: Y. Khan / M. Janes / C. Snook/ J. Cowan

Ministerial Approval:

September 5, 2018
Title: Newfoundland and Labrador Hydro Response to External Supply Adequacy Review

Issue: Newfoundland and Labrador Hydro’s ("NLH") response to a report on winter 2018/19 power supply adequacy commissioned by the Board of Commissioners of Public Utilities ("PUB")

Background and Current Status:

- On September 7, 2018, NLH submitted a two-part response to the Report. Part 1 provides the status of Labrador-Island Link (LIL) transmission line capacity levels, reliability of the Holyrood Thermal Generation Station (HTGS) and associated impacts on NLH’s supply planning. Part 2 addresses each of Liberty’s recommendations.

Part 1 - Labrador Island Link, Holyrood Thermal Generation, and Impacts
- NLH reports that LIL is undergoing dynamic commissioning for pole 1 operation. Pole 1 of the LIL was put into operation for 27 days between May and July 2018, which demonstrated it can be operated at a capacity of 45 MW with some testing completed at 65 MW.

- Prior to proven reliable operation, NLH is planning that LIL capacity shall be limited to 110 MW, which is the level at which under-frequency load shedding would likely occur in the event of the system tripping. Recognizing this, NLH intends to include the LIL at 110 MW in its supply planning for this coming winter.

- NLH notes that while the LIL has been demonstrated to operate up to 65 MW in the current configuration, the LIL does not yet meet the commercial operation threshold and therefore remains in dynamic commissioning. Further testing, working up to 110 MW, will occur prior to the winter season, with testing anticipated to begin in late September 2018.

- NLH further advises that since the LIL is still in the dynamic commissioning phase, it cannot be released for continuous operation over 110 MW. NLH notes that following the successful testing for the commercial operation of the “monopole low power configuration”, the LIL will undergo dynamic commissioning for a “Bipole low power configuration”. After that testing, another trial operation will begin to demonstrate operation without incident for a continuous 30-day period within a 90-day operating window before the bipole is accepted for commercial operation at low power (over 200 MW). Before final project completion of the LIL, it will undergo a third trial operation test at high output.

- NLH agrees with Liberty’s assessment that the 20 days of continuous operation is not the industry norm for full acceptance of a project. However, NLH notes that the 20 days is for the first phase of trial operation and for the full project acceptance from the vendor, there are two additional 30-day trial operations periods required.
**NLH generation Assets**

- NLH agrees that the Holyrood thermal generation station (HTGS) is aged and poses one of the higher risks to system reliability; however, NLH does not concur with Liberty's observation of serious problems resulting in forced outages. NLH advises that it seriously considers the reliability risk at the HTGS and proactively undertakes risk mitigation actions.

- NLH notes that it does not expect "perfect" HTGS operation over the coming winter season but it is confident that key issues have been corrected as part of the additional planned maintenance completed in 2018. NLH advises it will provide updates on HTGS reliability in its monthly energy supply and semi-annual generation adequacy PUB reports.

- NLH advises that reliability issues are expected and reflected in contingency planning. NLH is confident that removal of a generation unit from the HTGS from service for up to four weeks would not violate its planned reliability criteria for forced outages.

**Part 2 - Responses to Liberty's Recommendations**

- In response to Liberty’s Recommendation 1 on “PUB’s directing NLH to implement an enhanced monitoring program of Nalcor’s activities required to place the LIL reliably in service”, NLH advises that it is holding discussions with Nalcor that will follow through to full commissioning of the LIL. Based on these discussions, NLH confirms that LIL will be capable of delivering 110 MW to the IIS in this coming winter.

- Addressing Recommendation 2, NLH states that discussions are underway with Nalcor to capture the risk to LIL in-service timing and capacity, which will maintain the accountability for assessing IIS supply risk for the upcoming winter. NLH notes it will be updating the PUB monthly on any changes for the winter season.

- Responding to Recommendation 3, that NLH should develop a contingency plan for LIL unreliability, NLH concurs that while a combination of coincident supply issues would need to occur to cause significant loss of load, NLH is developing contingency plans to mitigate risk of customer outages. If NLH’s analyses determine LIL and Holyrood availability risks are sufficient, it will enact its contingency plan by November 12, 2018.

- In response to Liberty’s Recommendation 4 on asset management, NLH advises that NLH has commenced improvements in its asset management program and has established an asset management system that is modelled after industry best practices.

- Responding to Liberty's Recommendation 5 related to implications of problems with hydraulic assets, NLH notes that it manages and monitors known reliability concerns and aims to take action at the “right time”. NLH holds the view that intervention earlier than necessary can result in increased costs, while delayed intervention can be a reliability risk.

- NLH concludes that the evolving nature of the IIS with the introduction of the LIL and LTA assets and the associated later than anticipated in-service date brings an understandable level of uncertainty to supply adequacy and NLH is actively monitoring the availability of supply and impact on supply planning as it relates to the LIL, as well as the IIS.

- NLH further notes that through regular reporting commencing October 1, 2018, it will keep the PUB informed on the developments related to the anticipated LIL in-service date and any material changes impacting supply adequacy for the IIS.
Analysis:

- The Conclusion in NLH's response indicates the company understands and is working to mitigate Liberty's concern about LIL availability and reliability this coming winter:

  "The evolving nature of the IIS with the introduction of the LIL and LTA assets and the associated later than anticipated in-service date brings an understandable level of uncertainty to supply adequacy. As a result, Hydro is actively monitoring the availability of supply and impact on supply planning as it relates to the LIL, as well as the IIS. In addition to the existing system contingency plans in place, Hydro is developing a specific contingency plan in the event that the LIL does not meet the current assumed capacity and reliability parameters. Through regular reporting commencing October 1, 2018, Hydro will keep the Board informed on developments related to the anticipated LIL in-service date and any material changes impacting supply adequacy for the IIS."

Action Being Taken:

- NR will continue to monitor and advise on these proceedings.

Prepared/Approved by: Y. Khan / M. Janes / C. Snook / J. Cowan
Ministerial Approval: Received from Hon. Siobhan Coady

September 14, 2018
Title: Labrador-Island Link Availability and Rate Impacts

Issue: To provide an overview of Labrador-Island Link (LIL) delays and rate impacts

Background and Current Status:

- The LIL, together with the Labrador Transmission Assets (LTA) which connects Muskrat Falls (MF) to Churchill Falls (CF), will allow low-cost electricity generated at CF to be used to serve Island Interconnected Customers. Using this off-island CF power can offset the need for more expensive production at the Holyrood Thermal Generating Station ("Holyrood"), and can thus limit rate increases and/or potentially reduce rates in advance of MF commissioning (expected third quarter of 2020). This plan has factored prominently in Newfoundland and Labrador Hydro’s (NLH) 2017 General Rate Application (GRA).

- The GRA process establishes base electricity rates that utilities can charge their customers to recover costs. NLH filed its 2017 GRA with the Board of Commissioners of Public Utilities (PUB) on July 28, 2017. The GRA provided a forecast of NLH costs in 2018 and 2019.

- NLH’s 2017 GRA initially proposed using off-island power to displace Holyrood production, while continuing to charge Holyrood-based rates. NLH proposed accumulating any savings in an Off-Island Purchases Deferral Account to be used to offset MF-related rate increases in 2021. During the GRA process, the Consumer Advocate (CA) opposed the proposal.

- On July 16, 2018, parties to the GRA reached a supplemental settlement agreement that settled certain issues pertaining to the 2017 GRA including NLH abandoning the off-Island deferral account proposal. Instead, it was agreed to base the GRA on what is referred to as the “expected supply scenario”, which is costs that reflect the use of off-island power, and rates that immediately reflect the use of that power.

- On July 20, 2018, following the settlement agreement, NLH filed additional evidence outlining the rate impact of the settlement scenario. NLH’s interim rates application that the PUB approved on May 28, 2018, resulted in a rate increase of 7.5% effective July 1, 2018. NLH’s interim rates application had also indicated an additional 9.4% increase would be required January 1, 2019 but NLH’s settlement evidence indicated an increase of only 1.2% would be require as the off-island supply deferral proposal had been abandoned.

- The revised increases reflected NLH’s expectation that the LIL would be available for use by October 1, 2018, but this has since been delayed. This date was contingent on the timely delivery of LIL Protection and Control software.

- Based on the continuing work on LIL availability, NLH is preparing an update for the PUB.

Analysis:

- The LIL is still in delivery phase and not fully operational. Nalcor and NLH advise that while the most recent GRA evidence assumed delivery of 170MW to the Island via LIL, it is now a strongly held view that deliveries will likely be 110 MW.
With regard to current work on the LIL, Nalcor advises NR that obligations for software delivery have lengthened, which could impact that amount if energy that can be delivered by the LIL in advance of full completion of the Muskrat Falls Project.

