

March 1, 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: Capital Expenditures and Carryover Report for the Year Ending December 31, 2020**

Enclosed please find Newfoundland and Labrador Hydro's ("Hydro") Capital Expenditures and Carryover Report for the Year Ending December 31, 2020 ("Report").

This Report is filed pursuant to Board Order No. P.U. 6(2020) and provides information on Hydro's capital expenditures for all projects proposed and approved as part of the 2020 Capital Budget Application. As noted within the Report, information is also provided on capital expenditures related to additional Supplemental Capital Budgets approved by the Board. As per the Capital Budget Application Guidelines (Policy No. 1900.6–October 2007), the Report provides details and explanations regarding the reportable variances between budgeted and actual expenditures for projects with expenditures in the 2020 calendar year. It also provides a listing of funds carried over to future years and specific details regarding the execution of the Remove Safety Hazards project and various In-Service Failures projects.

Should you have any questions, please contact the undersigned.

Yours truly,

**NEWFOUNDLAND AND LABRADOR HYDRO**



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Senior Legal Counsel, Regulatory  
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Encl.

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# Capital Expenditures and Carryover Report for the Year Ended December 31, 2020

**March 1, 2021**

A report to the Board of Commissioners of Public Utilities





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## 1.0 Capital Expenditure Overview

This report outlines Newfoundland and Labrador Hydro's ("Hydro") capital expenditures and reportable variances for 2020 and project carryovers to 2021 and beyond. During 2020, Hydro invested \$87.6 million for the execution of capital projects to contribute to the provision of safe, reliable, least-cost electricity to customers.

The 2020 capital program was established prior to the emergence of the COVID-19 pandemic. In response to the pandemic, Hydro implemented business continuity plans and protocols for work execution to maintain its ability to complete essential work to ensure service reliability throughout the remainder of the year. Late in the first quarter of 2020, Hydro reviewed and prioritized all planned capital projects to support completion of all essential work in light of the pandemic. As the pandemic continued to evolve through the year, the review and prioritization process continued. In some cases, Hydro rescheduled work to ensure effective execution at a later time in 2020 than originally planned or carried work over into future years. Despite the challenges, Hydro successfully completed the essential capital work identified for completion in 2020.

Expenditures to maintain the hydraulic generation equipment and infrastructure across the province total \$10.6 million, including \$7.4 million for year one in the Hydraulic Generation Refurbishment and Modernization (2020–2021) project. The thermal generation equipment and infrastructure at the Holyrood Thermal Generating Station ("Holyrood TGS") required expenditures totalling \$12.6 million including \$8.2 million incurred in four supplemental capital projects that were required following Hydro's extension of the Holyrood TGS's operations to March 31, 2022<sup>1</sup>. Gas turbines required \$1.9 million in expenditures, of which \$1.2 million was invested in the Holyrood Gas Turbine. Sustaining capital for terminal station infrastructure totalled \$23.1 million including \$11.0 million in the Terminal Station Refurbishment and Modernization (2019–2020) project and \$4.3 million in the Upgrade Circuit Breakers project. In transmission, the Wood Pole Line Management Program continued in 2020, with \$2.9 million invested.

Actual expenditures in Hydro's overall capital program for 2020 were below budget by \$47.2 million. Additional information regarding analysis of the variance is included in Section 5.0.

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<sup>1</sup> Holyrood TGS operations have since been extended to March 31, 2023.

## 2.0 Capital Expenditures and Variance Summary

Appendix A, Table A-1 provides a summary of capital expenditures related to projects that were active in 2020, with associated expenditures broken out annually for the periods 2016–2020 (actuals) and 2021 and beyond (forecast) .A breakdown of the variance summary by asset type is presented in Table 1.

**Table 1: Total Capital Variance Summary by Asset Type (\$000)**

Asset Type	Board Approved Budget	Total Project Expenditures and Forecast	Variance
Hydraulic	56,204	44,621	(11,582)
Thermal	9,336	9,179	(157)
Gas Turbines	24,101	19,481	(4,620)
Terminal Stations	122,897	94,286	(28,611)
Transmission	22,771	22,861	90
Distribution	18,106	17,769	(337)
Rural Generation	28,707	28,414	(293)
Properties	1,378	1,444	67
Metering	244	181	(64)
Rural Systems Tools and Equipment	2,139	2,122	(17)
Information Systems	1,585	1,462	(124)
Telecontrol	1,737	1,670	(67)
Transportation	7,473	7,699	226
Administrative	996	962	(34)
Allowance for Unforeseen	1,216	218	(998)
Supplemental Projects	8,343	8,839	496
Projects Approved for less than \$50,000	100	87	(14)
<b>Total Capital Budget</b>	<b>307,334</b>	<b>261,296</b>	<b>(46,038)</b>

## 3.0 Capital Expenditures by Category

Appendix A, Tables A-2 to A-15 present Hydro’s Capital Expenditures by category including:

- Hydraulic Generation;
- Thermal Generation;
- Gas Turbine Generation;
- Terminal Stations;



- 1       • Transmission;
- 2       • Distribution;
- 3       • Rural Generation;
- 4       • Properties;
- 5       • Metering;
- 6       • Tools and Equipment;
- 7       • Information Systems;
- 8       • Telecontrol projects;
- 9       • Transportation;
- 10      • Administration;
- 11      • Allowance for Unforeseen Items;
- 12      • Supplemental Capital projects; and
- 13      • Projects less than \$50,000.

#### 14   **4.0   Variance Explanations (Greater than \$100,000 and 10%** 15   **Variance from Budget)**

16   As per the Capital Budget Guidelines set forth by the Board of Commissioners of Public Utilities  
17   (“Board”), Hydro is required to report on actual capital expenditure variances which exceed the  
18   approved total project budget by more than 10% and \$100,000.<sup>2</sup> Hydro has also included variance  
19   explanations if the 2020 project expenditures exceeded the approved 2020 budget by more than 10%  
20   and \$100,000. The projects are ordered and numbered based upon the order and number they appear  
21   in the tables found in Appendix A.

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<sup>2</sup> “Capital Budget Application Guidelines,” The Board of Commissioners of Public Utilities, October 2007, at p. 11.

**4.1 Hydraulic Generation Projects (Appendix A, Table A-2)**

**1. Hydraulic In-Service Failures**

While a variance explanation is not required for this project, Hydro committed to providing the Board with details for each of the In-Service Failures projects. A detailed list of work executed under the Hydraulic In-Service Failures project is located in Section 9.0.

**2. Hydraulic Generation Refurbishment and Modernization (2020–2021) - Various Sites**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	6,580.2	7,363.1	782.9

This is a two-year project (2020–2021) that commenced in 2020. The variance in 2020 expenditures is primarily attributed to the additional project cost that was necessary for the upgrade of Bear Brook Crossing on the access road to Bay d’Espoir Generating Station. This work to replace the existing culvert with a bridge was publically tendered and completed in 2020. The tendered pricing for the work was higher than the original estimate.

**3. Hydraulic Generation Refurbishment and Modernization (2019–2020) - Various Sites**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	7,362.3	1,939.9	(5,422.4)
Project	15,800.1	10,833.8	(4,966.3)

This is a two-year project (2019–2020) that commenced in 2019 and was closed in 2020. The variances in 2020 and total project expenditures are primarily attributed to the postponement of work related to Ebbegunbaeg Control Structure and Bay d’Espoir Intake Gate 2.

Following a careful review of the budget application and evolving scope, Hydro cancelled the Ebbegunbaeg Control Structure scope of work as communicated to the Board in its correspondence of April 17, 2020.<sup>3</sup>

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<sup>3</sup> “Cancellation of Capital Project – Ebbegunbaeg Control Structure Refurbishment,” Newfoundland and Labrador Hydro, April 17, 2020.

1 Hydro submitted a new four-year project in the 2021 Capital Budget Application that encompasses the  
2 entire structure refurbishment scope.

3 The project scope of work related to Bay d’Espoir Intake 2 was also cancelled in 2020, as communicated  
4 in correspondence to the Board filed on February 26, 2021.<sup>4</sup> Due to the impacts of COVID-19 and  
5 challenges in securing the required outages due to the prioritization of critical capital work, Hydro did  
6 not complete this scope in 2020 (Refer to Variance 4.) As outlined in its correspondence of February 26,  
7 2021, Hydro is evaluating its five-year capital plan and is reviewing the overall sequencing of capital  
8 project work as it relates to scheduling generation outages to determine when this work can best be  
9 rescheduled. This scope of work was removed from this project and is planned to be included in a  
10 future application to the Board.

11 **4. Hydraulic Generation Refurbishment and Modernization (2018–2019) - Various Sites**

<b>Variance</b>	<b>Budget (\$000)</b>	<b>Expenditures (\$000)</b>	<b>Variance (\$000)</b>
Annual	3,160.6	(740.9)	(3,901.5)
Project	14,608.5	8,483.0	(6,125.5)

12 This is a two-year project (2018–2019) that commenced in 2018 and was carried over and closed in  
13 2020. The variance in 2020 expenditures is attributed to the cancellation of work related to Bay  
14 d’Espoir Intake Gate 1 and Surge Tank 1, as outlined in correspondence to the Board filed on February  
15 26, 2021. The cancelled scopes of work were removed from this project and are planned to be included  
16 in a future application to the Board.

17 The variance in overall project expenditures is primarily attributed to the cancelled intake gate and  
18 surge tank scopes of work. In addition, there was a reduced volume of work compared to the original  
19 estimate for the Bay d’Espoir Unit 2 turbine overhaul completed in 2018. Upon disassembly of the  
20 turbine, it was found that the discharge wear ring was able to be refurbished in-place, rather than be  
21 replaced as originally planned.

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<sup>4</sup> “Cancellation of Previously Approved Capital Projects at Bay d’Espoir,” Newfoundland and Labrador Hydro, February 26, 2021.

1           **5. Refurbish Powerhouse Station Services – Bay d’Espoir**

<b>Variance</b>	<b>Budget (\$000)</b>	<b>Expenditures (\$000)</b>	<b>Variance (\$000)</b>
Annual	157.2	261.5	104.3

2   This is a three-year project (2017–2019) that commenced in 2017 and was carried over and completed  
3   in 2020. Most of the upgrades to the station services in Bay d'Espoir Powerhouses 1 and 2 were  
4   completed in 2019 and a portion of the budget was carried over into 2020 to complete the remaining  
5   work, consisting of panel board replacements in both powerhouses. The variance in 2020 expenditures  
6   is attributed to additional time required to complete the panel board replacements while adhering to  
7   the COVID-19 protocols. The overall project was completed for less than the approved budget.

8           **6. Replace Exciter Controls Units 1 to 6 - Bay d'Espoir**

<b>Variance</b>	<b>Budget (\$000)</b>	<b>Expenditures (\$000)</b>	<b>Variance (\$000)</b>
Annual	1,462.0	449.5	(1,012.5)

<b>Variance</b>	<b>Budget (\$000)</b>	<b>Forecast and Expenditures (\$000)</b>	<b>Variance (\$000)</b>
Project	3,347.0	2,344.7	(1,002.3)

9   This is a four-year project (2017–2020) that commenced in 2017 and has carried over into 2021. The  
10   variance in annual expenditures is attributed to being unable to complete the exciter controls  
11   replacement on Unit 6 as planned in 2020. The exciter controls replacement for four of the Bay d’Espoir  
12   generating units was completed in previous years of the project and the replacement for Unit 3 was  
13   completed in 2020 as planned. The work for Unit 6, however, could not be completed during the  
14   scheduled 2020 unit outage due to impacts associated with the early stages of the COVID-19 pandemic.  
15   At that time, there was uncertainty around the ability to complete work during the pandemic. Several  
16   safety considerations contributed to the decision to postpone the work, including challenges  
17   maintaining a safe working environment within the plant and concerns regarding mobilizing out of  
18   province resources into the Bay d’Espoir communities and the Bay d'Espoir Hydroelectric Generating  
19   Facility. At that time, guidance on COVID-19 controls was evolving and a COVID-19 control plan had not  
20   yet been established. Several logistical challenges and risks to cost and schedule were identified

1 including closure of all local accommodations and reduced productivity due to new COVID-19 controls.  
 2 The work for Unit 6 has been rescheduled to 2021.  
 3 The forecasted variance in overall project expenditures is attributed to the actual and forecast costs for  
 4 the construction contract and engineering being less than originally estimated.

5 **4.2 Thermal Generation Projects (Appendix A, Table A-3)**

6 **7. Rewind Unit 3 Stator - Holyrood**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	1,281.4	2,231.4	950.0

7 This is a two-year project (2020-2021) which commenced in 2020. The contract to design, manufacture,  
 8 and install the Unit 3 generator stator windings was awarded in 2020. The variance in 2020  
 9 expenditures is attributed to the design and manufacturing of the new windings being ahead of  
 10 schedule in 2020 when comparing to the original project schedule. Progress payments to the supplier  
 11 originally expected in the first quarter of 2021 were made in the fourth quarter of 2020.

12 **8. Thermal In-Service Failures**

13 While a variance explanation is not required for this project, Hydro committed to providing the Board  
 14 with details for each of the In-Service Failures projects. A detailed list of work executed under the  
 15 Thermal In-Service Failures project is located in Section 10.0.

16 **4.3 Gas Turbine Generation Projects (Appendix A, Table A-4)**

17 **9. Perform Combustor Inspection – Holyrood Gas Turbine**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	546.1	35.0	(511.1)

18 This is a two-year project (2020–2021) that commenced in 2020 and is carrying over to 2022. The  
 19 variance in 2020 annual expenditures is the result of a change in the required timing of the project. The  
 20 combustor inspection frequency is based on the number of gas turbine equivalent starts, with the next  
 21 inspection due at 1,120 lifetime equivalent starts. At the time of the budget proposal, it was projected  
 22 that this number of equivalent starts would be accumulated in 2021. An updated projection has

1 concluded that the equivalent starts threshold will not be reached until 2022. The project schedule has  
 2 therefore been extended to 2022. Hydro will continue to update the projected equivalent start  
 3 projections to determine if further change to the project schedule is warranted.

4 **10. Install Partial Discharge Monitoring – Holyrood Gas Turbine**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	37.8	165.4	127.6

5 This is a two-year project (2020–2021) that commenced in 2020. The variance in 2020 annual  
 6 expenditures is attributed to advancement of procurement costs compared to the estimate. The new  
 7 partial discharge monitoring equipment was ordered in 2020 and is expected to be received in 2021.  
 8 The terms of payment required a milestone payment in 2020 that was not anticipated at the time of  
 9 the budget estimate.

10 **11. Replace Fire Suppression System - Happy Valley Gas Turbine**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	264.6	158.9	(105.7)

11 This is a two-year project (2020–2021) that commenced in 2020. The variance in 2020 annual  
 12 expenditures is attributed to the engineering phase of the project. The engineering work to prepare the  
 13 technical specifications for the fire suppression system was completed in 2020 for less than the  
 14 budgeted amount.

15 **12. Generator Assessment – Happy Valley Gas Turbine**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	1,097.6	76.0	(1,021.6)

16 This is a one-year project (2020) that commenced in 2020 and has carried over to 2021. The variance in  
 17 2020 expenditures is attributed to the generator assessment being rescheduled to 2021. The work is to  
 18 be completed by the vendor holding the original equipment manufacturer intellectual property for the  
 19 gas turbine. That vendor was unable to provide an on-time proposal and quotation for the work,  
 20 partially due to COVID-19 and a decision by Brush to furlough its employees in the United Kingdom.

1 Brush also advised that the material and tooling delivery time from third-party vendors increased to 15  
 2 weeks. These delays would have pushed the field activity into the fall of 2020. Completing the work in  
 3 the fall introduces significant system risk, in that there would be inadequate time to address any  
 4 unforeseen issues identified during the inspection prior to the winter, when the gas turbine is required  
 5 for system reliability. On-site vendor expertise is required for the work, and those resources will come  
 6 from the United States of America and the United Kingdom. Such travel was complicated in 2020 by  
 7 international travel restrictions related to COVID-19. Reviewing the project and system risks, Hydro  
 8 concluded that the work should be rescheduled to 2021 and be executed as early as possible in the  
 9 year, when system conditions allow for scheduling of the required outage.

