

February 25, 2021

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 of Corporate Services & Board Secretary

Dear Ms. Blundon:

Re: 2021 Capital Budget Application – Replace Hydro Personal Computers (2021) and Diesel Genset Replacements (2021–2022) Projects – Additional Information

Newfoundland and Labrador Hydro (“Hydro”) filed its 2021 Capital Budget Application (“Application”) with the Board of Commissioners of Public Utilities (“Board”) on August 4, 2020 seeking approval under Section 41 of the *Public Utilities Act* (“Act”) of its proposed capital expenditures for 2021.

The Board issued Order No. P.U. 2(2021) on January 15, 2021 approving the Application with the exception of the Replace Hydro Personal Computers (2021) project and the Diesel Genset Replacements (2021-2022) project (“Projects”); the Board requested Hydro file additional information on these Projects and indicated the Projects would be addressed in a separate order of the Board.

The additional information requested by the Board follows.

Replace Hydro Personal Computers (2021) Project

In its 2021 and prior capital budget applications, Hydro has submitted projects for the “replacement” of personal computing devices. While the majority of devices acquired through these projects are required to replace devices, such replacements are not necessarily “like-for-like” replacements; for example, one type of device (e.g., a desktop) may be replaced with a personal computing device of a different type (e.g., a laptop) depending on the operational or role requirements for each specific device deployment. Devices may also occasionally be acquired to support new deployments where no existing personal computing device is being replaced or to replace existing devices that have failed prematurely. Hydro recognizes that the use of the term “replacement” in its project proposal did not fully portray its approach to device acquisition and deployment and apologizes for the confusion this has caused.

In Board Order No. P.U. 2(2021), the Board noted that “Hydro stated that it operates 313 desktops and 327 desktops were replaced in the past two years, it is not clear why 128 desktop computers have been identified for replacement in 2021.” While Hydro stated in its response to NP-NLH-003 that it had replaced a total of 327 desktops in 2019 and 2020,¹ this number includes desktops that were acquired to replace other types of personal computing devices, including the replacement of 206 thin-client devices

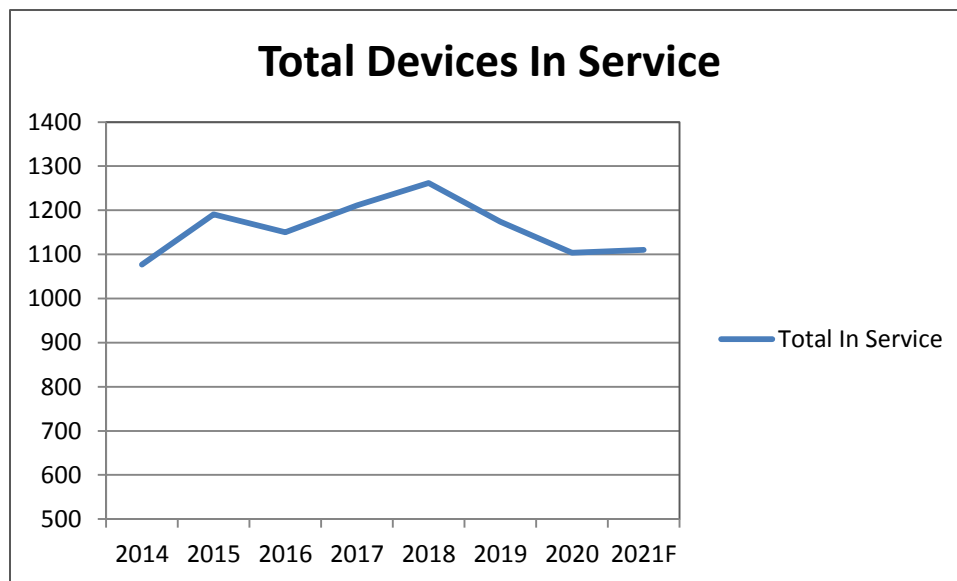
¹ 2019 actuals and 2020 year-to-date data as of October 2020.

in 2019 and 2020.² To be clear, the replacements acquired were desktops; however, the replaced devices were not all desktops.

