November 19, 2018

Dear [Name]

Re: Your request for access to information under Part II of the Access to Information and Protection of Privacy Act (File # NR-163-2018)

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 NL Hydro Hardwoods Gas Turbine operation including but not limited to any reference to UFOP or DAUFOP and any reference to the Combined Gas Turbines or CGT or CT

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.

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 as follows:

P.O. Box 8700, St. John’s, NL, Canada A1B 4J6 t 709.729-1466
Office of the Information and Privacy Commissioner  
2 Canada Drive  
P.O. Box 13004, Stn. A  
St. John’s, NL A1B 3V8  

Telephone: (709) 729-6309  
Toll-Free: 1-877-729-6309  
Facsimile: (709) 729-6500  

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  

Rod Hynes  
ATIPP Coordinator
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 then 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
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
• 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 than 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.
    o As an example, a restaurant that can seat 100 people will have a Capacity of 100 people
    o If 50 people are currently seating in the restaurant than it will be operating at half its capacity
    o 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.
    o 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 day, 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
Valentine’s 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 Valentine’s 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 cannot 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 then 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
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 markets 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
    o This could be 24 hours a day, 365 days a year or it could only be during peak hours
    o 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.
    o Holders of firm transmission rights have the first right to use the line.
    o Holders of non-firm transmission rights are allowed to flow if firm energy is not being delivered
    o 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

nalcenergy
Glossary
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 measured 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.
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.
Ms. C. Blundon
Public Utilities Board

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/kc

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
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:
  o 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)
  o 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.
  o 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.
  o Cracked rotor key welds observed on the generation unit at Upper Salmon plant. The 2018 capital plan includes upgrades to address these issues.
  o One existing cooler has been repaired and additional one was purchased for Hinds Lake plant.
  o NLH plans to replace the spherical valve controls in 2018 at Cat Arm.
  o Boiler tubes at the Holyrood Station (HTGS) were replaced in 2016.
  o Variable Frequency Drives at Holyrood were modified throughout 2016-17, but continue to have issues. NLH is closely monitoring the status.
  o Supplemental Capital Budget Application is being prepared to replace air heating equipment at Holyrood.
  o The turbine control system at Holyrood had issues and has been addressed.
  o Two exciter control systems at HTGS were installed in 1999, 2000 and another one was replaced in 2013 to ensure reliable operation.
  o Flanges on Unit 1 and 2 at HTGS experienced issues. One is replaced while the replacement of the other is planned for 2018.
  o A stop Valve in Unit 1 boiler at HTGS failed in January 2018. Originally supplied in 1969, the valve was replaced.
  o 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.
  o 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>Asset Type</th>
<th>Metric Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay D’Espoir Hydraulic Units</td>
<td>DAFOR&lt;sup&gt;1&lt;/sup&gt; = 3.85%</td>
<td></td>
</tr>
<tr>
<td>Remaining Hydraulic Units</td>
<td>DAFOR = 0.73%</td>
<td></td>
</tr>
<tr>
<td>Holyrood Thermal Units</td>
<td>DAFOR = 15%, 18%, 20%</td>
<td></td>
</tr>
<tr>
<td>Holyrood GT</td>
<td>DAUFOP&lt;sup&gt;2&lt;/sup&gt; = 5%</td>
<td></td>
</tr>
<tr>
<td>Stephenville GT</td>
<td>Base DAUFOP = 30%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sensitivity DAUFOP = 50%</td>
<td></td>
</tr>
<tr>
<td>Hardwoods GT</td>
<td>Base DAUFOP = 30% Sensitivity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DAUFOP = 50%</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: NLH Five year Capital Plan (Generation)

<table>
<thead>
<tr>
<th>Expended to 2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>Total</th>
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<tr>
<td>2,017.00</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

<sup>1</sup> Derating Adjusted Force Outage Rate (DAFOR) is a reliability KPI for generation assets that includes NLH’s thermal and hydroelectric generation assets on the interconnected systems. DAFOR 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.

<sup>2</sup> 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.
Newfoundland Hydro (NLH) 2017- GRA Hearing Summary

Day 1- Monday July 16, 2018

Witnesses from NLH
- Jennifer Williams, VP Production Operations
- Ron LeBlanc VP Transmission & Distribution & NLSO
- Terry Gardiner VP Engineering

Liam O’ Brien outside counsel for Newfoundland Power (NP) asked all the questions.

