Q. **Reference: Application**

Further to CA-NLH-001, for the years when Hydro did not spend the entire capital budget amount approved by the Board:

a) Explain why the approved amounts were not spent.

b) Did Hydro fail to meet its mandate in those years? If not, why not? If so, how, and to what extent, were customers impacted?

c) In years when Hydro underspends approved capital budget amounts that were required for it to meet its mandate, does the governing legislation provide the Board with any ability to request an explanation from Hydro for any adverse impacts upon customers arising from this underspending?

A. **a)** Newfoundland and Labrador Hydro ("Hydro") files with the Board of Commissioners of Public Utilities ("Board"), annually, a capital expenditures and carryover report, in accordance with the Board's Capital Budget Application Guidelines.[1] Each report includes explanations, as applicable, with respect to variances in capital expenditures relative to the capital budget amount approved by the Board in the reported year. Reports for years ending December 31, 2001 through to December 31, 2020 were filed in Hydro's response to the request for information CA-NLH-002 of its 2022 Capital Budget Application.[2] The report for the year ending December 31, 2021 is attached as CA-NLH-002, Attachment 1 of this proceeding.

In recent years, expenditures have typically been below budget by more than 10%. This prompted Hydro to conduct an analysis to determine the primary drivers of the under-expenditure. Analyses were completed following the 2018, 2019, 2020, and 2021 capital

[1] "Capital Budget Application Guidelines," Board of Commissioners of Public Utilities, rev. October 2007 (originally issued June 2, 2005).
[2] "2022 Capital Budget Application," Newfoundland and Labrador Hydro, rev. September 17, 2021 (originally filed August 2, 2021), CA-NLH-002.

programs; a summary was included in the capital expenditures and carryover reports for those years.

The analysis completed in 2020 identified three main causes of under-expenditure to that point:

1. Carryover of work to subsequent years due to impacts of the COVID-19 pandemic;
2. Work completed for less than the original budget estimates; and
3. Cancelled scopes of work.[3]

Actual expenditures in Hydro's overall capital program for 2021 were approximately 16.7%, or $22.8 million, below budget. The primary driver of Hydro's under-expenditure in 2021 was the carryover of work to future years, primarily as a result of the strategic deferral of work and the impacts of the COVID-19 pandemic on the supply chain. This carryover of work is largely associated with the carryover of work within multi-year projects continuing in 2022. For a more complete summary of the expenditure analysis, please refer to Section 5 of CA-NLH-002, Attachment 1.

Hydro continues to review its capital budget planning and execution methodologies and uses its expenditure analysis to identify trends and potential areas for improvement to reduce capital expenditure variances in future years.

b) In most instances where Hydro did not spend the entire capital budget amount approved by the Board, the underspend was the result of either Hydro completing the proposed scope of work for less than the estimated cost or the result of the carryover of work for execution in a subsequent year. Carryovers can occur due to a variety of factors including changes in the timing of work due to other system priorities ongoing. In either case—reduced cost or carryover of work—it is Hydro's view that it is meeting its mandate to deliver service to customers at the lowest possible cost consistent with reliable service. In instances whereby Hydro cancels or defers all or part of a project, such decisions are made through Hydro's

[3] For a more complete summary of the analysis, please refer to Hydro's response to CA-NLH-002, att. 20, sec. 5.0 filed as part of Hydro's 2022 Capital Budget Application.

established management of change process, which considers the risks and mitigations required as a result of project scope changes in light of Hydro's mandate.

c) The Board has broad discretion to obtain information from a public utility. In particular, the *Public Utilities Act* states that the Board ". . . shall have the right to obtain from a public utility all information necessary to enable to the board to fulfill its duties."[4]

[4] *Public Utilities Act*, RSNL 1990, c. P-47, s. 16.

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March 8, 2022

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 Ended December 31, 2021 – Revision 1

Enclosed please find a revision to Newfoundland and Labrador Hydro's Capital Expenditures and Carryover Report for the Year Ended December 31, 2021, originally filed with the Board of Commissioners of Public Utilities on March 1, 2022. Further information regarding the changes is provided in the Revision History sheet. For ease of reference, changes have been shaded grey.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

Shirley A. Walsh
Senior Legal Counsel, Regulatory
SAW/kd

Encl.

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Revision History

Revision	Date	Location	Reason
1	8-Mar-2022	Sec. 6.0, at p. 40, table 3	Correction to the Hydraulic Generation Refurbishment and Modernization – Various Sites; and Terminal Station Refurbishment and Modernization – Various Sites project amounts.

Capital Expenditures and Carryover Report for the Year Ended December 31, 2021

Original Submission: March 1, 2022

Revision 1: March 8, 2022

A report to the Board of Commissioners of Public Utilities

newfoundland labrador hydro

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Appendix A: Financial Schedules

1.0 Capital Expenditure Overview

This report outlines Newfoundland and Labrador Hydro's ("Hydro") capital expenditures and reportable variances for 2021 and project carryovers to 2022 and beyond. In 2021, Hydro's business continuity plans and protocols, implemented in response to the COVID-19 pandemic in 2020, continued to ensure Hydro was able to safely execute essential work through 2021.

1.1 Expenditures

Hydro's 2021 capital expenditures totaled $113.5 million. Expenditures to maintain Hydro's hydraulic generation equipment and infrastructure across the province totalled $20.2 million, including $15.5 million in the Hydraulic Generation Refurbishment and Modernization projects. The thermal generation equipment and infrastructure at the Holyrood Thermal Generating Station ("Holyrood TGS") required expenditures totalling $29.2 million,[1] including $9.8 million to overhaul Unit 1's turbine and valves. Invested capital for terminal station infrastructure totalled $22.4 million,[2] including $12.7 million in the Terminal Station Refurbishment and Modernization projects. More than $14.0 million was invested in Hydro's distribution systems in 2021, including $9.4 million in service extensions and distribution system upgrades.

Included in Hydro's total capital expenditures of $113.5 million was unplanned additional work totaling approximately $14.8 million. This included $4.0 million in emergency work which was completed using Hydro's Allowance for Unforeseen Items account, $1.8 million which was completed under the scope of supplemental projects approved in 2021, and a net $9.0 million increase in work to address in-service failures and unforeseen levels of required refurbishment identified during planned condition assessments in 2021.

Of the $14.8 million of unplanned additional work, approximately $11.7 million was related to the Holyrood TGS which, at the time of filing Hydro's 2021 Capital Budget Application, was expected to be maintained as a generating facility until March 31, 2022. The subsequent extension of Holyrood TGS as a generating facility to March 31, 2023 required Hydro to invest additional capital to support its ability to provide reliable service.

[1] Includes supplemental and unforeseen expenditures.
[2] Includes supplemental and unforeseen expenditures.

1.2 Expenditures Compared to Approved Budget

Actual expenditures in Hydro's overall capital program for 2021 were approximately 16.7% below budget or $22.8 million. The primary driver of Hydro's under-expenditure in 2021 was carryover of work to future years.[3] Hydro will carry approximately $34.1 million into 2022 and beyond,[4] primarily as a result of strategic deferral of work and the impacts of the COVID-19 pandemic on supply chain.

1.2.1 Strategic Deferral of 2021 Work

Hydro chose to strategically defer $13.3 million of capital work. Hydro believes that re-evaluating and confirming the requirement for investment prior to work execution and deferring certain capital work if appropriate is consistent with its legislated obligation to provide reliable service at the lowest possible cost to customers. An example of a strategic deferral is the deferral of the Holyrood Gas Turbine combustor inspection as the unit had not reached the number of equivalent starts Hydro deems necessary to warrant such inspection. Additionally, Hydro deferred replacing the Holyrood Transformer T7 as Hydro believed it prudent to leave Transformer T31, which is intended to replace Holyrood Transformer T7, in Churchill Falls through the winter 2021–2022 operating season until reliability of the Muskrat Falls – Happy Valley Interconnection is proven.

1.2.2 COVID-19 Impacts on Supply Chain in 2021

Approximately $7.6 million of Hydro's carryover relates to supply chain issues associated with the COVID-19 pandemic. In particular, much of Hydro's planned vehicle, light-duty mobile equipment, and personal computer equipment is experiencing delayed delivery.

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 2021, with associated expenditures broken out annually for the periods 2016–2021 (expenditures) and 2022 and beyond (forecast). A breakdown of the variance summary by asset type is presented in Table 1.

[3] Additional information regarding analysis of the variance is included in Section 5.0.
[4] $22.8 million is associated with carryover of work within multi-year projects continuing in 2022 and $11.3 million is associated with carryover of projects that were planned to be completed in 2021.

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

Asset Type	Board Approved Budget	Total Project Expenditures and Forecast	Variance
Hydraulic	46,817	49,370	2,553
Thermal	25,340	31,703	6,362
Gas Turbines	23,095	18,208	(4,887)
Terminal Stations	147,474	128,421	(19,054)
Transmission	22,875	24,801	1,925
Distribution	14,240	15,682	1,442
Rural Generation	26,429	26,510	81
Properties	384	150	(235)
Metering	233	229	(5)
Rural Systems Tools and Equipment	2,045	2,058	13
Information Systems	2,445	2,285	(160)
Telecontrol	1,034	1,107	73
Transportation	8,008	8,334	326
Administrative	2,134	2,118	(16)
Allowance for Unforeseen	2,108	4,007	1,899
Supplemental Projects	23,443	23,574	131
Projects Approved for less than $50,000	95	87	(8)

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;
- Transmission;
- Distribution;
- Rural Generation;
- Properties;

- Metering;
- Tools and Equipment;
- Information Systems;
- Telecontrol;
- Transportation;
- Administration;
- Allowance for Unforeseen Items;
- Supplemental Capital Projects; and
- Projects less than $50,000.

4.0 Variance Explanations (Greater than $100,000 and 10% Variance from Budget)

As per the Capital Budget Guidelines[5] set forth by the Board of Commissioners of Public Utilities ("Board"), Hydro is required to report on actual capital expenditure variances which exceed the approved total project budget by more than 10% and $100,000.[6] Hydro has also included variance explanations[7] if the 2021 project expenditures exceeded the approved 2021 budget by more than 10% and $100,000. The projects are ordered and numbered in the sections below based upon the order they appear in the tables found in Appendix A.

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

4.1.1 Refurbish Ebbegunbaeg Control Structure

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	3,236.8	2,196.4	(1,040.4)

[5] The Board issued provisional Capital Budget Guidelines on December 20, 2021, to be used in 2022 for the 2023 Capital Budget Applications and related matters. This filing is prepared pursuant to the Capital Budget Application Guidelines, approved by the Board in October, 2007.
[6] "Capital Budget Application Guidelines," The Board of Commissioners of Public Utilities, rev. October 2007 (originally issued June 2, 2005), sec. C, at p. 11.
[7] Minor discrepancies in the numbers presented in the tables are due to rounding.

This is a four-year project (2021–2024) that commenced in 2021. The variance in 2021 expenditures is primarily attributed to the carryover of the procurement and installation of the electric monorail hoist for the Ebbegunbaeg Control Structure to 2022. A hoist was designed and ordered in 2021 and experienced some fabrication delays at the manufacturer's facility in Germany. The hoist is expected to be received and installed in 2022. The variance in 2021 expenditures is also attributed to the monorail superstructure replacement being completed in 2021 for less than the original budget estimate.

4.1.2 Hydraulic Generation Refurbishment and Modernization (2021–2022) – Various Sites

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	6,569.5	3,640.2	(2,929.3)

This is a two-year project (2021–2022) that commenced in 2021. The project scope includes replacement or refurbishment of failing or failed assets at several hydraulic generating facilities. The variance in 2021 expenditures is primarily attributed to the Unit 6 stator rewind at the Bay d'Espoir Generating Station. Contract award pricing for the rewind is less than the original budget estimate. As well, the contact payment schedule has some of the milestone payments, originally estimated to occur in 2021, now expected in 2022. The rewind project scope remains on schedule with expected completion in 2022.

The variance in 2021 expenditures is also attributed to the carryover to 2022 of a portion of the condition assessment at Salmon River Spillway. The spillway gates and some of the other components to be assessed require the stoplogs to be installed to allow dewatering, but the stoplog monorail hoist was unexpectedly out of service for most of 2021. The hoist is now repaired and the remaining condition assessment work has been rescheduled to 2022. The condition assessment of the components that did not require stoplogs to be installed was completed in 2021 as planned.

4.1.3 Hydraulic In-Service Failures

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	1,250.0	2,059.1	809.1
Project	1,250.0	2,059.1	809.1

This was a one-year project (2021) completed in 2021. The budget for the project was based on prediction of the amount of work required to address in-service failures using historical data and

engineering judgement. The variance in 2021 project expenditures is attributed to the actual number of failures incurred. A detailed list of work executed under this project is found in Section 1.0.

4.1.4 Hydraulic Generation Refurbishment and Modernization (2020–2021) – Various Sites

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	10,322.0	11,900.4	1,578.4

Variance	Budget ($000)	Forecast and Expenditures ($000)	Variance ($000)
Project	16,830.2	19,527.0	2,696.9

This is a two-year project (2020–2021) that commenced in 2020 and has carried over to 2022. The project scope includes replacement or refurbishment of failing or failed assets at several hydraulic generating facilities. Most of the project scopes of work were completed in 2020 and 2021 as planned. Two scopes of work representing less than two percent of the overall project budget have carried over to 2022:

- Three sump pumps at Upper Salmon Generating Station were installed and placed into service in 2021 and two of the three pumps are functioning as intended. One of the pumps is experiencing functional issues and the project has carried over to 2022 to determine the root cause and implement a solution.
- The refurbishment of the sump level system at Cat Arm Generating Station has carried over to 2022. The planned total plant outage required to complete this work was cancelled due to system loads and the requirement for extended outages for other generating units, to facilitate more critical work. This work is rescheduled for 2022.

The variance in 2021 and overall project forecast plus expenditures are primarily attributed to the additional project expenditures that were necessary for the Unit 5 generator stator rewind at the Bay d'Espoir Generating Station. Greater than anticipated effort was required for the stator bar removal and stator cleaning. Due to the existence of a compound injected into the stator core slots in the

1970s,[8] removal of stator bars was difficult and the selected cleaning method was not entirely effective and had to be supplemented with time-consuming manual cleaning. Furthermore, a localized COVID-19 outbreak led to a pause in construction activity and a gradual return to work with direction from Public Health, resulting in additional expenditures associated with the loss of productivity.

4.1.5 Replace Exciter Controls Units 1 to 6 – Bay d'Espoir

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Project	3,347.0	2,343.3	(1,003.7)

This is a four-year project (2017–2020) that commenced in 2017 and was carried over and completed in 2021. The exciter controls replacements for five of the six Bay d'Espoir generating units were completed by the end of 2020. The work for Unit 6 could not be completed during the scheduled 2020 unit outage due to impacts associated with the early stages of the COVID-19 pandemic. At that time, there was uncertainty around the ability to complete work during the pandemic. Several safety considerations contributed to the decision to postpone the work, including challenges maintaining a safe working environment within the plant and concerns regarding mobilizing out-of-province resources into the Bay d'Espoir communities and the Bay d'Espoir Hydroelectric Generating Facility. Guidance on COVID-19 controls was evolving and a COVID-19 control plan had not yet been established. Several logistical challenges and risks to cost and schedule were identified including closure of all local accommodations and reduced productivity due to new COVID-19 controls. The work for Unit 6 was completed in 2021. The variance in overall project expenditures is attributed to the actual costs for engineering and the construction contract being less than the original budget estimates.

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

4.2.1 Overhaul Unit 1 Turbine and Valves – Holyrood

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	8,026.6	9,765.0	1,738.4
Project	8,026.6	9,765.0	1,738.4

[8] As recommended by the original equipment manufacturer ("OEM").

This was a one-year project (2021) that was completed in 2021. The variance in 2021 and overall project expenditures is primarily attributed to the requirement, as part of the turbine overhaul, to replace the turbine high temperature casing studs that were at the end-of-life. This requirement was not identified at the budget phase of the project. Also contributing to the variance was the extent of turbine refurbishment work. Upon disassembly and assessment of the turbine, the necessary refurbishment work was greater than anticipated at the time of the original budget estimate. In addition, there were expenditures for COVID-19 controls, including 14-day isolations for out-of-province workers, enhanced cleaning protocols, and additional contractor lunchroom trailers to promote physical distancing.

4.2.2 Thermal In-Service Failures

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	2,000.0	5,796.4	3,796.4
Project	2,000.0	5,796.4	3,796.4

This was a one-year project (2021) completed in 2021. The budget for the project was based on prediction of the amount of work required to address in-service failures, using historical data and engineering judgement. The variance in 2021 project expenditures is attributed to the actual number of failures incurred. A detailed list of work executed under this project is found in Section 1.0.

The level of expenditures in 2021 required to address failures for the Holyrood TGS was higher than expected, including the following scopes of work that totalled $3,969.4:

- Refurbish Unit 1 Cold Reheat Line ($1,133.5);
- Overhaul Marine Terminal Loading Arms ($684.7);
- Replace Waste Water Treatment Plant Roof ($545.2)[9];
- Refurbish Marine Terminal Fenders ($533.2)[9];
- Replace Unit 1 West Boiler Feed Pump Spare Components ($442.1)[9];
- Refurbish Unit 3 Outfall Discharge Pipe ($343.5); and
- Overhaul Boiler Stack Concrete Columns ($287.2).