10 **13. Upgrade Compressed Air System - Holyrood Gas Turbine**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	370.8	185.6	(185.2)
Project	388.4	203.2	(185.2)

11 This was a two-year project (2019–2020) that was completed in 2020. The variances in 2020 and overall  
 12 project expenditures are attributed to the construction being completed for less than originally  
 13 estimated. The project was estimated with the assumption that contractors would be performing the  
 14 work. Local internal resources were available resulting in less mobilization, travel, and contract  
 15 management costs.

16 **14. Replace Main Fuel Valves – Hardwoods**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Project	404.2	293.1	(111.1)

17 This was a one-year project (2019) that commenced in 2019 and was carried over and completed in  
 18 2020. The variance in project expenditures is attributed to the actual purchase cost of the new valves  
 19 being less than originally estimated.

1           **15. Increase Fuel and Water Treatment System Capacity - Holyrood Gas Turbine**

<b>Variance</b>	<b>Budget (\$000)</b>	<b>Expenditures (\$000)</b>	<b>Variance (\$000)</b>
Annual	488.0	832.8	344.8

<b>Variance</b>	<b>Budget (\$000)</b>	<b>Forecast and Expenditures (\$000)</b>	<b>Variance (\$000)</b>
Project	11,842.6	7,705.3	(4,137.3)

2       This is a two-year project (2018–2019) that commenced in 2018 and has carried over into 2021. The  
3       scope of work for this project is to expand the water treatment plant and install two new fuel tanks at  
4       the Holyrood Gas Turbine. In 2019, the water treatment plant expansion was completed and put into  
5       service. Also in 2019, construction was completed for the two new fuel storage tanks and they were  
6       placed in service with manual operation capability. The project carried over into 2020 to complete the  
7       automation of the fuel transfer system and complete secondary containment liner work that was  
8       hampered by inclement weather in 2019. The automation of the fuel transfer system work was  
9       completed in 2020. The secondary containment liner work was completed in 2020 as well but does not  
10      yet meet final acceptance criteria as the leakage rate measured in the dyke permeability test was  
11      higher than acceptable. The project has been carried over into 2021 for further investigation of the  
12      liner and resolution of the issue.

13      The variance in 2020 expenditures is attributed to additional costs associated with the dyke liner.  
14      Additional effort was required to investigate the cause of the higher than acceptable dyke permeability  
15      and to develop and implement risk mitigation including the installation of monitoring wells outside of  
16      the dyke to detect any release of fuel.

17      The forecasted variance in overall project expenditures is attributed to lower than estimated contract  
18      prices for the fuel tank construction. At the time of budget preparation, Hydro requested contractor  
19      budget pricing; however, the estimates were not received in time for inclusion into the project  
20      estimate prior to submission of the 2018 Capital Budget Application. In lieu of current contract  
21      estimates, Hydro used historical cost data from the original plant construction.



1 **4.4 Terminal Stations Projects (Appendix A, Table A-5)**

2 **16. Terminal Station In-Service Failures**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	1,500.0	1,081.0	(419.0)
Project	1,500.0	1,081.0	(419.0)

3 This was a one-year project (2020) completed in 2020. The budget for the project was based on  
 4 prediction of the magnitude of in-service failures using historical data and engineering judgement. The  
 5 variance in 2020 project expenditures is attributed to the actual number of failures incurred. A detailed  
 6 list of work executed under this project is found in Section 8.0.

7 **17. Replace Transformer T7 – Holyrood Terminal Station**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	2,678.1	660.6	(2,017.5)

8 This is a one-year project (2020) that commenced in 2020 and has carried over into 2021. The variance  
 9 in 2020 expenditures is attributed to a rescheduling of the replacement of the transformer at Holyrood  
 10 to 2021. As a result of Hydro’s decision to maintain Transmission Line L1301 as a backup for the  
 11 Muskrat Falls to Happy Valley Interconnection for the winter of 2020–2021,<sup>5</sup> Churchill Falls Transformer  
 12 T31 was not available in 2020 to replace Holyrood T7 as originally planned by Hydro and approved by  
 13 the Board. Hydro has performed an analysis of the resulting risk and it has confirmed that there will be  
 14 low risk to customers as a result of the deferral. Hydro has advised Newfoundland Power Inc. of this  
 15 decision. Removal of the old Holyrood T7 and its foundation, and installation of a new concrete pad  
 16 and oil containment system, was completed in 2020.

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<sup>5</sup> “Newfoundland and Labrador Hydro – Labrador East Reliability Plan Update,” Newfoundland and Labrador Hydro, March 17, 2020, at p. 3.

**18. Terminal Station Refurbishment and Modernization – Various Sites**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	3,712.0	1,703.4	(2,008.6)

This is a two-year project (2020–2021) that commenced in 2020 and includes a number of consolidated program-type projects across several sites and a focused refurbishment at Wabush Terminal Station.

The variance in 2020 expenditures is primarily associated with the capital programs for power transformers, protection control and monitoring systems, and the refurbishment of Wabush Terminal Station. The 2020 variance is primarily attributed to delayed engineering and procurement activities due to resource constraints and a focus in 2020 on completing other critical construction activity during the COVID-19 pandemic. Additionally, a portion of the planned work was completed in 2020 for less than the original material and labour estimates.

The following scope items have carried over to 2021 within this project:

- Engineering and material procurement associated with some of the power transformer and protection control and monitoring systems scopes of work at various sites;
- Engineering and material procurement associated with a circuit breaker and disconnect switches for Wabush Terminal Station; and
- Wabush Transformer T3 protection upgrade, to align with an associated breaker replacement that is scheduled for 2021.

**19. Upgrade Terminal Station for Mobile Substation – St. Anthony**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	450.2	551.9	101.7
Project	492.0	593.7	101.7

This was a two-year project (2019–2020) that was completed in 2020. The variances in 2020 and overall project expenditures were primarily attributed to higher than originally estimated construction labour and contract costs and a greater quantity of station fencing requiring upgrades than originally estimated.

1        **20. Terminal Station Refurbishment and Modernization– Various Sites**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	20,261.0	10,987.3	(9,273.7)

Variance	Budget (\$000)	Forecast and Expenditures (\$000)	Variance (\$000)
Project	29,952.9	20,843.2	(9,109.7)

2        This is a two-year project (2019–2020) that commenced in 2019 and has carried over to 2022 for a  
3        portion of the scope. It includes a number of consolidated program-type projects across several sites  
4        and a focused refurbishment at Wabush Terminal Station.

5        The variances in 2020 and overall project expenditures plus forecast are primarily associated with the  
6        capital programs for power transformers, protective relays, and the refurbishment of Wabush Terminal  
7        Station. The costs for materials and labour were less than originally estimated for several scope items  
8        within these programs, and some scopes of work were cancelled or rescheduled to future years.

9        The following scope items have carried over to future years within this project:

- 10        ● Protective relay replacements for: TL 206 line protection at Bay d’Espoir and Sunnyside; TL 247  
11        line protection at Deer Lake and Cat Arm; Bus 1 protection at Cat Arm; and Transformers T1, T2  
12        and T4 protection at Western Avalon. This rescheduling was undertaken in early 2020 to  
13        implement a more levelled, multi-year plan for protection upgrades.
- 14        ● For the Wabush Terminal Station refurbishment, a portion of the project scope was delayed  
15        and carried over to 2021 as a result of focusing on higher priority work during the COVID-19  
16        pandemic. The scope carried over includes 46 kV circuit breaker B3T1 (46-1) and transformer  
17        T1 protection upgrades, 46 kV circuit breaker B3T2 (46-2) and transformer T2 protection  
18        upgrades, disconnect switch B4L32-1 (32B15) replacement and the synchronous condenser SC1  
19        major inspection.

1 The following scope items have been rescheduled to 2021 and have been transferred to the 2020–2021  
2 Terminal Station Refurbishment and Modernization project, which has sufficient budget for this work:

- 3 • Transformer upgrades at various sites, including several tap changer upgrades requiring  
4 support from out-of-province contractors which could not be secured during the COVID 19  
5 pandemic in 2020;
- 6 • Hardwoods Bus B7 and several Churchill Falls instrument transformer replacements due to late  
7 equipment deliveries and outage unavailability in 2020;
- 8 • Bay d’Espoir Transformer T6 radiator replacement due to outage unavailability in 2020;
- 9 • Insulator replacements at Happy Valley, due to last minute cancellation of the crane contractor  
10 who had double-booked;
- 11 • Insulator replacements at Churchill Falls due to outage unavailability; and
- 12 • Disconnect switch replacements at Sunnyside, due to outage availability and updated condition  
13 assessment.

14 The following scope of work was cancelled following review of updated condition or system assessment  
15 information indicating that the work was not immediately required:

- 16 • Transformer bushing replacements at Churchill Falls, Stephenville, Hawke’s Bay, Granite Canal  
17 and Hardwoods Terminal Stations;
- 18 • Holyrood Bus B6, Hardwoods Transformer T3, and L’Anse Au Loup instrument transformers  
19 replacements;
- 20 • Installation of a moisture reduction system for Bay d’Espoir Transformer T1; and
- 21 • Insulator replacements at Churchill Falls.

1           **21. Implement Terminal Station Flood Mitigation - Springdale**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	1,047.6	450.3	(597.3)
Project	974.0	673.1	(300.9)

2       This was a two-year project (2018–2019) that was carried over and completed in 2020. The variances in  
3       2020 and overall project expenditures are attributed to a change in the project scope to a lower cost  
4       alternative. During engineering design it was determined that the original project alternative to  
5       construct a retention berm outside of Hydro’s property would cost significantly more than originally  
6       estimated. Further evaluation of project alternatives in 2019 demonstrated that the construction of a  
7       retention berm along the perimeter of the terminal station could also effectively achieve the desired  
8       level of flood mitigation and is the least cost alternative. The change in project alternative resulted in a  
9       carryover of the project construction into 2020 to allow for design and environmental assessment in  
10      2019. The design, environmental assessment, and construction were successfully completed. The costs  
11      associated with the environmental assessment were less than anticipated and the tendered price for  
12      the construction contract was less than estimated.

13           **22. Terminal Station Refurbishment and Modernization– Various Sites**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	6,522.6	3,202.4	(3,320.2)
Project	26,795.7	14,802.3	(11,993.4)

14      This was a two-year project (2018–2019) that was carried over and closed in 2020. The project included  
15      a number of consolidated program-type projects across several sites and a focused refurbishment at  
16      Wabush Terminal Station.

17      The variance in 2020 expenditures is primarily attributed to protective relays replacements being  
18      completed for less than the original materials and labour estimates. This project scope included the  
19      replacement of 20 protective relays, of which 19 were completed. The work for Holyrood Bus B12 was  
20      rescheduled to 2021 to accommodate more critical work in 2020 at the Holyrood Terminal Station.  
21      Proceeding with the Bus B12 protective relay work would have introduced risks associated with  
22      physical congestion and the complexity of overlapping designs. The scope of work for Holyrood Bus B12

1 was transferred to the 2019–2020 Terminal Station Refurbishment and Modernization project, for  
2 completion in 2021.

3 The variance in total project expenditures is primarily attributed to the capital programs for protective  
4 relay replacements, disconnect switch replacements, power transformer upgrades, and Wabush  
5 Terminal Station refurbishment. The costs for materials and labour were less than originally estimated  
6 for several scope items within these programs and some scopes of work were cancelled or rescheduled  
7 to future years.

8 The following scope items were rescheduled and transferred into the 2019–2020 Terminal Station  
9 Refurbishment and Modernization project which has sufficient budget for this work. The rescheduling  
10 was due to: newly acquired condition or system assessment information indicating that the work was  
11 not immediately required; system outage constraints; or balancing of the overall work plan. Items  
12 rescheduled include:

- 13 • Replacement of transformer bushings for Bay d’Espoir T10, Parson’s Pond T1, South Brook T1,  
14 Hardwoods GT1 and Wabush T6;
- 15 • Installation of transformer moisture reduction systems for Oxen Pond T2 and Happy Valley T3;
- 16 • Replacement of a disconnect switch at Rattle Brook Terminal Station;
- 17 • Replacement of insulators at Happy Valley and St. Anthony Airport Terminal Stations
- 18 • Replacement of protective relays for Bus B12 at Holyrood Terminal Station; and
- 19 • Replacement of one 46kV circuit breaker and line protection upgrade at Wabush Terminal  
20 Station.

21 The planned replacement of bushings for Bay d’Espoir Transformer T3 and Holyrood Transformer T7  
22 were cancelled due to a revised long-term asset plan for these transformers.

1        **23. Upgrade Circuit Breakers – Various Sites**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	13,337.3	4,299.6	(9,037.7)

Variance	Budget (\$000)	Forecast and Expenditures (\$000)	Variance (\$000)
Project	50,900.5	44,561.7	(6,338.8)

2

3        This is a five-year project (2016–2020) that commenced in 2016 and has been carried over into 2021.  
 4        The project scope includes several breaker replacements and refurbishments at a number of terminal  
 5        stations each year. The variance in 2020 expenditures is primarily attributed to work being completed  
 6        for less than the budget estimates and the release of the project contingency allowance which is not  
 7        expected to be required. The variance is also attributed to the carryover of three breaker replacements  
 8        into 2021 and the cancellation of one breaker replacement. Disruption of the annual work plan in the  
 9        early stages of the COVID 19 pandemic led to a shortened construction season. Remaining work was  
 10       prioritized and the master outage schedule was revised. Of the nine breakers originally planned to be  
 11       replaced in 2020, five were completed. Three breaker replacements were re-scheduled to 2021 as they  
 12       no longer fit into the revised master outage schedule. One breaker replacement was cancelled as it is  
 13       no longer required due to a planned reconfiguration of the Stephenville Terminal Station.

14       The forecasted variance in total project expenditure is primarily attributed to work being completed for  
 15       less than the budget estimates and the elimination of five breakers from the project scope: one at  
 16       Western Avalon Terminal Station in 2018, one at Bay d'Espoir Terminal Station 2 in 2018; one at Bay  
 17       d'Espoir Terminal Station 2 in 2019 which was instead refurbished in 2020, one at Hardwoods Terminal  
 18       Station in 2019 which was instead refurbished in 2020; and one at Stephenville Terminal Station in  
 19       2020, due to the planned reconfiguration of the station.

**4.5 Transmission Projects (Appendix A, Table A-6)**

**24. Muskrat Falls to Happy Valley Interconnection**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	7,450.0	4,659.8	(2,790.2)

This is a two year project (2019–2020) that commenced in 2019 and has carried over into 2021. The focus of the 2019 work was to complete the 138kV Muskrat Falls Terminal Station 2 construction, complete construction of the new six kilometre segment of 138 kV wood pole transmission line, and complete the line protection upgrades required in the Happy Valley Terminal Station. This work has been completed.

The focus of the 2020 work was to complete the expansion and upgrades to the Happy Valley Terminal Station and complete the final interconnection. The variance in 2020 expenditures is primarily attributed to a recommendation that transmission line L1301 and terminal station Muskrat Falls Terminal Station 3 remain available for service until reliable power supply from Muskrat Falls is established.<sup>6</sup> The planned relocation of Muskrat Falls Terminal Station 3 transformer T1 to Happy Valley Terminal Station to serve as new transformer T5 and the final interconnection work has been postponed until reliable supply from Muskrat Falls is established.

In addition, a portion of the project scope was moved to 2021 due to disruptions caused by the COVID-19 pandemic. There were schedule disruptions from COVID-19 associated with detailed planning to manage the COVID-19 safety risks. Consequently, the project scope was reviewed in 2020 to determine what work could effectively be completed in 2020 and what work would be deferred to 2021.

Work completed in Happy Valley Terminal Station in 2020 included distribution line relocations, site development, foundation construction, transformer containment system installation, site drainage, cable trench, conduit, grounding, installation of site perimeter fencing, and procurement of all equipment and materials.

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<sup>6</sup> “Newfoundland and Labrador Hydro – Labrador East Reliability Plan Update,” Newfoundland and Labrador Hydro, March 17, 2020, at p. 3.