Key Discussion Points

In the beginning, the Board was informed that the parties reached the Supplemental Settlement Agreement for Island Interconnected issues. Labrador issues are not covered by this agreement. Ms. Green presented an overview of the agreement.

- According the agreement, all Cost of Service Methodologies have been agreed upon.
- Generation Credit for Newfoundland Power for Isolated Diesel systems. Amount will be determined by the PUB.
- It has been agreed that Expected Supply Scenario (and not the Deferral Account Scenario) will be the basis for the General Rate Application
- Capacity Assistance Agreements will bring a reduction of approx. $600,000 in revenue requirement for NLH.
- NLH will file additional evidence for the rate impact that will flow out of this agreement.

This was followed by a brief introduction by witnesses with their work history/ profile
Liam O’ Brien asked about the cost control measures, targeted reductions and Organizational changes in NLH and witnesses involvement in those initiatives. Witnesses explained their varying degree of involvement with cost control measures including labor, training and travel costs and embedded contacts. Other discussion involved:

- Labor Cost control (FTE), NLH’s study on how to become more effective, and methods of budgeting for non-labor costs.
- Productivity initiatives and level of Interaction of staff with NLH’s Productivity Team (PT)
• Recommendations (if any) from the PT and their impact on Test year costs
• Flow of those cost control impacts to customers
• Productivity allowance of $1 million for Executives (Ref: NP-NLH 12 & undertakings 27-28)
• Plans to add new FTEs in 2018 or 19? (Ref: undertaking U-28)
• NLH’s efforts to decrease overtime and embedded contracts, negotiated 55 FTE rate
• Transfer of FTE from Nalcor to Hydro, Reorganization of regulated and unregulated assets
• Travel Costs (Ref NP- NLH-69)
• Inter-company Charges
• Regulatory oversight of NLSO by the PUB
• NEM’s Compliance with Least cost principles when purchasing energy for NLH
• Integration with the Grid and Transition to Operation and delays

Day 2 Tuesday July 17, 2018
Witnesses from NLH
• Jennifer Williams, VP Production Operations
• Ron LeBlanc VP Transmission & Distribution & NLSO
• Terry Gardiner VP Engineering

Liam O’ Brien outside counsel for Newfoundland Power (NP) continued asking questions.

Key Discussion Points
• Liam O’ Brien asked whether NEM charges NLH for Energy Purchases, to which Jennifer Williams responded that No, NEM does not charge NLH for Energy purchases.
• NEM will provide a total of 200 GWh energy in 2018-2019, (90 GWh in 2018 and 110 GWh in 2019). Current purchases are priced at $0.2 cents/kWh.
• Concept of Ponding was explained by Jennifer Williams.
• LIL, O&M costs start, once commissioning is complete, approx. $3.3 Million for 2018 based on figures provided by Nalcor.
• NLH is expected to pay 10% of the LIL and LTA costs to Nalcor.
• NLH has Reserve Assistance agreement with Nova Scotia Power with Reciprocity.
• Significant investment done in equipment repairs at Bay d’Espoir generation station, especially Penstock 1 and 3 where leaks and weld degradation was observed. Penstock 2 is being looked at this year. Similarly, repairs were done at Hardwoods and
Stephenville’s turbines. In the Capital Budget application, NLH is looking for capital budget to keep the units maintained and running until 2021.

- Liam O’Brien pointed out that Liberty was critical of NLH’s management and operational philosophy. NLH staff said they were working on the report’s recommendations to make NLH’s Operational philosophy cost effective.
- In response to a question on whether coming online of TL-267 will reduce stand by Generation, Jennifer said that Yes, but the impact will not be significant, due to Derating in Holyrood.
- One of the Recommendations of the Liberty’s Report required NLH to Re-examine its approach to balance costs and reliability. Liam O’ Brien asked on what has NLH done so far in relation to this recommendation. Jennifer replied they have started stakeholders’ consultations and discussion and whatever comes out of the discussion will be put together as a plan, moving forward.
- Terry Gardiner informed the hearing that NLH has set a target of 10% cost variance in Capital and other expenditures and has tried to achieve the target.
- Ron LeBlanc informed the hearing that Nalcor provided the numbers for LIL and LTA costs and NLH is responsible for those costs. If the costs are unreasonable, NLH can object to/question them, but at the end of the day, NLH has an obligation to pay.

Liam O’ Brien concluded his questions. Stephen Fitzgerald represented the Consumer Advocate and started asking questions. Dennis Brown did not attend the hearing today.