[9] Scope of work addressed a failure that occurred in 2020, with execution spanning 2020 and 2021.

To ensure reliable service for customers while the Muskrat Falls assets are brought online and proven reliable, Hydro has made a commitment to have the Holyrood TGS fully available for generation until March 31, 2024. This commitment has been extended several times in one-year increments, increasing the challenge to balance cost and reliability for an aged plant that is nearing the end of its service requirement as a generating facility. With a more certain future, many of the 2021 In-Service Failure requests would likely have been completed under planned capital work. Boiler Stack Refurbishment, and Overhaul of Marine Terminal Loading Arms are two such examples.

4.2.3 Overhaul Unit 3 Boiler Feed Pump East – Holyrood

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	373.0	257.8	(115.2)
Project	373.0	257.8	(115.2)

This was a one-year project (2021) that was completed in 2021. The variance in 2021 and overall project expenditures is attributed to the extent of pump refurbishment work. Upon disassembly and assessment of the pump, the level of necessary refurbishment was greater than anticipated at the time of the original budget estimate.

4.2.4 Upgrade Distributed Control System Hardware – Holyrood

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	360.4	171.6	(188.8)

This is a two-year project (2021–2022) that commenced in 2021. The variance in 2021 expenditures is attributed to a global microchip shortage related to the COVID-19 pandemic, delaying factory assembly of the new distributed control system components. The factory acceptance test and component delivery are now expected to be completed in 2022.

4.2.5 Boiler Condition Assessment and Miscellaneous Upgrades – Holyrood

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	3,000.0	3,889.2	889.2
Project	3,000.0	3,889.2	889.2

This was a one-year project (2021) that was completed in 2021. The variance in 2021 and overall project expenditures was primarily attributed to the extent of boiler refurbishment work. Upon disassembly and assessment of the boiler, the level of necessary refurbishment was greater than anticipated at the time of the original budget estimate. A summary of activities completed that were not originally contemplated in the project scope are included in Section 12.0. In addition, there were expenditures for COVID-19 controls, including 14-day isolations for out-of-province workers, enhanced cleaning protocols, and additional contractor lunchroom trailers to promote physical distancing.

4.2.6 Upgrade Waste Water Equalization System – Holyrood

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	1,813.4	168.2	(1,645.2)

This is a two-year project (2021–2022) that commenced in 2021. The variance in 2021 expenditures is attributed to a change in the project execution plan resulting in most of the 2021 planned activities shifting into 2022. The plan reflected in the original budget proposal included completion of a portion of the construction in 2021 and the remaining construction in 2022. During detailed project planning, it was determined that construction in a single year would result in less risk, during project execution, to the safe and reliable operation of the existing equipment in the wastewater equalization building. Engineering was completed in 2021 and construction is now scheduled for 2022.

4.2.7 Inspect Chemical Tanks – Holyrood

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	919.8	514.6	(405.1)
Project	919.8	514.6	(405.1)

This was a one-year project (2021) that was completed in 2021. The variance in 2021 and overall project expenditures is attributed to the extent of chemical tank refurbishment work. Upon cleaning and assessment of the tanks, the level of necessary refurbishment was less than anticipated at the time of the original budget estimate.

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

4.3.1 Construct Lube Oil Cooler Hood and Containment System – Holyrood Gas Turbine

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	318.8	210.6	(108.2)

This is a one-year project (2021) that commenced in 2021 and has carried over into 2022. The project scope is to install a new lube oil cooler hood and containment system for the Holyrood Gas Turbine. The variance in 2021 expenditures is attributed to the construction being rescheduled to 2022. The construction was originally scheduled for October 2021 during a three-week planned outage of the gas turbine. The outage was delayed and subsequently cancelled in 2021 due to system loads and the requirement for extended outages for other generating units, to facilitate more critical work. The required gas turbine outage is being rescheduled to 2022.

4.3.2 Replace Fuel Oil, Lube Oil, and Glycol Pumps – Happy Valley Gas Turbine

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	234.8	111.3	(123.5)

Variance	Budget ($000)	Forecast and Expenditures ($000)	Variance ($000)
Project	405.3	286.7	(118.6)

This is a two-year project (2021–2022) that commenced in 2021. The project scope is to replace the existing fuel, lube oil and glycol pumps and motors. The project remains on schedule with expected completion in 2022. The variances in 2021 and overall project expenditures plus forecast are attributed to lower vendor pricing compared to the original budget estimates for the supply of the new pumps.

4.3.3 Perform Combustor Inspection – Holyrood Gas Turbine

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	3,038.5	39.3	(2,999.2)

This is a two-year project (2020–2021) that commenced in 2020 and is carrying over to 2023. The project scope is to complete a combustor inspection and overhaul for the Holyrood Gas Turbine. The

variance in 2021 expenditures is attributed to a change in the required timing of the project. The combustor inspection frequency is based on the number of gas turbine equivalent starts, with the next inspection due at 1,120 lifetime equivalent starts. At the time of the budget proposal, it was projected that this number of equivalent starts would be accumulated in 2021. An updated projection has concluded that the equivalent starts threshold will not be reached until 2023. The project schedule has therefore been extended to 2023. Hydro will continue to update the projected equivalent start projections to determine if further change to the project schedule is warranted.

4.3.4 Install Partial Discharge Monitoring – Holyrood Gas Turbine

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	429.4	230.3	(199.0)

This is a two-year project (2020–2021) that commenced in 2020 and has carried over to 2022. The project scope is to install a partial discharge monitoring system for the Holyrood Gas Turbine generator. The variance in 2021 expenditures is attributed to the construction being rescheduled to 2022. The construction was originally scheduled for October 2021 during a three-week planned outage of the gas turbine. The outage was delayed and subsequently cancelled in 2021 due to system loads and the requirement for extended outages for other generating units, to facilitate more critical work. The required gas turbine outage is being rescheduled to 2022.

4.3.5 Replace Fire Suppression System – Happy Valley Gas Turbine

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	2,349.1	1,764.1	(585.0)
Project	2,642.4	1,923.0	(719.4)

This was a two-year project (2020–2021) that commenced in 2020 and was completed in 2021. The project scope was to replace the existing carbon dioxide fire suppression systems with modern fire suppression systems at the Happy Valley Gas Turbine. In the original budget proposal, it was identified that different types of fire suppression systems might be chosen for the various spaces to be protected. Through detailed engineering, it was determined that a hybrid nitrogen-water fire suppression system was suitable for all spaces to be protected. The variances in 2021 and overall project expenditures are attributed to the selection of a single type of system and lower engineering and contract pricing compared to the original budget estimate.

4.3.6 Generator Assessment – Happy Valley Gas Turbine

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	1,021.6	1,145.9	124.3
Project	1,097.6	1,221.9	124.3

This was a one-year project (2020) that commenced in 2020 and was carried over and completed in 2021. The project scope was to dismantle the generator to inspect, test, and clean the generator rotor and stator. The work was completed by the vendor holding the OEM intellectual property for the gas turbine. In the first half of 2020, that vendor was unable to provide an on-time proposal and quotation for the work, partially due to COVID-19 and a decision by the vendor to furlough its employees in the United Kingdom. The vendor also advised that the material and tooling delivery time from third-party vendors increased to 15 weeks. These delays would have pushed the field activity into the fall of 2020. Completing the work in the fall would have introduced significant system risk, in that there would be inadequate time to address any unforeseen issues identified during the inspection prior to the winter, when the gas turbine is required for system reliability. On-site vendor expertise was required for the work, and those resources were from the United States of America ("USA") and the United Kingdom. Such travel was complicated in 2020 by international travel restrictions related to COVID-19. Reviewing the project and system risks, Hydro rescheduled and subsequently completed the work in 2021.

The variances in 2021 and overall project expenditures are primarily attributed to the following work that was identified and completed as part of the generator assessment:

- Rebabbiting of two worn bearings; and
- Replacement of one worn bearing.

The variances in 2021 and overall project expenditures are also attributed to costs related to managing the risk of COVID-19. At the time of mobilization of the vendor's technical resources, international travelers were required to self-isolate for 14 days in St. John's prior to traveling to Labrador.

4.3.7 Increase Fuel and Water Treatment System Capacity – Holyrood Gas Turbine

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	724.8	157.2	(567.6)

Variance	Budget ($000)	Forecast and Expenditures ($000)	Variance ($000)
Project	11,842.6	7,705.2	(4,137.4)

This is a two-year project (2018–2019) that commenced in 2018 and has carried over into 2022. The scope of work for this project is to expand the water treatment plant and install two new fuel storage tanks at the Holyrood Gas Turbine. In 2019, the water treatment plant expansion was completed and put into service. Also in 2019, construction was completed for the two new fuel storage tanks and they were placed in service with manual operation capability. The project carried over into 2020 to complete the automation of the fuel transfer system and complete secondary containment liner work that was hampered by inclement weather in 2019. The automation of the fuel transfer system work was completed in 2020. The secondary containment liner work was completed in 2020 as well, but does not yet meet final acceptance criteria as the leakage rate measured in the dyke permeability test was higher than acceptable. The project carried over into 2021 for further investigation of the liner and resolution of the issue. The locations of leaks could not be identified and it was concluded that replacement of the complete liner is necessary to achieve an acceptable permeability rate. This work was tendered and awarded to a contractor in 2021, with construction scheduled for 2022. The variance in 2021 expenditures is attributed to the fuel storage secondary containment liner work being rescheduled to 2022.

The variance in overall project expenditures plus forecast is attributed to lower than estimated contract prices for the fuel tank construction completed in 2019. At the time of budget preparation, Hydro requested contractor budget pricing; however, the estimates were not received in time for inclusion in the project estimate prior to submission of the 2018 Capital Budget Application. In lieu of estimates from the contractor, Hydro used cost data from the original plant construction.

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

4.4.1 Terminal Station In-Service Failures

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	1,800.0	1,178.0	(622.0)
Project	1,800.0	1,178.0	(622.0)

This was a one-year project (2021) completed in 2021. The budget for the project was based on prediction of the amount of work required to address in-service failures, using historical data and engineering judgement. The variance in 2021 project expenditures is attributed to the actual number of failures incurred. A detailed list of work executed under this project is found in Section 9.0.

4.4.2 Upgrade Circuit Breakers – Various (2021–2023)

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	5,418.8	2,597.7	(2,821.0)

This is a three-year project (2021–2023) that commenced in 2021.[10] The project scope includes several circuit breaker replacements and refurbishments at a number of terminal stations. The variance in 2021 expenditures is attributed to:

- Work being completed for less than the budget estimate;
- A shift in the timing of some progress payments for the supply of new breakers into 2022;
- The planned deferral of one breaker replacement from 2022–2023 (shifting the associated 2021–2022 costs to 2022–2023); and
- The carryover of one breaker refurbishment to 2022 due to the unavailability of parts from the OEM.

[10] This project was originally proposed as a two-year project (2021–2022) as part of the 2021 Capital Budget Application. The project schedule was then updated and approved as a three-year project (2021–2023) as part of the 2022 Capital Budget Application.

4.4.3 Upgrades for Future Retirement of Stephenville Gas Turbine

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	1,530.3	151.8	(1,378.6)

This is a two-year project (2021–2022) that commenced in 2021. The project scope includes a number of upgrades to the Bottom Brook and Stephenville Terminal Stations to minimize the risk of customer outages due to a transformer or transmission line failure, following the decommissioning of Stephenville Gas Turbine.

The variance in 2021 expenditures is primarily attributed to the cancellation of a portion of the project scope following an optimization of the engineering design of Bottom Brook Terminal Station. The procurement and installation of the following equipment was removed from the project scope:

- One 230 kV circuit breaker;
- One 72.5 kV circuit breaker;
- Three 72.5 kV disconnect switches;
- Power and control cables for the above listed equipment;
- Take off structures including overhead conductor; and
- Protection, control and communications upgrades for the above listed equipment.

The variance in 2021 expenditures is also attributed to the delay in completion of a portion of the engineering and procurement activities to 2022, resulting from the pause in the project to optimize and confirm the scope.

4.4.4 Additions for Load – Wabush Substation Upgrades

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	1,186.7	300.6	(866.1)

This is a three-year project (2021–2023) that commenced in 2021. The project scope includes a number of equipment replacements and upgrades to ensure a reliable supply to the Wabush Substation customers. The variance in 2021 expenditures is attributed to a change in the project execution plan resulting in the yard extension construction being rescheduled to 2022, following the completion of

surveying, geotechnical work and engineering design in 2021. The variance is also attributed to the removal from the project scope of the purchase and installation of one 12.5 kV voltage regulator bank to be installed on feeder 7 L13 and the purchase of one spare voltage regulator. This scope was cancelled following a review of updated system requirements.

4.4.5 Wabush Terminal Station Upgrades

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	2,301.7	794.0	(1,507.7)

This is a three-year project (2021–2023) that commenced in 2021. The project scope includes the replacement of Transformers T4 and T5 and the addition of a new capacitor bank to support Hydro's ability to provide firm supply for customers in accordance with the criteria established for the transmission system in western Labrador. The variance in 2021 expenditures is attributed to a change in the project execution plan resulting in the yard extension construction being rescheduled to 2022, following the completion of surveying, geotechnical work and engineering design in 2021. The variance is also attributed to a portion of the engineering for the capacitor bank replacement carrying into 2022 and transformer milestone payments originally expected in 2021 now expected in 2022.

4.4.6 Terminal Station Refurbishment and Modernization – Various Sites

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	6,171.6	3,903.3	(2,268.3)

This is a two-year project (2021–2022) that commenced in 2021. The project includes a number of consolidated program-type projects across several sites. The variance in 2021 expenditures is primarily associated with the capital programs for power transformers; protection, control and monitoring systems; and grounding systems. The 2021 variance is primarily attributed to a portion of the engineering and procurement activities carrying over into 2022. Additionally, work was completed in 2021 for less than the original budget estimates.

The following scope items were cancelled following review of updated asset condition information indicating that the work was not immediately required:

- Cat Arm Transformer T1 Oil Processing; and

- Muskrat Falls Terminal Station Transformer T1 Bushing Replacements.

4.4.7 Replace Transformer T7 – Holyrood Terminal Station

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	2,017.5	250.2	(1,767.3)

This is a one-year project (2020) that has carried over into 2022. The variance in 2021 expenditures is attributed to further rescheduling of the transformer replacement at Holyrood to 2022. As a result of Hydro's decision to maintain Transmission Line L1301 as a backup for the Muskrat Falls – Happy Valley Interconnection for the winter of 2020–2021, Churchill Falls Transformer T31 was not available in 2020 to replace Holyrood T7 as planned by Hydro and approved by the Board. In 2020, Hydro performed an analysis of the resulting risk and confirmed that there would be low risk to customers as a result of this deferral. Hydro advised Newfoundland Power Inc. ("Newfoundland Power") of this decision. In 2021, as a consequence of the further deferral of the Muskrat Falls – Happy Valley Interconnection, the Churchill Falls Transformer T31 again was not available to replace Holyrood T7. As Hydro intends to continue to maintain L1301 as a backup supply for the 2021–2022 winter season, T31 will remain in Churchill Falls until summer 2022. Removal of the old Holyrood T7 and its foundation, and installation of a new concrete pad and oil containment system, were completed in 2020.

4.4.8 Terminal Station Refurbishment and Modernization – Various Sites

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	7,194.8	6,316.4	(878.4)

Variance	Budget ($000)	Forecast and Expenditures ($000)	Variance ($000)
Project	9,397.2	8,435.5	(961.7)

This is a two-year project (2020–2021) that commenced in 2020 and has carried over into 2022. The project includes a number of consolidated program-type projects across several sites and a focused refurbishment at Wabush Terminal Station. The variances in 2021 and overall project expenditures are primarily associated with the capital program for the refurbishment of Wabush Terminal Station. The variances are primarily attributed to work completed for less than the original budget estimates.

The following scope items have been carried over to 2022 within this project:

- Wabush Line L2 differential line protection upgrade, to align timing with a customer protection upgrade project that is now scheduled for 2022; and
- Happy Valley Fault Recorder installation, due to delays associated with another project that had to be completed prior to this work.

The following scope items were cancelled following review of updated asset condition information indicating that the work was not immediately required:

- Insulator replacements at Churchill Falls and Roddickton; and
- Major refurbishment of transformers at Hampden and Jackson's Arm.

4.4.9 Terminal Station Refurbishment and Modernization – Various Sites

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	3,964.6	2,440.7	(1,523.9)

Variance	Budget ($000)	Forecast and Expenditures ($000)	Variance ($000)
Project	29,952.9	20,239.7	(9,713.2)

This is a two-year project (2019–2020) that has been carried over to 2022, and includes a number of consolidated program-type projects across several sites and a focused refurbishment at Wabush Terminal Station. The variance in 2021 expenditures is primarily associated with the capital programs for protection control and monitoring systems and the refurbishment of Wabush Terminal Station. The variance is primarily attributed to:

- Carryover of the following scopes of work to 2022:
  - Bay d'Espoir and Sunnyside transmission line TL 206 protection upgrades, due to outage unavailability in 2021;
  - Cat Arm 230 kV Bus B1 protection upgrade, due to outage unavailability in 2021;
  - Cat Arm and Deer Lake transmission line TL 247 protection upgrades, to align with timing of transmission line TL 248 protection upgrades planned as part of another project in 2022;

- Western Avalon transformers T1 and T2 protection upgrades, as a planned deferral of work to level the demand on protection and control resources; and

- Work completed at Wabush for less than the original budget estimates.