Nalcor advises that it expects to receive the software in late September, 2018 or early October, 2018, which it will then test on the system. This will potentially allow for LIL commissioning by December 1, 2018.

NLH’s July 20, 2018 evidence filed with the PUB reflected supply costs resulting from off-island purchases over the LIL beginning October 1, 2018 and LIL monopole (i.e. one of two wires) availability in late October 2018. At that point NLH anticipated sourcing 606 GWh of off-island purchases in 2018 (recapture and other purchases via LIL and purchases via ML), and 1,016 GWh in 2019. NLH now advises it expects off-island purchases to be 485 GWh lower in 2018 and 160 GWh lower in 2019 given continued work on the LIL.

NLH advises that the exact rate impacts for each discrete customer group (retail, industrials, etc) are being calculated. The revised rate impact stems from reduced LIL availability in 2019, increases in expected fuel costs at Holyrood (among some other related factors), and potential deferral of LIL and LTA operating and maintenance costs to recovered in a future year.

**Action Being Taken:**
- NR has requested it be made aware of any changes to expected rate impacts as soon as the analysis is complete.

- NR will provide further analysis when it receives input from NLH and Nalcor.

Prepared by/Reviewed by: M. Janes / C. Snook / Ministerial Approval: NOT RECEIVED

September 18, 2018
Title: Labrador-Island Link Availability

Issue: To provide an overview of Labrador-Island Link (LIL) delays and rate impacts

Background and Current Status:
- The LIL, when used in concert with the Labrador Transmission Assets (LTA) which connects Muskrat Falls (MF) to Churchill Falls (CF), will allow low-cost electricity generated at CF to be used to serve Island Interconnected Customers. Using CF (off-island) power can offset the need for more expensive production at Holyrood, and can thus limit rate increases and/or potentially reduce rates in advance of MF commissioning (expected third quarter of 2020). This plan has factored prominently in Newfoundland and Labrador Hydro’s (NLH) 2017 General Rate Application (GRA).

- The GRA process establishes base electricity rates that utilities can charge their customers to recover costs. NLH filed its 2017 GRA with the Board of Commissioners of Public Utilities (PUB) on July 28, 2017. The GRA provided a forecast of NLH costs in 2018 and 2019.

- NLH’s 2017 GRA initially proposed to source off-island power to displace more expensive production at Holyrood, while continuing to charge rates based on Holyrood costs. NLH proposed that any savings would accumulate in an Off-Island Purchases Deferral Account to MF-related rate increases. This proposal met with significant opposition from the Consumer Advocate (CA).

- On July 16, 2018, parties to the GRA reached a supplemental settlement agreement, in which certain issues pertaining to the 2017 GRA were settled including NLH abandoning the proposal to establish an Off-Island Purchases Deferral Account. Instead, it was agreed to base the GRA on what is referred to as the “expected supply scenario”, which is costs that reflect the use of off-island power, and rates that immediately reflect the use of that power.

- On July 20, 2018, following the settlement agreement, NLH filed additional evidence outlining the rate impact of the settlement scenario. In its application for interim rates that was approved by the PUB on May 28, 2018, NLH received a rate increase of 7.5% effective July 1, 2018. NLH’s interim rates application also indicated an additional 9.4% increase would be required January 1, 2019 under the now-abandoned Off-Island Purchases Deferral Account. However, NLH’s subsequent settlement evidence indicated the projected January 1, 2019 average increase to Newfoundland Power (NP) residential customers would be only 1.2%.

- The revised increases reflected the fact that NLH expected the LIL would be available for use by October 1, 2018. This date was contingent on the timely delivery of LIL Protection and Control software being provided by General Electric (GE).

- Based on new information about the timing of LIL availability, NLH now advises that it is preparing an update for the PUB that will seek another revision in the January 1, 2019 rate as discussed below.
Analysis:

- Nalcor advises NR that

- Nalcor advises that it expects to receive the GE software in late September, 2018 or early October, 2018 which it will then test on the system. This will potentially allow for LIL commissioning by December 1, 2018.

- The delay in LIL commissioning prevents the use of cheaper off-island power to offset more expensive production at Holyrood.

- Any delay beyond October 1, 2018 would result in higher rate increases for 2019 – the longer the delay, the greater the increase.

- NLH is currently developing an analysis of potential rate impacts arising for this issue. NLH has indicated informally that the new January, 2019 rate increase will be higher as a result of the delay in the LIL. NR has requested it be made aware of the potential rate impact as soon as the analysis is complete.

Action Being Taken:

- NR will provide further analysis when it receives input from NLH and Nalcor.

Prepared by/Reviewed by: M. Janes / C. Snook / J. Cowan
Ministerial Approval: NOT RECEIVED
Purpose

- Provide an overview of Wind Generation in NL
History of Wind On Island

• Feasibility study completed in 2002
  – Wind potential for many 100’s of MW
  – Limited amounts can be absorbed into Provincial grid
  – Estimate at time was that 80 MW of non-dispatchable capacity could be seamlessly integrated
  – Projects of 25 MW or less could easily be integrated

• RFP Issued in 2006
  – St. Lawrence was selected
  – Fermeuse project was selected in a follow up RFP
  – A number of other projects were submitted but not accepted
Location of farms submitted for RFP
History of Wind in Labrador

- Hydro erected 4 wind monitoring towers in December 2006
  - Project was called Ossok Wind Power Project
  - Towers were located southwest of Churchill Falls near the Ossokmanuan Reservoir
  - 18 months of data was collected
  - Collected data was not overly favorable
    - Wind speeds were not great
    - Towers experienced icing issues
    - Report suggested picking another location

- Additional locations are available across Labrador
  - Remoteness of some locations will have cost challenges

- Potential exists for 1000’s of MW
  - Wind pairs well with Hydro
Small Wind Development in Labrador

- Coastal Wind Monitoring Study completed in 2016
  - Wind Towers erected in the following communities:
    - Nain
    - Makkovik
    - Hopedale
    - Cartwright
    - L’Anse-au-Loup

- Study was completed by Hydro on behalf of Government
  - Wind results were promising in all communities
  - Additional work is required to determine cost of integration
  - Government has released report on its website
    - An EOI for development in isolated communities is expected to be released in the near future
Current Wind Generation

- There are two large scale wind farms operating in NL
  - Both farms have Purchase Power Agreements (PPAs) with Hydro
  - St. Lawrence
    - In-Service Date: October, 2008
    - Size: 27 MW – Nine Vestas V90 turbines
    - Average Annual Generation: 97 GWh
    - PPA Price: $67 MWh at time of signing. Price has increased with escalation
  - Fermeuse
    - In-Service Date: April, 2009
    - Size: 27 MW – Nine Vestas V90 turbines
    - Average Annual Generation: 88 GWh
    - PPA Price: $71.5 MWh at time of signing. Price has increased with escalation
Current Wind Generation

- There are two small scale wind farms in Ramea
  - Nalcor
    - In Service Since: 2010
    - Size: 300 KW – Three 100 KW Northwind 100 Turbines
    - Turbines have experienced numerous outages
      - Outages are a result of minor maintenance issues
      - Turbines are unregulated and not required to meet town load. This has resulted in extended periods of
downtime as resources were required elsewhere
      - At the end of Q3 2017, all three turbines were repaired and are operational
    - PPA Price: Diesel offset cost. Based on formula and monthly diesel price
  - Frontier Power
    - In Service Since: 2004
      - Frontier has contractual right to first renewable generation
    - Size: 390 KW – Six 65 KW Windmatic Turbines
    - Average Annual Production: 588 MWh
    - PPA Price: Diesel offset cost. Based on formula and monthly diesel price
Wind Farm Performance

- The amount of energy produced from a wind farm is represented by its Capacity Factor (CF).
- CF is a ratio of a wind farm's annual production to the maximum power it could have produced if it ran 100% of the time at its maximum capacity. CF is usually shown as a %.
- As an example, a 50 MW wind farm that produces 150,000 MWh a year would have a CF of:
  \[
  \frac{150,000 \text{ MWh}}{(50 \text{ MW} \times 8760 \text{ Hours})} \times 100 = 34.2\%
  \]
- If that same 50 MW wind farm produced 438,000 MWh a year it would have a CF of:
  \[
  \frac{438,000 \text{ MWh}}{(50 \text{ MW} \times 8760 \text{ Hours})} \times 100 = 100\%
  \]
- The amount of energy produced by a wind turbine is based on the wind speed. As the wind is not blowing all the time, it is not possible for a real world wind turbine to have a CF of 100%.
- Canadian Wind Farms typically have CFs of approximately 35%.
Capacity Factors of NL Wind Farms