Hydro has proposed the acquisition of 128 desktop devices for 2021; Hydro confirms that these devices are expected to cost approximately \$233,000. Throughout the execution stage of the project, Hydro will determine the type of device deployed on a case-by-case basis depending on operational and role requirements; therefore, the number of each device type acquired may vary, while the total devices acquired is anticipated to remain relatively consistent. Given the current impact of the COVID-19 pandemic, Hydro continues to assess and evolve its needs as remote working capabilities remain an important component of Hydro's business continuity plans. The proposed devices are necessary to support Hydro's operational requirements in serving its customers.

A detailed variance analysis of computing devices for the period 2014-2020 is included as Appendix A. The quantity of devices deployed both on a type-by-type and total device basis is not static and varies year-over-year as Hydro assesses its operational requirements. On a total number of devices basis, Hydro's in-service personal computing devices have declined since 2018, as shown in Figure 1.

Figure 1: Total Personal Computing Devices In Service



On a cumulative basis, the analysis shows that the number of computing devices Hydro has acquired over the period 2014-2020 was 6%³ less than budget.

² Hydro has not acquired new thin-client devices since 2015, as it no longer deploys thin-client devices in most applications due to operational and compatibility issues.

³ $[(1,634-1,742)/1,742]*100$.

Diesel Genset Replacements (2021-2022) Project

The Diesel Genset Replacement project scope for Nain involves the replacement of Unit 574 at the Nain Diesel Generating Station due to reliability concerns with the unit. Engine obsolescence, increasing load in the community, and the logistical challenges associated with work execution including corrective maintenance in this remote location, combine to present an unacceptable risk to Hydro's provision of continued reliable service to Nain.

Unit 574 Operating Experience and Reliability [Order Reference p.11 (iii)(iv)(v)]

In response to PUB-NLH-032, Hydro provided a summary of corrective maintenance performed on Unit 574 since 2015. This data indicates that Hydro incurred approximately \$25,000 in corrective maintenance on this unit in the past 5 years (2016–2020). This corrective maintenance included 21 work orders over approximately 10,000 hours of operation, resulting in increased forced outages on the unit. By comparison Unit 591, a similar unit in Nain, had nine work orders over 33,000 operating hours. The Original Equipment Manufacturer has discontinued the production of the engine series in question; in the event of a failure of a major component of Unit 574, Hydro is constrained in its ability to conduct repairs due to engine obsolescence and lack of available parts.

In addition to the information provided in response to PUB-NLH-032, Hydro confirms it has incurred in excess of \$700,000 in unplanned corrective maintenance on Unit 574 since installation in 2002, including approximately \$350,000 from 2013–2015. A technician from the Original Equipment Manufacturer travelled to the site in 2015 and performed a series of tests but was unable to resolve the overheating issue. In consultation with the manufacturer, Hydro replaced an extensive list of major parts on Unit 574 (see Appendix B).

Following the extensive effort from 2013–2015 to investigate the overheating issue and replace major engine components, overheating issues remained; Hydro continued to operate Unit 574 at reduced output. Hydro also restricted average engine hours for Unit 574 from 4,000 to 2,000 hours per year in an effort to manage risk until the next planned overhaul. However, the manufacturer has not been able to resolve issues with this engine model and has subsequently discontinued production, resulting in many critical parts required for overhaul, corrective maintenance, or engine rebuild no longer available. Given the increased frequency of issues resulting in forced outages of the unit, continued operation at derated capacity is not a viable option.

Considering previous attempts to resolve the overheating issue, as well as equipment obsolescence and the unavailability of replacement parts, an overhaul of Unit 574 is not possible. The only viable course of action is the proposed replacement of Unit 574. It is Hydro's intention to maintain the viable parts from Unit 574 in inventory to support the continued operation of sister Unit 576 which is due for replacement in 2027.