- The Consumer Advocate (CA) Stephen Fitzgerald called Newfoundland and Labrador System Operator (NLSO) a new animal and inquired about its corporate structure.
- Ron LeBlanc said NLSO is an extension of Energy Control Centre (ECC) and a department of NLH with unique security features. Some information is shared with NLH internally while other is not. Nalcor also has access to some information in NLSO.
- NLSO treat NLH like they treat other transmission customers with no discrimination or preferential treatment. The reason of making NLSO part of NLH was to avoid extra costs in IT, HR and payroll etc. This is the way System Operators (SO) are working across North America.
- Other jurisdictions have made their SOs part of their Open Access Transmission, and once we get interconnected, we will require sort of similar structure as we have to offer access to others in the market and have to offer Reciprocity at the same terms and conditions as others. That’s why we have made NLSO part of the Open Access.
There is no Open Access Police Force, but a central system exists for complaints resolution to address any issues surrounding unfair treatment.

NLH’s interaction with NEM is through weekly meetings. Responding to CA’s question, Jennifer said that NLH can contract out energy purchases to other marketers, but NEM works together with NLH, both have the same interests and is favorable both for NLH and customers.

There is no directive from Nalcor to use NEM’s services.

When purchasing energy, NLH does not look for or know the generation source of power (like coal, hydro etc.). NLH follows least cost principles.

CA suggested to use other marketers if it is beneficial to do so from a consumer perspective.

Ron LeBlanc informed that sales and energy deals are outside NLSO’ mandate.

Responding to question from the CA, Ron said that the 22.9 cents/kWh came from Nalcor and NLH will update its numbers. The 22.9 cents number will mature overtime.

NO decrease is expected in the NLH’s load forecast. NLH relies on Newfoundland Power for Residential Load Forecast. Taking elasticity into consideration NLH found a negative 3% elasticity in load forecast, meaning that for a 100% rate increase one will observe a 3% reduction of load. But there are other factors that come into play.

CA referred to April 24 transcripts (Page 94-96) of Mr. Haynes testimony where he talks about ownership of recapture power.

The hearing was informed by Jennifer that there was no official Hiring freeze at NLH, but every position that is filled has to be justified first.

**Day 3 Wednesday July 18, 2018**

Witnesses from NLH

- Jennifer Williams, VP Production Operations
- Ron LeBlanc VP Transmission & Distribution & NLSO
- Terry Gardiner VP Engineering
Paul Coxworthy from the Industrial Customers Group and Ms. Maureen Green PUB’s Hearing Counsel asked questions.

**Key Discussion Points**

Paul Coxwothy’s discussion:

Ron Le Blanc’s answers

- There was NO double counting of LIL and LTA costs.
- NLH will get invoices for LTA costs once the project is commissioned.
- No template yet developed by NLH to check the reasonableness of the LTA costs. These will be mostly O&M costs, like snow clearing, right of way access.
- Ron is part of the Transitions to Operations Team.
- In order to assess NLH’s Reliability standards, a GAP analysis will be done in comparison with NERC standards and update NLH’s standards. In some cases NLH may exceed NERC standards while in other cases there might be deficiency. In Canada, some utilities have adapted NERC standards while others have not.
- NERC do not distinguish between regulated and unregulated utilities *(as I understood)*.

Terry Gardiner’s responses

- Certain positions within NLH, mostly technical (mechanical engineers) positions were not filled in 2016 that should have been filled.
- Talked about the roles of Reliability Engineer (RE) position. An RE looks at the overall reliability of the system, conducts inspections, look for system trips etc. Couldn’t spoke to the existence of Reliability Engineer position in other utilities in Canada, but said that other utilities do the same work, having the same functions and responsibilities.
- Reference to NP-NLH-12 Discussion around costs.
- Reserve sharing with Nova Scotia Power. NS Power is the not the only utility we will be dealing with. We have HQ and NB Power. Reserve sharing with NB Power is a slight possibility as they have some transmission constraints passing through Nova Scotia. No new infrastructure is required for Reserve sharing. Hydro Quebec has to conduct some transmission studies though.
- Impact of load forecast on revenue requirement will be addressed by Mr. Fagan.
Jennifer William’s Responses

- There is a daily transmission of approximately 45 MW.
- All the transmission over LIL is available to the Island and NLH customers.
- NLH will provide the PUB with the record of transmission.
- Bipole LTA will be operational in June 2019.
- Discussion and reference to the document “Additional cost of Service Information” table 5 where the 388 MW figure will become 493 with the supply of recapture power combined with additional purchases. There is more information coming in relation to this.
- Expected supply for Off Island Purchases for 2018 is 606 GWh.
- There will be opportunity to buy power off island outside of the firm contracts.
- Approximately 34 GWh will be purchased outside firm contracts.
- Jennifer’s part of time is paid by Nalcor. The time includes oversight of Exploit assets, operational issues and supervising staff of facility management at Exploits etc.
- There is a Power Purchase Agreement (PPA) in place between the Government and NLH for Exploits generation.
- No definite plan to dispose off (as I heard) the Exploit assets.
- In the past transfer of Exploit assets has been considered.
- Load forecast for 2018 was provided by NP.