- CFs of St. Lawrence and Fermeuse are shown for each of the last five years
- CFs for these wind farms are higher than the Canadian average

<table>
<thead>
<tr>
<th>Year</th>
<th>Fermeuse</th>
<th>St. Lawrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>38%</td>
<td>43%</td>
</tr>
<tr>
<td>2013</td>
<td>40%</td>
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<tr>
<td>2014</td>
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<td>2015</td>
<td>37%</td>
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<tr>
<td>2016</td>
<td>37%</td>
<td>43%</td>
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<tr>
<td>5 Year Average</td>
<td>37%</td>
<td>41%</td>
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</table>
Monthly Capacity Factors

• Annual capacity factor is an important way to describe the performance of a wind farm but it is not the only way
• Monthly capacity factor can also be used to examine the performance of a wind farm
• This is important to consider in NL as we have a winter peaking system and require more energy during winter months to meet domestic load
Fermeuse Monthly Capacity Factor

Fermeuse - 5 Year Average Monthly Capacity Factor

<table>
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<td>Oct</td>
<td>38%</td>
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<tr>
<td>Nov</td>
<td>37%</td>
</tr>
<tr>
<td>Dec</td>
<td>41%</td>
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</tbody>
</table>
St. Lawrence Monthly Capacity Factor

St. Lawrence - 5 Year Average Monthly Capacity Factor

<table>
<thead>
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<th>Month</th>
<th>Capacity Factor</th>
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</thead>
<tbody>
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<tr>
<td>Feb</td>
<td>46%</td>
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<td>Mar</td>
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<td>Nov</td>
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<tr>
<td>Dec</td>
<td>50%</td>
</tr>
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</table>
**Why not more wind on Island today?**

- **Existing hydroelectric supply can power NL for much of the year**
  - Holyrood generators used more in colder months when the load is highest
  - Costs less to generate power from existing hydro then from wind turbines

- **Non-Dispatchable**
  - Wind is intermittent and not always available when required
    - Wind power cannot be scheduled and varies second to second
    - Electricity generated from wind turbines is based on how fast the wind is blowing
      - On cold days the wind is not always blowing and no electricity can be generated
      - On other days when the wind is blow, there may not be enough load to serve and therefore the wind turbines are turned off.

- **Cannot be relied on for capacity reasons**
  - Due to their intermittent nature, wind turbines are not considered firm
  - When wind stops blowing, another source will have to start generating to maintain balance in electrical system
    - Additional reserve capacity would need to be available from another source to support wind
NL Wind Farms Combined Hours

- By looking at data from St. Lawrence and Fermeuse it is possible to get a clearer picture of wind production in NL.
- Each farm has a capacity of 27 MW for a total of 54 MW of wind generation on the island.

| Production Summary of Fermuse and St. Lawrence Combined |
|---------------------------------|----------|----------|----------|----------|----------|----------|
| Threshold                       | 2012    | 2013    | 2014    | 2015    | 2016    | Average  | % of Year|
| Hours with 0 MW                 | 325     | 376     | 579     | 328     | 385     | 399      | 5%        |
| Hours with Less that 2 MW       | 948     | 915     | 1226    | 925     | 961     | 995      | 11%       |
| Hours with Less than 10 MW      | 2823    | 2706    | 3258    | 2917    | 2958    | 2932     | 33%       |
| Hours Greater than 27 MW        | 3435    | 3236    | 2876    | 3014    | 3333    | 3179     | 36%       |
| Hours Greater than 50 MW        | 266     | 174     | 288     | 156     | 277     | 232      | 3%        |
| Hours with 54 MW                | 0       | 0       | 0       | 0       | 1       | 0.2      | 0.002%    |
Wind Generation in Fermuse

- Fermuse Generation Jan 1 to Jan 3, 2015
Future of Wind in NL – Post Maritime Link

- Once the Maritime Link is complete, NL will be connected to the North American Grid
- Wind energy while not needed domestically could be exported from NL
  - Energy could be used domestically but will need to compete with existing energy sources
- If a business case for wind development exists, Nalcor could:
  - Develop wind project internally
  - Partner with a 3rd party
  - Sign a PPA with 3rd party
    - 3rd party producers would not have access to firm transmission and would need to pay tariff
- The capacity of the Maritime Link will potentially limit export opportunities for 3rd parties
Future of Wind in Labrador

- There exists significant potential for large wind development in Labrador for export
- Nalcor/Hydro has investigated this opportunity to a degree
  - Wind data from Ossok is available
  - Strategic direction was shifted to LCP and no additional work was completed
  - Additional work would need to be completed to fully investigate this opportunity
- Export opportunities through Quebec may provide stronger economic benefits than island wind
- Wind and hydropower work well together
  - Hydro reservoirs can act as storage for wind and hydro generators can be used as reserve capacity
Wind Q & As

- **Can wind generation be dispatched or scheduled?**
  - The ability of wind generators to operate is contingent on its availability (i.e. whether or not the wind is blowing) and therefore cannot be turned on at will. Further, the level of output of wind generators follows the wind intensity that is intermittent in nature. It therefore cannot displace the need for and availability of generating sources that can be dispatched to follow and meet the constantly changing consumer demands.

- **What happens when the wind doesn’t blow?**
  - Since electrical systems require balance between the loads demanded by its customers and the power produced through its generators, when the wind stops blowing and wind generators stop producing, other generation sources (such as hydro or thermal) must operate to meet consumer demand. In addition to the requirement to have back-up capacity available for when the wind doesn’t blow, the intermittent nature of wind generation adds further variability to the system when the wind is blowing. Since other units cannot be started in time to address any shortages caused by these momentary changes in load seen by the other units on the system, it is important that when wind generation is on line, that there be sufficient additional reserve capacity on-line to address the added variability.
Wind Q & As

• *Why can’t wind replace Holyrood?*

  - The large thermal plant at Holyrood (490 MW) has a three-fold purpose. First, Holyrood is used to meet consumer demands during periods of high consumption. Second, Holyrood supplements the energy capability of the hydro plants as inflows to the reservoirs vary and is an essential part of Hydro’s supply portfolio. Third Holyrood is used to support transmission voltages and security on the eastern portion of the Island grid where the loads are high and there is little other generation. Due to the non-dispatchable and intermittent nature of wind generation, it cannot perform these functions.

Therefore, while wind offers the opportunity to displace a portion of the oil-fired energy produced at the Holyrood Thermal Generating Station, no amount of wind capacity could displace the entire facility without significant investments in other (most likely fossil-fueled) dispatchable sources.
What are the wind speeds in NL?

- Newfoundland’s wind resource can be characterized as “world-class” with numerous areas experiencing average wind speeds greater than 9 m/s (32 km/h).
- Wind speeds can be too high for generation
  - Turbines generally cut out at 25 m/s (90 km/h)
  - Ideal wind is steady, non gusting wind
- In 2015, Business Development hired Solas Consulting to produce wind speed maps for Newfoundland and Labrador.
  - These maps were completed using Vortex Wind Data.
  - Vortex uses statistical analysis and complex modeling to arrive at wind speeds.
  - No actual wind data was collected
  - Maps were provided at 80 m and 40 m hub heights
    - 40 m hub heights are inline with smaller wind turbines used in remote communities including Ramea
Potential copyright material

If you wish to obtain a copy please contact the ATIPP Office at (709) 729-7072 or atippoffice@gov.nl.ca.
Agenda

- Purpose
- Electrical System in NL
- Capacity and Energy
- Transmission
- Glossary
Purpose

• The purpose of this presentation is to:
  – Provide a brief overview of common electricity concepts and the electrical system in NL
Electrical System in NL
NL Electrical System

- NL has a winter peaking electrical system
  - Highest or peak load on the system is in the winter
  - High usage of electric heat across the province
- In order to ensure that all industrial and residential customers in the province have access to electricity, Hydro needs to ensure that it has enough installed firm capacity to meet this peak load
  - The system is therefore sized to meet the winter peak
  - The province has enough capacity to meet its needs but there is no excess
- The load in the summer is much lower than in the winter
  - In the summer not all generators in the fleet are producing electricity as it is not required.
  - Annual maintenance is performed on units during this down time.
  - For significant portions of the year, the NL load is served by hydro generation only
- Once the province is connected to the North American Grid through the Maritime Link (ML) and the Labrador Island Link (LIL), the generators that are not being used to meet domestic demand could be used to produce energy for the export market
Annual Energy Use in Newfoundland