The variance in overall project expenditures plus forecast is primarily associated with the capital programs for the refurbishment of power transformers, Wabush Terminal Station, protection control and monitoring systems, and disconnect switch replacements. The overall project variance is primarily attributed to:

- Work completed at Wabush for less than the original budget estimates;
- Protection upgrades and disconnect switch replacements completed for less than the original budget estimates;
- The cancellation of the following scopes of work following review of updated asset condition information indicating that the work was not immediately required:
  - Transformer bushing replacements at Churchill Falls, Stephenville, Hawke's Bay, Granite Canal and Hardwoods Terminal Stations;
  - Instrument transformers replacements at Holyrood Bus B6, Hardwoods Transformer T3, and L'Anse-au-Loup;
  - Installation of a moisture reduction system for Bay d'Espoir Transformer T1;
  - Insulator replacements at Churchill Falls; and
- The transfer of the following scopes of work to the 2021–2022 Terminal Station Refurbishment and Modernization project, which has sufficient budget for this work:
  - Transformer upgrades at various sites, including several tap changer upgrades requiring support from out-of-province contractors which could not be secured during the COVID 19 pandemic in 2020;
  - Hardwoods Bus B7 and several Churchill Falls instrument transformer replacements due to late equipment deliveries and outage unavailability in 2020;
  - Bay d'Espoir Transformer T6 radiator replacement due to outage unavailability in 2020;
  - Insulator replacements at Happy Valley, due to last minute cancellation of the crane contractor who had double-booked;

- Insulator replacements at Churchill Falls due to outage unavailability; and
- Disconnect switch replacements at Sunnyside, due to outage availability and updated condition assessment.

4.4.10 Upgrade Circuit Breakers – Various Sites

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Project	50,900.5	44,310.9	(6,589.6)

This is a five-year project (2016–2020) that commenced in 2016 and was carried over and completed in 2021. The project scope included several circuit breaker replacements and refurbishments at a number of terminal stations each year. The variance in total project expenditure is attributed to:

- Work being completed for less than the budget estimates; and
- The elimination of five breakers from the project scope:
  - One breaker at Western Avalon Terminal Station in 2018, due to a reconfiguration of the terminal station;
  - One breaker at Bay d'Espoir Terminal Station 2 in 2018, due to a reconfiguration of the terminal station
  - One breaker at Bay d'Espoir Terminal Station 2 in 2019, which was instead refurbished in 2020;
  - One breaker at Hardwoods Terminal Station in 2019, which was instead refurbished in 2020; and
  - One breaker at Stephenville Terminal Station in 2020, due to a planned reconfiguration of the terminal station.

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

4.5.1 Muskrat Falls – Happy Valley Interconnection

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	2,790.2	3,273.4	483.2

This is a two-year project (2019–2020) that commenced in 2019 and has carried over into 2022. The variance in 2021 expenditures is primarily attributed to additional work associated with the replacement of the Bus 12 and Bus 14 bus conductors at the Happy Valley Terminal Station. During detailed design, a requirement was identified to increase the bus conductor size to accommodate a higher current rating after the Muskrat Falls – Happy Valley Interconnection is complete. The review showed that existing B11 and B13 conductors were sized adequately, however B12 and B14 bus conductors required replacement. Also contributing to the variance, the project management and construction management costs were greater than anticipated at the time of the original budget estimate as a result of the extension of the project schedule to accommodate the additional work and required equipment outages.

In October 2021, a decision was made to postpone the interconnection of the new line (L1303) and keep L1301 in service until reliable supply from Muskrat Falls could be established, as voltage regulation provided by Muskrat Falls generation is a prerequisite for the interconnection between Muskrat Falls and Happy Valley-Goose Bay. This meant that the remaining work to complete the interconnection and the relocation the transformer from Muskrat Falls Terminal Station 3 to Happy Valley Terminal Station was rescheduled to 2022. However, on November 25, 2021 a winter storm in Labrador resulted in the failure of a structure on L1301 and an unplanned outage to the communities in the Labrador East Interconnected System. As a result, the decision was made to enact the contingency plan to isolate L1301 and interconnect Happy Valley Terminal Station to Muskrat Falls through the new transmission line L1303. Power was restored to customers in Labrador East via the interconnection on the evening of November 26, 2021. Modifications and commissioning of the transformer protection at Muskrat Falls were subsequently completed on December 10, 2021.

The interconnection and all other project work are now substantially complete except for the relocation of the 50 MVA transformer from Muskrat Falls Terminal Station 3 to Happy Valley Terminal Station, which is scheduled for the summer of 2022.

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

4.6.1 Provide Service Extensions – All Areas

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	3,740.5	4,343.5	602.9
Project	3,740.5	4,343.5	602.9

This is an annual project to provide service extensions to customers. The budget is based on historical data from each region. The annual and project variance is due to a higher number of service extension requests than forecasted, particularly in Labrador.

4.6.2 Distribution In-Service Failures, Miscellaneous Upgrades, and Streetlight Modernization – All Areas

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	3,803.6	5,032.6	1,229.0
Project	3,803.6	5,032.6	1,229.0

This is an annual project to address in-service failures of distribution equipment and complete upgrades to maintain reliable service to customers. The budget is based on historical cost data for each region. The LED streetlight modernization effort is also executed within this project. The annual and project variance is due to higher than forecasted costs which included extensive refurbishment requirements following a major ice event in January 2021 in Southern Labrador, particularly in the community of Cartwright.

4.6.3 Addition for Load Growth – Happy Valley Line 7

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	617.6	391.3	(226.3)

This is a one-year project (2021) that has carried over into 2022. The variance in 2021 expenditures is attributed to a portion of the procurement and construction activities carrying over into 2022 due to COVID-19 delays in manufacturing of regulators. One set of regulators was received and installed in 2021 and the second set is expected to be installed in 2022.

4.6.4 Labrador City L22 Voltage Conversion

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	593.6	0.0	(593.6)
Project	593.6	0.0	(593.6)

This is a one-year project (2021) that was cancelled. As communicated to the Board in a letter dated July 9, 2021, Hydro's original proposal was for the conversion of Line 22 in Labrador City from 4.16 kV to 25 kV and its connection to a distribution line originating in Vanier Substation. The original project proposal did not include the replacement of the underground infrastructure (i.e., underground cables and ductwork), temporary generation, and installation of transformers, as it was originally believed this work was the responsibility of the customer associated with this infrastructure. A review of the infrastructure has determined that ownership rests with Hydro and, as such, Hydro has an obligation to complete the work required to ensure continued, reliable service to the customer. Given the material change in scope and associated cost impacts, Hydro cancelled the project. Hydro subsequently proposed a project with revised scope, timing, and associated costs in its 2022 Capital Budget Application which has been approved by the Board.

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

4.7.1 Overhaul Diesel Units – Various

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	1,232.9	790.4	(442.5)
Project	1,232.9	790.4	(442.5)

This was a single-year project (2021) that was completed in 2021. The project scope was to overhaul diesel engines when they reach a specified number of operating hours or experience an issue that necessitates an unplanned overhaul. The variance in 2021 and overall project expenditures was attributed to less overhauls required in 2021 than anticipated at the time of the original budget estimate.

4.7.2 Diesel Genset Replacements (2021–2022)

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	2,560.6	1,503.8	(1,056.8)

Variance	Budget ($000)	Forecast and Expenditures ($000)	Variance ($000)
Project	2,846.8	2,546.8	(300.0)

This is a two-year project (2021–2022) that commenced in 2021. The project scope is to replace a diesel genset and upgrade associated mechanical, electrical, protection and control equipment in the Nain Diesel Plant. The variance in 2021 expenditures is primarily attributed to a late project start, following later than anticipated approval of the project.[11] The new genset was procured and installation commenced in 2021 and the remaining construction activity is expected to be completed in 2022. In addition, the variances in 2021 and overall project expenditures plus forecast are attributed to the engineering, procurement, and construction being completed for less than anticipated at the time of the original budget estimate.

4.7.3 Inspect Fuel Storage Tanks – Postville

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	532.6	350.3	(182.3)
Project	532.6	350.3	(182.3)

This was a one-year project (2021) that commenced and was completed in 2021. The project scope was to clean, inspect and refurbish two 319,000 litre diesel fuel storage tanks. The variance in 2021 and overall project expenditures was attributed to the contract pricing for the work being less than anticipated at the time of the original budget estimate; no significant tank refurbishment work was required following the inspections.

[11] This project was approved by the Board on March 29, 2021 in Board Order No. P.U. 11(2021).

4.7.4 Replace Fuel Storage Tank – Paradise River

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	350.3	234.1	(116.2)
Project	350.3	234.1	(116.2)

This was a one-year project (2021) that commenced and was completed in 2021. The project scope was to replace the existing 45,400 litre diesel fuel storage tank and associated piping with two new 8,000 litre horizontal, double wall tanks and associated piping. The variance in 2021 and overall project expenditures was attributed to the contract pricing for the work being less than anticipated at the time of the original budget estimate.

4.7.5 Diesel Plant Ventilation Upgrade – Nain

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	757.0	557.0	(199.9)
Project	853.1	653.1	(200.0)

This was a two-year project (2020–2021) that commenced in 2020 and was completed in 2021. The project scope was to upgrade the original plant ventilation system with a higher capacity system to provide adequate cooling and reduce maintenance. The variances in 2021 and overall project expenditures were attributed to contract pricing for the work being less than anticipated at the time of the original budget estimate.

4.7.6 Diesel Genset Replacements – Mary's Harbour

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	349.8	729.0	379.2

This was a one-year project (2020) that commenced in 2020, and was carried over and completed in 2021. The project scope was to replace two diesel genset units and upgrade associated mechanical, electrical, protection and control equipment at Mary's Harbour Diesel Plant. This work was substantially completed in 2020, and the remaining work to upgrade the plant automatic control system was completed in 2021.

The variance in 2021 expenditures is primarily attributed to the unexpected early failure of a generator for one of the gensets installed in 2020. The manufacturer provided a replacement generator under warranty, which was installed and placed in service in 2021. This failure event delayed the completion of the plant automatic control system upgrade, and resulted in additional engineering and construction effort and associated travel costs.

4.7.7 Replace Powerhouse Roofing System – L'Anse-au-Loup and St. Anthony Diesel Plant

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	1,199.7	105.8	(1,093.9)

Variance	Budget ($000)	Forecast and Expenditures ($000)	Variance ($000)
Project	1,321.2	1,085.0	(236.2)

This is a two-year project (2020–2021) that commenced in 2020 and has carried over into 2022. The project scope is to replace the roofing systems and install rooftop fall protection systems for the St. Anthony and L'Anse-au-Loup Diesel Plants. The variance in 2021 expenditures is attributed to the construction activities carrying over to 2022. The contractor was unable to procure roof panels in time for installation in 2021 due to manufacturer delays. The variance in overall expenditures plus forecast is attributed to the contract pricing for the work being less than anticipated at the time of the original budget estimate.

4.7.8 Diesel Genset Replacements (2019–2020)

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	2,834.6	2,535.2	(299.4)

This is a two-year project (2019–2020) that commenced in 2019 and has carried over into 2022. The variance in 2021 expenditures is attributed to a portion of the scope carrying over to 2022. The project purpose is to increase the generation capacity of the Cartwright Diesel Plant and to replace a genset that had reached end-of-life. Work originally planned for 2020 carried over to allow engineering and construction resources to focus on higher priority work during the COVID-19 pandemic, specifically the diesel genset replacements at Makkovik and Mary's Harbour. At Cartwright, an overhaul of an existing

diesel genset was completed in 2020 to bolster plant reliability through the winter of 2020–2021. Most of the project scope was subsequently completed in 2021, including replacement of the genset to provide the required capacity to the community. A portion of the remaining plant automation work has carried over to 2022 due to internal protection and control resources in 2021 being dedicated to higher priority work.

4.7.9 Diesel Genset Replacements – Makkovik

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	(225.2)	1,331.0	1,556.2
Project	8,900.2	10,456.4	1,556.2

This was a three-year project (2018–2020) that commenced in 2018 and was carried over and completed in 2021. The project scope was to replace a genset that reached end-of-life, upgrade associated mechanical and electrical equipment, extend the diesel plant building to accommodate the new genset, and install a new fire suppression system. The variances in 2021 and overall project expenditures were attributed to additional costs that were not anticipated at the time of the original budget estimate, specifically:

- Contaminated soil requiring remediation;
- Unanticipated technical issues that arose from the fuel system design, that required more engineering effort to resolve; and
- Evolving requirements to manage the COVID-19 risk that led to additional project management, planning and construction costs.

4.7.10 Replace Automation Equipment – St. Anthony

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	170.0	24.0	(146.0)

Variance	Budget ($000)	Forecast and Expenditures ($000)	Variance ($000)
Project	1,873.3	2,248.1	374.8

This is a two-year project (2018–2019) that commenced in 2018 and has carried over to 2022. The engineering, procurement and construction were substantially completed in 2019, and the automation programming and commissioning carried over to 2020 due to the requirement to divert resources to support work in Charlottetown following the diesel plant fire in late 2019. Some of the automation work was completed in early 2020 but COVID-19 restrictions during the early stages of the pandemic resulted in the technical resources demobilizing from site. Those technical resources were then dedicated to higher priority work for the remainder of 2020. COVID-19 impacts in early 2021 again impacted this work and technical resources were dedicated to higher priority work for the remainder of 2021. The remaining automation work has been rescheduled to 2022.

The variance in 2021 expenditures is attributed to the rescheduling of the remaining project activities to 2022. The variance in overall project expenditures plus forecast is attributed to the construction effort being more than in the original project estimate. Some of the protection and control equipment required upgrades that were not anticipated at the time of the budget estimate. Additional labour costs and mobilization and demobilization costs were incurred due to:

- The failure of the existing switchgear for one of the gensets;
- The requirement to divert resources to support work in Charlottetown following the diesel plant fire in late 2019; and
- The starting and stopping of work due to the COVID-19 pandemic.

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

4.8.1 Upgrade Fire Suppression System – Bishop's Falls

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	286.0	51.3	(234.6)
Project	384.2	149.5	(234.6)

This is a two-year project (2020–2021) that has been closed. During the detailed engineering design phase and associated onsite testing of the existing water supply infrastructure, it was determined that there is insufficient flow capacity available to supply the planned extension of the existing sprinkler system. As the project could not be successfully executed as proposed, the construction work was cancelled. Hydro is contemplating a future project that will include this sprinkler system extension and also address the water supply issues at this facility. Costs incurred on this project to test the existing

system and design the sprinkler extensions are of future value and will be held in a work-in-progress account, to be assigned to the asset for depreciation if the subsequent project is approved and executed.

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

There are no reportable variances under Metering Projects.

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

4.10.1 Replace Light-Duty Mobile Equipment – Various Sites

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	549.6	136.1	(413.5)

This is a one-year project that commenced in 2021 and has carried over to 2022. Procurement of the light-duty mobile equipment was initiated in 2021 but most equipment will not be delivered until 2022 due to COVID-19 delivery delays experienced by the suppliers.

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

4.11.1 Replace Hydro Personal Computers (2021)

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	905.4	458.9	(446.6)

This is a one-year project that commenced in 2021 and has carried over to 2022. Procurement of personal computers was initiated in 2021 but some equipment will not be delivered until 2022 due global supply chain delays associated with the COVID-19 pandemic.

4.11.2 Replace Peripheral Equipment (2021)

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	256.4	138.4	(118.0)

This is a one-year project that commenced in 2021 and has carried over to 2022. Procurement of equipment was initiated in 2021 but some equipment will not be delivered until 2022 due to global supply chain delays associated with the COVID-19 pandemic. In addition to supply chain delays, three printers and one plotter were removed from the project scope due to changing business needs.

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

There are no reportable variances under Telecontrol Projects.

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

4.13.1 Replace Light- and Heavy-Duty Vehicles (2021–2022) – Various

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	1,321.0	81.4	(1,239.5)

This is a two-year project (2021–2022) that commenced in 2021. The original project schedule included procurement of a portion of the light-duty mobile equipment in 2021; however, most equipment will not be delivered until 2022 due to COVID-19 delivery delays experienced by the suppliers.

4.13.2 Level II Chargers for Electric Vehicles

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	299.8	194.1	(105.7)

This is a one-year project (2021) that has been carried over into 2022. The project scope is to install charger stations for electric vehicles at nine locations. As noted in responses to 2021 Capital Budget Application requests for information PUB-NLH-020 and PUB-NLH-021, Hydro planned to extend the project schedule into multiple years, if required, to coincide with available federal funding. Work was substantially completed in 2021 at three locations. Funding has subsequently been received for the remaining six locations, which are now scheduled for construction in 2022.