1 Work that has been deferred until 2021 includes replacement of reclosers with breakers, erection of  
 2 structural steel, bus upgrades, installation of high voltage equipment, installation of protection and  
 3 control panels, and installation of Transformer T5.

4 **4.6 Distribution Projects (Appendix A, Table A-7)**

5 **25. Additions for Load - Distribution System - Makkovik and Hopedale**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	846.1	135.0	(711.1)

6 This is a one-year project (2020) that has been carried over into 2021. The variance in 2020  
 7 expenditures is attributed to procurement and construction activities being deferred to 2021 due to  
 8 access restrictions to both of these Labrador communities as a result of COVID-19. Hydro engaged  
 9 community stakeholders and it was agreed that the work should be deferred to 2021 to mitigate the  
 10 COVID-19 risk. Engineering has been completed with the remaining procurement and construction  
 11 activities rescheduled to 2021.

12 **26. Install Recloser Remote Control (2019-2020) - Rocky Harbour**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	364.0	109.4	(254.6)
Project	386.0	131.4	(254.6)

13 This was a two-year project (2019–2020) that was completed in 2020. The variances in 2020 and overall  
 14 project expenditures are attributed to a narrowing of the project scope. The original project scope  
 15 included the installation of remote terminal units and civil upgrades as part of the implementation of  
 16 remote control of the recloser at Rocky Harbour. It was later determined that remote control could be  
 17 provided without the installation of new remote terminal units and without any civil upgrades.

**4.7 Rural Generation Projects (Appendix A, Table A-8)**

**27. Overhaul Diesel Units: Various**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	2,310.9	1,923.2	(387.7)
Project	2,310.9	1,923.2	(387.7)

This was a one-year project (2020) that was completed in 2020. The variance in project expenditures is primarily attributed to the cancellation of the planned overhaul of Unit 574 in the Nain Diesel Plant. That unit experienced a persistent overheating problem and Hydro decided it is not feasible to continue operating this unit, as an engine overhaul is not possible due to engine obsolescence and the unavailability of replacement components. The planned overhaul was therefore cancelled and Hydro included a project in the 2021 Capital Budget Application to replace the unit.<sup>7</sup>

The planned overhauls of Unit 591 in Nain and Unit 2096 in Postville were also not completed in 2020. A review of updated forecasts of the number of operating hours on these units and their recent operating experience indicated that these overhauls were not required in 2020. The planned overhaul of Unit 2058 in Little Bay Islands was not completed in 2020, since that plant was decommissioned.

**28. Replace Automation Equipment – Rigolet**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	363.8	58.0	(305.8)

This is a one-year project (2020) that commenced in 2020 and has carried over to 2021. The variance in 2020 expenditures is the result of carrying over most of the scope of work to 2021. Travel restrictions to Labrador during the early stages of the COVID-19 pandemic preventing the required on-site technical review from occurring when originally planned, leading to a delay in the design, procurement and construction of the automation equipment.

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<sup>7</sup> In Board Order No. P.U. 2(2021), the Board requested additional information regarding replacement of Unit 574 before approval of the project. Hydro filed “2021 Capital Budget Application – Replace Hydro Personal Computers (2021) and Diesel Genset Replacement (2021–2022) Projects – Additional Information” on February 25, 2021.

1        **29. Upgrade Fuel Storage Tanks - Charlottetown**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	467.2	310.7	(156.5)
Project	467.2	310.7	(156.5)

2        This was a one-year project (2020) completed in 2020. The planned configuration of the fuel storage  
 3        tank farm at Charlottetown was revisited in early 2020, taking into consideration updated fuel storage  
 4        requirements and existing tank condition assessments. An optimized tank farm configuration resulted  
 5        in a lower overall project cost and least-cost alternative. The original project budget included the cost  
 6        associated with the cleaning, demolition, and disposal of an existing vertical fuel storage tank to make  
 7        room for new tanks, but the new configuration did not require that footprint. The cleaning, demolition,  
 8        and disposal of that tank; therefore, could not be capitalized and was expensed as an operating cost.

9        **30. Diesel Genset Replacements – Mary’s Harbour**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	3,900.7	2,799.0	(1,101.7)

Variance	Budget (\$000)	Forecast and Expenditures (\$000)	Variance (\$000)
Project	3,900.7	3,148.8	(751.9)

10       This is a one-year project (2020) that commenced in 2020 and has carried over to 2021. The project  
 11       scope is to replace two diesel genset units and associated exhaust stacks, radiators, aftercoolers,  
 12       switchgear, ventilation, protection, and controls necessary to facilitate the proper function of the new  
 13       units at Mary’s Harbour Diesel Plant. This work was substantially completed in 2020 and the new  
 14       gensets are in service. A portion of the work to update the automatic control system has carried over  
 15       to 2021.

16       The variance in overall project expenditures plus forecast is primarily attributed to the electrical,  
 17       protection, and controls scope of work being completed for less than the original budget estimates.  
 18       Fewer construction resources were required to complete the work than originally estimated. Also, the  
 19       project was estimated with the assumption that contractors would be performing a portion of the

1 work. Internal resources were available, resulting in less mobilization, travel, and contract management  
2 costs.

3 The variance in 2020 project expenditures is attributed to the electrical, protection, and controls scope  
4 of work being completed for less than the original budget estimates and the carryover of the remaining  
5 automation work to 2021.

6 **31. Additions for Load – Isolated Generation Systems**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	(23.1)	154.6	177.7
Project	2,182.5	2,578.2	395.7

7 This was a two-year project (2019–2020) that was completed in 2020. This project scope included the  
8 construction of a new vertical fuel storage tank and associated earth dyke upgrades in Makkovik. The  
9 variances in 2020 and overall project expenditures are attributed to an increase in quantity of  
10 earthwork that was required to complete upgrades to the existing dyke, identified during engineering  
11 design. Additionally, the contract costs for mobilization and the tank construction were higher than  
12 originally estimated. Prior to contract award, an updated net present value of project alternatives was  
13 completed and it was confirmed that the original alternative remained least cost.

14 **32. Diesel Genset Replacements (2019-2020)**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	3,807.2	972.6	(2,834.6)

15 This is a two-year project (2019–2020) that commenced in 2019 and has carried over to 2021. The  
16 variance in 2020 expenditures is attributed to a rescheduling of the installation of a new diesel genset  
17 in Cartwright Diesel Plant to 2021. The rescheduling allowed engineering and construction resources to  
18 focus on higher priority work during the COVID-19 pandemic in 2020, specifically the diesel genset  
19 replacements at Makkovik and Mary’s Harbour. At Cartwright, an overhaul of an existing diesel genset  
20 was completed in 2020 to bolster plant reliability through the winter of 2020–2021.

1           **33. Diesel Plant Engine Cooling System Upgrades – Various Sites**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	147.0	274.5	127.5

2   This was a two-year project (2018–2019) that commenced in 2018 and was carried over and completed  
3   in 2020. The project scope included the replacement of cooling equipment at various diesel plants. All  
4   of the planned work for 2019 was completed except for the installation of radiators at the Rigolet and  
5   St. Anthony Diesel Plants. The construction resources for this work were reassigned to restore  
6   generation in Charlottetown following the diesel plant fire in late 2019. The work at Rigolet and St.  
7   Anthony was then rescheduled to 2020 and was completed. The variance in 2020 expenditures is  
8   attributed to a greater level of effort than originally anticipated for the radiator replacement at St.  
9   Anthony, where the removal of the existing radiator and piping proved to be challenging. The overall  
10  project was completed within 10% of approved budget.

11           **34. Replace Automation Equipment – St. Anthony**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	(44.7)	160.2	204.9

Variance	Budget (\$000)	Forecast and Expenditures (\$000)	Variance (\$000)
Project	1,873.3	2,248.2	374.9

12   This is a two-year project (2018–2019) that commenced in 2018 and has carried over into 2021. The  
13   engineering, procurement, and construction were substantially completed in 2019, and the automation  
14   programming and commissioning carried over. Some of the automation work was completed in early  
15   2020. COVID-19 restrictions during the early stages of the pandemic resulted in the technical resources  
16   demobilizing from site. Those technical resources were then dedicated to higher priority work for the  
17   remainder of the year. The remainder of the automation work has been rescheduled to 2021.

18   The variances in 2020 expenditures and overall project expenditures plus forecast are attributed to the  
19   construction effort being more than the original project estimate. Some of the protection and control  
20   equipment required upgrades that were not anticipated at the time of the budget estimate. Additional

1 labour costs and mobilization and demobilization costs were incurred due to the failure of the existing  
 2 switchgear for one of the gensets and the requirement to divert resources to support work in  
 3 Charlottetown following the diesel plant fire in late 2019.

4 **4.8 Properties Projects (Appendix A, Table A-9)**

5 There are no reportable variances under Properties Projects.

6 **4.9 Metering Projects (Appendix A, Table A-10)**

7 There are no reportable variances under Metering Projects.

8 **4.10 Tools and Equipment Projects (Appendix A, Table A-11)**

9 **35. Replace Light Duty Mobile Equipment – Various Sites**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	499.6	68.0	(431.6)

10 This is a one-year project that commenced in 2020 and has carried over to 2021. Procurement of the  
 11 light-duty mobile equipment was initiated in 2020 but most equipment will not be delivered until 2021  
 12 due to COVID-19 delivery delays experienced by the suppliers.

13 **36. Tools and Equipment Less than \$50,000**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	439.4	265.7	(173.7)
Project	439.4	265.7	(173.7)

14 This is a one-year project that commenced and closed in 2020. The annual and project variances are  
 15 related to some tools that could not be procured in 2020 due to long delivery times from suppliers.

1        **37. Replace Off-Road Track Vehicles – Bishop’s Falls and Bay d’Espoir**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Project	1,200.0	1,334.5	134.5

2        This is a 2018 project that carried over and was completed in 2020. This project included the  
 3        procurement of a track unit with aerial device and a backyard aerial device unit. The backyard unit cost  
 4        was higher than the original estimate due in part to US steel tariffs and changes in the value of the  
 5        Canadian Dollar. The actual cost of the track unit was above the budget estimate due to higher  
 6        commissioning costs due to pandemic quarantine requirements.

7        **4.11 Information Systems Projects (Appendix A, Table A-12)**

8        There are no reportable variances under Information Systems Projects.

9        **4.12 Telecontrol Projects (Appendix A, Table A-13)**

10       **38. Replace Radomes – Various**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	384.5	215.1	(169.4)
Project	384.5	215.1	(169.4)

11       This was a one-year project (2020) that was completed in 2020. The project is part of an ongoing  
 12       program to replace radomes<sup>8</sup> that are near end of life. The variance in project expenditures is  
 13       attributed to the 2020 work being completed for less than originally estimated. The budget estimate  
 14       was based upon previous cost experience for radome replacements. In 2020, the supply and  
 15       installation of radomes was publically tendered for a three-year period (2020–2022), where the award  
 16       of scope for each calendar year is subject to approval of the associated annual project by the Board.  
 17       The multi-year contract allowed Hydro to leverage volume pricing and achieve savings.

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<sup>8</sup> Radomes are the protective covers that enclose the delicate components of the microwave antennas in Hydro’s microwave radio system.

**4.13 Transportation Projects (Appendix A, Table A-14)**

**39. Replace Light and Heavy Duty Vehicles (2020-2021) - Various**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	1,625.5	3.9	(1,621.6)

This is a two-year project (2020–2021) that commenced in 2020. The original project schedule included procurement of a portion of the light-duty mobile equipment in 2020; however, most equipment will not be delivered until 2021 due to COVID-19 delivery delays experienced by the suppliers.

**40. Replace Vehicles and Aerial Devices – Various Sites**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	458.0	632.7	174.7

This is a two-year project (2019–2020) that has carried over into 2021. The variance in annual expenditures is attributed to higher than anticipated unit costs, due in part to US steel tariffs and changes in the value of the Canadian Dollar. One material handling device remains to be received in 2021.

**41. Replace Vehicles and Aerial Devices – Various Sites**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
Annual	765.7	991.9	226.2
Project	2,420.9	2,647.1	226.2

This is a two-year project (2018–2019) that commenced in 2018, carried over and was completed in 2020. The variance in annual and project expenditure is attributed to higher than anticipated unit costs, due in part to US steel tariffs and changes in the value of the Canadian Dollar.

**42. Administrative Projects (Appendix A, Table A-14)**

There are no reportable variances under Administrative Projects.



**4.14 Allowance for Unforeseen Items (Appendix A, Table A-15)**

**43. Allowance for Unforeseen Items**

<b>Variance</b>	<b>Budget (\$000)</b>	<b>Expenditures (\$000)</b>	<b>Variance (\$000)</b>
Annual	1,216.4	218.4	(998.0)
Project	1,216.4	218.4	(998.0)

The Allowance for Unforeseen Items is an annual allotment that permits Hydro to act expeditiously to deal with events affecting the electrical system that cannot wait for specific approval of the Board. Some costs were incurred in 2020 in relation to the work required to restore service to Charlottetown and Pinsent’s Arm following a catastrophic fire that occurred at the Charlottetown Diesel Generating Station in 2019. Replacement of a failed generator in Charlottetown was also executed under the 2020 project. Hydro initiated an additional project in 2020 to replace a failed engine at the Port Hope Simpson Diesel Generating Station; however, due to the lead time associated with procurement and shipping of the replacement engine, costs will not be incurred in 2020 as reflected in the above variance. Hydro received approval to replenish the Allowance for Unforeseen Items Account in Board Order No. P.U. 32(2020), increasing the total 2020 allowance to \$1.2 million.

Hydro completed installation of the replacement engine for the Port Hope Simpson Generating Station in February 2021 and will file a report on this project with the Board as per Capital Budget Application Guidelines requirements.

**4.15 Supplemental Projects (Appendix A, Table A-15)**

**44. Construction and Installation of an Electric Vehicle Fast Track Network**

<b>Variance</b>	<b>Budget (\$000)</b>	<b>Expenditures (\$000)</b>	<b>Variance (\$000)</b>
Annual	2,059.4	1,623.5	(435.9)
CIAC <sup>9</sup> (annual)	(1,800.0)	(1,364.1)	435.9

This is a one-year project (2020) that has been carried over into 2021. The variance in 2020 expenditures is attributed to a portion of the construction carrying over into 2021. The carryover was caused by COVID-19 delays in equipment manufacturing and labour required to secure necessary

<sup>9</sup> Contribution in aid of Construction (“CIAC”).

1 easement to begin work. All civil work was completed in 2020 and equipment placement,  
 2 commissioning, and site clean-up will be completed in 2021. Receipt of the remaining Contribution In  
 3 Aid of Construction (“CIAC”) funds will also be received in 2021.

4 **45. Integrate Renewable PH2 - Mary's Harbour - CIAC**

Variance	Budget (\$000)	Expenditures (\$000)	Variance (\$000)
CIAC (annual)	(332.9)	(498.0)	(165.1)

5 This is a two-year project that commenced in 2020. While there is no reportable variance related to  
 6 execution of the project, all CIAC funding was received in 2020.

7 **5.0 Capital Budget Versus Actual Expenditures 2011–2020**

8 Table 2 provides a summary of Hydro’s capital budget variances for the years 2011–2020.

**Table 2: Capital Budgets/Expenditures 2011–2020**

Year	Budget (\$000)	Actual Expenditures (\$000)	Variance (\$000)	Variance (%)
2011	67,454	63,116	(4,338)	(6.4)
2012	93,840	77,252	(16,588)	(17.7)
2013	116,373	84,755	(31,618)	(27.2)
2014	280,601	204,728	(75,873)	(27.0)
2015	311,177	125,119	(186,058)	(59.8)
2016	350,601	203,941	(146,660)	(41.8)
2017	340,501	340,741	240	0.1
2018	213,050	156,985	(56,065)	(26.3)
2019	164,194	126,575	(37,619)	(22.9)
2020	134,752	87,555	(47,197)	(35.0)

9 In 2020, actual expenditures were below budget in Hydro’s overall capital program by \$47.2 million  
 10 (35.0%), as shown in Table 2. The six capital projects outlined in the following were the main  
 11 contributors to the variance. Excluding the contribution of these projects, the overall actual  
 12 expenditures would have been within 10% of the budget.