Island Interconnected System - Energy Supply

GWh

- Hydro Generation 2015
- Thermal Generation 2015
- Power Purchases 2015
- Hydro Generation 2016
- Thermal Generation 2016
- Power Purchases 2016
NLH Generation Sources

- **Hydroelectric**
  - There are hydroelectric generating stations located across Newfoundland and Labrador
  - This is the province’s main source of electricity
- **Thermal**
  - Holyrood Thermal Generating Station
  - Holyrood Combustion Turbine
  - Hardwoods, Stephenville, HV-GB Gas Turbines
- **Diesel**
  - 25 Diesel Plants
- **Wind**
  - 3 Wind Farms (Hydro has PPAs with these wind producers)
- **Additional power is also purchased from Newfoundland Power and CBPPL**
Balance on the Grid

- An electrical grid must be in balance. The supply of electricity must equal the load at all times.
- If there is an imbalance, then the Grid will react to ensure that balance is restored.
- The load on the Grid fluctuates constantly based on customer demand.
- To ensure balance, the electrical Grid signals dispatchable generators across the province to increase or decrease generation to meet the new load.
  - In normal operations, this happens instantaneously and customers are not impacted by these changes.
- If a generator experiences a problem and shuts down unexpectedly, the Grid reacts by shedding load (dropping customers) so that the system regains balance.
  - The instantaneous shedding of load results in an unplanned outage to customers.
  - This is called under frequency load shedding and is explained [here](#).
- A outage can also occur if the load gets too high and goes beyond the capacity of the electrical system.
Meeting Capacity Requirements

- To ensure that the load never gets as high as the firm capacity of the system, NL Hydro’s System Planning Group forecasts what the load will be both in the short term and long term.
- Long term predictions of future load growth are used to help ensure that there is enough installed capacity to meet customer demand. If the load is expected to increase, additional firm capacity may have to be built.
  - Capacity takes time to build/install. Approximately 2 years for a Combustion Turbine and 5 years for Hydro Plants. Approval is also required by the PUB.
- The installed capacity on the island is based on the maximum load that is expected on the Grid plus a safety factor.
  - Simply put, the safety factor is an additional amount of capacity that is kept in reserve. The amount of reserve is determined by System Planning and is based on reliability standards and best industry practices.
- Generation sources like Wind Turbines and Solar Panels are non-firm generation sources and cannot be relied on to supply power when required and therefore cannot be considered firm capacity.
Capacity and Energy
Capacity and Energy

- It is often said that NL is long on energy but short on capacity. What does this actually mean?
  - As discussed previously, the NL interconnected system is designed to meet the peak load. This peak load only happens a few hours a year
    - If the load on the system was expected to increase through normal load growth or through the addition of a large industrial customer, NL Hydro would have to build or secure a new source of firm capacity to meet the new peak load
    - NL Hydro operates the system with only the amount of firm capacity that is necessary to meet peak load.
      - Any additional firm capacity beyond what is required to meet peak load would not be economically prudent as the costs of adding capacity would be paid for by ratepayers
  - Therefore during the peak winter periods, the interconnected system is “short” on capacity as there is no excess beyond what is needed to serve customers
  - During the remainder of the year, the installed capacity of all the generators on the island is larger then what is required to meet the needs of the province
    - These generators are capable of producing additional energy that is not required to meet domestic load. In fact, the generators are capable of producing significant quantities of energy that can be exported to external markets
    - This is why the province is “long” on energy
Capacity & Energy Analogy

- It can be helpful to explain capacity and energy by looking at the case of a Restaurant
  - Capacity - The total number of seats in a restaurant is the Capacity.
    - As an example, a restaurant that can seat 100 people will have a Capacity of 100 people
    - If 50 people are currently seating in the restaurant than it will be operating at half its capacity
    - If 101 people wanted to sit in the restaurant at the same time it would be over capacity and one person would have to wait in line.
    - Unlike restaurants, the electricity system does not have lines. The system must be sized to accommodate all customers at the same time and must be built large enough to serve everyone
Capacity & Energy Analogy

- Energy - The specific number of meals that can be served in an hour, a week, or a year would be equal to Energy
  - Looking at our 100 seat restaurant, the number of meals that will be consumed in a day, week or year will depend on the demand by customers
    - If the restaurant is busy and all tables are full (Full Capacity) than the restaurant will produce 100 meals an hour but no more due to the lack of additional seats
    - If the restaurant is open 24 hours a day and all tables are full for every hour of the day, the restaurant will produce 2400 meals a day (24 x 100)
    - If the restaurant is open 24 hours a days, 365 days a year and every table is full every hour of the day, the restaurant will produce 876,000 meals a year (8760 hours in a year x 100)
  - In this example the capacity of the restaurant is 100 people and the annual energy produced is 876,000 meals
  - This is equivalent to a 100 MW generator producing 876,000 MWh of energy over the course of a year
Determining the optimal restaurant size

- A restaurant is designed to seat an optimal number of people
  - They want to have enough tables to serve all the customers that they expect to walk through their doors
  - If the restaurant is too big, the owners will have to pay additional costs
    - They will be paying rent on a building that is oversized, they will have to pay extra wait staff to serve the tables even if they are not being used, etc.

- If the restaurant is too small, they will have a long line and will be turning customers away
- When designing the restaurant capacity, the owners must decide how many customers they are comfortable turning away
- Most restaurants are not full every hour of every day and an optimal number of seats must be determined to ensure customers are satisfied and that the restaurant is operating in the most economical way
Valentines day and Mother’s Day are very popular days for people to eat out at restaurants. On these days most restaurants are usually at full capacity at all hours.
- On these days, if the restaurant had 10 or 20 more seats, they would have no problem filling these seats
- On these days the restaurant is capacity constrained
- During almost all other times of the year, the restaurant is not at full capacity and it would not be cost effective to build seating for 10 or 20 more people for two days of the year
- A smart restaurant owner will design the size of their restaurant to make sure that it is full most of the time but that is not oversized

Like Valentines Day and Mother’s Day in restaurants, the electrical system has peak days. These are the coldest days in the winter
- Unlike restaurants, the electrical system can not make people wait in line. The system needs to be designed to meet everyone’s demands. This means that the system must have the capacity to meet the expected load
- As building extra capacity is expensive and is paid for by ratepayers, it is important to build enough to serve the needs of the province but no more
Capacity & Energy Analogy

• To Summarize:
  – The NL electrical system is designed to serve the peak load
    • That means that there is enough installed capacity or MWs to serve all customers on the coldest day of the year but not a significant amount of excess
    • During the rest of the year, the installed capacity is larger than required to meet the load and the province can produce significantly more energy than it requires
    • Newfoundland can be said to be long on energy and short on capacity
    • Post Muskrat Falls, the excess capacity can also be used to produce energy for export
  – If a new industrial customer came forward with a requirement for firm power during the peak periods, new capacity would have to be built to serve this load
Capacity & Energy Analogy

• Looking at our restaurant example, this would be equivalent to a new office building that is planning to open next to the restaurant.
  – If the new building is built, it would bring new customers to the restaurant.
  – It may make economic sense for the restaurant to expand the number of seats to meet the new customers demand
  – Before the restaurant spends money to expand its capacity, it will need to:
    • Determine if there are any other things it can do to generate more revenue from its existing infrastructure
    • Gain assurances that the new building is going to be built and that new customers will need to be served regularly
Transmission
Transmission

- The Maritime Link (ML) and the Labrador Island Link (LIL) are being completed as part of the Lower Churchill Project
  - The ML has a capacity of 500 MW and the LIL has a capacity of 900 MW
- For the first time ever, the island of Newfoundland will be connected to the North American electrical Grid
- Excess energy from NL will now be able to be sold to external markets in Canada and the United States.
  - Alternatively, it will be possible to import energy if required
- The amount of energy that can be sold will depend on the excess energy in the province that is available for sale and the space available on the transmission links
- The LIL will be used mostly to bring energy from Muskrat Falls to NL
- The ML will be used to export energy to NS and beyond
  - A portion of the capacity of the line will be dedicated to existing commitments to Emera and NSPI
  - The remainder of the line will be used to export electricity to external markers or import electricity if required
Transmission Rights

- There are two types of transmission rights:
  - Firm - The guaranteed right to delivery electricity across a transmission line during a period of time
    - This could be 24 hours a day, 365 days a year or it could only be during peak hours
    - Firm transmission is contracted and the generator of electricity is able to schedule its energy deliveries
  - Non-firm - Allows for the flow of energy when there is space on the line.
    - Holders of firm transmission rights have the first right to use the line.
    - Holders of non-firm transmission rights are allowed to flow if firm energy is not being delivered
    - Ability to flow will fluctuate and it is not possible to guarantee delivery during any specific hour of the day