Increasing Community Load [Order Reference p.11 (i)]

Nain is a winter peaking system and has experienced growth over the past decade as illustrated by the historical production data presented in Table 2. The distribution system currently serves about 500 customers. With reduced output of Unit 574, the Nain Diesel System has a firm capacity of 2,275 kW.

Table 1: Nain Diesel Generating Station Historical Production

Year	Gross Peak (kW)	Gross Energy (MWh)	Forecast ⁴	Forecast ⁷
			Gross Peak (kW)	Gross Energy (MWh)
2019	2,085	9,853	2,281	10,310
2018	2,115	9,731	2,285	10,365
2017	2,105	9,378	2,220	9,993
2016	2,048	9,377	2,071	9,283
2015	2,072	9,414	1,981	9,301
2014	1,914	8,287	1,961	9,254
2013	1,646	7,622	1,721	8,175
2012	1,658	7,592	1,706	8,053
2011	1,566	7,674	1,622	7,707
2010	1,541	7,321	1,659	7,659

Since 2010, the number of residential customers on this system has grown by approximately 12% and average use per residential customer has increased by approximately 20%. The general service sector has also experienced significant growth, with 20% more customers compared to 2010.

The Nain Isolated Load forecast, issued in spring 2020, is presented in Table 3. The system gross peak is projected to exceed existing firm capacity in 2022.

Table 2: Nain Isolated Load Forecast (2020)

Year	Spring 2020 Forecast		Spring 2019 Forecast ⁵	
	Gross Peak (kW)	Gross Energy (MWh)	Gross Peak (kW)	Gross Energy (MWh)
2020	2,210	9,980	2,301	10,397
2021	2,242	10,129	2,322	10,493
2022	2,279	10,303	2,343	10,590
2023	2,297	10,386	2,387	10,795
2024	2,315	10,469	2,405	10,880
2025	2,333	10,553	2,423	10,966

Load Curtailment Option (Order Reference p.11 (ii))

Hydro has confirmed there is no opportunity for customer curtailment in Nain. Major customers were contacted and it was confirmed that interruption would not be acceptable, particularly when peak loads are experienced during harsh winter conditions. On this basis, adequate reliable generation is required to ensure firm supply to all Nain customers.

⁴ Forecast Gross Peak and Gross Energy as of prior year Spring Forecast (E.g. 2018 forecast as of Spring 2017)

⁵ Spring 2019 Forecast was presented in Hydro's project submission in its 2021 Capital Budget Application.

Addition of a Smaller Genset Option (Order Reference p.11 (vi))

Hydro has confirmed that the alternative of continuing to operate Unit 574 at reduced output while supplementing plant capacity with an additional smaller unit is not viable. In addition to the reliability concerns associated with continued operation of Unit 574, the existing generating station does not have room to accommodate an additional unit. A Class 5 estimate for expansion of the existing facility and installation of an additional smaller unit (450 kW) is approximately \$8.6 million over a four-year schedule. Such an alternative does not meet Hydro's requirement for least-cost, reliable service, nor does it address the firm capacity shortfall in an acceptable time frame.

Nain Wind Micro Grid Project Capacity Contribution (Order Reference p.11 (vii))

Hydro does not believe it is appropriate to derive or assign a capacity contribution for the Nain Wind Micro Grid. Given that this project will be one of the first Wind-Battery-Diesel Micro Grid implementations of its size, there is no operational history on which to base an assumed capacity value. Further, the Nain site is a fully electrically isolated system and would have no neighbouring jurisdictions to support operations in the event that the wind generation became unavailable, which could result from low or excessively high wind days, or forced outages. Hydro does not believe a comparison to treatment on the Newfoundland and Labrador Interconnected System is appropriate as the Newfoundland and Labrador Interconnected System has a greater diversity of generation sources, two interconnections to the North American grid, and over ten years of operational data. Hydro has long established planning criteria for its isolated systems which are separate and distinct from the planning criteria in place for its interconnected systems. As such, it is Hydro's opinion that diesel generation will continue to be required to provide firm capacity and the replacement of Unit 574 is required on an ongoing basis.