4.13.3 Replace Light-and Heavy-Duty Vehicles (2020-2021) – Various

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	3,205.1	658.7	(2,546.4)

This is a two-year project (2020–2021) that commenced in 2020 and has carried over into 2022. The original project schedule included procurement of a portion of the light-duty mobile equipment in 2020 and 2021. However, the remaining equipment will not be delivered until 2022 due to COVID-19 delivery delays experienced by the suppliers.

4.13.4 Replace Vehicles and Aerial Devices – Various Sites

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	(174.7)	151.1	325.8
Project	1,843.0	2,168.9	325.9

This is a two-year project (2019–2020) that was completed in 2021. The variance in 2021 and overall project expenditures is attributed to higher than anticipated unit costs, due in part to USA steel tariffs and changes in the value of the Canadian dollar.

4.13.5 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)

4.14.1 Allowance for Unforeseen Items

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	2,108.0	4,006.9	1,898.9
Project	2,108.0	4,006.9	1,898.9

The Allowance for Unforeseen Items is an annual $1.0 million allotment that permits Hydro to act expeditiously to deal with events affecting the electrical system that cannot wait for specific approval of the Board.

Costs totalling $108,000 were incurred in 2021 in relation to the work required to complete the replacement of an engine that failed at the Port Hope Simpson Generating Station in 2020. Hydro subsequently received approval to replenish the Allowance for Unforeseen Items Account in Board Order No. P.U. 17(2021).

On October 12, 2021, Hydro notified the Board of a required Allowance for Unforeseen project related to a boiler tube failure at the Holyrood TGS. Costs incurred for this project were $2.25 million.

On November 19, 2021, Hydro notified the Board of a required Allowance for Unforeseen project related to the failure of the T2 power transformer at the Holyrood TGS. Costs incurred for this project in 2021 were $1.65 million.

On December 17, 2021, Hydro received approval to replenish the Allowance for Unforeseen Items Account in Board Order No. P.U. 34(2021) for any unforeseen and urgent capital expenditures necessary for the remainder of 2021.

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

4.15.1 Overhaul Unit 1 Boiler Feed Pump East – Holyrood

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	443.0	554.7	111.6
Project	443.0	554.7	111.6

This is a one-year supplemental project (2021) that commenced and was completed in 2021.[12] The variance in 2021 and overall project expenditures is attributed to the extent of pump refurbishment work. Upon disassembly and assessment of the pump, the level of necessary refurbishment was greater than anticipated at the time of the original budget estimate. The additional refurbishment work included welding, machining, post weld heat treatment, and non-destructive testing, with onsite technical support from the pump original equipment manufacturer during execution.

4.15.2 Valentine Gold Interconnection[13]

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	3,479.3	826.1	(2,653.2)

This is a three-year supplemental project (2021–2023) that commenced in 2021.[14] The variance in 2021 expenditures is attributed to a longer than anticipated environmental assessment process, which resulted a delay in the start of construction activities. Additional environmental submission requirements, beyond what was originally contemplated, are required by the Government of Newfoundland and Labrador. Construction activities are now expected to commence in 2022, pending release from environmental assessment.

[12] The project was approved by the Board on May 26, 2021 in Board Order No. P.U. 18(2021).
[13] The Valentine Gold Interconnection project is fully contributed.
[14] The project was approved by the Board on August 18, 2021 in Board Order No. P.U. 27(2021).

4.15.3 Replace Unit 2047 Ramea (2021)

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	307.7	49.0	(258.7)

This is a three-year supplemental project (2021-2023) that commenced in 2021.[15] The project scope is to replace a genset and upgrade associated mechanical, electrical, protection and control equipment at the Ramea Diesel Plant. The variance in 2021 expenditures is attributed to a portion of the engineering and procurement activities shifting into 2022, following approval of the project in August 2021.

4.15.4 Phase 2 – Electric Vehicle Charging Network

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	1,410.1	59.0	(1,351.1)

This is a two-year supplemental project (2021–2022) that commenced in 2021.[16] The variance in 2021 expenditures is attributed to later than anticipated regulatory approval of the project, resulting in procurement and construction activity carrying over into 2022.

4.16 CIAC[17] Projects (Appendix A, Table A-16)

4.16.1 Phase 2 – Electric Vehicle Charging Network – Federal and Nalcor CIAC

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual - Federal	(441.4)	0.0	441.0
Annual - Nalcor	(107.6)	0.0	107.6

The variance in 2021 contributions from the Federal government and Nalcor Energy are the result of project activities carrying over into 2022 as noted in Section 4.15.4.[18]

[15] The project was approved by the Board on August 20, 2021 in Board Order No. P.U. 28(2021).
[16] The project was approved by the Board on September 29, 2021 in Board Order No. P.U. 30(2021).
[17] Contribution in Aid of Construction ("CIAC").
[18] The project was approved by the Board on September 29, 2021 in Board Order No. P.U. 30(2021).

4.16.2 IOC[19] – Circuit Breaker Replacement and Associated Protection – CIAC

Variance	Budget ($000)	Expenditures ($000)	Variance ($000)
Annual	(750.0)	(412.5)	337.5

This is a two-year project (2021–2022) that commenced in 2021.[20] The variance in 2021 contribution is attributed to the value of work completed in 2021 being less than budgeted.

5.0 Capital Budget Versus Actual Expenditures 2012–2021

Table 2 provides a summary of Hydro's capital budget variances for the years 2012–2021.

Table 2: Capital Budgets/Expenditures 2012–2021

Year	Budget ($000)	Actual Expenditures ($000)	Variance ($000)	Variance (%)
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)
2021	136,304	113,492	(22,812)	(16.7)

In 2021, actual expenditures were below budget in Hydro's overall capital program by $22.8 million (16.7%), as shown in Table 2. The following four capital projects were the main contributors to the variance.[21]

1) Variance 4.3.3: Perform Combustor Inspection – Holyrood Gas Turbine (-$3.0 million).

2) Variance 4.4.2: Upgrade Circuit Breakers (-$2.8 million).

3) Variance 4.15.2: Valentine Gold Interconnection (-$2.7 million).

[19] Iron Ore Company of Canada ("IOC").
[20] The project was approved by the Board on May 31, 2021 in Board Order No. P.U. 19(2021).
[21] The overall actual expenditures would have been 8.7% below budget had there been no variances for these four projects.

4) Variance 4.13.3: Replace Light- and Heavy-Duty Vehicles (-$2.5 million).

Hydro completed an analysis of 2021 projects and expenditures to determine the contributions to the overall variance from the approved capital budget. The results of Hydro's analysis are summarized in Chart 1 and discussed below.

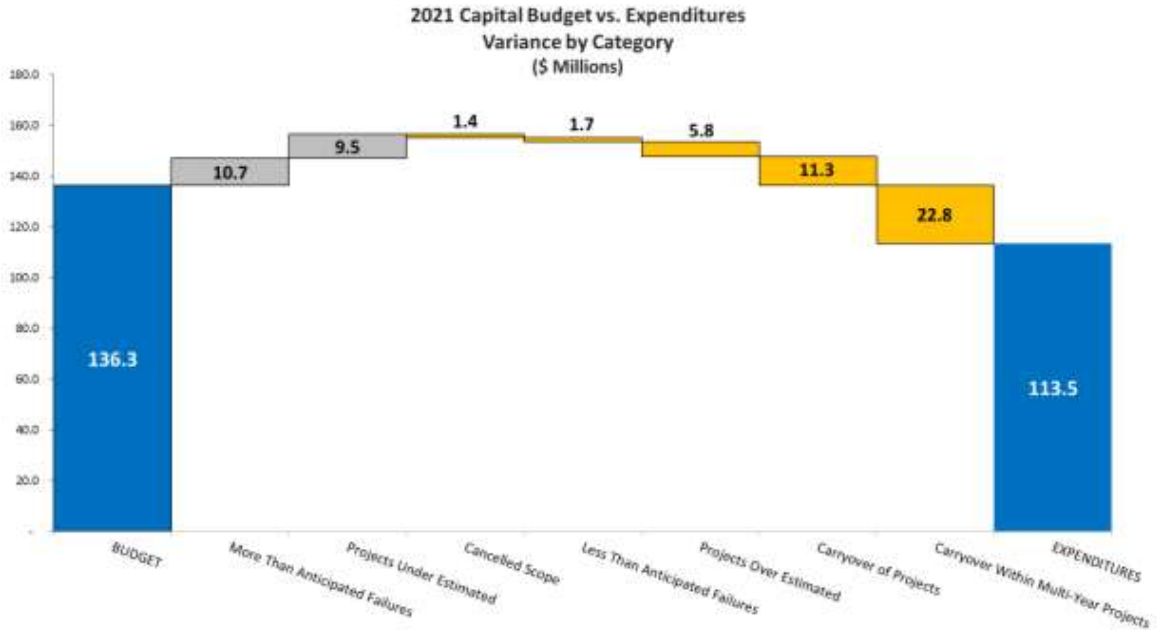

Chart 1: Analysis of 2021 Projects Expenditures

Carryover of Work to Future Years

The primary driver of the 2021 under expenditures was carryover of project work to future years. Total carryover is $34.1 million, of which $22.8 million is associated with carryover of work within multi-year projects continuing in 2022 and $11.3 million is associated with carryover of projects that were planned to be completed in 2021. Three main themes related to carryover were identified – strategic deferral of work, pandemic-related supply chain challenges, and later than anticipated project approvals for capital projects.

1) **Strategic Deferral of Work**. When appropriate, Hydro made strategic decisions to carryover work to future years based on updated asset condition information, updated electrical system planning requirements, or improved project execution plans within multi-year projects. The

projects with the most material scopes of work that were strategically carried over from 2021 to future years were:

- Variance 4.3.3: Perform Combustor Inspection – Holyrood Gas Turbine;
- Variance 4.4.2: Upgrade Circuit Breakers;
- Variance 4.4.7: Replace Transformer T7 – Holyrood Terminal Station;
- Variance 4.2.6: Upgrade Waste Water Equalization System – Holyrood;
- Variance 4.4.5: Wabush Terminal Station Upgrades;
- Variance 4.4.3: Upgrades for Future Retirement of Stephenville Gas Turbine; and
- Variance 4.4.4: Additions for Load – Wabush Substation Upgrades.

2) **Pandemic Related Supply Chain Challenges**. Supply chain challenges during the COVID-19 pandemic resulted in delayed delivery of some new equipment for capital projects that prevented Hydro from placing new assets in service in 2021. The projects with the most material carry over of expenditures due to delayed delivery of equipment were:

- Variance 4.13.3: Replace Light- and Heavy-Duty Vehicles (2020–2021);
- Variance 4.13.1: Replace Light- and Heavy-Duty Vehicles (2021–2022);
- Variance 4.7.7: Replacement Powerhouse Roofing System – L'Anse-au-Loup and St. Anthony Diesel Plant;
- Variance 4.1.1: Replace Ebbegunbaeg Control Structure;
- Variance 4.11.1: Replace Hydro Personal Computers (2021); and
- Variance 4.10.1: Replace Light-Duty Mobile Equipment.

3) **Later than Anticipated Project Approvals**. Approval by the Board or release from environmental assessment for some projects took longer than Hydro anticipated at the time of project budget preparation, leading to later than anticipated project start and carryover of some 2021 project activities into future years. The projects with the most material scopes of work carried over due to later than anticipated approval were:

- Variance 4.15.2: Valentine Gold Interconnection;

- Variance 4.15.4: Phase 2 – Electric Vehicle Charging Network; and
- Variance 4.7.2: Diesel Genset Replacements (2021–2022).

Projects Estimates

Capital project work completed in 2021 for less than the original budget estimate accounted for approximately $5.8 million of under-expenditure and work completed in 2021 for more than the original budget estimate accounted for $9.5 million in over-expenditure, for a net over-expenditure associated with estimates of $3.7 million. Hydro experienced a significant improvement in the variances between project expenditures and the original budget estimates for work completed in 2021 in comparison to previous years. Due to an intentional effort to improve Hydro's capital project estimates, including a specific emphasis on refining contingency estimates,[22] project estimates were not a material contributor to Hydro's under-expenditure in 2021.

Projects Based on Failures and Condition Assessments

Some projects have unknown scopes of work at the time of budget estimate preparation, including: the in-service failures projects for Hydraulic Generation, Thermal Generation and Terminals Stations; projects that utilize the Allowance for Unforeseen account; and several projects that involve taking assets out of service for condition assessment to determine the extent of refurbishment required. For these projects, estimates are typically based on historical cost experience and engineering judgement. In 2021, projects of this nature with expenditures in excess of the estimate accounted for $10.7 million in over-expenditures, and projects of this nature with less expenditures than estimated accounted for $1.7 million in under-expenditures, for a net over-expenditure of $9.0 million. The most material projects in this category with over-expenditures were:

- Variance 4.2.2: Thermal In-Service Failures;
- Allowance for Unforeseen Project: Replace Holyrood TGS Transformer T2;
- Variance 4.2.1: Overhaul Unit 1 Turbine and Valves – Holyrood;
- Allowance for Unforeseen Project: Unit 3 Boiler Waterwall Tube – Holyrood;

[22] For projects that commenced in 2019 or earlier, contingency was typically estimated at 20% and was not required in many cases. Contingency was reduced to approximately 10% in the estimates for projects that started in 2020 or 2021 and has generally been reflecting a more accurate representation of the contingency required upon work execution.

- Variance 4.2.5: Boiler Condition Assessment and Miscellaneous Upgrades – Holyrood; and
- Variance 4.1.3: Hydraulic In-Service Failures.

Cancelled Scope of Work

Following approval of the Board, projects may be cancelled in whole or in part if new information or conditions impact the original project justification. Cancelled scopes of work accounted for $1.4 million in 2021 under-expenditures. The projects with the most material cancelled scopes of work were:

- Variance 4.6.4: Labrador City L22 Voltage Conversion;
- Variance 4.7.1: Overhaul Diesel Units – Various; and
- Variance 4.8.1: Upgrade Fire Suppression System – Bishop's Falls.

Continual Improvement

Hydro continues to review its capital budget planning and execution methodologies and use its expenditures analysis to identify opportunities which may contribute to reduced capital expenditure variances in future years. Given that the primary driver of under-expenditure in 2021 was carryover of work to future years, Hydro intends to further scrutinize its project schedules prior to submission of project proposals, with an emphasis on confirming the following:

- That the planned in-service dates for projects align with best available asset condition and system planning information;
- That project schedules include adequate time for the regulatory review process;
- That project schedules include adequate time for the procurement of long-lead equipment (particularly in the near term when supply chain is impacted by the COVID-19 pandemic); and
- That project schedules reflect a realistic level of procurement and construction activity in the first year of multi-year projects.

6.0 Carryover Report

As discussed in Section 5.0, Hydro's 2021 carryover was primarily driven by strategic deferral decisions, supply chain challenges, and project approval timing. Table 3 provides a summary listing of the carryovers for projects continuing from 2021.