- Nalcor has the firm transmission rights for both the ML and the LIL
  - Nalcor will look to use these firm rights to export/import as much electricity as economically and technically possible
  - There will be times when Nalcor will not be flowing electricity across the links and non-firm transmission rights will be available for purchase.
Excess Energy
Excess Energy Available For Export

Surplus Provincial Energy by Month - Post Muskrat Falls

GWh

Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

2021  2022  2023  2024  2025
Glossary

• Capacity - Is related to power and is the maximum power output of a generator, i.e. it is the highest amount of electricity that a generating unit is capable of producing at any moment
  o As an example, a 100 MW generator can produce electricity at any power level between 0 to 100 MW. The maximum it can produce is 100 MW and thus has a capacity of 100 MW
  o When we talk about the capacity of the Newfoundland electrical system, we mean the maximum power output of all the generators added together
  o Firm capacity is the total power available from dispatchable generation sources on the island
  o Another term related to capacity is Capacity Factor (CF). The CF is the average energy generated divided by the rated peak energy
    o A 100 MW generator operating at 100 MW for half the hours in a year would have a CF of 50%
Glossary

• Energy - Is the amount of electricity a generator actually produces over a specific period of time
  o For example, a generator with 100 megawatt (MW) capacity that operates at that power level consistently for one hour will produce 100 megawatt hours (MWh) of electricity
  o If the generator operates at only half its capacity for one hour, it will produce 50 MWh of electricity
  o Many generators do not operate at their full capacity all the time and the generators output will vary based on conditions at the power plant and load on the Grid
  o As energy numbers can be quite large, there are sometimes expressed in GWh (1 GWh = 1000 MWh) or TWh (1 TWh = 1000 GWh)
Glossary

• **Generation Types**

  • **Dispatchable** - Generating plants that can adjust their power output up or down based on changes in the load or based on a command from a system operator are said to be dispatchable generation
    
    o These generators can be counted on to supply the exact amount of power required when it is required. This type of generation can be considered firm capacity
    
    o Hydro Plants, Diesel Plants and the Holyrood Thermal Generating Station are all examples of dispatchable generators. These plants all have a way to store the fuel (water, diesel, etc.) required to spin their turbines

  • **Non-Dispatchable** – Generation that cannot be controlled by a system operator or respond to changes in the load is non-dispatchable
    
    o Intermittent sources of power like wind turbines and solar panels are examples of non-dispatchable generation. These generation types are considered non-firm and do not have a capacity value
    
    o Wind turbines and solar panels can not be counted on to provide power at all times due to the constantly changing weather conditions
    
    o There amount of power produced from a wind turbine fluctuates from second to second based on constantly changing wind speeds
    
    o Non-dispatchable generators due not have a means to store their fuel source (air, sun, etc.) for use at later date
Glossary

- **Generator** - A device that turns the rotation of a magnetic core into electricity
  - A turbine is connected to a generator and is used to rotate the core
  - Generators can be large or small and the size is measured in Watts, Kilowatts or Megawatts. 1 megawatt = 1 million watts

- **Grid** - The Grid is an interconnected network of equipment used to deliver electricity from producers to consumers
  - It consists of generating stations, high voltage transmission lines that carries electricity over long distances, distribution lines that connect individual customers, etc.
  - The Grid allows generating stations to be connected to customers across the province and also allows the generators to instantaneously respond to changes in the load

- **Load** - The demand for electricity at any moment in time
  - The Provincial load is measured in MW or GW.
  - The load on the Grid fluctuates every second of every day
  - The supply of electricity must equal the load at all times
  - Generators connected to the Grid ramp their production up or down to maintain balance
Glossary

• Power - Is the amount of electricity produced by a generator at a given moment in time. A generator can have a range of power outputs up to its maximum rating (capacity of unit). Power is usually measured in kilowatts, megawatts or gigawatts.

• Turbine - A mechanical device used to turn a generator.
  - Turbines are essential large fans that are turned (rotated) by using air, water, or steam.
  - Holyrood uses steam turbines, hydro plants use water turbines and wind turbines use air.
November 23, 2017

Hon. Siobhan Coady
Minister of Natural Resources
Government of Newfoundland and Labrador
Confederation Building
P.O. Box 8700
St. John’s, NL
A1B 4J6

Minister Coady,

As requested, this letter contains data and additional detail regarding the operation of Newfoundland and Labrador Hydro’s Holyrood gas turbine to date in 2017.

Table 1 shows the monthly production and cost of fuel figures for the Holyrood gas turbine for 2017 and 2016.

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</tr>
<tr>
<td>March</td>
<td>2,492,177</td>
<td>1,188,424</td>
<td>1,303,753</td>
<td>9,546,426</td>
<td>5,758,263</td>
<td>3,788,163</td>
</tr>
<tr>
<td>April</td>
<td>757,890</td>
<td>1,478,796</td>
<td>(720,906)</td>
<td>2,890,195</td>
<td>6,843,474</td>
<td>(3,953,279)</td>
</tr>
<tr>
<td>May</td>
<td>691,925</td>
<td>157,093</td>
<td>534,832</td>
<td>2,747,028</td>
<td>670,500</td>
<td>2,076,528</td>
</tr>
<tr>
<td>June</td>
<td>70,502</td>
<td>17,093</td>
<td>53,409</td>
<td>343,398</td>
<td>47,000</td>
<td>296,398</td>
</tr>
<tr>
<td>July</td>
<td>26,096</td>
<td>70</td>
<td>26,026</td>
<td>1,555,080</td>
<td>32,359</td>
<td>1,522,721</td>
</tr>
<tr>
<td>August</td>
<td>2,847,953</td>
<td>-</td>
<td>2,850,534</td>
<td>9,236,000</td>
<td>-</td>
<td>9,236,000</td>
</tr>
<tr>
<td>September</td>
<td>-</td>
<td>789,573</td>
<td>(789,573)</td>
<td>954</td>
<td>3,474,233</td>
<td>(3,473,279)</td>
</tr>
<tr>
<td>October</td>
<td>978,161</td>
<td>212,322</td>
<td>765,839</td>
<td>3,904,234</td>
<td>915,127</td>
<td>2,989,107</td>
</tr>
<tr>
<td>Total</td>
<td>12,420,381</td>
<td>19,901,430</td>
<td>(7,478,468)</td>
<td>48,278,098</td>
<td>99,684,580</td>
<td>(51,406,482)</td>
</tr>
</tbody>
</table>

To the end of October 2017, the cost of fuel consumed by the gas turbine in 2017 is approximately $12 million, as compared to approximately $20 million for the same period in 2016. This also compares to $134 million incurred in fuel costs for the Holyrood Thermal Station in 2017 to end of October.

For a period this past summer, the gas turbine was operating at increased production. From July 31 to Aug 23, 2017 there was a “total plant outage” at the Holyrood Thermal Generating Station.
(HTGS). This was a planned outage during which all three generating units were removed from service in order for Hydro to safely conduct its required planned maintenance program on systems that are common to all three units. During that period in particular, the gas turbine was operated to ensure appropriate system reliability while the HTGS was offline for maintenance.

Whenever there are planned outages to generation or transmission equipment for maintenance purposes on the Avalon Peninsula, the Holyrood gas turbine is typically run to ensure adequate electricity reserves and maintain a reliable power system. If, for instance, the gas turbine was not running during these occasions and another transmission line trip occurred, it could potentially result in customer outages until the gas turbine was started.

The fuel cost associated with running the gas turbine in August 2017 is $2.8 million. There was no total plant outage in 2016, and therefore there were no costs in August 2016.

As outlined in the table, the higher production and fuel costs overall in 2016 is a result of increased operation of the unit in January and February of 2016. This was partially due to the fact that dry conditions in late 2015 and early 2016 resulted in low reservoir levels and necessitated the use of more thermal generation.

Hydro is confident in its ability to reliably supply customers now and as we head into the winter period. The combustion turbine continues to be an important component in Hydro’s system.

Jennifer Williams
Vice President, Production
January 19, 2018

The Honourable Siobhan Coady, Minister
Department of Natural Resources
Government of Newfoundland and Labrador
Natural Resources Building
P. O. Box 8700,
St. John's, NL
A1B 4J6

Dear Ms. Coady:

Re: Newfoundland and Labrador Hydro’s Winter Readiness Planning Report - Update

For your information, please see the attached update on the Winter Readiness Planning Report that was submitted to The Board of Commissioners of Public Utilities on January 19. The report was filed on December 8, 2017, but noted some items that would be deferred to 2018 as well as some that would be completed prior to December 31, 2017.