Hydro continues to support the Nunatsiavut Government in the early stages of the project. Hydro anticipates that the Nain Wind Micro Grid firm capacity contribution may be appropriate for consideration during planning of future capital projects, once Hydro has established adequate operating history to inform its assumptions on the Micro Grid's contribution.

Summary – Nain Proposal

Hydro has proposed to replace Unit 574 to maintain safe, reliable, least-cost service for its customers in Nain. Despite Hydro's efforts to address issues with Unit 574, the engine continues to be unreliable with no viable options for resolution. Should this project not proceed, Unit 574 will remain at risk of failure, with a potential extended out of service period. Without Unit 574, Hydro would be in violation of its firm capacity criteria, resulting in an unacceptable risk to the provision of safe and reliable service to Nain. Should an unplanned failure occur during the harsh winter months, when shipping services are unavailable to this remote community, Hydro would not be able to deploy emergency generation. Even without a failure of Unit 574 at reduced output of the unit, Hydro projects it will be in violation of its firm capacity criteria in 2022. Running Unit 574 at reduced output also places additional demand on the remaining units servicing Nain. Timely approval of this project is critical to accommodate a lengthy procurement timeline and delivery during the limited shipping season.

Conclusion

With the additional information contained within, Hydro respectfully submits that the Replace Hydro Personal Computers (2021) project and the Diesel Genset Replacements (2021-2022) project should be approved.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO



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Appendix A

2014–2020 Computing Device Variance Analysis

2021 Capital Budget Application – Replace Hydro Personal Computers (2021) and Diesel Genset Replacements (2021–2022) Projects – Additional Information, Appendix A

2014-2020 Computing Device Variance Analysis

Over the period of 2014–2020, Hydro acquired a total of 1,634 computing devices as compared to a budgeted number of 1,742 devices for the same period. The decrease in actual devices acquired versus budgeted was primarily a reflection of a re-evaluation in 2018 of retirement criteria for personal computing devices.⁶ Removing the impact of the 2018 anomaly, Hydro acquired a total of 1,594 devices, compared to its proposed procurement of 1,503 devices over the 2014-2020 period. As requested in Board Order No. P.U. 2(2021), a variance analysis of Hydro’s total devices proposed for procurement versus actual devices acquired for the period 2014–2020 are outlined in Table 1.

Table 3: 2014–2020 Computing Device Variance Analysis

	2014	2015	2016	2017	2018	2019	2020 ⁷
Desktops							
CBA ⁸ Proposed	121	19	12	21	103	104	138
Acquired	167	12	27 ⁹	17	6	124	253
Laptops							
CBA Proposed	109	92	144	100	62	44	106
Acquired	112	113	140	122	29	136	66
Workstations							
CBA Proposed	7	11	12	8	13	3	3
Acquired	0	13	0	0	5	21	2
Rugged PCs¹⁰							
CBA Proposed	0	0	0	0	0	0	10
Acquired	0	13	39	0	0	0	0
Thin-Clients¹¹							
CBA Proposed	0	213	27	13	61	186	0
Acquired	0	217	0	0	0	0	0
Total Devices							
CBA Proposed	237	335	195	142	239	337	257
Acquired	279	368	206	139	40	281	321
Variance (# of devices)	42	33	11	-3	-199	-56	64
Variance (%)	18%	10%	6%	-2%	-83%	-17%	25%

⁶ In 2018, Hydro re-evaluated its retirement criteria for Personal Computing devices, which resulted in a significant reduction in the number of devices procured compared to the quantities proposed, as reported in its 2018 Capital Expenditures and Carryovers Report.

⁷ Actuals year-end 2020.

⁸ Capital Budget Application (“CBA”).