Table 3: 2021 Carryover Report for the Year Ending December 31, 2021 ($000)

Project Name	Category	Board Approved Budget Carried Over Projects [23]	Revised Planned Capital Expenditure Carried Over Projects [23]	Total Actual Expenditures Carried Over Projects [23]	Carryover Amount	Original Completion Year
Increase Fuel and Water Treatment System Capacity - Holyrood Gas Turbine	Gas Turbine Gen	724.8	724.8	157.2	567.6	2019
Replace Human Machine Interface - Cartwright	Rural Gen	56.7	56.7	42.6	14.1	2019
Replace Automation Equipment - St. Anthony	Rural Gen	170.0	170.0	24.0	146.0	2019
Upgrade Uninterruptible Power Supply 3 and 4 - Holyrood	Thermal Gen	65.5	164.8	97.1	67.7	2020
Replace Transformer T7 - Holyrood Terminal Station	Terminal Stations	2,017.5	2,017.5	250.2	1,767.3	2020
Diesel Genset Replacements (2019–2020)	Rural Gen	2,834.6	2,834.6	2,535.2	299.4	2020
Replace Automation Equipment - Rigolet	Rural Gen	305.8	305.8	339.7	(33.9)	2020
Terminal Station Refurbishment and Modernization - Various Sites	Terminal Stations	1,920.8	1,838.8	918.3	920.5	2020
Install Partial Discharge Monitoring - Holyrood Gas Turbine	Gas Turbine Gen	429.4	429.4	230.3	199.0	2021
Construct Lube Oil Cooler Hood - Holyrood Gas Turbine	Gas Turbine Gen	318.8	318.8	210.6	108.2	2021
Purchase Capital Spares - Holyrood Gas Turbine	Gas Turbine Gen	213.8	196.2	159.2	37.0	2021
Replace Light- and Heavy-Duty Vehicles (2020–2021) - Various	Transportation	3,205.1	3,205.1	658.7	2,546.4	2021
Replace Light-Duty Mobile Equipment - Various Sites	Tools and Equip	549.6	549.6	136.1	413.5	2021
Level II Chargers for Electric Vehicles	Transportation	299.8	299.8	194.1	105.7	2021
Install Recloser Remote Control (2020–2021) - Hampden and Upper Salmon	Distribution	222.9	222.9	213.7	9.3	2021
Muskrat Falls – Happy Valley Interconnection	Transmission	2,790.2	4,647.5	3,273.4	1,374.0	2021
Wabush L34 and L35 Protective Relays	Supplemental	234.6	234.6	231.7	2.9	2021
Addition for Load Growth - Happy Valley L7	Distribution	617.6	615.5	391.3	224.1	2021
Replace Powerhouse Roofing System - L'Anse-au-Loup and St. Anthony	Rural Gen	1,199.7	963.3	105.8	857.6	2021
Replace Elevator Motors and Control Equipment - Hydro Place	Administrative	672.5	672.5	595.7	76.8	2021
Replace Personal Computers - Hydro Place	Info Systems	905.4	905.4	458.9	446.6	2021
Replace Peripheral Infrastructure - Hydro Place	Info Systems	256.4	205.0	138.4	66.6	2021
Upgrade Distribution Control System - Holyrood	Thermal Gen	360.4	360.4	171.6	188.8	2022
Upgrade Wastewater Equalization System - Holyrood	Thermal Gen	1,813.4	1,813.4	168.2	1,645.2	2022
Upgrade Circuit Breakers - Various (2021–2022)	Terminal Stations	5,418.8	4,653.4	2,597.7	2,055.7	2022
Upgrade/Retire Stephenville Gas Turbine - BBK T4	Terminal Stations	1,530.3	1,530.3	151.8	1,378.5	2022
Perform Combustor Inspection - Holyrood Gas Turbine	Gas Turbine Gen	3,038.5	3,011.1	39.3	2,971.8	2022
Replace Light- and Heavy-Duty Vehicles (2021–2022) - Various	Transportation	1,321.0	1,321.0	81.4	1,239.5	2022
Distribution System Upgrades (2021–2022) - Various	Distribution	318.9	318.9	328.6	(9.7)	2022
Phase 2 - Electrical Vehicle Charging Network	Supplemental	1,410.1	1,410.1	59.0	1,351.1	2022
Diesel Genset Replacements (2021–2022)	Rural Gen	2,560.6	2,260.6	1,503.8	756.8	2022
Replace Transfer Switches - Hydro Place	Administrative	197.4	197.4	107.7	89.7	2022
Replace Voltage Regulators - Happy Valley Gas Turbine	Gas Turbine Gen	131.3	131.3	53.0	78.3	2022
Replace Fuel Lube Glycol Pump - Happy Valley Gas Turbine	Gas Turbine Gen	234.8	116.2	111.3	4.9	2022
Upgrade Compressed Air - Happy Valley Gas Turbine	Gas Turbine Gen	76.6	76.6	41.8	34.8	2022
Refurbish Ebbegunbaeg Control Structure	Hydraulic Gen	3,236.8	3,236.8	2,196.4	1,040.4	2022
Valentine Gold Interconnection	Supplemental	3,479.3	3,479.3	594.0	2,885.2	2023
Replace Unit 2047 Ramea (2021)	Supplemental	307.7	307.7	49.0	258.7	2023
Upgrade Substation - Wabush	Terminal Stations	1,186.7	1,186.7	300.6	886.1	2023
Upgrade Terminal Station - Wabush	Terminal Stations	2,301.7	2,301.7	794.0	1,507.7	2023
Hydraulic Generation Refurbishment and Modernization - Various Sites (2021–2022)	Hydraulic Gen	5,211.3	5,211.1	2,205.5	3,005.6	2021–2022
Hydraulic Generation Refurbishment and Modernization - Various Sites (2020–2021)	Hydraulic Gen	477.5	931.8	668.3	263.6	2021
Terminal Station Refurbishment and Modernization - Various Sites (2021–2022)	Terminal Stations	5,193.4	4,924.6	3,057.5	1,867.2	2022
Terminal Station Refurbishment and Modernization - Various Sites (2020–2021)	Terminal Stations	2,815.4	1,768.7	1,353.0	415.6	2021
TOTAL CARRYOVER TO 2022 AND BEYOND					**34,131.8**	
Less CIACs:						
Wabush L34 and L35 Protective Relays - CIAC	CIAC	(234.6)	(234.6)	(231.7)	(2.9)	2021
IOC - Circuit Breaker Replacement and Associated Protection - CIAC	CIAC	(625.5)	(625.5)	(287.6)	(337.9)	2022
Phase 2 - Electric Vehicle Charging Network - Federal CIAC	CIAC	(441.4)	(441.4)	-	(441.4)	2022
Phase 2 - Electric Vehicle Charging Network - Nalcor CIAC	CIAC	(107.6)	(107.6)	-	(107.6)	2022
TOTAL CARRYOVER TO 2022 AND BEYOND NET OF CIACs					**33,242.0**	

[23] The Board Approved Budget, Revised Planned Capital Expenditure and Total Actual Expenditures listed are in relation to the component of the project that is being carried over. In instances in which a project has subsets of work (e.g. refurbishment and modernization at various sites) then only the portion of the project that has been carried over has been listed.

7.0 Safety Hazards

In Board Order No. P.U. 38(2010) related to Hydro's 2011 Capital Budget Application, the Board directed Hydro to include in its annual report on capital expenditures an explanation on each project that was undertaken for the Remove Safety Hazards project, setting out the safety hazard that was identified, the location, the steps taken to address the issue, and the amount of the expenditure. Table 4 outlines the projects undertaken in 2021.

Total Approved Budget: **$199,100**

Total Expenditure: **$224,700**

Table 4: Safety Hazards

Project Title and Location	Expenditure ($000)	Safety Hazard Identified	Project Scope
Marine Terminal Railing Refurbishment Holyrood TGS	90.6	Sections of safety railing, sections of vehicle guard rail, and the safety chain system on the operator platform for the fuel offloading arm were observed to be corroded and/or damaged, posing an elevated safety risk to personnel during docking and fuel offloading operations.	Damaged and/or deteriorated railings, guard rails, and the loading arm platform safety chain system were replaced.
Overhead Monorail Crane Drop Stop Bracket Installation Various Locations	48.9	Existing monorail crane trolleys do not include drop stop brackets that prevent the trolley and suspended load from falling to the floor in the event of a wheel failure.	Drop stop brackets were designed, fabricated and installed on the crane trolley units at Hinds Lake Powerhouse and Hinds Lake Intake. Drop stop brackets for Upper Salmon Powerhouse, West Salmon Spillway, Cat Arm Powerhouse, and Hinds Lake Spillway which were designed and fabricated as part of the 2020 Remove Safety Hazards project were installed under the scope of the 2021 Remove Safety Hazards project.

Project Title and Location	Expenditure ($000)	Safety Hazard Identified	Project Scope
Fuel Storage Tank Platforms and Railings Extension Hopedale Diesel Plant	38.6	Operators must access the top of the horizontal fuel tanks to perform fuel measurements and operate control valves. Smooth rounded tank tops pose considerable fall risk while piping in the area adds tripping hazard risk. This risk is typically mitigated by installing ladders and platforms with railings. The tanks in Hopedale have such features but they did not extend to all areas that need to be accessed by operators.	Existing fuel storage tank platforms and railings were extended.
Door Canopies Replacement Wabush Line Depot	30.0	Doorway canopies protect staff and visitors from snow and ice that slides off sloped metal roofs. The existing canopies at the Wabush Line Depot were damaged and at risk of detaching from the building and becoming a safety hazard.	New door canopies were installed which include an improved design for fastening to the wall structure.
Asphalt Paving of Helipad Area Bishop's Falls	16.6	Change from a two-rotor aircraft to a larger three-rotor folding blade aircraft resulted in a new procedure to fold/unfold the blades before and after hangar storage of the helicopter. This procedure requires the use of rolling stair platforms to reach the blades in the area surrounding the aircraft landing zone. The existing area was gravel, making it difficult to safely maneuver and stabilize the platforms.	The gravel area surrounding the aircraft landing zone was paved with asphalt.

8.0 Perform Software Upgrades and Minor Enhancements

In its 2021 Capital Budget Application, Hydro committed to providing a summary of unforeseen work executed under the Perform Software Upgrades and Minor Enhancements project in this report. Table 5 provides a summary of such work.

Project scope changes also included cancellation of two planned scopes of work, as follows:

1) Enhancement to the Work Protection Code System. This system is used to produce necessary documentation to safely isolate pieces of equipment that require maintenance. The enhancement work was cancelled as the vendor has advised that the system is nearing end of life. Hydro is contemplating replacement of the software as part of a future capital budget application.

2) Enhancement of the Planned System Equipment Outage System. This system is an in-house built IBM Notes application/database used to track and manage planned equipment outages. The enhancement work was cancelled as the required timing for this work has changed. At the time of the budget proposal preparation, IBM Notes was planned to be replaced in the near term and, as such, this application/database needed to be redesigned for another platform. The timing of IBM Notes replacement is now under review and this scope of work may form part of a future capital budget application.

Total Approved Budget: **$372,100**

Total Expenditure: **$281,100**

Table 5: Unforeseen Software Upgrades and Enhancement Scope

Project	Expenditure ($000)	Project Scope and Justification
Spreadsheet Server Licences Purchase	30.0	Hydro utilizes Spreadsheet Server software for budget calculations and reporting. Additional licences were required to facilitate reporting requirements within Hydro.
Street Light Tracking Software Upgrade	24.0	Hydro utilizes Street Light Tracking software to manage its street lights for customers. The purpose of the scope of work was to allow entry of each street light into the software with a unique serial number. This permits visibility into the total number of active street lights for any given customer at a given time. It also allows the total of each size and type of street light to be portrayed on customer billings.
Power Monitoring Expert (PME) Software Upgrade	16.0	Hydro utilizes PME software to supervise parts of the energy management system. The software collects and organizes data gathered from the electrical network and presents it as meaningful, actionable information. In 2021, it was required to upgrade this software to the latest version in order to correct current system issues, ensure configuration is correct from installation, and transition from the current environment to a new protected/segmented environment.
Multi Vendor 90 (MV90) Software Upgrade	15.0	Hydro utilizes MV90 software for meter reading interval data collection, management and analysis, for key account customers. In 2021, it was required to upgrade this software to the latest version in order to correct current system issues and ensure configuration is correct from installation.

9.0 Terminal Station In-Service Failures

Hydro has committed to providing a summary of activities completed under the Terminal Station In-Service Failures project. Table 6 outlines 2021 expenditures under this project.

Total Approved Budget: **$1,800,000**

Total Expenditure: **$1,178,000**

Table 6: Terminal Station In-Service Failures

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
Synchronous Condenser 1 (SC1) Rotor Pole 5 Replacement Wabush Terminal Station	543.6	SC1 is used to produce reactive power to control the voltage on Wabush Terminal Station 46 kV Bus 3 and Bus 4. Without a source of variable reactive power, load curtailment of the Industrial customers supplied from this station would be required to control this voltage. Voltage drop testing completed in 2021 identified one (or more) inter-turn short-circuits in the rotor windings for SC1 Rotor Pole 5. The OEM of the synchronous condenser recommended that the pole be replaced.	SC1 Rotor Pole 5 was replaced.
Mobile Substation P235 Refurbishment	340.9	Mobile Substation P235 is owned by Hydro and is one of five mobile substations shared by Hydro and Newfoundland Power for use as an emergency backup for their terminal stations and substations and to avoid extended outages to customers during execution of maintenance and capital programs. The following issues were identified and required rectification for Unit P235: • The cooler pumps were leaking and causing air bubbles in the oil which could lead to dielectric failure of the transformer's insulation, resulting in an internal electrical fault in the transformer. Therefore, the pumps could not be operated and the transformer could not be used.	Mobile Substation P235 was refurbished, to rectify the issues with the cooler pumps, flow gauges, transformer tap changers, and transformer low voltage series-parallel switch.

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
		• The flow gauges that are required to ensure that the cooling oil is flowing in the correct direction had failed. • The transformer was experiencing gassing and one of the transformer's tap changers had deteriorated contacts which could lead to a failure of these transformer components and possibly an electrical fault within the transformer. • Dissolved gas analysis and follow-up review of testing and operational data indicated signs of deterioration on a low voltage series-parallel switch inside the transformer.	
Power Transformer Protective Devices Replacement Various Locations	108.5	Inspections of 18 power transformer protective devices revealed that the devices had either failed or were at risk of imminent failure due to moisture ingress resulting in electrical contact corrosion.	18 power transformer protective devices were replaced.
Circuit Breaker B1L66 Major Overhaul Hardwoods Terminal Station	68.4	Circuit Breaker B1L66 at Hardwoods Terminal Station was identified as leaking sulphur hexafluoride (SF6) gas to atmosphere, which is an environmental concern as SF6 is known as a harmful greenhouse gas. Leaking gas could have resulted in loss of dielectric and a potential for flashover of the breaker, compromising the reliability of the electricity system in the area.	Circuit Breaker B1L66 was overhauled to address the SF6 leakage.
Transformer T1 Low Voltage Flex Lead Replacement Upper Salmon Terminal Station	52.9	All 24 of the Upper Salmon Terminal Station T1 low-voltage flexible lead connectors failed catastrophically with each connector open-circuiting due to material loss (melting) resulting from the overheating of each connector.	All 24 low voltage flexible connectors were replaced.

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
125 VDC Battery Bank Replacement Grandy Brook Terminal Station	18.7	The 125 VDC battery bank at Grandy Brook Terminal Station supplies direct current (DC) power to protection and control relays, a high speed ground device, and a disconnect switch motor operator. Planned inspection data revealed that the condition had deteriorated in 11 of the 15 battery jars that make up the battery bank, introducing a high risk of the DC power not being available to operate devices required for reliability of the terminal station.	The 125 VDC battery bank was replaced.
Transmission Line TL217 B-Phase Capacitive Voltage Transformer ("CVT") Replacement Western Avalon Terminal Station	18.1	Inspection revealed that the B-phase CVT on 230 kV TL217 in the Western Avalon Terminal Station was deteriorated and required replacement. Continuing to operate this CVT in a deteriorated state would have created a risk of catastrophic failure and a forced outage of TL217 and could have resulted in collateral damage to nearby equipment.	The B-Phase CVT was replaced.
Capacitor Bank C1 Neutral Surge Arrester Replacement Oxen Pond Terminal Station	15.4	The Oxen Pond capacitor bank C1 neutral surge arrester failed and immediate replacement was required to restore protection of the electrical equipment from lightning and switching surges.	Capacitor Bank C1 Neutral surge arrester was replaced.
138kV A-Phase Potential Transformer ("PT") Replacement Bottom Brook Terminal Station	11.5	During scheduled preventative maintenance checks, the 138 kV A-phase PT on Bus 2 failed Doble testing and required immediate replacement. Due to its deteriorated condition, continuing to operate this PT would have created a risk of catastrophic failure which could have resulted in a forced bus 2 outage and potentially resulted in other collateral damage to nearby equipment.	The 138kV A Phase PT was replaced.

10.0 Hydraulic In-Service Failures

Hydro has committed to providing a summary of activities completed under the Hydraulic Generation In-Service Failures project. Table 7 outlines 2021 expenditures under this project.

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

Total Expenditure: **$2,059,100**

Table 7: Hydraulic In-Service Failures

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
Generator Rotor Rim Guide Block Replacement Upper Salmon	1,333.5	During the 2021 planned annual preventative maintenance checks, significant cracks were discovered on the rotor rim guide blocks. Further inspection and testing, including metallurgy analysis, revealed fatigue cracking on 6 of 16 guide blocks. The cracks were beyond repair and the original equipment manufacturer recommended complete replacement of all guide blocks.	All 16 rotor rim guide blocks and associated keys were replaced with new. Further refurbishment of the generator will be required to fully address the rotor rim issue and Hydro is preparing a supplemental capital budget proposal for that work.
Safety Boom Replacement Salmon River Spillway	252.6	The existing safety boom experienced multiple cable failures and damage to the boom components that were beyond repair. The safety boom required replacement with a more robust design to withstand high water velocities experienced during spilling operations.	Two new safety boom shore anchors were constructed and a new safety boom was procured. The boom will be installed and removed seasonally, starting in spring of 2022.
Generator Rotor Pole Replacement Upper Salmon	133.3	In November 2021, the generating unit tripped while operating at near full load. Upon investigation, it was determined the unit had experienced a rotor ground fault during the trip event and that Pole #9 had failed.	Rotor Pole #9 was replaced with an available spare. The failed rotor pole will be refurbished and returned to inventory as part of the 2022 In-Service Failures project.

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
Units 5 and 6 Spare Generator Rotor Pole Procurement Bay d'Espoir	126.8	A review of critical spares concluded that a spare rotor pole for Units 5 and 6 is required to mitigate the risk of a generating unit being out of service for an extended period in the event that a pole fails. The generators for Units 5 and 6 have a different design than the other Bay d'Espoir units and therefore require a separate spare rotor pole.	A new spare rotor pole for Units 5 and 6 was procured.
Turbine Governor System Blade Accumulator Refurbishment Granite Canal	96.2	In February 2021, the generating unit experienced two forced outages due to increased pressures in the nitrogen-charged blade accumulators which are part of the governor system used to control the turbine's blade pitch and efficiency. The increase in pressure was an indication of oil leakage across the accumulator's piston rings, which required refurbishment.	The existing governor blade accumulators were refurbished.
Unit 7 Spare Generator Rotor Pole Refurbishment Bay d'Espoir	61.9	A deteriorated rotor pole was identified and removed from Bay d'Espoir Unit 7 and replaced with an available spare. To replenish the spare, the removed pole required refurbishment. A spare pole is required to mitigate the risk of the generating unit being out of service for an extended period in the event that a pole fails.	The rotor pole was refurbished and returned to inventory as a spare.