Details of the update are included in the attached. I would point out that in all cases, the risks have been assessed and are low. In the unlikely event of an issue, we are ready to respond promptly.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

Jim Haynes
President, Newfoundland and Labrador Hydro

JH/jmf
January 19, 2018

The Board of Commissioners of Public Utilities
Prince Charles Building
120 Torbay Road, P.O. Box 21040
St. John’s, NL A1A 5B2

Attention: Ms. Cheryl Blundon
Director Corporate Services & Board Secretary

Dear Ms. Blundon:


On December 8, 2017, Newfoundland and Labrador Hydro (Hydro) filed the Winter Readiness Planning Report – November Update (the Report). While all winter readiness work for the Holyrood Thermal Generating Station, within the Bay d’Espoir Hydroelectric system, and on the transmission system were completed by the submission date, the report noted that several items for Gas Turbines, Terminal Stations, and Capital Projects were scheduled to be completed within 2017, but after submission of the Report on December 8, 2017, and that a further update would be provided to the Board of Commissioners of Public Utilities (the Board) regarding these items. For the items carried into 2018, as noted in the Report, assessment of the risk has been completed and items have been moved into the 2018 Integrated Annual Work Plan. This letter provides Hydro’s update to the December 8, 2017 Winter Readiness Report for items planned to be completed by December 31, 2017.

Status Update – Gas Turbines
As noted in section 2.2 of the Report, three items were outstanding after December 8, 2017 with respect to Hydro’s Gas Turbines. The status of those items is provided below:

- Item: Replace service computer for the Hardwoods Gas Turbine
  
  Update: This preventive maintenance work was to swap the computer on the Hardwoods Gas Turbine with the spare computer (ensures a healthy backup computer is ready and available), and was completed by the Terminal Station group on December 13, 2017.

- Item: Annual inspection of the lube oil for the Holyrood Gas Turbine
  
  Update: Although scheduled to be complete by December 22, 2017, this work was actually completed on December 3, 2017, but inadvertently did not get reported as complete in the December 8, 2017 Winter Readiness Update Report.

- Item: Annual inspection of the emergency diesel for the Holyrood Gas Turbine
  
  Update: The annual inspection was completed and passed on December 13, 2017.
Status Update – Terminal Stations
As indicated in Section 2.4 of the Report, three winter readiness items in the Terminal Station were incomplete as of the December 8, 2017 report. The status of those items is below:

- Item: Four minor modifications of the Breaker Failure System on Hardwoods Transformers T1, T2, T3, and T4 were delayed due to delays in capital project upgrades as a result of delays in receiving the required materials
  - Update: Minor modifications of the breaker fail system for T1, T2, T3 and T4 were completed on December 14, 2017.

- Item: Preventive maintenance work on Hardwoods B889 Operate Breaker delayed due to coordination of work with Newfoundland Power
  - Update: The preventive maintenance work was completed on December 11, 2017.

- Item: Preventive maintenance work to swap computers on the Hardwoods Gas Turbine was delayed due to system loading and conditions.
  - Update: The service computer work was jointly completed with the Gas Turbines group, which was completed on December 13, 2017 as noted above.

Status Update – Capital Projects
As described in the Report, some capital projects were noted as having winter readiness activities that were incomplete on December 8, 2017 and would be completed in 2017, or were carried over to 2018. The status of those items is as follows:

Capital Projects Completed
- Item: Refurbishment of Penstock 1 – Bay d’Espoir
  - Update: Penstock 1 required emergency refurbishment due to a weld failure. This work was completed as planned and the penstock went into service on December 8, 2017; however, cleanup and demobilization continued after this date until December 15, 2017.

- Item: Purchase Capital Spares – Hydraulic: Bay d’Espoir Unit 7 Excitation Transformer and Hinds Lake Excitation Transformer
  - Update: As noted, the Bay d’Espoir Unit 7 Excitation Transformer was due to be delivered on December 22, 2017, and was received on site on January 4, 2018. The Hinds Lake Excitation Transformer was due to be delivered on December 15, 2017, and was received on site on January 10, 2018.

- Item: Purchase Capital Spares – Terminal Stations
  - Update: The remaining item in this work scope was the purchase of isolated phase bus ducts for the spare transformer. This equipment was received in Bishop’s Falls on December 12, 2017.

- Item: Purchase Backup Diesel for Station Service - Grand Falls and Buchans
  - Update: The Backup Diesel unit was expected to be delivered on December 15, 2017 and was received on site on December 19, 2017.
• Item: Perform Wood Pole Line Management
  o Update: Remaining work on TL 203 planned for completion by December 8, 2017 was delayed until TL 267 was in service to reduce the execution risk and was partially completed during the week of December 11, 2017. The remaining work was carried over to 2018 with required pole replacements completed on January 19, 2018. Replacement of two crossarms and a crossbrace are in progress and are scheduled for completion by January 24, 2018.

• Item: Construct 230 kV Transmission Line – Bay d’Espoir to Western Avalon
  o Update: This transmission line, known as TL 267, went into service on December 6, 2017.

Capital Projects Carried into 2018 Annual Work Plan:
The following projects have not been completed as of this report date, and are added to the 2018 Annual Work Plan. Notes are referenced to the December 8, 2017 Winter Readiness Update Report, Appendix A.

• Purchase Capital Spares – Hydraulic
  o From Note 1C – The Hinds Lake exciter slip rings are scheduled for delivery on May 15, 2018.

• Upgrade Work – Cat Arm
  o From Note 2A – A risk assessment was completed as noted in the December 8, 2017 update report, with completion of the required work planned for 2018.

• Refurbishment of the Main Generator Breaker for Upper Salmon
  o From Note 3 – Parts were received and are available in the event of failure as noted in December 8, 2017 update report. Work will be completed in 2018.

• Procurement of 12 MW of Diesel Generation – Holyrood
  o From Note 8A – Diesel generation units are available for emergency and peak load generation, as well as black start of the Holyrood plant. Remaining work will be completed in spring of 2018.

• Replacement due to In-Service Failures – Terminal Stations
  o From Note 5 – A new 230 kV circuit breaker, a new 138 kV circuit breaker and a new 69 kV circuit breaker are on order and were expected on January 12, 2018. The new delivery date is January 29, 2018. Hydro has access to other spare circuit breakers that are available in the event of failure.

• Replace Air Conditioning Units – Hydro Place
  o From Note 7 – The work to replace the air conditioner in the Uninterruptable Power Supply room in Hydro Place was expected to be completed by December 15, 2017; however, this work has been delayed until January 26, 2018. It should be noted that temporary air conditioning is in place and available until the new permanent unit is installed, so there is no risk due to the carryover of this project.
Summary
As indicated above, much of the outstanding work has been completed, with some work remaining; however, in all cases the risks have been assessed and are low, with all equipment to remediate failures available in the unlikely event of an issue. Unless otherwise noted, any work that remains incomplete will become part of the 2018 integrated annual work plan, for execution in 2018. We continue to assess the condition of the assets discussed with overall reliability and customer outages in mind, and do not believe that there are any major concerns.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

Michael S. Ladha
Legal Counsel & Assistant Corporate Secretary
MSL/skc

cc: Gerard Hayes – Newfoundland Power
    Paul Coxworthy – Stewart McKelvey Stirling Scales
    Dean Porter – Poole Althouse

Ecc: Denis Fleming – Cox & Palmer
     Roberta Frampton Benefiel – Grand Riverkeeper Labrador

Dennis Browne, Q.C. – Consumer Advocate
Danny Dumaresque
July 23, 2018

Honorable Siobhan Coady
Minister of Natural Resources
P.O. Box 8700
St. John’s, NL
A1B 4J6

Dear Minister Coady,

The Public Utilities Board is currently undertaking hearings regarding electricity rate increases within this province. Accompanying these hearings is a public discourse surrounding the future of electricity rates within this province.

The CEO of Nalcor, Mr. Marshall, continues to indicate that the subsidization of power rates is the responsibility of the government of Newfoundland and Labrador. When asked if government should subsidize rates, he said “That would be a public policy decision. Not for me. It's for the government. It's doesn't matter if I agree or disagree” (source: https://www.cbc.ca/news/canada/newfoundland-labrador/stan-marshall-rates-1.4683797).

With this in mind and on behalf of the people of the province, questions about your government’s rate mitigation efforts as well as the options available are found in the following pages.

I look forward to your response,

Mr. Keith Hutchings

MHA Ferryland
Official Opposition Caucus
**Ratepayers: The Cost of Electricity**

Our Party has been clear that it would use all available options to reduce the cost of electricity for ratepayers in the province. While the current government has discussed options, full rate reduction details are not available.