Ms. Maureen Green’s Questions

Terry Gardiner’s responses

- NLH use embedded contracts in capital projects, regulatory and Norman’s Bay operations. There are also temporary employees with NLH. They are hired through the regular hiring process and are mostly seasonal. Example would be Line inspectors.

Jennifer Williams

- Jennifer Williams said that NLH do not use NEM for OFF Island Purchases.
- Recapture energy is purchased through a contract between CFLC and NLH.
- Price for imports is usually 0.2 cents/kWh.
• Expected imports for 2018 are 135 GWh over LIL. This is over and above the Recapture Power. And 93 GWh over the Maritime Link. This number keeps changing. Total Imports for 2018 and 2019 are 606 GWh including both Recapture and Market Purchases.

• Market purchases include firm contacts and sport purchases.

• NLH will provide an undertaking for breakdown of purchase in 2018 and 2019.

• NKH may purchase power from other sources.

• To check whether NEM’s price is reasonable, NLH has a guideline. We do analyze to see if it cheaper compared Holyrood. How much cheaper that is not a question.

• For 2018 test year LIL O&M costs are $8.3 Million.

• PUB’s jurisdiction to review LIL energy purchases in relation to the exemption orders,

• MS. Green asked on NLH’s follow up on Liberty’s recommendation in relation to a software issues and Generation Adequacy report Page 39. Liberty was critical of NLH criteria.

• Ms. Green asked whether Off Island Purchases not related to MF and purchases through ML are subject to PUB’s jurisdiction, and included in current GRA. How are they going to be shared with the parties of GRA?

• Ms. Jenifer responded that we will see what information can we share and what is subject to confidentiality and not sharable.

• Ms. Green asked How NLH ensures to comply with the least cost principle of the Power Policy of the Province, when making purchases through NEM?

• Ms. Jennifer informed that interest of Nalcor and NH are the same and NLH sources out cheapest available power, although some restrictions apply. Effort is made to find the best cost.

• Ms. Green said that transmission costs may or may not get exempted under the Exemption Order OC. Mr. LeBlanc said it is a legal subject and cannot speak to it.

• Jenifer informed the hearing that Liberty has flagged some costs and they were reviewing Liberty’s recommendations.

Ron LeBlanc responses

• NLH will receive invoice for LIL O& M cost, but he was not sure who will be sending the invoice, it will be either Nalcor or CFCL or other entity that owns the LIL assets.
**Day 6- Thursday July 26, 2018**

Witnesses from NLH

- Lisa Hutchens, VP Finance

Consumer Advocate Denis Browne, Paul Coxworthy and Ms. Green asked all the questions.

**Lisa Hutchens and CA’s discussion**

- Referring to a footnote of the supplemental evidence filed with the PUB, the CA said that the operating and maintenance costs associated with the LIL and the LTA in the 2018 and 2019 test year revenue requirements are 8.4 million and 51.4 million respectively. Hydro is required to pay these costs for the use of the LIL and LTA to provide savings, etc.” Now that says Hydro is required to pay these costs. Required by whom?

- Lisa Hutchens said that she think it will be required by virtue of the contracts. THE CA questioned why NLH signed the contract requiring NLH to pay for these costs until NLH get Public Utility Board approval.

- Lisa Hutchens replied that the execution of the contract is associated with the usage of the LIL and the LTA, and in return for the use of those assets, there’s an expectation that NLH would pay the owner of those assets or the operator of those assets a fee for the use of those assets. NLH believe that the use of those assets will provide a benefit to ratepayers that is incorporated in the expected supply scenario.

- Lisa said the NLH’s interpretation of the Order in Council interpretation is that those costs will have to be paid at some point, it’s just a question of when. So those costs would then roll into the Muskrat Falls costs that get recovered under the OC once Muskrat Falls is fully commissioned.