13 **1)** Variance 20: Terminal Station Refurbishment and Modernization – Various Sites 2019–2020  
 14 (-\$9.3 million). The variance in 2020 expenditures is primarily associated with the capital

1 programs for power transformers, protective relays, and the refurbishment of Wabush  
2 Terminal Station. The costs for materials and labour were less than originally estimated for  
3 several scope items within these programs, and some scopes of work were cancelled or  
4 rescheduled to future years.

5 **2)** Variance 23: Upgrade Circuit Breakers, Various Sites (-\$9.0 million). The variance in 2020  
6 expenditures is primarily attributed to work being completed for less than the budget  
7 estimates and the release of the project contingency allowance which is not expected to be  
8 required. The variance is also attributed to the carryover of three circuit breaker replacements  
9 into 2021, and the cancellation of one breaker replacement.

10 **3)** Variance 3: Hydraulic Generation Refurbishment and Modernization 2019–2020 (-\$5.4 million).  
11 The variance in 2020 expenditures is primarily attributed to the postponement of work related  
12 to Ebbegunbaeg Control Structure and Bay d’Espoir Intake Gate 2.

13 **4)** Variance 4: Hydraulic Generation Refurbishment and Modernization 2018–2019 (-\$3.9 million).  
14 The variance in 2020 expenditures is primarily attributed to the postponement of work related  
15 to Bay d’Espoir Intake Gate 1 and Surge Tank 1.

16 **5)** Variance 22: Terminal Station Refurbishment and Modernization – Various Sites 2018–2019  
17 (-\$3.3 million). The variance in 2020 expenditures is primarily attributed to protective relay  
18 replacements being completed for less than the original materials and labour estimates.

19 **6)** Variance 32: Diesel Genset Replacements 2019-2020 (-\$2.8 million). The variance in 2020  
20 expenditures is attributed to a rescheduling of the installation of a new diesel genset in  
21 Cartwright Diesel Plant to 2021.

22 Hydro completed an analysis of all projects that had an annual under-expenditure of greater than  
23 \$100,000 in 2020 to determine the primary drivers. Three main causes were identified, accounting for  
24 approximately 84% of the overall under-expenditure for the projects analyzed:

25 **1)** Scopes of work delayed due to the COVID-19 pandemic accounted for approximately 36% of  
26 the overall under-expenditure for the projects analyzed. Factors leading to delays included:  
27 challenges in securing and mobilizing out-of-province contractors; specific restrictions for travel  
28 to Labrador; restrictions for access to Hydro facilities; closure of accommodations in some  
29 communities; and delays at manufacturing facilities. The most material scopes of work delayed  
30 due to the COVID-19 pandemic were:

- 1           • Variance 32: diesel generator replacement at Cartwright;
- 2           • Variance 23: three circuit breaker replacements;
- 3           • Variance 20: a portion of the planned upgrades at Wabush Terminal Station;
- 4           • Variances 35 and 39: procurement of light and heavy duty vehicles;
- 5           • Variance 4: refurbishment of Bay d’Espoir Intake 1 and Surge Tank 1;
- 6           • Variance 24: a portion of the planned upgrades at Happy Valley Terminal Station;
- 7           • Variance 12: generator assessment for the Happy Valley Gas Turbine;
- 8           • Variance 25: distribution upgrades in Makkovik and Hopedale; and
- 9           • Variance 44: installation of an electric vehicle fast track network.

10       **2)** Work completed for less than the budget estimates accounted for approximately 33% of the  
11       overall under-expenditure for the projects analyzed. Most of the project scopes that were  
12       completed for less than budget were in projects which commenced in 2019 or earlier;  
13       contingency for those projects was typically estimated at 20% and was not required in many  
14       cases. Contingency was reduced to approximately 10% in the estimates for projects that  
15       started in 2020. The most material scopes of work completed for less than budget were:

- 16           • Variance 23: replacement and refurbishment of circuit breakers in various Terminal  
17           Stations;
- 18           • Variances 20 and 22: protective relay replacements, transformer refurbishments,  
19           insulator replacements, and disconnect switch replacements in various Terminal  
20           Stations;
- 21           • Variance 6: exciter controls replacements at Bay d’Espoir Generating Station; and
- 22           • Variance 30: the electrical, protection and control scope of work associated with the  
23           replacement of a diesel generator at Mary’s Harbour Diesel Plant.

24       **3)** Cancelled scope accounted for approximately 13% of the overall under-expenditure for the  
25       projects analyzed. The most material scopes of work cancelled were:

- 26           • Variance 3: refurbishment of Ebbegunbaeg Control Structure;
- 27           • Variances 3 and 4: refurbishment of Bay d’Espoir Intake Structures and Surge Tank 1;

- 1                   • Variance 20: various transformer refurbishments; and
- 2                   • Variance 23: a circuit breaker replacement at Stephenville Terminal Station.

3           Hydro anticipates that COVID-19 will continue to impact capital project execution in 2021,  
4           particularly given the recent developments in the province related to the COVID-19 pandemic.  
5           Hydro intends to approach the planning for 2021 capital project execution in a similar manner to its  
6           approach in 2020. Capital work will be included in the integrated annual work plan and each scope  
7           of work will be assigned a risk and criticality ranking. Hydro will use this ranking, as required, to  
8           adjust the Annual Work Plan activities to ensure work critical to the safe and reliable operation of  
9           the system can proceed.

10          As outlined in Hydro’s Efficiency and Effectiveness Plan update to the Board,<sup>10</sup> Hydro has identified  
11          capital planning as an area of focus to pursue efficiencies and cost savings. Hydro intends to review  
12          its capital budget planning and execution methodologies and use its underspend analysis to  
13          identify trends and potential areas for improvement to reduce capital expenditure variances in  
14          future years.

## 15   **6.0   Carryover Report**

16   Table 3 provides a summary listing of the carryovers for projects initiated between 2016 and 2020.

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<sup>10</sup> “Efficiency and Effectiveness Plan – Fall 2020 Update,” Newfoundland and Labrador Hydro, November 12, 2020.

Table 3: 2020 Carryover Report for the Year Ending December 31, 2020 (\$'000)

Project Name	PUB		Total		Original Completion Year
	Approved Budget	Revised Budget	Actual Expenditures	Carryover Amount	
	2020	2020 <sup>11</sup>	2020		
Additions for Load - Distribution System - Makkovik and Hopedale	846.1	846.1	135.0	711.1	2020
Construction and Installation of an Electric Vehcile Fast Track Network	2,059.4	2,059.4	1,623.5	435.9	2020
Construction and Installation of an Electric Vehcile Fast Track Network - CIAC	(1,800.0)	(1,800.0)	(1,364.1)	(435.9)	2020
Diesel Genset Replacements - Makkovik	3,592.8	3,140.8	3,366.0	(225.2)	2020
Diesel Genset Replacements - Mary's Harbour	3,900.7	3,148.8	2,799.0	349.8	2020
Diesel Genset Replacements (2019-2020)	3,421.8	3,807.2	972.6	2,834.6	2020
Diesel Plant Ventilation Upgrade - Nain	162.7	162.7	96.1	66.6	2021
Distribution System Upgrades (2020-2021) - Various	102.7	102.7	121.0	(18.3)	2021
Generator Assessment - Happy Valley Gas Turbine	1,097.6	1,097.6	76.0	1,021.6	2020
Hydraulic Generation Refurbishment and Modernization - Various Sites 2020	3,400.2	4,076.4	4,004.3	72.1	2020
Increase Fuel and Water Treatment System Capacity - Holyrood Gas Turbine	-	1,557.6	832.8	724.8	2019
Install Partial Discharge Monitoring - Holyrood Gas Turbine	37.8	19.8	165.4	(145.6)	2021
Install Recloser Remote Control (2020-2021) - Hampden and Upper Salmon	71.3	71.3	33.7	37.6	2021
Integrate Renewable PH2 - Mary's Harbour	332.9	332.9	256.9	76.0	2021
Integrate Renewable PH2 - Mary's Harbour - CIAC	(332.9)	(332.9)	(498.0)	165.1	2021
Muskat Falls to Happy Valley Interconnection	7,392.1	7,450.0	4,659.8	2,790.2	2020
Perform Combustor Inspection - Holyrood Gas Turbine	546.1	573.5	35.0	538.5	2022
Perform Minor Enhancements - Hydro Place	49.0	49.0	22.8	26.2	2020
Replace Automation Equipment - Rigolet	363.8	363.8	58.0	305.8	2020
Replace Automation Equipment - St. Anthony	-	330.2	160.2	170.0	2019
Replace Elevator Motors and Control Equipment - Hydro Place	89.1	89.1	64.2	24.9	2021
Replace Exciter Controls Units 1 to 6 - Bay d'Espoir	1,429.6	679.1	449.5	229.6	2020
Replace Fire Supression System - Happy Valley Gas Turbine	264.6	130.1	158.9	(28.8)	2021
Replace Human Machine Interface - Cartwright	-	154.0	97.3	56.7	2019
Replace Light and Heavy Duty Vehicles (2020-2021) - Various	1,625.5	1,625.6	4.0	1,621.6	2021
Replace Light Duty Mobile Equipment - Various Sites	499.6	521.7	68.0	453.7	2020
Replace Powerhouse Roofing System - L'Anse Au Loup and St. Anthony	125.3	125.4	121.5	3.9	2021
Replace Transformer T7 - Holyrood Terminal Station	2,678.1	2,678.1	660.6	2,017.5	2020
Replace Vehicles and Aerial Devices - Various Sites	594.9	458.0	632.7	(174.7)	2020
Rewind Unit 3 Stator - Holyrood	1,281.4	1,281.4	2,231.4	(950.0)	2021
Terminal Station Refurbishment and Modernization - Various Sites 2019	8,132.1	5,869.1	1,904.5	3,964.6	2020
Terminal Station Refurbishment and Modernization - Various Sites 2020	2,299.0	2,369.6	860.1	1,509.5	2021
Upgrade Circuit Breakers - Various Sites	11,116.8	6,998.5	4,299.6	2,698.9	2020
Upgrade Fire Suppression System - Bishop's Falls	91.6	91.6	98.2	(6.6)	2021
Upgrade Uninterruptible Power Supply 3 & 4 - Holyrood	348.7	348.7	283.2	65.5	2020
Wabush L34 and L35 Protective Relays	43.7	43.7	24.7	19.0	2021
Wabush L34 and L35 Protective Relays - CIAC	(43.7)	(43.7)	(24.7)	(19.0)	2021
	<b>57,840.4</b>	<b>50,476.9</b>	<b>31,509.7</b>	<b>20,987.2</b>	

<sup>11</sup> Revised Budget = Board Approved Budget + Carryovers + Change Management.

## 1 7.0 Safety Hazards

2 In Board Order No. P.U. 38(2010) related to Hydro's 2011 Capital Budget Application, the Board  
 3 directed Hydro to include in its annual report on capital expenditures an explanation on each project  
 4 that was undertaken for the Remove Safety Hazards project, setting out the safety hazard that was  
 5 identified, the location, the steps taken to address the issue, and the amount of the expenditure. Table  
 6 4 outlines the projects undertaken in 2020.

**Total Approved Budget: \$198,600**

**Total Expenditure: \$218,400**

**Table 4: Safety Hazards**

Project Title and Location	Expenditure (\$000)	Safety Hazard Identified	Project Scope
Replace Emergency Eyewash and Shower Stations  Holyrood TGS	145.7	Existing eyewash and shower stations, connected to domestic water piping, were identified during periodic testing to frequently lack sufficient pressure to consistently and adequately perform. In addition, locations of some existing units are no longer suitable due to plant layout changes.	Purchased and installed standalone eyewash/shower units with self-contained water supply in locations to best suit current operations and hazards.
Replace Main Gate  Holyrood TGS	31.2	The main entrance gate, comprised of two (2) three metre sliding panels, failed due to age and weather damage. The single security guard at the gate must make routine rounds of the site, leaving the gate unattended for periods of time. Leaving the failed gate in the open position posed a risk of intrusion by unauthorized persons or large animals, resulting in public safety risk and hazards to employees.	Replaced main gate with a new six metre single panel complete with mechanism and control.
Drop Stop Installation on Overhead Monorail Cranes  Upper Salmon Powerhouse, West Salmon Spillway, Cat Arm Powerhouse, Hinds Lake Spillway	22.7	Existing crane trolleys do not include drop stop brackets that prevent the trolley and suspended load from falling to the floor in the event a wheel failure.	Drop stop brackets were designed, fabricated and installed on each crane trolley unit.

Project Title and Location	Expenditure (\$000)	Safety Hazard Identified	Project Scope
Journey Management Application for Working Alone  Various Locations, Network Services	18.8	Workers are commonly required to work or travel alone, often in remote locations. Hydro has established methods to monitor and ensure wellbeing of these workers, but call-in to supervisors or a third-party service has gaps and shortcomings in practice. An available general-purpose cellular phone application was successfully trialled and a need was identified to customize the application to fully resolve communication and content gaps.	The existing cellular phone application was customized with the addition of a safety checklist and upload of site specific information and travel routes.

## 8.0 Terminal Station In-Service Failures

- Hydro has committed to providing a summary of activities completed under the Terminal Station In-Service Failures project. Table 5 outlines 2020 expenditures under this project.

**Total Approved Budget: \$1,500,000**

**Total Expenditure: \$1,081,000**

**Table 5: Terminal Station In-Service Failures**

Project Title and Location	Expenditure (\$000)	Failure Identified	Project Scope
Breaker Refurbishment  Doyles and St. Anthony Terminal Stations	297.7	B1L15 at Doyles Terminal Station and B1C3 at St. Anthony Terminal Station are 69 kV circuit breakers that had been identified as leaking sulfur hexafluoride (SF6) gas to atmosphere. The leaking of SF6 to atmosphere is an environmental concern with the gas being known as the most harmful greenhouse gas. Leaking gas could result in a flashover of the breaker or a catastrophic failure resulting in loss of service to customers and compromising the integrity of the electrical system in the area.	The 69 kV breakers B1L15 at Doyles Terminal Station and B1C3 at St. Anthony Terminal Station were refurbished. At Doyles, the terminal station configuration was such that the breaker was unable to be isolated from the electrical system to facilitate the breaker refurbishment. To avoid an extended customer outage, a bypass disconnect switch was installed at Doyles. This bypass arrangement will provide benefits for future maintenance as well.



**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Transformer T1 On-Load Tap Changer Overhaul  St. Anthony Diesel Plant	222.6	A test of the St. Anthony Diesel Plant Terminal Station T1 tap changer identified an abnormal dissipation of energy, indicating fault or wear activity to the extent that there was risk of imminent failure.	Transformer T1 On-Load Tap Changer was overhauled.
Replacement of Four (4) Relay Test Sets	214.1	Four (4) relay test sets located at Bishop's Falls (2005 vintage), Whitbourne (2005 vintage), Stephenville (2005 vintage), and St. Anthony (2007 vintage) failed and required replacement. These sets are used by Protection and Control Technologists to complete preventative maintenance, troubleshooting and projects. Specifically, the relay test sets are used to check the condition of protective relays and current transformer secondary circuits as well as to complete commissioning of new equipment.	Four (4) replacement relay test sets were purchased.
Replacement of Power Transformer Protective Devices  Various Locations	152.4	Inspections of twenty-three (23) power transformer protective devices revealed that the devices had failed or were at risk of imminent failure, due to moisture ingress resulting in electrical contact corrosion.	Twenty-three (23) power transformer protective devices were replaced.
Breaker B2T4 Rebuild  Bay d'Espoir Terminal Station 1	65.5	In 2019, 230 kV Breaker B2T4 failed and was replaced under the 2019 In Service Failures project. The failed breaker was sent to a factory for rebuild to serve as an onsite spare.	The failed 230 kV Breaker B2T4 was rebuilt by the original equipment manufacturer ("OEM") and returned to Bay d'Espoir in 2020 as an onsite spare. The OEM covered the factory rebuild cost and Hydro covered the shipping costs to and from the factory.