In July 2017 Premier Ball told The Telegram that it was the Liberal’s mission to ensure that rates did not exceed 17 cents per kWh, as a result of the Muskrat Falls project.

In April 2018, Minister Coady noted that the target range for electricity rates would be between 16 and 18 cents per kWh. She additionally indicated a desire to be competitive with other Atlantic Canadian provinces.

Q1: Will you commit to the people of the province that their electricity rates will remain below 16 cents per kWh.

Q2: Can you please provide the analysis done by the Department of Natural Resources, or provided to the Department, which outlines rate projections for the other Atlantic Provinces over the next 20 years?

Regarding rate mitigation, the second Federal Loan Guarantee will decrease rates by approximately 1.5 cents/Kwh as according to Nalcor.

As according to the 2017 provincial budget speech “Nalcor has been directed to source $210 million to lower electricity rates starting in 2020-2021, with this preliminary rate reserve growing to $245 million in the following fiscal years”.

Q3: What will be the impact of this $210million-$245million on the reduction of rates, how many cents per kilowatt will rates be decreased because of this reserve?

Q4: To date, how much has Nalcor sourced for the reduction of rates and where are these funds coming from?

In their current General Rate Application, Newfoundland and Labrador Hydro had suggested setting up an “Off Island Purchases Deferral Account”. This account would use the savings from importing cheaper via the Labrador Island Link and the Maritime Link in place of using more expensive power from the Holyrood Generating Station. However, this idea has since been dropped from the General Rate Application.

Q5: Can you please indicate why this has been dropped from the General Rate Application and outline if Nalcor or Government has an additional plan to use the Labrador Island Link and the Maritime Link to raise money which can be used for rate mitigation?
There is the potential for $135 million to be generated from the sale of excess energy in 2021. Given that the Muskrat Falls project has the potential to generate revenue from the sale of export power, rates will be lowered from the profits collected.

**Q6: What will be the impact of the sale of excess power on electricity rates, how many cents per kilowatt will rates be decreased through this revenue?**

To recap, according to Nalcor’s June 2017 project update, the average electricity price is expected to increase to 22.89 cents in 2021. We know that this number includes savings from the extended Federal Loan Guarantee. If the other options for rate mitigation as listed above were included, the rate would decrease.

**Q7: Given the various options available for rate mitigation, please give the total potential amount which rates could be reduced by using all the factors above.**

**Other Factors Which Impact Customer Rates**

Muskrat Falls is not the only factor which will impact the cost of rates for customers in this province. Naclor, and its subsidiaries, have embarked on a number of infrastructure upgrades, like the TL-267 transmission line. The cost of which will be passed on to ratepayers in this province.

**Q8: In the estimated rate increases, how much will rates increase because of infrastructure investments compared to the rate increases for the Muskrat Falls Project?**

**Holyrood Generating Station**

The current CEO of Nalcor, Mr. Stan Marshall, along with the Minister of Natural Resources and the Premier have indicated that when the Labrador Island Link is completed the transmission line will be energized and will be used to bring power from the Upper Churchill into the Island portion of the province to replace generating capacity from Holyrood. The Maritime Link will also be used to bring electricity into this province.

**Q9: What is the current long term plan for Holyrood (including timelines?) Will Holyrood be decommissioned or will it remain operational?**

**Carbon Tax**

The Federal Government has been clear that a Carbon Tax will be imposed by 2019 if the provinces have not enforced a provincial tax scheme.
Q10: What Impact will the Muskrat Falls project have on whether ratepayers would have to pay a carbon tax as a part of their energy bills?

Q11: What would be the average carbon tax on energy generated at the Holyrood Generating Facility as compared to the average carbon tax on energy generated at the Muskrat Falls generation station?
Dear Mr. Hutchings:

Re: Electricity Rates in Newfoundland and Labrador

I am writing in response to your recent letter that posed 11 questions regarding future electricity rates in Newfoundland and Labrador and rate management efforts. The following provides answers to each of those questions:

Question 1: Will you commit to the people of the Province that their electricity rate will remain below 16 cents per kWh?

On September 5, 2018 Premier Ball most recently reaffirmed this government's commitment to correct the mistakes of the previous administration, to mitigate the impact of their poorly-conceived Muskrat Falls Project on Newfoundlanders and Labradorians and ensure that the ratepayer is protected. To support these efforts we have asked the Board of Commissioners of Public Utilities (PUB) to report on options to reduce the impact of MFP costs on electricity rates. The mandate of the independent, transparent and expert PUB ultimately is to ensure rates charged are just and reasonable, and that service provided is safe and reliable.

Question 2: Can you please provide the analysis done by the Department of Natural Resources, or provided to the Department, which outlines rate projections for the other Atlantic Provinces over the next 20 years.

Reliable electricity rates projections over a 20-year horizon are not available. We do, however, have rate projections up until 2020, which are outlined below:

<table>
<thead>
<tr>
<th>Province</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nova Scotia</td>
<td>16.0</td>
<td>16.2</td>
<td>17.2</td>
</tr>
<tr>
<td>PEI</td>
<td>15.6</td>
<td>16.0</td>
<td>N/A</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>12.5</td>
<td>12.8</td>
<td>13.2</td>
</tr>
</tbody>
</table>

Source: Nalcor's Muskrat Falls Project Update, June 2017
Question 3: What will be the impact of this $210 million-$245 million on the reduction of rates, how many cents per kilowatt will rate be decreased because of this reserve?

NL Hydro noted on page 20 of its August 3, 2018 PUB filing, “Supplemental Evidence Customer Impacts Reflecting 2017 GRA Settlement Agreements”:

"It is estimated that each 1¢ per kWh in rate mitigation provided to customers will require approximately $70 million per year in funding."

Question 4: To date, how much has Nalcor sourced for the reduction on rates and where are these funds coming from?

As you indicate in your letter, Nalcor is not required to produce these funds until 2020-2021. Since you wrote, and as you are aware, our Government has announced that the PUB will examine options to reduce impacts of Muskrat Falls, including both cost savings and revenue opportunities involving the electricity-related activities of Nalcor Energy and its subsidiaries; and the domestic need for Muskrat Falls power versus export availability – both of which will help protect the ratepayer.

We will also be working with the Federal Government to identify areas where the Government of Canada can assist given our mutual interest in ensuring affordable energy costs.

Question 5: (In relation to the proposed Off-Island Purchases Deferral Account) Can you please indicate why this has been dropped from the General Rate Application and outline if Nalcor or Government has an additional plan to use the Labrador Island Link and the Maritime Link to raise money which can be used for rate mitigation?

It was Newfoundland and Labrador Hydro’s (NLH) decision to no longer pursue the Off-Island Purchases Deferral Account. In a July 30, 2018 filing with the Board of Commissioners of Public Utilities (PUB), NLH explained that with regard to the proposed Off Island Purchases Deferral Account:

“As long as Hydro maintained its application for the Off-Island Purchases Deferral Account, it was clear a supplemental negotiated settlement with the parties was unlikely. This increased the risk of a protracted 2017 GRA which would not only increase the cost of the hearing portion of Hydro application but also would place significant schedule risk for Hydro’s upcoming regulatory applications required to be filed with the Board prior to the in-service of the Muskrat Falls Project. As a result, Hydro entered into a settlement agreement dated July 16, 2018 which proposes to establish customer rates based on the expected cost of supply.”
The GRA process is still ongoing, and the PUB has yet to issue an Order on this matter. With respect to the Labrador Island Link and the Maritime Link, these transmission assets can potentially maximize and optimize export opportunities, and this activity could raise funds that can be used for rate management.

Question 6: What will be the impact of the sale of excess power on electricity rates, how many cents per kilowatt will rates be reduced by using all of the above?

NL Hydro noted on page 20 of its August 3, 2018 PUB filing, “Supplemental Evidence Customer Impacts Reflecting 2017 GRA Settlement Agreements”:

"It is estimated that each 1¢ per kWh in rate mitigation provided to customers will require approximately $70 million per year in funding."

This illustrates that it is only through using all options available that we will protect the ratepayer.

Question 7: Given the various options available for rate mitigation, please give the total potential amount which rates could be reduced by using all the factors above.

Our Government will consider all means possible to minimize the impacts of the Muskrat Falls Project legacy on the electricity customers of the Province. As noted above, in addition to our efforts, the PUB has been given broad discretion to examine all options available to mitigate rates including from savings from Nalcor Energy’s unregulated electricity activities.