⁹ Hydro’s response to NP-NLH-003 reflected an error in the quantity of desktop devices acquired in 2016. The actual number acquired was 27 not 71.

¹⁰ Prior to 2020, this type of laptop was not differentiated from other laptops in project proposals.

¹¹ Hydro proposed the replacement of thin-client devices in its 2015–2019 Capital Budget Applications; however, it did not acquire new thin-client devices beyond 2015 due to challenges with deployment of these devices. In late 2018, Hydro decided to discontinue the use of thin-client devices, opting to replace these devices with desktop or laptop devices as appropriate for each deployment.

2021 Capital Budget Application – Replace Hydro Personal Computers (2021) and Diesel Genset Replacements (2021–2022) Projects – Additional Information, Appendix A

Notable variances against plan for 2018-2020 are discussed below.

2014 Variances

Hydro acquired a total of 279 devices in 2014, compared to its forecasted procurement of 237 devices. The increase in devices acquired over forecast was largely due to the expansion of personal computing devices in remote Hydro locations facilitated by increased connectivity in these locations.

2015 Variances

Hydro acquired a total of 368 devices in 2015, compared to its forecasted procurement of 335 devices. The increase in devices acquired over forecast was largely due to the deployment of rugged PCs to technical staff for use in harsh environmental conditions, as well as the increased deployment of laptop devices for users requiring computer access while working remotely or travelling.

2016 Variances

Hydro acquired 206 devices in 2016, compared to its forecasted procurement of 195 devices. The increase in devices acquired over forecast was largely due to the deployment of rugged PCs to technical staff for use in harsh environmental conditions.

2017 Variances

There was no notable variance for 2017. Hydro acquired 139 devices as compared to its forecasted procurement of 142 devices.

2018 Variances

As described in Hydro's 2018 Capital Expenditures and Carryover Report,¹² the 2018 Replace Personal Computers project was initially based on a replacement cycle of four years for laptops, five years for desktops and workstations, and six years for thin-clients. Hydro subsequently reviewed and updated its Personal Computer Replacement Program and adopted a five to seven year computer life cycle utilizing extended warranties and run to-failure modes. Device acquisitions for 2018, and the associated project budget, were reduced to reflect this revised retirement criteria.

2019 Variances

Hydro acquired a total of 281 devices in 2019, compared to its forecasted procurement of 337 devices. No thin-client devices were acquired in 2019, as Hydro has transitioned away from thin-client devices for most applications due to operational requirements and compatibility issues. Existing thin-clients were replaced with desktops and laptops as required.

¹² "Capital Expenditures and Carryover Report for the Year Ending December 31, 2018," Newfoundland and Labrador Hydro, March 1, 2019.

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2020 Variances

In 2020, Hydro replaced a total of 321 devices, compared to its forecasted procurement of 257 devices. The additional devices acquired above forecast are mainly attributed to the continued retirement of thin-client devices, the majority of which having been replaced with desktop devices.



Appendix B

Major Parts Replacement List

2021 Capital Budget Application – Replace Hydro Personal Computers (2021) and Diesel Genset Replacements (2021–2022) Projects – Additional Information, Appendix B

Major Part	Replacement Detail Number and Frequency
Aftercooler	2, replaced twice
Thermostat	1
Injectors	16
Turbos	2
Fuel Injection Pumps	16, replaced twice
Fuel Nozzles	16
Main Fuel Pump	1
Waste Gates and Gaskets	Replaced once
Exhaust Clamps	Replaced once
Engine Control Module	2, replaced twice
Cam Shaft	2
Connecting Rod Bearings	2
Cylinder Liners	2
Cylinder Heads	20
Pistons	18
Wiring Harness	2
Front and Rear Oil Seals	Replaced once
Base Pan and Gaskets	Replaced once
Fuel Valves	Replaced once
Coolant Tubes	Replaced once
Fan Motor	Replaced once
Fuel Filter Assembly	Replaced once
Oil Pump	Replaced once
Glycol Holding Tank	Replaced once