**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Purchase Spare Disconnect Switch	40.7	In 2019, a 145 kV disconnect was used from the stand-by equipment pool to replace a failed disconnect switch at Bay L'Argent Terminal Station. In order to maintain adequate spare availability, a replacement 145 kV disconnect was required.	One spare 145 kV disconnect switch was purchased for the stand by equipment pool.
Synchronous Condenser 2 (SC2) Human Machine Interface (HMI) Upgrade  Wabush Terminal Station	23.2	The existing HMI for SC2 was no longer functional and vendor support for the associated software was discontinued. The HMI is required to provide oversight of operating parameters and access to logged historical operating data for the synchronous condenser. Failure to have access to this data will result in the unavailability of key information for operations oversight, failure/event analysis and management purposes.	The existing HMI for SC2 was upgraded with new software.
Purchase Spare Synchronous Condenser Breaker  Wabush Terminal Station	22.1	Synchronous Condenser Breakers 4-1, 12 1A, 12-1B, 4-2, 12-2A, and 12-2B are approximately 50 years old and there have been several issues found with these breakers on recent unit inspections that required emergency repair, which extended the length of the equipment outages. Due to the age and recent maintenance issues of these breakers, it was determined a spare was required in the event of failure.	A spare synchronous condenser breaker was purchased.
Surge Arrester Replacement  Holyrood and Massey Drive Terminal Stations	16.3	Surge arresters H1, H2 and H3 on Station Service Transformer SST1-2 at Holyrood Terminal Station and H1 and X1 on Transformer T3 at Massey Drive Terminal Station failed Doble testing during planned preventive maintenance checks, resulting in the requirement for immediate replacement.	Surge arresters H1, H2 and H3 on SST1-2 at Holyrood Terminal Station and H1 and X1 on T3 at Massey Drive Terminal Station were replaced.
Disconnect Switch L2L38 Replacement  Holyrood Terminal Station	15.0	On August 31, 2020, an attempt was made to close disconnect switch L2L38. The disconnect switch was inoperable and required immediate replacement.	Disconnect Switch L2L38 was replaced with an available spare.

Project Title and Location	Expenditure (\$000)	Failure Identified	Project Scope
Replace Bus 13 Differential Protection Relays  Bay d'Espoir Terminal Station 2	11.4	Three (3) Bus 13 differential protection relays malfunctioned on three (3) separate occasions in 2020. The relays were electro-mechanical overcurrent type and were obsolete. Immediate replacement was required to ensure protection systems were operating correctly.	Three (3) Bus 13 differential protection relays were replaced.

## 1 9.0 Hydraulic In-Service Failures

- 2 Hydro has committed to providing a summary of activities completed under the Hydraulic Generation  
3 In-Service Failures project. Table 6 outlines 2020 expenditures under this project.

**Total Approved Budget: \$1,250,000**

**Total Expenditure: \$1,287,200**

**Table 6: Hydraulic In-Service Failures**

Project Title and Location	Expenditure (\$000)	Failure Identified	Project Scope
Units 1–6 Spare Generator Thrust and Guide Bearing Assembly Procurement  Bay d'Espoir	276.2	Presently there is one spare thrust and guide bearing assembly for Units 1–6, and it has been determined that a second spare assembly is required for risk mitigation. Over the period of 2017–2019 there were bearing failures of the Unit 2 thrust bearing and the Unit 3 thrust and guide bearings, which were discovered during maintenance activities. There is a high probability that similar failures could occur on the other units. If a failed bearing is not too severely damaged, it can be refurbished and maintained as a spare. Refurbishment of a bearing can take 18–22 weeks depending on fabricator availability. If a failed bearing is severely damaged, a new bearing would need to be procured to replenish the spare, and fabrication of a new bearing would take 20–25 weeks depending on fabricator availability.	One set of spare thrust and guide bearings that will fit Bay d'Espoir Units 1–6 was procured and delivered to site.

**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Capital Spares Procurement  Granite Canal and Upper Salmon	234.8	An excitation transformer for the unit at Granite Canal and a transformer for the Upper Salmon Intake Structure were determined to be required for the standby pool, to allow fast responsive action to future failures of long lead time equipment.	An excitation transformer for Granite Canal was ordered and received in 2020. An intake transformer for Upper Salmon was ordered in 2020 and is expected to be received in the first quarter of 2021. For the Upper Salmon transformer, the planned concrete pad and oil containment system was constructed in 2020.
Dam Stabilization  Roddickton	220.7	The Roddickton mini hydro plant includes a 75m-long rock and gravel filled timber crib dam complete with a low flow drain and a 800 mm diameter penstock. The timber crib structure deteriorated to a point where the internal timbers rotted and stability was marginal, particularly during ice loading. Short term solutions were implemented to manage the reservoir inflows. However, these solutions were no longer successful and more recent events and inspections revealed additional rotting and movement of the structure, increasing the probability of dam failure.	Roddickton dam was stabilized in 2020 by placement of armour stone downstream of the dam. To facilitate the work, road refurbishment and the construction of access ramps were required.
Unit 3 Generator Thrust and Guide Bearing Assembly Refurbishment  Bay d'Espoir	115.5	Unit 3 experienced abnormal vibration. Inspection revealed that the thrust and guide bearing assembly was worn past the point of operation and could no longer be placed into reliable service.	The failed bearing assembly was removed from service and replaced with the available spare bearing assembly. The failed bearing assembly was rebabbitted and refurbished to serve as a spare.

**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

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<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Unit 7 Turbine Guide Bearing Refurbishment  Bay d'Espoir	77.7	The Unit 7 turbine guide bearing failed in service as a result of a bonding failure between the bearing casing and the babbitt material. This resulted in a loss of clearance in the bearing.	The failed Unit 7 turbine guide bearing was replaced with the available spare. The failed bearing assembly was rebabbitted and refurbished to serve as a spare.
Units 1, 4, 5 and 6 Generator Bearing Cooler Refurbishment  Bay d'Espoir	68.1	A unit generator bearing oil cooler set is comprised of 3 stainless steel coil-type coolers that are submersed in a bath of oil. Cold penstock water flows through the coil and enables heat transfer from the oil to the water, thereby reducing the oil temperature and ensuring the unit does not run at high temperatures and cause equipment damage. Temperature increases in 2020 were noticed to be higher than the historic norm and trending toward the temperature alarm points. An inspection revealed that the generator bearing cooler sets for Units 1, 4, 5 and 6 were fouled by varnish on the external surface of the coils and had organic buildup on the inside surface. This impacted the bearing cooler heat transfer and cooling capacity which required immediate corrective action to avoid a potential generation disruption.	Generator bearing oil coolers were replaced in Units 1, 4, 5, and 6. Existing coolers were then cleaned and refurbished and placed in inventory as spares.

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**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Unit Breaker Replacement  Paradise River	55.2	The unit breaker failed to close resulting in a forced outage on November 18, 2019 rendering the hydro generating plant unavailable for approximately one week. The investigation revealed that the charging motor had failed and a mechanical shaft was bent. The charging motor was replaced; however the bent mechanical shaft could not be fixed and the breaker was placed back into service with the bent shaft. Further inspection during a unit outage revealed that the open and close gear mechanism showed signs of deterioration, with noticeable wear on the gear teeth. Pieces of metal from the gear teeth were discovered in the interior breaker housing; these were removed, but further wear could cause a short circuit, if the metal pieces contaminate the electrical parts of the breaker. The breaker required replacement.	A new unit breaker was procured and installed.
Units 1 to 7 Generator Bearing Oil Replacement  Bay d'Espoir	53.3	BDE Units 1 to 7 generator bearing assemblies are submersed in an oil bath during operation. Oil temperatures were noticed to be trending upward toward the temperature alarm points. When operating at higher temperatures, the oil will break down and trigger a rapid buildup of varnish and other forms of fouling that will lead to equipment deterioration and inoperability. The existing oil has a maximum operating temperature of 74°C and is no longer recommended for use in these units. The operating temperatures of the oil were recorded to be approaching the recommended maximum operating temperature.	The generator bearing oil for BDE Units 1 to 7 was replaced with an oil recommended by the original equipment manufacturer .
Fire Pump Replacement  Hinds Lake	41.4	The internal components and casing of Fire Pump No. 2 deteriorated to the point where the pump was no longer viable for continued operation. The pump had been in service since 1980.	A replacement fire pump was procured under the 2019 Hydraulic In-Service Failures project. Installation was completed in 2020.

**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Fire Panel Replacement  Granite Canal	40.2	The existing fire alarm system for the powerhouse has been in operation since 2002. Replacement parts are no longer available and the system has been indicating sensor faults due to failing alarm system components. The panels and field devices require replacement.	Procurement of replacement fire alarm panels and field devices was completed under the 2019 Hydraulic In-Service Failures project. Installation was completed in 2020.
Shaft Seal Replacement  Granite Canal	37.9	The unit turbine shaft carbon seal leakage rate was at a point where all three head cover drainage pumps could not stop the water from entering the turbine pit. The unit tripped offline on March 24, 2020 and March 25, 2020 due to the water levels in the turbine pit. Investigation determined that the shaft carbon seal was exhibiting signs of damage, with scoring observed on the sealing faces.	The turbine shaft carbon seal and related components were replaced.
Oil Skimmer Replacement  Upper Salmon	30.8	The mop-type sump oil skimmer, which floats on top of the water to collect oil, was past its useful life and causing issues due to entanglement with equipment and piping located in the sump. Replacement parts were no longer available. The oil skimmer is essential to ensure the recovery of any oil lost within the powerhouse and prevent any discharge into the environment.	The existing oil skimmer was replaced with a belt-type oil skimmer.
Powerhouse 1 Overhead Crane Refurbishment  Bay d'Espoir	28.4	While using the powerhouse 30 ton overhead crane, the hoist operated in the opposite direction and travelled up instead of down. This caused the wire rope to fail which damaged the sheaves located on the crane. The upper limit switch lever was also bent beyond repair and replacement was required.	Replacement sheaves, wire rope, and a limit switch were installed and a load test was conducted to re-certify the overhead crane.
Sump Oil In Water Detection System Replacement  Granite Canal	7.0	The sump oil in water detection system is used to monitor the sump contents and send an alarm if oil is detected, so that the oil can be removed and not released to the environment. The existing sensor failed and a direct replacement is no longer available.	A replacement oil-in-water detection system was procured and will be installed under the 2021 Hydraulic In-Service Failure project.

1 **10.0 Thermal In-Service Failures**

2 Hydro has committed to providing a summary of activities completed under the Thermal Generation In-  
 3 Service Failures project. Table 7 outlines 2020 expenditures under this project.

**Total Approved Budget:           \$2,000,000**

**Total Expenditure:                 \$1,836,700**

**Table 7: Thermal Generation In-Service Failures**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Waste Water Treatment Building Roof Replacement  Holyrood TGS	275.7	The Waste Water Treatment Plant (“WWTP”) was installed in 1992 and there have been no major upgrades to the roof since its original installation. The WWTP processes effluent from the periodic basin which originates from air heater washes, boiler washes, batch reactor waste and landfill leachate. In 2020, a large leak was identified in the roof of the WWTP. Upon investigating the leak, it was discovered that the roof failed and required a full replacement, to prevent damage to the equipment housed in the building.	The WWTP roof replacement commenced in 2020. All materials were received and a contractor from Nova Scotia mobilized to execute the work. Due to changing COVID-19 protocols and poor weather conditions, the work was paused at 5% completion and will resume in 2021 when weather conditions are favourable. A contingency plan was implemented to temporarily protect equipment inside the building during the 2020-2021 operating season.



**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Cooling Water Outfall Pipe Replacement  Holyrood Unit 3	244.3	In 2020, sink holes were discovered in the vicinity of the Unit 3 circulating water discharge line from the seal pit to the outfall into Holyrood Bay. This indicated a leak in the cooling water discharge line, which was subsequently confirmed with a dye test. A consultant was engaged and an inspection of the pipeline was completed during the Unit 3 annual outage in 2020. It was confirmed that a section of the discharge pipe, below where the sink hole appeared, is in poor condition and must be replaced. The consultant recommended installing a new pipe section inside the existing 84 inch pipeline.	Materials and equipment have been procured and a contract is in place to execute cooling water outfall pipe replacement. The work requires a total plant outage to obtain the necessary isolations to perform the work safely and is planned to be completed during the 2021 total plant outage.
West Boiler Feed Pump Replacement  Holyrood Unit 1	162.9	In 2020, the Unit 1 west boiler feed pump seized during operation; the shaft was prevented from spinning and the rotor locked. This caused an induced current in the motor resulting in significant overheating and damage to the rotor's squirrel cage bars.	The West boiler feed pump volute and motor for Unit 1 were replaced with available spare components.
Variable Frequency Drive Cell Spares Replacement  Holyrood Thermal Generating Station	112.3	Nineteen Boiler Forced Draft Fan Variable Frequency Drive cells failed in service in 2020. These failures did not affect production as there is redundancy built into the system to account for failures.	The failed variable frequency drive cells were replaced using available spares. The failed cells were refurbished and returned to inventory as spares.

**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Feed Water Valves Overhaul  Holyrood Unit 3	107.1	<p>Boiler Feed Pumps (BFPs) provide high pressure feed water to the boiler during operation by taking feed water from the deaerator storage tank and pumping it through the high pressure feed water heaters, economizer, and into the boiler steam drum. The feed water is then converted into superheated steam in the boiler which then flows to the steam turbine. Feed water systems are controlled with valves to regulate flow to the boiler, based on operating loads and the amount of water needed to feed the boiler for steam production.</p> <p>During unit operation, the feed water control valves were observed to be passing fluid while in the closed position. During the Unit 3 annual outage, the valves were disassembled and it was determined that wear on main internal sealing components was causing both valves to pass fluid.</p>	The Unit 3 feed water control valves were overhauled.
East Fuel Oil Pump Replacement, Holyrood Unit 1 and West Fuel Oil Pump Replacement, Holyrood Unit 2	104.3	The Unit 1 East and Unit 2 West fuel oil pumps were found to be worn by abrasives inherent in Bunker C heavy fuel and no longer able to meet operating requirements.	The Unit 1 East and Unit 2 West fuel oil pumps were replaced during the annual unit outages.
Stack Winch System Replacement  Holyrood Thermal Generating Station	94.6	Each of the three boiler exhaust stacks has a mid-way platform which contains an environmental monitoring station, providing continuous emissions monitoring (CEM) of carbon monoxide, carbon dioxide, nitrous oxide, sulfur dioxide and oxygen. As required by federal regulations and the plant's certificate to operate, a third party completes a yearly test on the CEM equipment to ensure it is measuring accurately. Tools and equipment used to service and test the CEMs are brought to the mid-way platform using the stack winch system.	Stack Winch System Replacement, Holyrood Thermal Generating Station

**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Extraction Pumps Expansion Joints Replacement  Holyrood Unit 3	91.5	<p>After steam passes through the low pressure stage of the turbine, it forms condensate and collects in the condenser. The Unit 3 extraction pumps draw liquid condensate from the condenser and pump it through low pressure heat exchangers before recycling it back to the boiler for steam production. Both pumps are required to be in-service to achieve full loading of Unit 3. The expansion joints are installed between the condenser outlet piping and the pump's suction inlet to accommodate vertical and horizontal movement caused by heating and cooling cycles.</p> <p>The expansion joints had deteriorated over time causing them to crack and leak, which caused air to be drawn into the line through the cracks. This caused increased backpressure in the condenser which affected the unit's ability to reach full load.</p>	The Unit 3 extraction pumps expansion joints were replaced.
East and West Cooling Water Pump Motor Refurbishment, Holyrood Unit 1 and East Cooling Water Pump Motor Refurbishment, Holyrood Unit 3	88.5	<p>During the annual inspections on the Unit 1 East and West Cooling Water Pump motors and the Unit 3 East Cooling Water Pump motor, the megger test readings were low, indicating that the winding insulation had deteriorated to the point where there was high risk of a short circuit between the windings or the windings and the ground. An overhaul of each motor was required to restore the insulation integrity.</p>	The cooling water pump motors were refurbished, including: removal of contamination by a special cleaning process; heat drying and special painting of the stator and rotor electrical windings; re-testing of the windings and resistance temperature detectors; and replacement of the motor roller bearings.
Fire Hydrants and Valves Replacement  Holyrood Thermal Generating Station	83.8	<p>In 2020, two fire hydrants failed and required replacement. In addition, the valves in the fire water distribution lines, which are used to isolate the Bunker C fuel tank farm and the light oil tanks, failed and required replacement.</p>	The failed fire hydrants and isolation valves were replaced.