- The CA pointed out that consumers aren’t getting very much energy in 2018 from the LIL and LTA. If it’s costing us (consumers) totality, $8,365,000.00, and we’re only getting a portion of the electricity that was intended, shouldn’t the cost be apportioned according to what we’re getting?

- Lisa Hutchens said that using the LIL and the LTA to bring power down from Muskrat Falls, that triggers those costs. NLH’s position is that the cost associated with the operation of the LIL and the LTA are being incurred in order to provide for the energy to come down through the LIL.

- Discussion around costs related to staffing level (12 employees) of the Corporate Services and Regulatory Affairs department of NLH and having a full time lawyer.

- Discussion on comparison of NLH salaries with other utilities, seconded employees to Innovation and Productivity team and role of managers vs the productivity team.
Justification of the team when managers are required to control costs find efficiencies. Consumers are paying already for managers now they are required to pay for the PT

- Receiving NEM’s services when other experienced marketers are there.
- Elasticity studies (ES) before Muskrat Falls project. CA requested to check if any ES were done in the years 2012-16
- CA’s criticism on NLH request for rate increase over and above revenue requirement (referring perhaps to Rate rider) based on something prospective; to make a determination of something that’s down the road and is not currently in NLH’s revenue requirement.
- Discussion around the diminishing load and development and implementation of an attendance support program within NLH

**Lisa Hutchens and Paul Coxworthy’s discussion**

- Reference to IC-NLH-122 and discussion around project updates on recent Island Interconnected Rates. And related impact of LIL and LTA O&M costs
- Terms of Reference of the Innovation and Productivity team and PT’s meeting minutes, Overlap of Management’s monthly meetings and PT meetings.
- Cost control: Overtime and efforts to control/reduce overtime, fully staffed model for LIL LTA, Existing staffing model of current transmission. Current model is a typical fully staffed model with 66 FTEs. It was done by looking at other utilities like Hydro Quebec, Manitoba Hydro and a Hydro in New Zealand because they also HVDc.
  - LIL LTA will be available in 2018.
  - 2018 test year costs coming out of the LIL, LTA. Costs have been reduced down to 8.3-8.4 million. Community Betterment amount of $250,000
  - Transfer of Exploit Generation Assets to NLH and related accounting practices.

**Lisa Hutchens and Ms. Green’s discussion**

- Grant Thornton Report on Hydro’s 2017 GRA, where the report raised the issue of the amount included in the revenue requirement with respect to long term debt and fee on the long term debt had been adjusted by the Board in the last GRA.
- PUB’s the Order arising from the last rate case, the Board referred to the Newfoundland Power Order where it had found that only 50 percent of the payments related to financial performance and regulatory performance were appropriate to recover from ratepayers.
Witnesses from NLH: Kevin Fagan Director Regulatory Affairs
Liam O’ Brien outside counsel for Newfoundland Power & Consumer Advocate Denis Browne, asked all the questions.

**Liam O’Brien’s Discussion with Kevin Fagan**

Kevin’s Responses

- In response to a question from Mr. O’Brien, Kevin briefly presented his profile and work history, and responsibilities in current role as Director Regulatory Affairs for NLH. He is involved in regulatory filing, rate development OIPD Account, rate proposals and cost of service methodology, among other things.

- Off Island Purchases Deferral Account was not a proposal initially when NLH filed its current GRA.

- There is no formal proposal for a Rate Rider before the Board. Increasing rates after Muskrat Falls is a big concern.

- LIL is expected to be operational on October First, 2018.

- In response to question from Mr. O’Brien, on how would NLH deal with rates in the absence of OIPD Account, Kevin said that it is up to the PUB to decide, whether the PUB wants to include Lil and LTA O&M costs in rates or not. We will use savings from Off Island purchases and sale of Recapture power to lower rates.

- Reference to table 11, supplemental evidence, 22.89c/kwH rate; the focus was on 2021, when MF will be online.

- Information from Nalcor was used in determining the revenue Requirement.

- Muskrat Falls PPA is different from Transmission funding Agreement.

- Mr. O’Brien asked if there were any Rate Mitigation Plans. Mr. Fagan said that legislation limit NLH’s options. They presented the Rate Rider and OIPD account. Do not have any the plan at the moment.

- There is no confirmation from the Government on 18 cents/ KwH.

- There would be more power purchase through LIL but I cannot talk about it due to Confidentiality agreement.