Question 8: In the estimated rate increases, how much will rates increase because of infrastructure investment compared to the rate increases for the Muskrat Falls Project?

Nalcor’s June 23, 2017 project update forecasted domestic electric rates without rate mitigation of 22.89 cents per kWh; the Muskrat Falls Project accounts for approximately 11.7 cents per kWh of this total. The remaining 11.3 cents per kWh relates to the operations of Newfoundland and Labrador Hydro (6.8 cents per kWh) and Newfoundland Power (NP) (4.5 cents per kWh).

Question 9: What is the current long term plan for Holyrood (including timelines)? Will Holyrood be decommissioned or will it remain operational?

NLH’s 2019 Capital Budget Application to the PUB, filed on July 31, 2018, provides the following timeline for Holyrood:

- Phase 1 – Normal Production Phase (Completed - 2016 through to the second quarter 2018): All three units are available for prime power generation with Unit 3 also available for synchronous condenser operation, as required;
- Phase 2 – Standby Production Phase (Second quarter 2018 through to the end of the winter 2021): Units will be placed in Standby Mode as reliable off-Island supply is secured. Unit 3 will be operated in synchronous condenser mode, as required; and
• Phase 3 – Post Interconnection Phase (Post-winter 2021): All Muskrat Falls Units will have been placed in-service and both the plant and the LIL have operating experience. Holyrood Units 1 and 2 will have been placed in Standby Mode, until decommissioning is appropriate. Holyrood Unit 3 will continue to operate as a synchronous condenser.

Question 10: What impact will the Muskrat Falls Project have on whether ratepayers would have to pay a carbon tax?

The Government of Canada's carbon tax does not propose to apply to hydroelectric generation.

Question 11: What would be the average carbon tax on energy generated at the Holyrood Generating Facility as compared to the average carbon tax on energy generated at the Muskrat Falls generation station?

In 2016 and 2017, the last two years of full production at Holyrood, its greenhouse gas (GHG) emission were 1.35 million tonnes and 1.4 million tonnes, respectively. Historical levels of production would result in carbon pricing of approximately $33 million per year based on 2022 federal backstop carbon pricing.

Please feel free to contact me if you have any additional questions.

Sincerely,

SIOBHAN COADY, MHA
St. John's West
Minister

c. Honourable Dwight Ball, Premier
Overview
Reservoir and Energy Supply Management

February 2018

newfoundland labrador hydro
a ntlcor energy company
Agenda

A. Energy and Capacity In Newfoundland
B. Water Management
C. Winter Supply – General update
D. 2018 Supply Adequacy work
E. What the water management world will look like with interconnection
A. Energy and Capacity in Newfoundland
Bay d’Espoir Reservoir System

NEWFOUNDLAND AND LABRADOR HYDRO
BAY D'ESPOIR DEVELOPMENT
Energy and Capacity in Newfoundland

• We plan for Capacity and Energy separately
  – You can have lots of one but not the other

• Energy – Megawatt hours
  – We need enough fuel (or water) to keep the generators running for as long as customers want their electricity

• Capacity - Megawatts
  – We need enough capacity (generators) to ensure all customers can use what they need and when they need it
Water Management – Storage

• Storage (Measured in GWh)
  – Energy stored in reservoirs in form of water
  – Like a tank of fuel
  – Will hear Hydro indicate “x% of average, x% below maximum operating level, x% above minimum”
  – Very broad range of water in storage

• Average Storage
  – Not too conservative, not too risky – balanced
  – Use last 20 years of data
Water Management – Storage

• Minimum Storage
  – We plan to have more water in storage than minimum
  – Minimum is different at different times of the year
  – Can drop close to or below minimum
  – Increase other generation sources in response to trending to low water in storage

• Maximum Storage
  – Need to stay below or we risk dam safety (if a big rain or snowmelt comes)
Water Management – Inflows

- Inflows give us storage, so dependent on each other but not the same
- Inflows
  - From rain or snow melt, quick or slow
  - Comes in a general pattern, but always some variation
  - Annual expectation based on history
  - We monitor daily, weekly, monthly, quarterly, annually
  - Adjust generation accordingly
- Will also hear Hydro indicate “x% of average, xth lowest inflows year to date, etc” (60 years of inflow data)
Water Management – Plan for Low Inflows

- We plan to get average water to get average production from hydro units.
- But, we also plan for worst case scenario, a conservative approach - take driest seasons NL has on record (late 50s, early 60s).
- We compare where we are at any point in time, and assume we get the same amount of water like we go into the dry seasons.
- If we are getting low in storage, and we get a repeat of the driest season, we would increase other generation to help not go below minimum water levels in storage.
- Only do this when predicting dryer period as other generation is more costly.
Water Management - Decision Making

• Computer modelling - statistics
• Skilled employees interpretation
• Generally have weeks to make a decision when we see abnormal trends developing
  – Such as this past winter
• Major decisions include:
  1. When to increase Holyrood (more cost)
  2. Should we generate at gas turbines for energy (due to low water) – costly
  3. When to go back to normal operation
Energy and Capacity in Newfoundland

- **Generation Mix** – least cost
- **Base load plants, peaking plants, other**
  - Hydro (Bay d’Espoir, Cat Arm, Hinds Lake, etc)
  - Holyrood
  - Gas Turbines
  - Other island generators (wind, NP, Exploits, etc)
  - Capacity assistance and imports
Energy and Capacity in Newfoundland

• Supplying customers - planning includes:
  – What amount of water we can expect to receive (average and dry year)
  – Historical generation plant issues that may affect ability to generate
  – Known other issues
  – Human resourcing
  – Expected load

• Compare expected load to expected ability to generate with the generation mix we have

• Adjust accordingly
B. Water Management
Energy Mix (last 20 years)

**Hydraulic - Dark blue**
- Avg: 4500
- High: 5000 in 1994
- Low: 4000 in 2001

**Thermal - Light blue**
- Avg: 1400
- High: 2500 in 2002
- Low: 800 in 2006
Current Storage Pattern – 1354 GWh

Total System Energy Storage

- 2017
- 2018
- Min. Energy Storage Target
- Max. Operating Level
Key Water Management Take Aways

1. Gas turbine generation:
   - In 2017, was NOT run for low water reasons

2. Inflows are not same as storage
   - Ok to be a lot less than maximum, or less than previous year – prefer a typical pattern but we rarely get the perfect pattern – that’s ok
   - We pay close attention to storage and inflows – but we generally have many weeks in which to take action (unless we get a hurricane and we cannot draw down quickly for that purpose)

3. If action is needed, we ramp Holyrood up, which is normal, or we can turn to gas turbines.
   - Plan to only do these actions when necessary, so we can keep costs down. Balancing act.
C. 2018 Winter Supply – General Update
2018 Winter Generation Supply

• Plan for 240MW reserves
• Plan for p90 – a worst case load demand scenario
• Have notification system set up in the event we drop below
• Specific issues:
  – Holyrood unit 1 (failed boiler stop valve) – now online
  – Other de-rates at Holyrood (air flow)
  – Grand Falls G4 – in commissioning
  – Bay d’Espoir
  – Frazil Ice
• Our worst case planning assumes plants will experience issues
2018 Winter Generation Supply

Three pronged approach to ensure supply:

1. Assume very high customer demand (P90) and have generation to meet that demand
2. But, assume we will have generating unit issues as history shows us we will
3. Then, have extra generation or supply available when you inevitably have those generation issues – this is your reserves

- Reserves come from many options
  - Installed generation, NP, NUGs, curtailment, capacity assistance, voltage reduction, and now imports
Current Reserve Picture

- Wind is not included in the next day’s reserve forecast. We only add it in the morning of.
- Maritime Link purchases are also not in this chart. We are currently reflecting it day ahead.

Island System Available Reserve Forecast
Forecast issued @ 2018/02/22 08:20:48

From this day forward, no wind, no Maritime Link in forecast
2018 Supply Adequacy Project - Future

• Process:
  – Technical analysis of what future system should look like and what reliability criteria could be required
  – Determine if any gaps when compared to current system
  – If gaps, develop solutions and cost estimates to address gaps – engage PUB and intervenors

• Complete by year end
  – Expect lengthy consultation with PUB
E. New Interconnected World and Water Management
Water Management in Interconnected World

- Transitioning some work to Nalcor Energy Marketing
  - Hydro maintains accountability and oversight for its physical assets, water, technical and customer requirements

- Energy Marketing as Hydro partner:
  A. Arrange for, and execute, energy imports to offset Holyrood and minimize energy costs
  B. Future, will arrange for and execute energy sales for Hydro as a means to maximize value of water

- Developing protocols and procedures to facilitate this work
Additional discussion & questions