**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Low Load Control Valve Replacement  Holyrood Unit 2	75.9	The Boiler Feed Pumps (BFPs) provide high pressure feed water to the boiler during operation. The low load control valve on the Unit 2 BFP system was found to be leaking during start-up in 2020, which contributed to the unit's failed start-up attempt. Disassembly and inspection identified deterioration of the valve's major internal components (plug and seat ring). The damaged components could not be repaired.	The Unit 2 low load control valve damaged components were replaced with available spares during the annual Unit 2 outage.
Compressor 1 and 2 Oil and Cooler Replacement, Holyrood Thermal Generating Station	48.5	Operational data for Compressors 1 and 2 showed an upward trend in oil temperatures. This prompted an inspection which revealed that the compressor oil coolers were fouled and approaching failure.	The compressor oil and cooler were replaced for Compressor 1. The compressor oil, cooler and shaft seals were replaced for Compressor 2.
Boardwalk Refurbishment  Holyrood Marine Terminal	42.6	In 2020, heavy rainfall caused washouts along the embankment upon which the marine terminal boardwalk is constructed. The washouts caused large rocks, trees and ground to slide into several structural supports of the wooden boardwalk which led to collapse in some areas.	The marine terminal boardwalk structural supports were refurbished and the embankment was shored up.
Jetty Capstan Gear Box Refurbishment  Holyrood Marine Terminal	34.2	The Holyrood Thermal Generating Station receives approximately 10–12 shipments of Bunker C fuel oil via tanker ships annually. The tanker ships dock at the fuel offloading facility and are secured into position via six capstans during the fuel offloading process. The six capstans are equipped with electrically driven gearboxes to secure the mooring lines for the tanker ship. All six capstans are required to be in operation in order to safely dock the ships.	Jetty Capstan Gear Box Refurbishment, Holyrood Marine Terminal

**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Spare Fire Water Pump Procurement, Holyrood Thermal Generating Station	29.5	In 2019, the electric fire pump was taken out of service to repair a packing leak and damage was discovered to the shaft, bearings, and seals. The jockey pump was also inspected and found to have major cavitation damage on the internal components.	The electric driven fire pump was refurbished in 2019 to replace the damaged internal components. The jockey pump was replaced in 2019 with an available spare pump.
Air Heater Header Pressure Control Valve Overhaul, Holyrood Unit 1	26.5	The Unit 1 Air Heater Header Pressure Control Valve failed during operation and an assessment during the annual outage determined that the valve internal components required replacement and the valve actuator required an overhaul and calibration.	The Unit 1 Air Heater Header Pressure Control Valve and its actuator were overhauled during the unit outage and calibrated during unit start-up.
Fuel Oil Suction Strainers Replacement  Holyrood Units 1 and 2	26.0	<p>The fuel oil suction strainers are on the inlet supply to the fuel oil heating and pumping sets which are fed from the main fuel oil tanks. They are the last filter to capture foreign components before they enter the fuel oil pumps, fuel oil heaters, piping and boiler burner system (burner tips). The strainers are duplex basket type which means there are two parallel basket housing compartments. At any given time, only one strainer is in service and the other strainer is isolated to allow basket removal and cleaning while online.</p> <p>The Units 1 and 2 fuel oil suction strainers are 1969 vintage equipment and the internal sealing components of the strainers were worn over time, making it difficult to obtain a seal between the left and right sides of the strainer housings.</p>	The Unit 1 and 2 fuel oil strainers were replaced during the Unit 1 and 2 annual outages.

**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Spare West Boiler Feed Water Pump Motor Procurement  Holyrood Unit 2	24.3	The West boiler feed water pump motor failed in 2019.	The failed feed water pump motor for Unit 2 was replaced with an available spare in 2019. A new motor was ordered and received in 2020 to replace the spare.
Spare Hydraulic Servo Valves Procurement  Holyrood Units 1 and 2	22.9	Unit 1 tripped off line in 2018 as a result of turbine steam control valves closing without receiving the command from the control system. An investigation concluded that hydraulic system contamination was the cause of the unit trip. Hydro proceeded to refurbish the hydraulic system on Unit 1. The Unit 2 hydraulic system is identical to that for Unit 1 and, while no failures had occurred, Hydro determined it was reasonable to expect that the system for Unit 2 was in the same contaminated condition as for Unit 1.  The refurbishment of Unit 1 hydraulic system consumed all of the spares in the standby pool. A review of the component failure rate resulted in an update to the standby spare strategy to increase the required number of available spares.	In 2018 and 2019, the hydraulic systems for the Unit 1 and Unit 2 control valves were refurbished. Spare hydraulic servo valves for the Unit 1 and Unit 2 turbine hydraulic system were ordered in 2019 and received in 2020.
Air Heater Condensate Control Valves Replacement  Holyrood Unit 3	20.9	During the 2019/2020 operating season, plant operations were unable to control the condensate tank level within the required set points for Unit 3. Investigation confirmed that the main control valve and bypass valves had failed and were passing condensate.	The failed air heater condensate control valves for Unit 3 were replaced.

**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Air Heater Condensate Check Valve Replacement  Holyrood Unit 1	20.8	Steam Coil Air Heaters (SCAHs) are used to add heat to incoming boiler combustion air at lower loads to ensure exhaust gas temperatures stay elevated.  The condensate check valve on the Unit 1 air heater system failed during the 2019–2020 operating season due to water hammer. The bolted head bonnet on the check valve failed and was leaking condensate which posed a safety risk. The extent of the damage was beyond repair.	The Unit 1 air heater condensate check valve was replaced during the annual outage.
South Vacuum Pump Inlet Valve Replacement  Holyrood Unit 3	19.4	During the 2019–2020 operating season, the inlet valve on the Unit 3 South Vacuum Pump began experiencing operational issues. The motorized butterfly valve is operated remotely from the control room. When the pump is started or stopped from the control room, the valve is supposed to automatically open or close, but the valve consistently jammed when tested. Repairs could not be completed because the valve is obsolete and replacement parts are no longer available.	The inlet valve for the Unit 3 South Vacuum Pump was replaced.
Low Pressure Drain Pump Seal Replacement  Holyrood Unit 1	16.9	The Unit 1 low pressure drain pump tripped off during operation and subsequent investigation determined that the mechanical seal had failed.	The mechanical seal for the Unit 1 low pressure drain pump and associated cooling water piping were replaced.
Sootblower Carriage Assembly Replacement  Holyrood Unit 3	14.6	A Unit 3 boiler sootblower failed to operate when a sootblowing cycle was initiated at the control room. During the Unit 3 annual outage, the issue was investigated and a failed carriage assembly was discovered. The carriage assembly required replacement due to damage to the internal gears.	The failed sootblower carriage assembly for Unit 3 was replaced.
Diesel Generator 3 Protection Relay Replacement, Holyrood Thermal Generating Station	13.0	In 2020, Diesel Generator 3 failed to synchronize to the electrical system. It was determined that the main multifunction protection relay could not load the protection program and needed to be replaced to restore normal operation.	The failed protection relay for Diesel Generator 3 was replaced.

**Capital Expenditures and Carryover Report For the Year Ended December 31, 2020**

<b>Project Title and Location</b>	<b>Expenditure (\$000)</b>	<b>Failure Identified</b>	<b>Project Scope</b>
Spare Forced Draft Fan Bearing Liner Procurement  Holyrood TGS	11.8	The forced draft fan bearing liner failed in 2019.	The failed forced draft fan bearing liner was replaced with an available spare in 2019. A new bearing liner was ordered and received in 2020 to replace the spare.
West Boiler Feed Water Pump Safety Valves Replacement  Holyrood Unit 3	11.0	The Boiler Feed Pumps (BFPs) provide high pressure feed water to the boiler during operation. There are safety relief valves on the BFP suction and discharge lines which are designed to relieve excess pressure to protect the pump and associated piping from dangerous overpressure conditions.  The suction line safety relief valves on the BFPs failed in-service and were relieving pressure from the line while in operation under normal operating conditions. The valves were damaged beyond repair.	The failed Unit 3 West boiler feed water pump safety valves were replaced.
West Boiler Drum Water Level Gauge Electronic Verification Unit Replacement  Holyrood Unit 2	6.6	During the 2020 outage, it was determined that Unit 2 Boiler Drum West side electronic verification unit for the water level gauge system had a failure in one of its power supplies. Replacement parts for the verification unit are no longer available and a complete replacement unit was required.	The electronic verification unit of the Unit 2 West side boiler drum water level gauge system was replaced and a spare unit was purchased.
Condenser Partition Valve Actuator Replacement  Holyrood Unit 1	6.3	The condenser partition valve failed to operate when attempting to perform a backwash on Unit 1 toward the end of the 2019/2020 operating season. During the annual unit outage, it was determined that the condenser partition valve was in adequate condition but the valve's motorized actuator had failed, preventing it from opening/closing. The actuator was found to be damage beyond repair.	The condenser partition valve actuator for Unit 1 was replaced.



## 11.0 Boiler Condition Assessment and Miscellaneous Upgrades – Holyrood Thermal Generating Station

In the 2020 supplemental capital budget application for the Holyrood Boiler Condition Assessment and Miscellaneous Upgrades project, Hydro listed all known equipment requiring immediate replacement<sup>12</sup> and indicated that it was possible that additional components may be identified as requiring immediate replacement during the 2020 condition assessment. For those additional components that were material in dollar value and met capitalization criteria, Hydro proposed to communicate these items to the Board in this 2020 Capital Expenditures and Carryover Report. Level 2 condition assessments were completed on Units 1, 2, and 3 and no additional items were identified as requiring immediate refurbishment or replacement.

All work identified in the application was completed during the 2020 annual unit outages with the exception of the following items that were impacted by the COVID-19 pandemic and the ability to schedule the required out-of-province contractor employees:

- Units 1 and 2: Internal borescope inspection of the economizer inlet header including measurement of ligament cracks to track growth. The boiler service provider confirmed that deferring this work to 2021 is low risk to unit operation. A visual inspection and UT survey was also completed and no issues were identified;
- Units 1, 2 and 3: Detailed condition assessment of the air heater including OEM technical assistance, inspection, and service guidance. The boiler service provider confirmed that the equipment is fit for service with the condition assessment by the OEM deferred to 2021. A visual inspection was performed and minor repairs were completed; and
- Units 2 and 3: Condition assessment of forced draft fans. A visual inspection was performed and minor repairs were completed. The boiler service provider confirmed that the equipment is fit for service with the condition assessment by the OEM deferred to 2021.

The approved budget for this supplemental project was \$3,056,700. Actual expenditures totalled \$3,221,200. Monthly status updates were filed with the Board during execution of this project.

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<sup>12</sup> “Application for Approval of Capital Projects Necessary for the Continued Operation of the Holyrood Thermal Generating Station,” Newfoundland and Labrador Hydro, April 7, 2020, Schedule 1, Appendix A, Appendix A-1.





# Appendix A

## Financial Schedules



Table A-1: 2020 Capital Expenditures By Year  
(\$'000)

Summary	Actual Expenditure and Forecast										K-F Project Variance	H-D Annual Variance																				
	A		B		C		D (B+C)		E				F (A+C+E)		G		H		I		J		K (G+H+I+J)									
	2016	2017	2018	2019	2020	Original 2020	Revised 2020	2021 and Beyond	Total	2016	2017	2018	2019	2020	2021 and Beyond	2021 and Beyond	2020	2021 and Beyond	2021 and Beyond	2021 and Beyond	Total	2016	2017	2018	2019	2020	2021 and Beyond	Total				
2020 Projects	-	-	-	-	55,856.5	55,856.5	55,856.5	37,202.1	93,058.6	-	-	-	12,528.5	49,552.5	37,202.1	10,707.9	109,991.0	16,932.4	16,932.4	16,932.4	16,932.4	16,932.4	-	-	-	12,528.5	49,552.5	37,202.1	10,707.9	109,991.0		
2019 Projects	-	-	-	40,844.7	43,724.0	43,724.0	47,203.2	-	84,568.7	-	-	-	21,442.3	22,884.7	-	6,681.2	51,008.2	(33,560.5)	(33,560.5)	(33,560.5)	(33,560.5)	(33,560.5)	-	-	-	21,442.3	22,884.7	-	6,681.2	51,008.2		
2018 Projects	-	-	31,552.5	35,844.9	3,715.0	3,715.0	16,736.0	-	71,112.4	-	-	13,941.1	24,720.8	10,107.6	-	669.6	49,439.0	(21,673.4)	(21,673.4)	(21,673.4)	(21,673.4)	(21,673.4)	-	-	-	13,941.1	24,720.8	10,107.6	669.6	49,439.0		
2017 Projects	-	532.4	3,394.5	2,337.6	1,429.6	1,429.6	1,619.2	-	7,694.1	-	225.8	1,632.4	3,497.4	711.0	-	229.6	6,296.1	(1,398.0)	(1,398.0)	(1,398.0)	(1,398.0)	(1,398.0)	-	-	-	225.8	1,632.4	3,497.4	711.0	6,296.1		
2016 Projects	6,969.1	10,808.7	15,408.6	6,597.3	11,116.8	11,116.8	13,337.3	-	50,900.5	5,599.5	8,877.8	15,184.2	7,901.7	4,299.6	-	2,698.9	44,561.7	(6,338.8)	(6,338.8)	(6,338.8)	(6,338.8)	(6,338.8)	-	-	-	8,877.8	15,184.2	7,901.7	4,299.6	44,561.7		
<b>Grand Total</b>	<b>6,969.1</b>	<b>11,341.1</b>	<b>50,355.6</b>	<b>85,624.5</b>	<b>115,841.9</b>	<b>115,841.9</b>	<b>134,752.2</b>	<b>37,202.1</b>	<b>307,334.3</b>	<b>5,599.5</b>	<b>9,103.6</b>	<b>30,757.7</b>	<b>70,090.6</b>	<b>87,555.4</b>	<b>37,202.1</b>	<b>20,987.2</b>	<b>261,296.0</b>	<b>(46,038.3)</b>	<b>(46,038.3)</b>	<b>(46,038.3)</b>	<b>(46,038.3)</b>	<b>(46,038.3)</b>	<b>(46,038.3)</b>	<b>(46,038.3)</b>	<b>(46,038.3)</b>	<b>9,103.6</b>	<b>30,757.7</b>	<b>70,090.6</b>	<b>87,555.4</b>	<b>37,202.1</b>	<b>20,987.2</b>	<b>261,296.0</b>

2020 Capital Budget Approved by Board Order No. P.U. 6 (2020)	107,576.1
New Project Approved by Board Order No. 39 (2019)	244.0
New Project Approved by Board Order No. 39 (2019)	(192.6)
New Project Approved by Board Order No. 7 (2020)	2,059.4
New Project Approved by Board Order No. 7 (2020)	(1,800.0)
New Project Approved by Board Order No. 14 (2020)	7,638.2
New Project Approved by Board Order No. 25 (2020)	332.9
New Project Approved by Board Order No. 25 (2020)	(332.9)
New Project Approved by Board Order No. 26 (2020)	43.7
New Project Approved by Board Order No. 26 (2020)	(43.7)
New Project Approved by Board Order No. 32 (2020)	216.4
2020 New Projects under \$50,000 Approved by Hydro	100.4
Total Approved Capital Budget Before Carryovers	115,841.9
Carryover Projects 2019 to 2020	18,910.3
<b>TOTAL APPROVED CAPITAL BUDGET</b>	<b>134,752.2</b>

Table A-2: 2020 Capital Expenditures: Hydraulic Generation (\$'000)