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
Spare T2 Transformer Procurement Upper Salmon Intake Structure	16.9	A review of critical spares identified that a spare T2 transformer was required at the Upper Salmon Intake Structure to allow fast responsive action to future failures of long-lead time equipment.	A new transformer was ordered and the concrete pad and oil containment system was constructed in 2020, as part of the 2020 In-Service Failures project. The new transformer was received and installed in 2021 but failed commissioning tests. Hydro is working with the manufacturer to resolve the equipment issue. Resolution and completion of this work is expected in 2022 as part of the 2022 In-Service Failures project.
Fire Pump 1 Replacement Hinds Lake	15.9	Fire Pump 1 supplies water for fire fighting as a backup to water supplied from the generating unit's cooling water system. The pump failed and is no longer manufactured or supported by the OEM and spare parts cannot be procured. The pump required replacement.	A new fire pump was ordered and received in 2021 and is planned to be installed in 2022 as part of the 2022 In-Service Failures project.
Stop Log Hoist Motors Replacement Salmon River Spillway	11.9	The monorail hoist is used to install and remove stoplogs to facilitate maintenance and repairs to the spillway gates. During an operational check to function test the monorail hoist, the trolley motors failed, and were subsequently deemed unusable and unrepairable. New motors were required.	The stop log hoist motors were replaced.
Sump Oil-In-Water Detection System Replacement Granite Canal	7.1	The sump oil-in-water detection system is used to monitor the powerhouse 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 was no longer available.	The sump oil-in-water detection system was replaced.

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
Powerhouse 2 Jockey Pump Replacement Bay d'Espoir	1.7	The jockey pump maintains fire header pressure when the hydro generating unit is dewatered. The pump was determined to be operating improperly and deemed not fit-for-service. A cost-benefit analysis concluded that replacement is more cost effective than refurbishment.	A new jockey pump was ordered in 2021 and is expected to be received and installed in 2022 as part of the 2022 In-Service Failures project.
Powerhouse 1 Overhead Crane Refurbishment Bay d'Espoir	1.3	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.	The powerhouse 1 overhead crane was refurbished, load-tested and re-certified as part of the 2020 In-Service Failures project. Damage to the brake shoes and lever was subsequently identified and was refurbished as part of the 2021 In-Service Failures project.

11.0 Thermal In-Service Failures

Hydro has committed to providing a summary of activities completed under the Thermal Generation In-Service Failures project. Table 8 outlines 2021 expenditures under this project.

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

Total Expenditure: **$5,796,400**

Table 8: Thermal Generation In-Service Failures

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
Refurbish Unit 1 Cold Reheat Line	1,133.5	In October 2021, following completion of the annual Unit 1 outage work, a water hammer event occurred in the Cold Reheat (CRH) line during start-up which resulted in significant movement of the piping and a forced outage on Unit 1. The movement resulted in significant damage to portions of pipe insulation, pipe hangers, and structural beams supporting piping.	The turbine and boiler OEM and service provider were engaged to provide an inspection and testing plan for the CRH line. A scaffolding contractor was engaged to erect scaffolding to facilitate inspections on the CRH line. Significant portions of pipe insulation were removed to facilitate non-destructive evaluation (NDE) of the piping. All pipe hangers on the line were inspected by a pipe support specialist. An internal assessment of the boiler re-heater tubes and associated welded connections was completed by the boiler OEM. Structural repairs were completed on beams, damaged pipe hangers were refurbished, and welding repairs were completed on damaged piping and boiler tubing headers. Unit 1 was then returned to service following completion of refurbishment work.

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
Overhaul Marine Terminal Loading Arms	684.7	In August 2021, a contractor was engaged to complete a Level 2 Condition Assessment of the Marine Terminal Loading Arms. During the condition assessment, the following upgrade requirements were identified for both the North and South loading arms: • Swivel joints required replacement to ensure safe transfer of fuel; • Hydraulic system overhaul was required to ensure reliable operation of fuel transfer equipment; and • Swivel joint grease required an upgrade with a higher grade of lubricant. The following upgrades were required for the North arm only: • Swivel joint ball bearings had failed and required replacement; and • Sections of piping were found to be degraded beyond safe limits and required immediate replacement.	All required upgrades to the loading arms were completed following the condition assessment.
Replace Waste Water Treatment Plant ("WWTP") Roof	545.2	In May of 2020, a large leak was identified in the roof of the WWTP. Upon investigating the leak, it was discovered that the roof had deteriorated and replacement was required. Replacement of the roof was required to prevent water damage to the process equipment housed inside the WWTP.	Approximately 5% of the roof was replaced as part of the 2020 In-Service Failures project, and the remaining 95% was replaced in 2021.
Refurbish Marine Terminal Fenders	533.2	During an annual inspection of the Marine Terminal, it was determined that the linkage pins securing Fenders 3 and 8 had worn beyond acceptable limits and required replacement. In addition, the timber coverings on Fender 3 had also deteriorated and required replacement.	Fender linkage pins and timbers were replaced in the fall of 2021.

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
Replace Unit 1 West Boiler Feed Pump Spare Components	442.1	In 2020, the Unit 1 West Boiler Feed Pump failed while in operation. Following disassembly, it was determined that both the pump volute and motor had significant damage and required replacement with available spares from the plant inventory.	In 2021, the pump volute and motor that failed in 2020 were sent to specialist shops for refurbishment and then returned to the plant inventory as spares.
Refurbish Unit 3 Outfall Discharge Pipe	343.5	In 2020, a leak was discovered in the 84 inch diameter discharge line for the Unit 3 cooling water seal pit. A consultant was engaged to perform a detailed inspection of the pipeline and it was determined that an approximate 20 foot section of the discharge pipe had partially collapsed and required replacement.	Engineering, planning and procurement of materials was completed as part of the 2020 In-Service Failures project, but replacement was not possible in 2020 because the required generation outage was not available. The deteriorated pipe section was replaced in 2021 during the scheduled Unit 3 annual outage.
Overhaul Boiler Stack Concrete Column	287.2	Inspections of the concrete columns on all three boiler stacks revealed several areas with significant concrete spalling. Refurbishment of the concrete was required to reduce the rate of concrete degradation, to ensure continued structural integrity of the stacks and to reduce the safety hazard imposed by concrete falling from the stacks.	Stack concrete was refurbished on all three stacks during the scheduled 2021 annual unit outages.
Refurbish Unit 3 North and South Vacuum Pumps	229.0	In 2021, the Unit 3 North and South pumps experienced high vibration while operating. Both pumps were removed from service during the 2021 annual Unit 3 outage and shipped to the OEM shop for inspection and refurbishment. The vibration levels also caused damage to the base for each pump.	Each pump was removed from service during the scheduled 2021 annual Unit 3 outage and refurbished at the OEM shop. The pump bases were refurbished, and pumps were-installed and returned to service.

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
Replace Unit 2 Flame Scanners	192.7	The original boiler flame scanners installed on all three generating units are obsolete and spares are no longer available. Early in 2021, accumulated failures of the existing flame scanners left an insufficient quantity of spares. Differences in design between the new and original model scanners makes partial upgrade of scanners impractical.	New model flame scanners were procured and installed on Unit 2 and re-useable flame scanners were placed in inventory as spares for Units 1 and 3.
Refurbish Unit 3 West Boiler Feed Pump	192.1	During the 2021 annual Unit 3 outage, the West boiler feed pump volute was found to be seized and no longer operable. The volute was then sent to the OEM for assessment and it was determined that the anti-rotation pins had sheared causing internal damage. Refurbishment of the pump was necessary to restore the full operating capacity of Holyrood Unit 3.	The Unit 3 West Boiler Feed Pump volute was overhauled at the OEM shop and returned to site and reinstalled in the pump.
Replace Compressor 3 High Pressure and Low Pressure Elements	147.4	In 2021, Air Compressor 3 failed while in operation. Upon disassembly, it was determined that internal components had seized and required replacement.	The internal damaged components were replaced with new parts and the air compressor was returned to service.
Replace Unit 2 East Fuel Oil Pump	83.9	The discharge pressure of the existing fuel oil pump was found to be below minimum operating parameters. Inspection of the pump revealed that the internal components were damaged beyond repair due to the abrasive properties of No.6 fuel oil.	A replacement pump was purchased and installed in early 2021.
Replace Unit 3 Stack Continuous Emissions Monitoring (CEM) System Bundle	81.4	The Unit 3 stack CEM bundle heat tracing system failed while in operation. The CEM bundle is required to ensure continued monitoring of stack emissions as required under the plant's operating permit.	The CEM bundle was replaced with a spare available from the plant inventory.

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
2021 Repair / Replace Failed Variable Frequency Drive (VFD) Cells	79.3	14 boiler forced draft fan VFD cells serving all three generating units failed in service in 2021. Failed VFDs required immediate replacement to ensure reliable operation of the boilers.	All failed cells were replaced using available spares from the plant inventory. The failed cells were refurbished when possible and returned to inventory as spares.
Replace Braking System on 25 Ton Crane Hoist	72.9	The braking system on the powerhouse overhead crane 25 ton hoist failed in early 2021 and required replacement to facilitate scheduled plant annual outage work service work and capital upgrades. The existing parts were obsolete and could not be procured for direct replacement.	A new crane hoist braking system was designed, fabricated and installed.
Replace Unit 3 General Service Cooling Water (GSCW) Tube Bundles	56.7	The performance of the GSCW heat exchanger was found to be deteriorated to a point that the system, while still fully operational, no longer provided 100% redundancy as intended in the original design. Any further deterioration or failure of a tube bundle would lead to a derating of Unit 3.	Replacement heat exchanger tube bundles were procured and installed.
Replace Unit 3 Turbine Generator Lube Oil	56.7	The condition of the Unit 3 turbine generator lubricating oil was found to have been degraded beyond acceptable levels and required immediate replacement to minimize the risk of premature bearing wear or failure.	The existing oil was replaced with new oil during the Unit 3 outage in the summer of 2021.
Replace Unit 3 Stack Opacity Monitor Brackets	56.7	The mounting brackets for the Unit 3 stack opacity monitor were found to be severely corroded beyond acceptable limits and required replacement.	Replacement mounting brackets were installed during the scheduled 2021 Unit 3 outage.
Replace Unit 2 Turbine Generator Cooling Water Control Valve	51.0	The Unit 2 turbine generator cooling water control valve was found to be seized in a partially closed position due to internal corrosion. The inability to fully open this valve reduced the cooling capacity of the Unit 2 Turbine-Generator cooling systems.	A replacement valve was purchased and installed in late 2021.

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
Refurbish Air Compressor 1 Motor	45.3	The motor for Air Compressor 1 experienced a bearing failure during operation which enabled the rotor to contact the stator and cause significant internal damage to the motor.	The Air Compressor 1 motor was refurbished at a local shop and returned to service.
Refurbish Unit 1 Boiler Feed Pump East Motor	45.3	The Unit 1 East Boiler Feed Pump Motor lubricating oil supply line developed a leak during operation which resulted in reduced lubrication to the motor bearings causing damage.	The Unit 1 East Boiler Feed Pump Motor was refurbished at a local motor shop and returned to service.
Refurbish Unit 3 Synchronous Condenser Auxiliary Cooling Water Pump	45.3	The auxiliary cooling water pump was inspected in late 2020 following synchronous condenser operation of Unit 3 and was found to have significant corrosion damage caused by sea water.	The Unit 3 synchronous condenser auxiliary cooling water pump was refurbished at the original equipment manufacturer's shop and returned to service.
Upgrade Unit 3 Boiler Drain Valves	39.7	During the 2020–2021 operating season, three Unit 3 boiler drain valves were determined to be leaking and required replacement.	The Unit 3 boiler drain valves were replaced during the planned annual Unit 3 outage.
Restore Slow Speed Operation on Turbine Hall Overhead Crane	34.7	The electronic clutch and low speed motor on the turbine hall overhead crane trolley failed. The low-speed travel function is required for removal and installation of several key turbine and generator components during the planned annual generating unit outages. The existing speed control system was obsolete and a direct replacement was not available.	The crane service contractor installed a new variable speed drive system on the trolley to restore the low speed travel functionality to the crane.
Refurbish Failed Fuel Oil Pipe Supports	32.1	An inspection of the fuel oil piping system determined that five pipe supports had deteriorated to the point where one had failed and the other four were at risk of failure. Replacement of the five pipe supports was required to mitigate the risk of fuel leakage to the environment.	The five pipe supports were replaced.

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
Replace Fire Hydrant	30.0	The valve stem on a fire hydrant failed, resulting in a requirement to replace the entire hydrant to prevent further damage to the fire protection system as well as surrounding systems that could be damaged by water leakage.	The failed fire hydrant was replaced.
Overhaul Unit 2 West Cooling Water Pump Motor	28.3	During the annual 2021 Unit 2 outage, testing of the Unit 2 West cooling water pump motor showed a sharp decrease in resistance readings on the stator windings. This condition indicated possible degradation of the stator winding insulation.	The Unit 2 West Cooling Water Pump Motor was inspected and refurbished at a local shop and returned to service.
Refurbish Spare Marine Terminal Capstan Gearbox	27.3	One of six Capstan gearboxes installed at the Holyrood Marine Terminal became seized and was replaced with a spare gearbox from the plant inventory. Replenishment of the spare gearbox was required to ensure reliable operation of the Marine Terminal which is required for the continued supply of fuel to all three generating units at Holyrood.	The failed gearbox was sent to a local shop for refurbishment and returned to the plant inventory as a spare.
Replace Unit 3 West Fuel Oil Pump	27.2	The discharge pressure of the existing Unit 3 West fuel oil pump was found to be below minimum operating parameters. Inspection of the pump revealed that the internal components were damaged beyond repair and replacement was required.	The existing fuel oil pump was replaced.
Replace Unit 3 Auxiliary Steam Valve	24.9	A Unit 3 auxiliary steam valve was found to be damaged beyond repair and replacement was required.	The valve was replaced during the annual Unit 3 outage.
Replace Unit 2 Gland Seal Steam Exhauster	24.9	The Unit 2 North gland seal steam exhauster seized during operation and required replacement to prevent failure of the generating unit bearings due to contamination of the lubricating oil system with steam.	The gland seal steam exhauster was replaced.

Project Title and Location	Expenditure ($000)	Failure Identified	Project Scope
Replace Electric Fire Pump and Control Boards	23.2	During a weekly test on the electric fire pump, the pump would not start and there was a significant cooling water leak from the inboard bearing. Investigation determined that the leak was caused by a failure of the main shaft bushing. It was also determined that that three circuit boards in the controller panel had failed. Replacement of the failed components was necessary to ensure reliable fire protection service for the plant.	The electric fire pump circuit boards were replaced with new components and the pump assembly was replaced with a spare taken from the plant inventory.
Replace Unit 3 High Pressure Heater No.: 6 Inlet Valve	23.0	In 2021, the Unit 3 High Pressure Feeedwater Heater No. 6 inlet valve had a packing failure and developed a high-temperature water leak during operation.	The valve was replaced during the 2021 annual Unit 3 outage.
Replace Stack 3 Aviation Traffic Lighting	21.6	One of the aviation traffic lights on Stack 3 failed and required replacement to maintain compliance with Canadian Aviation Regulations and ensure safety to aviation traffic.	The failed traffic light was replaced.
Refurbish Unit 1 East Forced Draft Fan Bearing Capital Spare	20.4	A crack was discovered in the forced draft fan bearing during a condition assessment completed in 2020 and it was replaced with an available spare from the plant inventory at that time. Replenishment of the critical spare bearing was required to ensure reliable service of Unit 1.	The failed bearing was sent to the fan original equipment manufacturer for assessment and it was determined that re-babbitting of the bearing was required. The bearing was refurbished and returned to the plant inventory as a spare.
Replace Unit 1 Atomizing Steam Control Valve	20.4	During the 2020–2021 winter operating season, the Unit 1 Atomizing Steam Control Valve developed a leak during operation. Replacement of the valve was necessary to eliminate the safety hazard caused by the steam leak.	The Unit 1 atomizing steam valve was replaced during the annual Unit 1 outage.
Replace Air Compressor 2 Starter	13.6	Air Compressor 2 tripped while in service causing damage to the starter, resulting in the air compressor being out of service.	The Air Compressor 2 starter was replaced and the air compressor was returned to service.

12.0 Boiler Condition Assessment and Miscellaneous Upgrades – Holyrood Thermal Generating Station

In the capital budget application for the Holyrood Boiler Condition Assessment and Miscellaneous Upgrades project, approved as part of Hydro's 2021 Capital Budget Application, Hydro listed all known components requiring replacement or refurbishment prior to the 2021–2022 winter operating season and indicated that it was possible that additional components may be identified as requiring replacement or refurbishment during the 2021 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 2021 Capital Expenditures and Carryover Report. The condition assessments were completed on Units 1, 2, and 3 in 2021 and Table 9 provides a summary of the additional components that required replacement or refurbishment prior to the 2021–2022 winter operating season.