- Energy supply costs include energy costs plus transmission tariff for each jurisdiction, say if you we purchase from New England through NB and NS, we have to pay Transmission Tariff for NB and NS which may be different. It also includes losses costs.
- LIL & LTA O&M costs for 2018 are $8365M and for 2019 $51400M.

- Kevin informed the hearing that they became aware of the O&M costs for LIL and LTA when they were preparing the OIPDA proposal.

- Discussion around the invoices and scrutiny and audit of LIL and LTA invoices from Nalcor by NLH. NLH audits every invoice irrespective of the sources and they will be available for review by the PUB.

- O&M costs will not be over stripped by savings.

- Excess revenue of $21.2M include interim rates of July 1.

- $7M extra divide by 20 months equals $350,000/month LTA/LIL O&M costs per month for 2018 and 2019 test years.

- Discussion on the numbers on rates and revenue requirements and how NLH came up with the numbers, and isolated systems deferral Accounts.

- Rates won’t change in 2018 and there will be rate reduction in 2019

- 2017 GRA cost recovery rider filed in compliance filing.

- NLH has already started planning for its next GRA. Aim is to have it filed by mid-June 2019, but doesn’t seems to be achievable. Dependent on the conclusion of current GRA.

**Consumer Advocate Denis Browne’s discussion with Kevin Fagan**

- Rate of energy in Labrador to data centres is 3cents/kwh

- IN response to a question from CA, Kevin said that total power sale in Labrador will be 60 GWH in 2019, mainly driven by data centres.

- NLH is purchasing power at less than 3 cents per kilowatt-hour.

- CA pointed out that NLH has entered into agreements that are regarded confidential by the PUB. And we have no around to examine these agreements to see if these agreements hold value for customers.

- Kevin said that those agreements will benefit customers.

- CA said that there is no public scrutiny and NLH will be filing some evidence related to those agreements at the end of the week when there will be no debate in the PUB.

- CA also said that LIL is shared with Emera and ML is also shared which further complicates the matter, requiring public scrutiny.

- Kevin said that none of the LIL O&M costs are going to Emera. Emera comes into play after Muskrat Falls comes on line.
- NLH will be scrutinizing LIL and LTA cost invoices.

- In response to question from the CA, Kevin responded that he is not sure about what type of Confidentiality is NH seeing this week.

- CA said that it is a bit objectionable that NLH is bringing forward Confidentiality motions before the PUB at the end of the GRA hearing as we will not be able to debate it and there will be no witness to speak to them.

- Alex Templeton, Counsel for NLH explained that they are seeking confidentiality around some Off Island Purchase agreements and numbers around them to avoid potential reverse engineering.

- CA mentioned that open and transparent systems tend to yield better outcomes.

- CA also questioned that who is protecting the public, when NLH gets invoices from the parent company?

- Kevin said that NLH follow the laws and general accounting principles and will scrutinize the costs on the invoices.

- CA mentioned that NLH does not have an actual invoice regarding LIL/LTA O&M Costs to present to the PUB. It is just information from the presentation decks provide by Nalcor. How would NLH justify these costs?

- Kevin said that NLH will review the costs.

- CA also said that NLH is claiming cists against the Order in Council.

- Kevin said that Legislation requires the consumers to pay for the cost of service. If they don’t pay it now, they will ultimately have to pay for the service they receive. If they pay it now, it will be beneficial and according to the FAIRNESS and INTERGERNATIONAL EQUITY principles of rate design.

- CA also pointed out that consumers have nothing to do with the delay MF project and why should they pay for the bad judgement by Nalcor. Reference to Forensic Audit

- Kevin said that Government is committed to Rate Mitigation, and we would be looking at 25-30% rate increase anyway even without the delays in the MF project. rate shock of 10% including the interim rate increase.

- Discussion around number of employees on the regulatory affairs team, workload and overtime.

- CA said that the PUB has not approved yet the recovery of LIL & LTA O&M costs.

- Elasticity studies /modelling
Day 8- Tuesday August 7, 2018

Witnesses from NLH: Kevin Fagan Director Regulatory Affairs

Consumer Advocate Denis Browne continued his questions followed by questions from Paul Coxworthy of the Island Industrial Customers Group and Ms. Green, Hearing Council for the PUB.