Hydraulic Generation Projects	Capital Budget											Actual Expenditure and Forecast						K-F Project Variance	H-D Annual Variance	Notes					
	A		B		C		D (B+C)		E		F (A+C+E)		G		H		I				J		K (G+H+I+J)		
	2016	2017	2018	2019	2020	Original 2020	Revised 2020	2021 and Beyond	Total	2016	2017	2018	2019	2020	2021 and Beyond	Total	2016				2017	2018	2019	2020	2021 and Beyond
<b>2020 Projects</b>																									
Hydraulic In-Service Failures	-	-	-	-	1,250.0	1,250.0	-	-	1,250.0	-	-	-	-	1,287.2	-	1,287.2	-	-	-	-	-	-	1,287.2	1	
Hydraulic Generation Refurbishment and Modernization - Various Sites	-	-	-	-	6,580.2	6,580.2	10,249.8	16,830.0	-	-	-	-	-	7,363.1	10,249.8	17,685.0	-	-	-	-	-	-	72.1	2	
Purchase Tools and Equipment Less than \$ 50,000	-	-	-	-	21.0	21.0	-	21.0	-	-	-	-	-	36.1	-	36.1	-	-	-	-	-	-	15.1		
<b>2019 Projects</b>																									
Hydraulic Generation Refurbishment and Modernization - Various Sites	-	-	-	10,313.6	1,875.8	5,486.5	7,362.3	-	15,800.1	-	-	-	-	1,939.9	-	10,833.8	-	-	-	-	-	-	-	(4,966.3)	3
<b>2018 Projects</b>																									
Hydraulic Generation Refurbishment and Modernization - Various Sites	-	-	10,325.4	4,283.1	3,160.6	-	3,160.6	-	14,608.5	-	-	-	-	(740.9)	-	8,483.0	-	-	-	-	-	-	-	(6,125.5)	4
<b>2017 Projects</b>																									
Refurbish Powerhouse Station Services - Bay d'Espoir	-	413.2	2,473.3	1,460.6	157.2	-	157.2	-	4,347.1	-	-	-	-	261.5	-	3,951.5	-	-	-	-	-	-	-	(395.6)	5
Replace Exciter Controls Units 1 to 6 - Bay d'Espoir	-	119.2	921.2	877.0	32.4	1,429.6	1,462.0	-	3,347.0	-	-	-	-	449.5	-	2,344.7	-	-	-	-	-	-	-	(1,002.3)	6
<b>Total Hydraulic Generation Projects</b>	-	532.4	13,719.9	16,934.3	5,226.0	14,767.3	19,993.3	10,249.8	56,203.7	-	-	-	-	10,596.4	10,249.8	44,621.3	-	-	-	-	-	-	-	(11,582.4)	

Table A-3: 2020 Capital Expenditures: Thermal Generation  
(\$'000)

Thermal Generation Projects	Capital Budget										Actual Expenditure and Forecast							K-F							
	A			B			C		D (B-C)		E		F (A+C+E)			G		H		I		J		K (G+H+I+J)	
	2016	2017	2018	2019	2020	Carryover to 2020	Original 2020	Revised 2020	2021 and Beyond	Total	2016	2017	2018	2019	2020	2021 and Beyond	2021 and Beyond	2020	2021 and Beyond	2021 and Beyond	Carryover to 2021 and Beyond	Total	Project Variance	H-D Annual Variance	Notes
2020 Projects	-	-	-	-	-	-	1,281.4	1,281.4	5,664.2	6,945.6	-	-	-	-	2,231.4	5,664.2	(950.0)	6,945.6	-	950.0	7	-	950.0	7	
Rewind Unit 3 Stator - Holyrood	-	-	-	-	-	-	348.7	348.7	-	348.7	-	-	-	-	283.2	-	-	348.7	-	(65.5)	-	-	(65.5)	-	
Upgrade Uninterruptible Power Supply 3 & 4 - Holyrood	-	-	-	-	-	-	2,000.0	2,000.0	-	2,000.0	-	-	-	-	1,836.7	-	-	1,836.7	-	(163.3)	-	-	(163.3)	8	
Thermal In-Service Failures	-	-	-	-	-	-	41.7	41.7	-	41.7	-	-	-	-	48.0	-	-	48.0	-	6.3	-	6.3	6.3	-	
Purchase Tools and Equipment Less than \$ 50,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Total Thermal Generation Projects</b>	-	-	-	-	-	-	3,671.8	3,671.8	5,664.2	9,336.0	-	-	-	-	4,399.3	5,664.2	(884.5)	9,179.0	(157.0)	727.5	-	(157.0)	727.5	-	

Table A-4: 2020 Capital Expenditures: Gas Turbine Generation (\$000)

Gas Turbine Generation Projects	Capital Budget											Actual Expenditure and Forecast								K-F		H-D	
	A		B		C	D (B+C)		E		F (A+C+E)		G		H		I	J		K (G+H+I+J)		Project Variance	Annual Variance	Notes
	2017	2018	2019	2020	Original 2020	Revised 2020	2021 and Beyond	Total	2016	2017	2018	2019	2020	2021 and Beyond	2021 and Beyond	Carryover to 2021 and Beyond	Total						
2020 Projects	-	-	-	-	546.1	546.1	546.1	4,900.0	4,900.0	5,446.1	-	-	-	35.0	4,900.0	538.5	5,473.5	27.4	(511.1)	9			
Perform Combustor Inspection - Holyrood Gas Turbine	-	-	-	-	37.8	37.8	37.8	575.0	575.0	612.8	-	-	-	165.4	575.0	(145.6)	594.8	(18.0)	127.6	10			
Install Partial Discharge Monitoring - Holyrood Gas Turbine	-	-	-	-	264.6	264.6	264.6	2,377.9	2,377.9	2,642.5	-	-	-	158.9	2,377.9	(28.8)	2,508.0	(134.5)	(105.7)	11			
Replace Fire Suppression System - Happy Valley Gas Turbine	-	-	-	-	1,097.6	1,097.6	1,097.6	-	-	1,097.6	-	-	-	76.0	-	1,021.6	1,097.6	-	(1,021.6)	12			
Generator Assessment - Happy Valley Gas Turbine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
2019 Projects	-	-	1,666.8	316.9	-	316.9	-	-	-	1,666.8	-	-	1,245.1	360.2	-	-	1,605.3	(61.5)	43.3				
Overhaul Olympus Gas Generator - Stephenville	-	-	70.7	53.1	317.7	370.8	370.8	-	-	388.4	-	-	17.7	185.6	-	-	203.2	(185.2)	(185.2)	13			
Upgrade Compressed Air System - Holyrood Gas Turbine	-	-	404.2	72.8	-	72.8	-	-	-	404.2	-	-	168.0	125.1	-	-	293.1	(111.1)	52.3	14			
Replace Main Fuel Valves - Hardwoods	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
2018 Projects	-	8,829.9	3,012.7	488.0	-	488.0	-	-	-	11,842.6	-	-	2,583.8	3,563.9	832.8	-	7,705.3	(4,137.3)	344.8	15			
Increase Fuel and Water Treatment System Capacity - Holyrood Gas Turbine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
<b>Total Gas Turbine Generation Projects</b>	-	-	8,829.9	5,154.4	930.8	2,263.8	3,194.6	7,852.9	7,852.9	24,101.0	-	-	2,583.8	4,994.7	1,939.0	7,852.9	2,110.5	(4,620.2)	(1,255.6)				



Table A-5: 2020 Capital Expenditures: Terminal Stations  
(\$000)

Terminal Stations Projects	Capital Budget											Actual Expenditure and Forecast					K-F		Notes									
	A				B		C		D (B+C)		E		F (A+C+E)		G			H		I		J		K (G+H+I+J)				
	2016	2017	2018	2019	2020	Carryover to 2020	Original 2020	Revised 2020	2021 and Beyond	Total	2016	2017	2018	2019	2020	2021 and Beyond	Total	2016		2017	2018	2019	2020	2021 and Beyond	Total	Project Variance	Annual Variance	
2020 Projects																												
Terminal Station In-Service Failures	-	-	-	-	1,500.0	-	1,500.0	1,500.0	-	1,500.0	-	-	-	1,081.0	-	-	1,081.0	-	-	-	-	-	-	-	-	(419.0)	(419.0)	16
Replace Transformer T7 - Holyrood Terminal Station	-	-	-	-	2,678.1	-	2,678.1	2,678.1	-	2,678.1	-	-	-	660.6	-	-	660.6	-	-	-	-	-	-	-	-	(2,017.5)	(2,017.5)	17
Purchase SF6 Multi Analyzer - Various	-	-	-	-	207.1	-	207.1	207.1	-	207.1	-	-	-	155.7	-	-	155.7	-	-	-	-	-	-	-	-	(51.4)	(51.4)	
Terminal Station Refurbishment and Modernization - Various Sites	-	-	-	-	3,712.0	-	3,712.0	3,712.0	5,684.9	9,396.9	-	-	-	1,703.4	5,684.9	8,997.8	-	-	-	-	-	-	-	-	(499.1)	(2,008.6)	18	
2019 Projects																												
Upgrade Terminal Station for Mobile Substation - St. Anthony	-	-	-	89.3	402.7	47.5	402.7	450.2	-	492.0	-	-	-	41.8	551.9	-	593.7	-	-	-	-	-	-	-	-	101.7	101.7	19
Terminal Station Refurbishment and Modernization - Various Sites	-	-	-	10,891.1	19,061.8	1,199.2	19,061.8	20,261.0	-	29,952.9	-	-	-	5,891.3	10,987.3	-	20,843.2	-	-	-	-	-	-	-	-	(9,109.7)	(9,273.7)	20
2018 Projects																												
Implement Terminal Station Flood Mitigation - Springdale	-	-	186.2	787.8	1,047.6	1,047.6	-	1,047.6	-	974.0	-	-	-	87.0	450.3	-	673.1	-	-	-	-	-	-	-	-	(300.9)	(597.3)	21
Terminal Station Refurbishment and Modernization - Various Sites	-	-	8,170.6	18,625.1	6,522.6	6,522.6	-	6,522.6	-	26,795.7	-	-	-	9,616.1	3,202.4	-	14,802.3	-	-	-	-	-	-	-	-	(11,993.4)	(3,320.2)	22
2016 Projects																												
Upgrade Circuit Breakers - Various Sites	6,969.1	10,808.7	15,408.6	6,597.3	2,220.5	11,116.8	13,337.3	-	-	50,900.5	-	-	-	7,901.7	4,299.6	-	44,561.7	-	-	-	-	-	-	-	(6,338.8)	(9,037.7)	23	
<b>Total Terminal Stations Projects</b>	<b>6,969.1</b>	<b>10,808.7</b>	<b>23,765.4</b>	<b>36,990.6</b>	<b>11,037.4</b>	<b>38,678.5</b>	<b>49,715.9</b>	<b>5,684.9</b>	<b>122,897.2</b>																			
	5,599.5	8,877.8	17,303.8	23,537.8	23,092.2	5,684.9	10,190.5	94,286.4																				
	(419.0)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(28,610.8)	(26,623.7)	

Table A-6: 2020 Capital Expenditures: Transmission (\$000)

Transmission Projects	Actual Expenditure and Forecast										K-F Project Variance	H-D Annual Variance	Notes				
	A					G								J Carryover to 2021 and Beyond	K(G+H+I+J) Total		
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020							
2020 Projects																	
Wood Pole Line Management Program - Various Sites	-	-	-	-	2,792.7	2,792.7	-	-	-	2,882.6	-	-	-	-	2,882.6	89.9	89.9
2019 Projects																	
Muskkrat Falls to Happy Valley Interconnection	-	-	-	12,586.4	7,392.1	7,450.0	-	-	12,528.5	4,659.8	-	2,790.2	-	19,978.5	-	(2,790.2)	24
<b>Total Transmission Projects</b>	-	-	-	12,586.4	10,184.8	10,242.7	-	-	12,528.5	7,542.4	-	2,790.2	-	22,861.1	89.9	(2,700.3)	

Table A-7: 2020 Capital Expenditures: Distribution  
(\$000)

Distribution Projects	Actual Expenditure and Forecast										K-F		H-D										
	A				B		C		D (B+C)		E		F (A+C+E)		G		H		I		J		K (G+H+I+J)
	2016	2017	2018	2019	2020	Carryover to 2020	Original 2020	Revised 2020	2021 and Beyond	Total	2016	2017	2018	2019	2020	2020 and Beyond	2021 and Beyond	Carryover to 2021 and Beyond	Total	Project Variance	Annual Variance	Notes	
2020 Projects																							
Provide Service Extensions - All Areas	-	-	-	-	4,312.5	-	4,312.5	4,312.5	-	4,312.5	-	-	-	-	4,012.0	-	-	-	-	4,012.0	(300.5)	(300.5)	
Provide Service Extensions - All Areas - CIAC	-	-	-	-	(196.5)	-	(196.5)	(196.5)	-	(196.5)	-	-	-	-	(269.0)	-	-	-	-	(269.0)	(72.5)	(72.5)	
Upgrade Distribution Systems - All Areas	-	-	-	-	3,456.5	-	3,456.5	3,456.5	-	3,456.5	-	-	-	-	3,297.0	-	-	-	-	3,297.0	(159.5)	(159.5)	
Upgrade Distribution Systems - All Areas - CIAC	-	-	-	-	(93.5)	-	(93.5)	(93.5)	-	(93.5)	-	-	-	-	(8.4)	-	-	-	-	(8.4)	85.1	85.1	
Distribution System Upgrades (2020-2021) - Various	-	-	-	-	102.7	-	102.7	102.7	3,155.1	3,257.8	-	-	-	-	121.0	3,155.1	(18.3)	(18.3)	3,257.8	-	-	18.3	
Install Recloser Remote Control (2020-2021) - Hampden and Upper Salmon	-	-	-	-	71.3	-	71.3	71.3	185.3	256.6	-	-	-	-	33.7	185.3	37.6	37.6	256.6	-	-	(37.6)	
Additions for Load - Distribution System - Makkovik and Hopedale	-	-	-	-	846.1	-	846.1	846.1	-	846.1	-	-	-	-	135.0	-	-	711.1	846.1	-	-	(711.1)	25
2019 Projects																							
Distribution System Upgrades - Various Sites	-	-	-	390.8	5,490.1	(31.4)	5,490.1	5,458.7	-	5,880.9	-	-	-	422.2	5,823.7	-	-	-	6,245.9	365.0	365.0		
Install Recloser Remote Control (2019-2020) - Rocky Harbour	-	-	-	66.1	319.9	44.1	319.9	364.0	-	386.0	-	-	-	22.0	109.4	-	-	-	131.4	(254.6)	(254.6)	26	
<b>Total Distribution Projects</b>	-	-	-	456.9	14,309.1	12.7	14,309.1	14,321.8	3,340.4	18,106.4	-	-	-	444.2	13,254.4	3,340.4	730.4	730.4	17,769.4	(337.0)	(1,067.4)		