Total Approved Budget: **$3,000,000**

Total Expenditure: **$3,889,200**

Table 9: Boiler Condition Assessment and Miscellaneous Upgrades – Holyrood TGS

Scope Title	Expenditure ($000)	Scope of Work and Justification
Air Heater Refurbishment Holyrood TGS Units 1, 2, and 3	729.6	The following work for the Units 1, 2 and 3 Air Heaters was identified as being required prior to the 2021–2022 winter operating season, based upon inspections performed by the original equipment manufacturer in 2021: • Replace corroded casing areas, Units 1, 2, and 3; • Replace seals, Units 1, 2, and 3; and • Refurbish drive gear shaft, Unit 1 West Air Heater. This work was completed during the 2021 Units 1, 2 and 3 planned outages.
Upgrade Boiler Windbox Holyrood TGS Unit 3	570.5	Unit 3 experienced windbox wall tube failures in 1993, 2002 and 2016. In 2020, the boiler original equipment manufacturer performed an engineering study on this cracking issue and identified a design flaw making this component susceptible to fatigue failure due to thermal cycling. An upgraded design was completed to reduce the thermal stress and the upgrade was completed by the boiler service contractor during the 2021 Unit 3 planned outage.

Scope Title	Expenditure ($000)	Scope of Work and Justification
High Pressure Feedwater Heater No. 6 Bypass Elbow Replacement Holyrood TGS Unit 3	196.9	The Unit 3 High Pressure Feedwater Heater No. 6 bypass piping elbow was inspected during the 2021 outage for flow accelerated corrosion, in accordance with the original equipment manufacturer recommendations. The inspection revealed wall thicknesses below the recommended minimum, indicating that replacement was required prior to the 2021–2022 winter operating season. The elbow was replaced during the 2021 Unit 3 outage.

Appendix A

Financial Schedules

newfoundland labrador hydro

Table A-1: 2021 Capital Expenditures By Year
($000)

Summary	Capital Budget[1]										Actual Expenditure and Forecast															
	A					B	C	D (B+C)	E	F (A+C+E)	G					H	I	J	K (G+H+I+J)						K-F	H-D
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total						Project Variance	Annual Variance
2021 Projects	-	-	-	-	-	-	79,843.6	79,843.6	70,750.1	150,593.7	-	-	-	-	-	65,364.3	70,518.1	21,666.0	157,548.5						6,954.8	(14,479.3)
2020 Projects	-	-	-	-	27,103.6	8,207.5	35,183.3	43,390.7	2,427.4	64,714.3	-	-	-	-	18,463.3	35,496.2	2,427.4	9,144.0	65,530.8						816.5	(7,894.6)
2019 Projects	-	-	-	25,558.1	30,470.6	9,471.4	-	9,471.4	-	56,028.7	-	-	-	20,097.9	17,349.5	8,443.0	-	2,608.1	48,498.5						(7,530.2)	(1,028.4)
2018 Projects	-	-	9,741.4	9,281.9	3,592.8	669.6	-	669.6	-	22,616.1	-	-	4,296.0	9,529.0	4,359.0	1,512.1	-	713.7	20,409.8						(2,206.3)	842.5
2017 Projects	-	119.2	921.2	877.0	1,429.6	229.6	-	229.6	-	3,347.0	-	182.7	628.9	853.9	449.5	228.2	-	-	2,343.3						(1,003.7)	(1.4)
2016 Projects	6,969.1	10,808.7	15,408.6	6,597.3	11,116.8	2,698.9	-	2,698.9	-	50,900.5	5,599.5	8,877.8	15,184.2	7,901.7	4,299.6	2,448.2	-	-	44,310.9						(6,589.6)	(250.7)
Forecast Adj.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						-	-
Grand Total	6,969.1	10,927.9	26,071.2	42,314.3	73,713.4	21,277.0	115,026.9	136,303.8	73,177.5	348,200.3	5,599.5	9,060.5	20,109.2	38,382.5	44,920.9	113,492.1	72,945.5	34,131.8	338,641.9						(9,558.4)	(22,811.8)

2021 Capital Budget Approved by Board Order No. P.U. 2(2021)	107,452.9
New Project Approved by Board Order No. P.U. 25(2020)	165.1
New Project Approved by Board Order No. P.U. 26(2020)	215.6
Top-Up Approved by Board Order No. P.U. 17(2021)	108.0
New Project Approved by Board Order No. P.U. 18(2021)	443.0
New Project Approved by Board Order No. P.U. 20(2021)	350.0
New Project Approved by Board Order No. P.U. 27(2021)	3,479.3
New Project Approved by Board Order No. P.U. 28(2021)	307.7
New Project Approved by Board Order No. P.U. 30(2021)	1,410.1
Top-Up Approved by Board Order No. P.U. 34(2021)	1,000.0
2021 New Projects under $50,000 Approved by Hydro	95.1
Total Approved Capital Budget Before Carryovers	115,026.9
Carryover Projects 2020 to 2021	21,277.0 [2]
TOTAL APPROVED CAPITAL BUDGET	136,303.9
Less:	
Budgeted CIAC's	(290.0)
Carryover CIAC's	(289.8) [2]
Supplemental CIAC's	(5,409.7)
TOTAL APPROVED CAPITAL BUDGET NET OF CIACs	130,314.4 [3]

[1] Annual budgets previous to 2021 pertain to projects that have expenditures in 2021.

[2] The 2021 carryover is $20.987 million net of CIAC's of $0.289 million ($21.277 - $0.289 = $20.987).

[3] The net capital expenditures exclude insurance proceeds. As per Board Order No. P.U. 13(2012), insurance proceeds are offset against the cost of capital asset and as a reduction of the rate base value of assets. In 2021, Hydro reached a settlement on the Charlottetown Diesel Generating Station fire for $4.5 million. Of which, $0.9 million has been put in service to offset the Charlottetown fire capital job. The remaining $3.6 million will be applied against the planned expenditures in Labrador South.

Table A-2: 2021 Capital Expenditures By Category
($000)

Hydraulic Generation Projects	Capital Budget								Actual Expenditure and Forecast									K-F	H-O		
	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 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																								
Refurbish Ebbegunbaeg Control Structure	-	-	-	-	-	-	3,236.8	3,236.8	10,383.1	13,619.9	-	-	-	-	-	2,196.4	10,383.1	1,040.4	13,619.9	-	0.0%	(1,040.4)	-32.14%	4.1.1
Hydraulic Generation Refurbishment and Modernization - Various Sites	-	-	-	-	-	-	6,569.5	6,569.5	5,005.6	11,575.1	-	-	-	-	-	3,640.2	5,005.6	3,005.6	11,651.4	75.3	0.66%	(2,929.3)	-44.59%	4.1.2
Hydraulic Generation Refurbishment - Various Sites	-	-	-	-	-	-	1,250.0	1,250.0	-	1,250.0	-	-	-	-	-	2,058.1	-	263.6	2,321.7	896.1	64.78%	809.1	64.78%	4.1.3
Purchase Tools and Equipment less than $50,000	-	-	-	-	-	-	194.3	194.3	-	194.3	-	-	-	-	-	168.8	-	-	168.8	(25.5)	-13.12%	(25.5)	-13.12%	
2020 Projects																								
Hydraulic Generation Refurbishment and Modernization - Various Sites	-	-	-	-	6,580.3	72.1	10,249.9	10,322.0	-	16,830.2	-	-	-	-	7,363.0	11,900.4	-	263.6	19,527.0	2,696.9	16.02%	1,578.4	15.29%	4.1.4
2017 Projects																								
Replace Exciter Controls Units 1 to 6 - Bay d'Espoir	-	119.2	92.12	877.0	1,429.6	229.6	-	229.6	-	3,347.0	-	182.7	628.9	853.9	449.5	228.2	-	-	2,343.3	(1,003.7)	-29.99%	(1.4)	-0.60%	4.1.5
Total Hydraulic Generation Projects	-	119.2	92.12	877.0	8,009.9	301.7	21,500.6	21,802.3	15,388.7	46,816.5	-	182.7	628.9	853.9	7,812.5	20,193.2	15,388.7	4,309.6	49,369.6	2,553.1		(1,609.0)		

Table A-3: 2021 Capital Expenditures By Category
($000)

Thermal 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)					
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																								
Overhaul Unit 1 Turbine/Valve - Holyrood	-	-	-	-	-	-	8,026.6	8,026.6	-	8,026.6	-	-	-	-	-	9,765.0	-	-	9,765.0	1,738.4	21.66%	1,738.4	21.66%	4.2.1
Overhaul Unit 3 Generator - Holyrood	-	-	-	-	-	-	572.7	572.7	-	572.7	-	-	-	-	-	611.0	-	-	611.0	38.3	6.69%	38.3	6.69%	4.2.1
Thermal Life Extension Plan - Holyrood	-	-	-	-	-	-	2,000.0	2,000.0	-	2,000.0	-	-	-	-	-	5,794.4	-	-	5,794.4	3,794.4	189.72%	3,794.4	189.72%	4.2.2
Overhaul Unit 3 Boiler Feed Pump - Holyrood	-	-	-	-	-	-	372.0	372.0	-	372.0	-	-	-	-	-	257.8	-	-	257.8	(114.2)	-30.89%	(114.2)	-30.89%	4.2.3
Upgrade Distribution Control System - Holyrood	-	-	-	-	-	-	360.4	360.4	368.2	728.6	-	-	-	-	-	171.6	368.2	188.8	728.6	(188.8)	0.00%	(188.8)	-52.38%	4.2.4
Boiler Condition Assessment/Upgrade - Holyrood	-	-	-	-	-	-	3,000.0	3,000.0	-	3,000.0	-	-	-	-	-	3,889.2	-	-	3,889.2	889.2	29.64%	889.2	29.64%	4.2.5
Upgrade Wastewater Equalization System - Holyrood	-	-	-	-	-	-	1,813.4	1,813.4	547.7	2,361.1	-	-	-	-	-	168.2	547.7	1,645.2	2,361.1	-	0.00%	(1,645.2)	-90.72%	4.2.6
Inspect Chemical Tanks - Holyrood	-	-	-	-	-	-	919.8	919.8	-	919.8	-	-	-	-	-	514.6	-	-	514.6	(405.1)	-44.05%	(405.1)	-44.05%	4.2.7
Purchase Tools and Equipment less than $50,000	-	-	-	-	-	-	64.4	64.4	-	64.4	-	-	-	-	-	45.3	-	-	45.3	(19.1)	-29.68%	(19.1)	-29.68%	
2020 Projects																								
Rewind Unit 3 Stator - Holyrood	-	-	-	-	1,281.4	(950.0)	5,664.2	4,714.2	-	6,945.6	-	-	-	-	2,231.4	5,054.3	-	-	7,285.7	340.1	4.90%	340.1	7.21%	
Upgrade Uninterruptible Power Supply 3 and 4 - Holyrood	-	-	-	-	348.7	65.5	-	65.5	-	348.7	-	-	-	-	283.2	97.1	-	67.7	448.0	99.4	28.50%	31.6	48.23%	
Total Thermal Generation Projects	-	-	-	-	1,630.1	(884.5)	22,794.4	21,909.9	915.9	25,340.4	-	-	-	-	2,514.6	26,370.6	915.9	1,901.7	31,702.8	6,362.4		4,460.7		

Table A-4: 2021 Capital Expenditures By Category
($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)					
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																								
Construct Lube Oil Cooler Hood - Holyood Gas Turbine	-	-	-	-	-	-	318.8	318.8	-	318.8	-	-	-	-	-	210.6	-	108.2	318.8	-	0.00%	(108.2)	-33.94%	4.3.1
Overhaul Gas Generator - Holyood Gas Turbine	-	-	-	-	-	-	213.8	213.8	-	213.8	-	-	-	-	-	156.2	-	57.6	213.8	(17.6)	-8.23%	(64.5)	-29.15%	
Replace Voltage Regulators - Happy Valley Gas Turbine	-	-	-	-	-	-	131.3	131.3	211.0	342.3	-	-	-	-	-	53.0	211.0	78.3	342.3	-	0.00%	(78.3)	-59.63%	
Replace Fuel Lube Glycol Pump - Happy Valley Gas Turbine	-	-	-	-	-	-	234.8	234.8	170.5	405.3	-	-	-	-	-	111.3	170.5	4.9	286.7	(118.6)	-29.27%	(123.5)	-52.61%	4.3.2
Upgrade Compressed Air - Happy Valley Gas Turbine	-	-	-	-	-	-	76.6	76.6	69.2	145.8	-	-	-	-	-	41.8	69.2	34.8	145.8	-	0.00%	(34.8)	-45.49%	
2020 Projects																								
Perform Combustor Inspection - Holyood Gas Turbine	-	-	-	-	546.1	538.5	2,500.0	3,038.5	2,427.4	5,473.5	-	-	-	-	35.0	39.3	2,427.4	2,971.8	5,473.5	(0.0)	0.00%	(2,999.2)	-98.71%	4.3.3
Install Partial Discharge Monitoring - Holyood Gas Turbine	-	-	-	-	37.8	(145.6)	575.0	429.4	-	612.7	-	-	-	-	165.4	220.3	-	199.0	594.8	(18.0)	-2.93%	(199.0)	-46.36%	4.3.4
Replace Fire Supression System - Happy Valley Gas Turbine	-	-	-	-	264.6	(28.8)	2,377.9	2,349.1	-	2,642.4	-	-	-	-	158.9	1,764.1	-	-	1,923.0	(739.4)	-27.28%	(585.0)	-24.90%	4.3.5
Generator Assessment - Happy Valley Gas Turbine	-	-	-	-	1,097.6	1,021.6	-	1,021.6	-	1,097.6	-	-	-	-	76.0	1,145.9	-	-	1,221.9	124.3	11.33%	124.3	12.17%	4.3.6
2018 Projects																								
Increase Fuel and Water Treatment System Capacity - Holyood Gas Turbine	-	-	8,829.9	3,012.7	-	724.8	-	724.8	-	11,842.6	-	-	2,588.8	3,563.9	832.8	157.2	-	567.6	7,705.2	(4,137.4)	-34.94%	(567.6)	-78.32%	4.3.7
Total Gas Turbine Generation Projects	-	-	8,829.9	3,012.7	1,946.1	2,110.5	6,428.1	8,538.6	2,878.1	23,094.9	-	-	2,588.8	3,563.9	1,268.1	3,917.7	2,878.1	4,001.7	18,208.3	(4,486.6)		(4,615.9)		

Table A-5: 2021 Capital Expenditures By Category
($000)

Terminal Stations 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)					
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																								
Terminal Station In-Service Failures	-	-	-	-	-	-	1,800.0	1,800.0	-	1,800.0	-	-	-	-	-	1,178.0	-	-	1,178.0	(622.0)	-34.55%	(622.0)	-34.55%	4.4.1
Upgrade Circuit Breakers - Various (2021–2023)	-	-	-	-	-	-	5,418.8	5,418.8	5,113.9	10,532.7	-	-	-	-	-	2,597.7	5,113.9	2,055.7	9,767.3	(765.4)	-7.27%	(2,821.0)	-52.06%	4.4.2
Upgrade/Retire Stephenville Gas Turbine - B8K T4	-	-	-	-	-	-	1,530.3	1,530.3	5,344.5	6,874.8	-	-	-	-	-	151.8	5,344.5	1,378.5	6,874.8	(0.0)	0.00%	(1,378.6)	-90.08%	4.4.3
Purchase SF6 Reclaim Units - Various	-	-	-	-	-	-	142.7	142.7	-	142.7	-	-	-	-	-	142.2	-	-	142.2	(0.5)	-0.34%	(0.5)	-0.34%	
Upgrade Substation - Wabush	-	-	-	-	-	-	1,186.7	1,186.7	9,306.7	10,493.4	-	-	-	-	-	300.6	9,306.7	886.1	10,493.4	-	0.00%	(886.1)	-74.67%	4.4.4
Upgrade Terminal Sites - Labrador	-	-	-	-	-	-	2,201.7	2,201.7	9,277.1	11,478.8	-	-	-	-	-	709.4	9,277.1	1,492.3	11,478.8	-	0.00%	(1,492.3)	-65.90%	4.4.5
Terminal Station Refurbishment and Modernization - Various Sites	-	-	-	-	-	-	6,171.6	6,171.6	6,957.3	13,128.9	-	-	-	-	-	3,903.3	6,957.3	1,867.2	12,727.8	(401.1)	-3.06%	(2,268.3)	-36.75%	4.4.6
2020 Projects																								
Replace Transformer T7 - Holyrood Terminal Station	-	-	-	-	2,678.1	2,017.5	-	2,017.5	-	2,678.1	-	-	-	-	660.6	250.2	-	1,767.3	2,678.1	(0.1)	0.00%	(1,767.3)	-87.60%	4.4.7
Terminal Station Refurbishment and Modernization - Various Sites	-	-	-	-	3,711.9	1,509.5	5,685.3	7,194.8	-	9,397.2	-	-	-	-	1,703.5	6,316.4	-	415.6	8,435.5	(961.7)	-10.23%	(878.4)	-12.21%	4.4.8
2019 Projects																								
Terminal Station Refurbishment and Modernization - Various Sites	-	-	-	10,891.1	19,061.8	3,964.6	-	3,964.6	-	29,952.9	-	-	-	5,891.3	10,987.2	2,440.7	-	920.5	20,239.7	(9,713.2)	-32.43%	(1,523.9)	-38.44%	4.4.9
2016 Projects																								
Upgrade Circuit Breakers - Various Sites	6,969.1	10,808.7	15,408.6	6,597.3	11,116.8	2,698.9	-	2,698.9	-	50,900.5	5,599.5	8,877.8	15,184.2	7,901.7	4,299.6	2,448.2	-	-	44,310.9	(6,589.6)	-12.95%	(250.7)	-9.29%	4.4.10
Total Terminal Stations Projects	6,969.1	10,808.7	15,408.6	17,488.4	36,568.7	10,190.5	24,237.1	34,427.6	35,993.6	147,474.2	5,599.5	8,877.8	15,184.2	13,792.9	17,650.8	20,523.1	35,993.6	10,798.7	128,420.7	(19,053.6)		(13,904.5)		