Consumer Advocates discussion with Kevin Fagan

- The CA asked whether NLH purchases energy itself from other jurisdictions rather not using NEM’s service.
- Kevin said that NLH is a utility and is not in the business of energy marketing, neither have the expertise to purchase/ market energy and secure best value for the money and better deal for the customers of the province.
- Responding to a Q from the CA on how ca we be sure that NEM is getting a better deal for consumers Kevin referenced the Ponding Agreement and said that NLH review all the transactions and all the information is made available to the PUB to ensure we get the best deal for customers/ people of the province (follow the least cost principles).
- The CA pointed out that there is no public scrutiny of NEM’s transactions, and the public is cut out of the process. Kevin said that the PUB has a role to play, Hydro has its own role, and it is a question of how much management by HYDRO versus management by the PUB. The PUB has the authority to judge.
- Previously, the Recapture energy was sold to Quebec under an agreement/ after the expiry of the agreement the energy was sold to EMERA, and later on NEM starting selling the energy on behalf of the NLH.
- No analysis was done to assess if EMERA was getting better deals for NLH/customers, but the overall understanding was that they were doing better deals.
- Involvement of politics in purchasing power from other jurisdictions such as New England and not from Quebec. Pancaking of tariffs when buying from father jurisdictions, and losses through BN, NS etc.
- Why were the O&M costs so high when the LIL and LTA are new facilities? NLH did a comparison to other similar size transmission systems and found that the costs were $2M above the range. In case of DC facilities there was limited information available and based on the information, NEM’s costs were materially above the range.
- Nalcor was provided with findings of the research, to pushback for high costs. They (Nalcor) will provide new numbers in September, 2018.
Discussion on Ponding Agreement and fees charged by NEM to NLH. Some share of the savings from Ponding Agreement will go Nalcor.

Hydro will have Revenue deficiency if coming on line of LIL is further delayed, impact on customer rates

If LIL is up and running in a timely fashion, displacing Holyrood generation (fuel cost with energy imports) might not be the immediate option as Holyrood (HR) is run for capacity purposes, to deal with capacity and energy requirements.

The CA asked on any ES by NLH. No elasticity studies (ES) done by NLH in case of rate increase from 11.4cents to 18 cents, but built into forecast costs. The CA sked what will happen to consumers when the rates go up from 11.4cents.

The CA asked that when people start to leave the system and NLH needs revenue, what NLH’s plan was then. Kevin said that Muskrat Falls (MF) is very valuable resources and we need to use it wisely. NLH has done some research done looking at economic development rates, looking at load retention rates for Industrial Customers, looking at how you deal with rates for electric vehicles etc. NLH presented our report to the PUB with regard to we should change our rate structure so that – for Newfoundland Power so that they see the marginal price. So, if load changes, they don’t see the 18 cent change, but if the marginal change may only be six cents.

Kevin said things can be done with regard to rate design. Like time of use pricing etc.

Historically Time of day pricing has been advocated but faced resistance from NLH and NP.

But looking forward, you’re going to have – you’ll have marginal energy cost differences as well as capacity cost. So, time-of-day rates may make a lot more sense. We will look at rates going forward

NLH is looking at the fall filing for the Cost of Service methodology was also included rate design filing for Newfoundland Power and Island Industrial Customers, so they could still have a good marginal price signal.

The CA said that if NLH is going to do something, there should be announcement of some sort, People are out there now making decisions as to what they’re going to do in reference to their electricity bills and looking at variations.

The CA also brought the point that Hydro Quebec has a proposal to the Energy Board, the Regie, for a variable rate but a higher price for electricity during peak periods and a lower price when demand is lower, even though in Quebec itself, they’re paying I think it’s seven cents for a kilowatt.
• The CA said that NLH estimates a reduction of five percent of energy usage by customers would increase customer rates on average by approximately four percent. Applying the same approach, Hydro estimates a reduction of ten percent of energy usage by customers would increase customer rates on average by approximately eight percent. So the customers jump off the system, you’re looking to the remaining customers to make up the deficit. Isn’t that the so called death spiral?

• Kevin said “that’s assuming the existing rate design that the customer – that the marginal energy price that the customer would see would be say the 18 cents, for example. If you – if the rate design changed, then that wouldn’t necessarily be the case. But under the current rate structure that math would work, yes”.

• Referring to CA-NLH-033, the CA said that confused messages coming out of Hydro. In the one instance, you’re telling people if they go to electric space heating, you’re going to punish your neighbour because we’re going to put up electricity for your neighbour who has not seen fit to do that. And on the other hand, you’re telling us there could be rate design which may give a two-tiered system whereby people can get charged more for more consumption or people could have a basic lifeline rate of 700 kilowatts or time-of-use rates. There’s all kinds of variations out there. But, no one knows what you’re going to do. There is no plan and people are out there on the move now.