**Table A-8: 2020 Capital Expenditures: Rural Generation (\$000)**

Rural Generation Projects	Actual Expenditure and Forecast											K-F		H-D	Notes							
	G											Project Variance	Annual Variance									
	2016	2017	2018	2019	2020	2021 and Beyond	J Carryover to 2021 and Beyond	K (G+H+I+J)	Total													
	A	B	C	D (B+C)	E	F (A+C+E)																
	2016	2017	2018	2019	2020	Original 2020	Revised 2020	2021 and Beyond	Total	2016	2017	2018	2019	2020	2021 and Beyond	J Carryover to 2021 and Beyond	K (G+H+I+J)	Total	Project Variance	Annual Variance	Notes	
<b>2020 Projects</b>																						
Overhaul Diesel Units - Various	-	-	-	-	2,310.9	2,310.9	2,310.9	-	2,310.9	-	-	-	-	1,923.2	-	-	-	1,923.2	(387.7)	(387.7)	27	
Diesel Plant Ventilation Upgrade - Nain	-	-	-	-	162.7	162.7	162.7	690.4	853.1	-	-	-	-	96.1	690.4	66.6	-	853.1	(66.6)	(66.6)		
Replace Automation Equipment - Rigolet	-	-	-	-	363.8	363.8	363.8	-	363.8	-	-	-	-	58.0	-	305.8	-	363.8	(305.8)	(305.8)	28	
Replace Sewage Lift System - Rigolet	-	-	-	-	127.9	127.9	127.9	-	127.9	-	-	-	-	203.1	-	-	-	203.1	75.2	75.2		
Upgrade Fuel Storage Tanks - Charlottetown	-	-	-	-	467.2	467.2	467.2	-	467.2	-	-	-	-	310.7	-	-	-	310.7	(156.5)	(156.5)	29	
Diesel Genset Replacements - Mary's Harbour	-	-	-	-	3,900.7	3,900.7	3,900.7	-	3,900.7	-	-	-	-	2,799.0	-	349.8	-	3,148.8	(751.9)	(1,101.7)	30	
Replace Powerhouse Roofing System - L'Anse Au Loup and St. Anthony	-	-	-	-	125.3	125.3	125.3	1,195.8	1,321.1	-	-	-	-	121.5	1,195.8	3.9	-	1,321.2	0.1	(3.8)		
<b>2019 Projects</b>																						
Additions for Load - Isolated Generation Systems	-	-	-	1,523.6	(682.0)	658.9	(23.1)	-	2,182.5	-	-	-	-	154.6	-	-	-	2,578.2	395.7	177.7	31	
Replace Human Machine Interface - Cartwright	-	-	-	306.9	154.0	154.0	154.0	-	306.9	-	-	-	-	97.3	-	56.7	-	306.9	(0.0)	(56.7)		
Diesel Genset Replacements (2019-2020)	-	-	-	525.6	385.4	3,421.8	3,807.2	-	3,947.4	-	-	-	-	140.2	-	2,834.6	-	3,947.4	0.0	(2,834.6)	32	
<b>2018 Projects</b>																						
Diesel Plant Engine Cooling System Upgrades - Various Sites	-	-	638.4	671.6	147.0	-	147.0	-	1,310.0	-	-	-	-	274.5	-	-	-	1,437.5	127.5	127.5	33	
Diesel Plant Fire Protection - Postville	-	-	505.6	336.4	296.8	-	296.8	-	842.0	-	-	-	-	326.8	-	-	-	872.0	30.0	30.0		
Diesel Genset Replacements - Makkovik	-	-	604.1	4,703.3	(452.0)	3,592.8	3,140.8	-	8,900.2	-	-	-	-	3,366.0	-	(225.2)	-	8,900.2	0.0	225.2		
Replace Automation Equipment - St. Anthony	-	-	307.4	1,565.9	(44.7)	-	(44.7)	-	1,873.3	-	-	-	-	160.2	-	170.0	-	2,248.2	374.9	204.9	34	
<b>Total Rural Generation Projects</b>	-	-	2,055.5	9,633.3	(195.5)	15,132.0	14,936.5	1,886.2	28,707.0	-	-	-	-	10,863.6	1,886.2	3,562.2	-	28,414.2	(292.8)	(4,072.9)		

Table A-9: 2020 Capital Expenditures: Properties  
(\$000)

Properties Projects	A						B					C					D (B+C)					E					F (A+C+E)					Actual Expenditure and Forecast						K-F		
	2016	2017	2018	2019	2020	Total	2018	2019	2020	Carryover to 2020	Original 2020	Revised 2020	2021 and Beyond	Total	2018	2019	2020	2021 and Beyond	2021 and Beyond	2020	2017	2018	2019	2020	2021 and Beyond	Total	2016	2017	2018	2019	2020	2021 and Beyond	2021 and Beyond	2021 and Beyond	Project Variance	Annual Variance	Notes			
2020 Projects	-	-	-	-	-	-	-	-	-	91.6	91.6	91.6	292.6	384.2	-	-	-	-	-	98.2	-	-	-	98.2	292.6	(6.6)	384.2	-	-	-	-	-	-	-	-	-	6.6			
Upgrade Fire Suppression System - Bishop's Falls	-	-	-	-	-	-	-	-	-	648.3	648.3	648.3	-	648.3	-	-	-	-	-	724.2	-	-	-	724.2	-	-	724.2	-	-	-	-	-	-	-	-	-	75.9			
Upgrade Line Depots - Various	-	-	-	-	-	-	-	-	-	648.3	648.3	648.3	-	648.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	75.9		
2018 Projects	-	-	104.0	119.0	57.7	122.2	179.9	-	345.2	-	-	-	-	-	-	-	-	-	-	170.6	-	-	-	170.6	-	-	335.9	-	-	-	-	-	-	-	-	-	(9.3)	(9.3)		
Install Energy Efficiency Lighting in Diesel Plants - Various	-	-	104.0	119.0	57.7	862.1	919.8	292.6	1,377.7	-	-	-	-	-	-	-	-	-	-	993.0	-	-	-	993.0	292.6	(6.6)	1,444.3	-	-	-	-	-	-	-	-	-	66.6	73.2		
<b>Total Properties Projects</b>	-	-	104.0	119.0	57.7	862.1	919.8	292.6	1,377.7	-	-	-	-	-	-	-	-	-	-	993.0	-	-	-	993.0	292.6	(6.6)	1,444.3	-	-	-	-	-	-	-	-	-	66.6	73.2		

Table A-10: 2020 Capital Expenditures: Metering  
(\$000)

Metering Projects	Actual Expenditure and Forecast											K-F																			
	A				B				C			D (B+C)		E		F (A+C+E)		G		H		I		J		K (G+H+I+J)					
	2016	2017	2018	2019	2020	2019	2020	Revised 2020	2021 and Beyond	Total	2016	2017	2018	2019	2020	2019	2020	2020	2021 and Beyond	Total	2016	2017	2018	2019	2020	2021 and Beyond	Total	Project Variance	Annual Variance	Notes	
2020 Projects	-	-	-	-	-	-	-	244.2	-	244.2	-	-	-	-	-	-	-	180.6	-	180.6	-	-	-	-	-	-	-	-	-	-	
Purchase Meters and Metering Equipment - Various	-	-	-	-	-	-	-	244.2	-	244.2	-	-	-	-	-	-	-	180.6	-	180.6	-	-	-	-	-	-	-	-	-	-	
Purchase Meters and Metering Equipment - Various CIAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Total Metering Projects</b>	-	-	-	-	-	-	-	244.2	-	244.2	-	-	-	-	-	-	-	180.6	-	180.6	-	-	-	-	-	-	-	-	-	-	

Table A-11: 2020 Capital Expenditures: Tools and Equipment  
(\$000)

Tools and Equipment	Actual Expenditure and Forecast										K-F		Notes		
	G				H		I		J		K (G+H+I+J)	Project Variance		Annual Variance	
	2016	2017	2018	2019	2020	2020	2021 and Beyond	2021 and Beyond	Carryover to 2021 and Beyond	Total					
2020 Projects															
Replace Light Duty Mobile Equipment - Various Sites	-	-	-	-	68.0	-	-	-	453.7	521.7	22.1	(431.6)	35		
Purchase Tools & Equipment Less than \$50,000	-	-	-	-	265.7	-	-	-	-	265.7	(173.7)	(173.7)	36		
2018 Projects															
Replace Off-Road Track Vehicles - Bishop's Falls and Bay d'Espoir	-	213.7	986.3	1,031.7	-	1,031.7	-	-	-	1,334.5	134.5	41.3	37		
<b>Total Tools and Equipment</b>	-	213.7	986.3	1,031.7	939.0	1,970.7	-	-	453.7	2,121.9	(17.1)	(564.0)			

Table A-12: 2020 Capital Expenditures: Information Systems  
(\$000)

Information Systems Projects	Actual Expenditure and Forecast											K-F Project Variance	H-D Annual Variance	Notes			
	G				H		I		J	K (G+H+I+J)							
	2016	2017	2018	2019	2020	2020	2021 and Beyond	2021 and Beyond	Carryover to 2021 and Beyond	Total	Total						
<b>2020 Projects</b>																	
Replace Personal Computers - Hydro Place	-	-	-	-	673.3	673.3	-	-	-	630.0	-	-	-	-	630.0	(43.3)	(43.3)
Replace Peripheral Infrastructure - Hydro Place	-	-	-	-	222.1	222.1	-	-	-	176.6	-	-	-	-	176.6	(45.5)	(45.5)
Upgrade Core IT Infrastructure - Hydro Place	-	-	-	-	193.7	193.7	-	-	-	259.5	-	-	-	-	259.5	65.8	65.8
Refresh Security Software - Hydro Place	-	-	-	-	110.2	110.2	-	-	-	32.6	-	-	-	-	32.6	(77.6)	(77.6)
Perform Minor Enhancements - Hydro Place	-	-	-	-	49.0	49.0	-	-	-	22.8	-	-	26.2	-	49.0	-	(26.2)
Upgrade Software Applications - Hydro Place	-	-	-	-	65.4	65.4	-	-	-	55.9	-	-	-	-	55.9	(9.5)	(9.5)
<b>2019 Projects</b>																	
Upgrade Energy Management System - Hydro Place	-	-	-	271.7	-	162.8	-	-	-	108.9	149.2	-	-	-	258.1	(13.6)	(13.6)
<b>Total Information Systems Projects</b>	-	-	-	271.7	1,313.7	1,476.5	-	-	-	108.9	1,326.6	-	-	26.2	1,461.7	(123.7)	(149.9)



Table A-13: 2020 Capital Expenditures: Telecontrol  
(\$'000)

Telecontrol Projects	Actual Expenditure and Forecast										K-F Project Variance	H-D Annual Variance	Notes				
	A					G								J Carryover to 2021 and Beyond	K (G+H+I+J) Total		
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020							
<b>2020 Projects</b>																	
Replace Network Communications Equipment - Various	-	-	-	-	186.8	186.8	-	-	-	193.3	-	-	193.3	6.5	6.5		
Upgrade Site Facilities - Various	-	-	-	-	45.5	45.5	-	-	-	46.4	-	-	46.4	0.9	0.9		
Replace Radomes - Various	-	-	-	-	384.5	384.5	-	-	-	215.1	-	-	215.1	(169.4)	(169.4)	38	
Upgrade Remote Terminal Units - Various	-	-	-	-	157.1	157.1	-	-	-	156.0	-	-	156.0	(1.1)	(1.1)		
Replace Battery Banks and Chargers - Various	-	-	-	-	195.9	195.9	-	-	-	263.7	-	-	263.7	67.8	67.8		
Purchase Tools and Equipment less than \$50,000	-	-	-	-	93.4	93.4	-	-	-	46.3	-	-	46.3	(47.1)	(47.1)		
<b>2019 Projects</b>																	
Upgrade Telecontrol Facilities - Gull Pond Hill and Bay d'Espoir Hill	-	-	-	96.3	577.6	576.1	-	-	97.8	651.4	-	-	749.2	75.3	75.3		
<b>Total Telecontrol Projects</b>	-	-	-	96.3	1,640.8	1,639.3	-	-	97.8	1,572.2	-	-	1,670.0	(67.1)	(67.1)		

Table A-14: 2020 Capital Expenditures: Transportation and Administrative  
(\$000)

Transportation	Actual Expenditure and Forecast											K-F		H-D														
	A			B		C		D (B+C)		E		F (A+C+E)			G		H		I		J		K (G+H+I+J)					
	2016	2017	2018	2019	2020	Original 2020	Revised 2020	2021 and Beyond	Total	2016	2017	2018	2019		2020	2021 and Beyond	Total	2016	2017	2018	2019	2020	2021 and Beyond	Total	Project Variance	Annual Variance	Notes	
2020 Projects																												
Replace Light and Heavy Duty Vehicles (2020-2021) - Various	-	-	-	-	-	1,625.5	1,625.5	1,583.5	3,209.0	-	-	-	-	3.9	1,583.5	1,621.6	3,209.0	-	-	-	-	3.9	1,583.5	1,621.6	3,209.0	-	(1,621.6)	39
2019 Projects																												
Replace Vehicles and Aerial Devices - Various Sites	-	-	1,248.1	(136.9)	594.9	458.0	-	1,843.0	-	-	-	1,385.0	632.7	-	(174.7)	1,843.0	-	-	-	1,385.0	632.7	-	(174.7)	1,843.0	0.0	174.7	40	
2018 Projects																												
Replace Vehicles and Aerial Devices - Various Sites	-	-	1,667.2	753.7	765.7	-	765.7	-	2,420.9	-	-	1,165.1	490.1	991.9	-	2,647.1	-	-	1,165.1	490.1	991.9	-	-	2,647.1	226.2	226.2	41	
<b>Total Transportation</b>	-	-	1,667.2	2,001.8	628.8	2,220.4	2,849.2	1,583.5	7,472.9	-	-	1,165.1	1,875.1	1,628.5	1,583.5	1,446.9	7,699.1	-	-	1,165.1	1,875.1	1,628.5	1,583.5	1,446.9	226.2	(1,220.7)		
Administrative																												
2020 Projects																												
Remove Safety Hazards - Various	-	-	-	-	-	198.6	198.6	-	198.6	-	-	-	-	218.4	-	-	218.4	-	-	-	-	218.4	-	-	218.4	19.8	19.8	
Purchase Office Equipment	-	-	-	-	-	60.9	60.9	-	60.9	-	-	-	-	7.0	-	-	7.0	-	-	-	-	7.0	-	-	7.0	(53.9)	(53.9)	
Replace Elevator Motors and Control Equipment - Hydro Place	-	-	-	-	-	89.1	89.1	647.6	736.7	-	-	-	-	64.2	647.6	24.9	736.7	-	-	-	-	64.2	647.6	24.9	736.7	-	(24.9)	
<b>Total Administrative</b>	-	-	-	-	-	348.6	348.6	647.6	996.2	-	-	-	-	289.6	647.6	24.9	962.1	-	-	-	-	289.6	647.6	24.9	962.1	(34.1)	(59.0)	

Table A-15: 2020 Capital Expenditures: Allowance for Unforeseen Items, Supplemental Capital Projects, and Projects less than \$50,000 (\$5000)

	Allowance For Unforeseen							Supplemental Projects							Projects Less than \$50,000													
	A		B		C		D (B+C)		E		F (A+C+E)		G		H		I		J		K (G+H+I+J)							
	2016	2017	2018	2019	2020	Original 2020	Revised 2020	2020	2021 and Beyond	Total	2016	2017	2018	2019	2020	2020	2021 and Beyond	Total	2016	2017	2018	2019	2020	2021 and Beyond	Total			
<b>2020 Projects</b>											<b>2020 Projects</b>										<b>2020 Projects</b>							
Contingency Fund											Construction and installation of an Electric Vehicle Fast Track Network																	
Generator Replacement - Charlottetown											Construction and installation of an Electric Vehicle Fast Track Network - CIAC																	
Engine Replacement - Port Hope Simpson											Construction of 5 line extension and the installation of power usage monitoring and control equipment at the BlockLab site																	
Allowance for Unforeseen - Top Up P.U. 32 (2020)											Construction of 5 line extension and the installation of power usage monitoring and control equipment at the BlockLab site - CIAC																	
											Overhaul Unit 2 Turbine Valves - Holyrood																	
<b>2019 Projects</b>											Overhaul Unit 2 Generator - Holyrood																	
Charlottetown Diesel Plant Restore Service Following Fire <sup>1</sup>											Overhaul Unit 3 Boiler Feed Pump West - Holyrood																	
<b>Total Allowance For Unforeseen</b>											Boiler Condition Assessment and Miscellaneous Upgrades - Holyrood																	
											Integrate Renewable PH2 - Mary's Harbour																	
											Integrate Renewable PH2 - Mary's Harbour - CIAC																	
											Wabush L34 and L35 Protective Relays																	
											Wabush L34 and L35 Protective Relays - CIAC																	
<b>2019 Projects</b>											Refurbishment and Upgrade of Olympus C Gas Generator - Serial Number 202204																	
											<b>Total Supplemental Projects Approved by PUB</b>																	
											<b>Total Supplemental Projects</b>																	
											<b>Projects Less than \$50,000</b>																	
											Replace Silencer on Unit 2073																	
											Diesel Plant Fibre Upgrade - Nain																	
											Warehouse Shelving - Bay d'Espoir																	
											<b>Total Projects Less than \$50,000</b>																	