• Kevin said that there is uncertainty and they are trying their best. The regulatory process is slow.

• The CA said that the correct signal right now be to tell customers there’s going to be rate stability, or you could end up paying lower rates for a while until NLH can figure this out because there are options whereby customers can pay lower rates now.

• Kevin said that a Government policy decision on how they’re going to deal with it.

• In response to a Q “Well, you’re the utility. Why does it fall to government to – does government – I asked you something quite specific” from the CA Kevin aid that because Government’s put legislation out that requires NLH to recover the full cost for Muskrat Falls from its customers. So, unless Government acts and changes that, then NLH has to do what legislation requires, the Government direction.

• Kevin informed the hearing that proposed increase for retail customers is 1.2 percent. And NLH has now deviated from the proposed off-island purchases deferral account.
• Discussion around Dr. Feehan study and Elasticity studies. The CA said DR. Feehan should have been invited to the hearing for questions and evidence.

Paul Coxworthy’s discussion with Kevin Fagan

• Discussion on Recapture energy (reference to CA-NLH 57-page 2), total amount available as excess recapture, and not necessarily deliverable to the island, but available on a monthly basis for the period 2018 to 2020
• LIL operation date and savings from Recapture Energy will increase substantially when LIL comes on-line. Impact of delays in LIL operational date
• Opportunities for other Off-Island purchases if LIL is not fully commissioned in October, Nov or December
• Limited ability of market purchases as marketers know the price of fuel and they know we try to replace Holyrood generation
• Reference to undertaking 54 –Determination of LIL/LTA O&M costs as percentage of the gross/net value of assets as opposed to tracking actual costs. Is this a standard industry practice to determine transmission costs as a percentage of actual gross value/capital costs of assets
• NLH has requested details of O&M costs and presented those to the PUB.
• Discussion of NLH upcoming filings with the PUB are Marginal Cost update, Cost of Service Methodology, Rate Design Review, Compliance filing, Next GRA late 2019, including Muskrat Falls Recovery. Timing of each filing, the PUB has approved interim transmission tariff and at the conclusion of that, you need to have a hearing with respect to open access transmission for file approval of transmission tariffs going forward reflecting post Muskrat Falls.
• Debate on whether LIL was a transmission or generation asset, because in the initial GRA stage LIL was described as generation asset part of Muskrat Falls, timeline of Government announcement on mitigation is unclear.

Ms. Green’s discussion with Kevin Fagan

• Filing of Ponding Agreement, and Outcomes of the agreement will be sharing of benefits between Nalcor and Hydro with respect to the purchase of energy and the storage of energy for later export. PUB would determine what the value of Nalcor Energy’s
contribution would be and what share would go to Nalcor Energy Marketing and remainder would go to NLH customers, anticipated savings for customers for 2018-19

- A deferral account would be proposed to be established upon approval of NLH proceeding with the ponding agreement.
- Confirmation directly from government with respect to the use of export revenues, no legislative requirement for it to be used to go back to the benefit of customers.
- Uncertainty surrounding the off-island purchases for 2018 and 2019, and the impact that that could have on customers. Forecast savings incorporated into the revenue requirement for establishing customer rates.$40M risk
- Availability of LIL available from October 1st for testing purposes vs availability until October 18th for the full amount.
- Uncertainty surrounding Off-Island purchases for 2018 and 2019 and its impact on customers.
- From a risk perspective, NLH is protected because of the energy supply cost variance account
- We could see as much of a swing of 5 to 6 percent of increasing rates in ‘19 required to recover the lost savings
- In presenting the Supplemental Evidence, price of number 6 fuel assumed was $85.55 per barrel (Canadian). Most recent forecast of # 6 fuel is going to be used when establishing the rates for compliance application (as required by the settlement agreement).
- If LIL is delayed, NLH would have the offset of no cost having to be paid for the use of the LIL. Also if LIL is not available in 2018, we could see as much of a swing of 5 to 6 percent increasing rates in 2019 required to recover the lost savings.
- Uncertainty about Tecora’s load
- Using the Expected supply scenario as the accepted approach and appropriate regulatory approach and the regulatory process to be able to manage this risk for customers and keeping the PUB informed on Off-Island purchases on an ongoing basis
- By the time of Compliance filing we will have much better information.
- Newfoundland Power has filed a Rate Application (GRA) seeking an increase in their return on equity of 100 bases points from 8.5 percent to 9.5 percent, to be implemented in 2019.
True-up
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**