Table A-6: 2021 Capital Expenditures by Category
($000)

Transmission Projects	Capital Budget									Actual Expenditure and Forecast										K-F		H-D		
	A					B	C	D (B+Q	E	F (A+C+E)	G				H			I	J	K (G+H+I+J)					
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																								
Wood Pole Line Management Program - Various Sites	-	-	-	-	-	-	2,886.9	2,886.9	-	2,886.9	-	-	-	-	-	2,964.9	-	-	2,964.9	68.0	2.35%	68.0	2.35%	
2013 Projects																								
Muskrat Falls – Happy Valley Interconnection	-	-	-	12,586.4	7,392.1	2,790.2	-	2,790.2	-	15,978.5	-	-	-	12,528.5	4,659.8	3,273.4	-	1,374.0	21,835.7	1,857.2	9.30%	483.2	17.32%	4.5.1
Total Transmission Projects	-	-	-	12,586.4	7,392.1	2,790.2	2,886.9	5,687.1	-	22,865.4	-	-	-	12,528.5	4,659.8	6,238.4	-	1,374.0	24,800.7	1,925.3		551.3		

Table A-7: 2021 Capital Expenditures By Category
($000)

Distribution 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)					
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																								
Provide Service Extensions - All Areas	-	-	-	-	-	-	3,740.5	3,740.5	-	3,740.5	-	-	-	-	-	4,343.5	-	-	4,343.5	602.9	16.12%	602.9	16.12%	4.6.1
Upgrade Distribution Systems - All Areas	-	-	-	-	-	-	3,803.6	3,803.6	-	3,803.6	-	-	-	-	-	5,032.6	-	-	5,032.6	1,229.0	32.31%	1,229.0	32.31%	4.6.2
Distribution System Upgrades (2021–2022) - Various	-	-	-	-	-	-	318.9	318.9	805.6	1,124.5	-	-	-	-	-	328.6	805.6	(9.7)	1,124.5	-	0.00%	9.7	3.04%	
Addition for Load Growth - Happy Valley L7	-	-	-	-	-	-	617.6	617.6	-	617.6	-	-	-	-	-	391.3	-	224.1	615.5	(2.1)	-0.35%	(226.3)	-36.64%	4.6.3
Voltage Conversion - Labrador City L22	-	-	-	-	-	-	593.6	593.6	-	593.6	-	-	-	-	-	-	-	-	-	(593.6)	-100.00%	(593.6)	-100.00%	4.6.4
2020 Projects																								
Distribution System Upgrades (2020–2021) - Various	-	-	-	-	102.7	(18.3)	3,155.1	3,136.8	-	3,257.8	-	-	-	-	121.0	3,364.5	-	-	3,485.5	227.7	6.99%	227.7	7.26%	
Install Recloser Remote Control (2020–2021) - Hampden and Upper Salmor	-	-	-	-	71.3	37.6	185.3	222.9	-	256.7	-	-	-	-	33.7	213.7	-	9.3	256.7	0.0	0.01%	(9.3)	-4.16%	
Additions for Load - Distribution System - Makkovik and Hopedale	-	-	-	-	846.1	711.1	-	711.1	-	846.1	-	-	-	-	135.0	689.1	-	-	824.1	(22.1)	-2.61%	(22.0)	-3.10%	
Total Distribution Projects	-	-	-	-	1,020.2	730.4	12,414.6	13,145.0	805.6	14,240.4	-	-	-	-	289.7	14,363.2	805.6	223.7	15,682.2	1,441.8		1,218.2		

Table A-8: 2021 Capital Expenditures By Category
($000)

Rural 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)				
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																								
Overhaul Diesel Units - Various	-	-	-	-	-	-	1,232.9	1,232.9	-	1,232.9	-	-	-	-	-	790.4	-	-	790.4	(442.5)	-35.89%	(442.5)	-35.89%	4.7.1
Diesel Genset Replacements (2021–2022)	-	-	-	-	-	-	2,560.6	2,560.6	286.2	2,846.8	-	-	-	-	-	1,503.8	286.2	756.8	2,546.8	(300.0)	-10.54%	(1,056.8)	-41.27%	4.7.2
Inspect Fuel Storage Tanks - Postville	-	-	-	-	-	-	532.6	532.6	-	532.6	-	-	-	-	-	350.3	-	-	350.3	(182.3)	-34.23%	(182.3)	-34.23%	4.7.3
Replace Fuel Storage Tanks - Paradise River	-	-	-	-	-	-	350.3	350.3	-	350.3	-	-	-	-	-	234.1	-	-	234.1	(116.2)	-33.17%	(116.2)	-33.17%	4.7.4
2020 Projects																								
Diesel Plant Ventilation Upgrade - Nain	-	-	-	-	162.7	66.6	690.4	757.0	-	853.1	-	-	-	-	96.1	557.0	-	-	653.1	(200.0)	-23.44%	(199.9)	-26.41%	4.7.5
Replace Automation Equipment - Rigolet	-	-	-	-	363.8	305.8	-	305.8	-	363.8	-	-	-	-	58.0	339.7	-	(33.9)	363.8	(0.0)	-0.01%	33.9	11.10%	
Diesel Genset Replacements - Mary's Harbour	-	-	-	-	3,900.7	349.8	-	349.8	-	3,900.7	-	-	-	-	2,799.0	729.0	-	-	3,528.0	(372.7)	-9.56%	379.2	108.41%	4.7.6
Replace Powerhouse Roofing System - L'Anse-au-Loup and St. Anthony	-	-	-	-	125.3	3.9	1,195.8	1,199.7	-	1,321.2	-	-	-	-	121.6	105.8	-	857.6	1,085.0	(236.2)	-17.88%	(1,093.9)	-91.18%	4.7.7
2019 Projects																								
Replace Human Machine Interface - Cartwright	-	-	-	306.9	-	56.7	-	56.7	-	306.9	-	-	-	152.9	97.3	42.6	-	14.1	306.9	0.0	0.00%	(14.1)	-24.89%	
Diesel Genset Replacements (2019–2020)	-	-	-	525.6	3,421.8	2,834.6	-	2,834.6	-	3,947.4	-	-	-	140.2	972.6	2,535.2	-	299.4	3,947.4	(0.0)	0.00%	(299.4)	-10.56%	4.7.8
2018 Projects																								
Diesel Genset Replacements - Makkovik	-	-	604.1	4,703.3	3,592.8	(225.2)	-	(225.2)	-	8,900.2	-	-	1,585.1	4,174.3	3,366.0	1,331.0	-	-	10,456.4	1,556.2	17.49%	1,556.2	-691.03%	4.7.9
Replace Automation Equipment - St. Anthony	-	-	307.4	1,565.9	-	170.0	-	170.0	-	1,873.3	-	-	127.2	1,790.8	166.2	24.0	-	146.0	2,240.1	374.8	20.01%	(146.0)	-65.89%	4.7.10
Total Rural Generation Projects	-	-	911.5	7,101.7	11,567.2	3,562.2	6,562.4	10,124.6	286.2	26,429.0	-	-	1,712.3	6,258.2	7,670.9	8,542.8	286.2	2,040.0	26,510.3	81.2		(1,581.8)		

Table A-9: 2021 Capital Expenditures By Category
($000)

Properties 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)				
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2020 Projects																								
Upgrade Fire Suppression System - Bishop's Falls	-	-	-	-	91.6	(6.6)	292.6	286.0	-	384.2	-	-	-	-	98.2	51.3	-	-	149.5	(234.6)	-61.07%	(234.6)	-82.05%	4.8.1
Total Properties Projects	-	-	-	-	91.6	(6.6)	292.6	286.0	-	384.2	-	-	-	-	98.2	51.3	-	-	149.5	(234.6)		(234.6)		

Table A-10: 2021 Capital Expenditures By Category
($000)

Metering 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)					
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																								
Purchase Meters and Metering Equipment - Various	-	-	-	-	-	-	233.4	233.4	-	233.4	-	-	-	-	-	228.5	-	-	228.5	(4.8)	-2.07%	(4.8)	-2.07%	
Total Metering Projects	-	-	-	-	-	-	233.4	233.4	-	233.4	-	-	-	-	-	228.5	-	-	228.5	(4.8)		(4.8)		

Table A-11: 2021 Capital Expenditures By Category
($000)

Tools and Equipment	Capital Budget								Actual Expenditure and Forecast										K-F		H-D		
	A				B	C	D (B+C)	E	F (A+C+E)	G				H			J	K (G+H+I+J)					
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																								
Replace Light-Duty Mobile Equipment - Various Sites	-	-	-	-	-	-	549.6	549.6	-	549.6	-	-	-	-	-	136.1	-	413.5	549.6	-	0.00%	(413.5)	-75.23%	4.10.1
Replace Heavy-Duty Off-Road Track Vehicle (V7601)	-	-	-	-	-	-	331.3	331.3	-	331.3	-	-	-	-	-	363.8	-	-	363.8	32.6	9.83%	32.6	9.83%	
Purchase Backhoe - Wabush	-	-	-	-	-	-	179.3	179.3	-	179.3	-	-	-	-	-	182.2	-	-	182.2	2.9	1.60%	2.9	1.60%	
Tools and Equipment less than $50,000	-	-	-	-	-	-	485.2	485.2	-	485.2	-	-	-	-	-	429.4	-	-	429.4	(55.8)	-11.50%	(55.8)	-11.50%	
2020 Projects																								
Replace Light Duty Mobile Equipment - Various Sites	-	-	-	-	499.6	453.7	-	453.7	-	499.6	-	-	-	-	68.0	465.3	-	-	533.3	33.7	6.75%	11.6	2.57%	
Total Tools and Equipment	-	-	-	-	499.6	453.7	1,545.4	1,999.1	-	2,045.0	-	-	-	-	68.0	1,576.9	-	413.5	2,058.4	13.4		(422.2)		

Table A-12: 2021 Capital Expenditures By Category
($000)

Information Systems 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)				
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																								
Replace Personal Computers - Hydro Place	-	-	-	-	-	-	905.4	905.4	-	905.4	-	-	-	-	-	458.9	-	446.6	905.4	-	0.00%	(446.6)	-49.32%	4.11.1
Replace Peripheral Infrastructure - Hydro Place	-	-	-	-	-	-	256.4	256.4	-	256.4	-	-	-	-	-	138.4	-	66.6	205.0	(51.4)	-20.04%	(118.0)	-46.02%	4.11.2
Upgrade Core IT Infrastructure - Hydro Place	-	-	-	-	-	-	262.8	262.8	-	262.8	-	-	-	-	-	257.5	-	-	257.5	(5.3)	-2.00%	(5.3)	-1.99%	
Refresh Cyber Security Infrastructure - Hydro Place	-	-	-	-	-	-	217.5	217.5	-	217.5	-	-	-	-	-	211.2	-	-	211.2	(6.3)	-2.89%	(6.3)	-2.89%	
Perform Minor Enhancements - Hydro Place	-	-	-	-	-	-	372.1	372.1	-	372.1	-	-	-	-	-	281.1	-	-	281.1	(91.0)	-24.45%	(91.0)	-24.45%	
Upgrade Hydro ECC Wall infrastructure - Hydro Place	-	-	-	-	-	-	188.5	188.5	-	188.5	-	-	-	-	-	142.3	-	-	142.3	(46.1)	-24.48%	(46.1)	-24.48%	
2020 Projects																								
Upgrade Core IT Infrastructure - Hydro Place	-	-	-	-	193.7	-	-	-	193.7	-	-	-	-	-	259.5	-	-	-	259.5	65.7	33.92%	-	0.00%	
Perform Minor Enhancements - Hydro Place	-	-	-	-	49.0	26.2	-	26.2	-	49.0	-	-	-	-	22.8	0.1	-	-	22.9	(26.1)	-53.21%	(26.1)	-99.60%	
Total Information Systems Projects	-	-	-	-	242.7	26.2	2,202.6	2,228.8	-	2,445.4	-	-	-	-	282.3	1,489.6	-	513.2	2,285.0	(160.4)		(739.3)		

Table A-13: 2021 Capital Expenditures By Category
($000)

Telecontrol Projects	Capital Budget									Actual Expenditure and Forecast									K-F		K-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 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																								
Replace Network Communications Equipment - Various	-	-	-	-	-	-	194.1	194.1	-	194.1	-	-	-	-	-	242.8	-	-	242.8	48.8	25.12%	48.8	25.12%	
Upgrade Substation Telecontrol - Various	-	-	-	-	-	-	48.9	48.9	-	48.9	-	-	-	-	-	48.4	-	-	48.4	(0.6)	-1.15%	(0.6)	-1.15%	
Replace Radios - Various	-	-	-	-	-	-	240.4	240.4	-	240.4	-	-	-	-	-	231.9	-	-	231.9	(8.5)	-3.53%	(8.5)	-3.53%	
Purchase Tools and Equipment less than $50,000	-	-	-	-	-	-	40.0	40.0	-	40.0	-	-	-	-	-	34.0	-	-	34.0	(6.0)	-15.06%	(6.0)	-15.06%	
Upgrade Remote Terminal Units - Various	-	-	-	-	-	-	183.4	183.4	-	183.4	-	-	-	-	-	199.2	-	-	199.2	15.8	8.62%	15.8	8.62%	
Replace Battery Banks and Chargers - Various	-	-	-	-	-	-	327.2	327.2	-	327.2	-	-	-	-	-	350.4	-	-	350.4	23.2	7.08%	23.2	7.08%	
Total Telecontrol Projects	-	-	-	-	-	-	1,034.1	1,034.1	-	1,034.1	-	-	-	-	-	1,106.7	-	-	1,106.7	72.6		72.6		

Table A-14: 2021 Capital Expenditures By Category
($000)

Transportation	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)					
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																								
Replace Light- and Heavy-Duty Vehicles (2021-2022) - Variou	-	-	-	-	-	-	1,321.0	1,321.0	1,335.1	2,656.1	-	-	-	-	-	81.4	1,335.1	1,239.5	2,656.1	-	0.00%	(1,239.5)	-93.84%	4.13.1
Level II Chargers for Electric Vehicle:	-	-	-	-	-	-	299.8	299.8	-	299.8	-	-	-	-	-	194.1	-	105.7	299.8	-	0.00%	(105.7)	-35.25%	4.13.2
2020 Projects																								
Replace Light- and Heavy-Duty Vehicles (2020-2021) - Variou	-	-	-	-	1,625.4	1,621.6	1,583.5	3,205.1	-	3,208.9	-	-	-	-	4.0	658.7	-	2,546.4	3,209.1	0.2	0.01%	(2,546.4)	-79.45%	4.13.3
2019 Projects																								
Replace Vehicles and Aerial Devices - Various Sites	-	-	-	1,248.1	594.9	(174.7)	-	(174.7)	-	1,843.0	-	-	-	1,385.0	632.7	151.1	-	-	2,168.9	325.9	17.68%	325.8	-186.52%	4.13.4
Total Transportation	-	-	-	1,248.1	2,220.3	1,446.9	3,204.3	4,651.2	1,335.1	8,007.8	-	-	-	1,385.0	636.7	1,085.4	1,335.1	3,891.6	8,333.8	326.1		(3,565.8)		

Administrative	Capital Budget									Actual Expenditure and Forecast									K-F		H-D		
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	Forecast Jul-Dec 2021	2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Notes
2021 Projects																							
Remove Safety Hazards - Various	-	-	-	-	-	-	199.1	199.1	-	199.1	-	-	-	-	-	-	-	-	25.6	12.87%	25.6	12.87%	
Purchase Office Equipment	-	-	-	-	-	-	62.3	62.3	-	62.3	-	-	-	-	-	20.4	-	20.4	(41.8)	-67.20%	(41.8)	-67.20%	
Replace Transfer Switches - Hydro Place	-	-	-	-	-	-	197.4	197.4	938.5	1,135.9	-	-	-	-	-	107.7	938.5	89.7	1,135.9	-	0.00%	(89.7)	-45.45%	
2020 Projects																							
Replace Elevator Motors and Control Equipment - Hydro Place	-	-	-	-	89.1	24.9	647.6	672.5	-	736.7	-	-	-	-	64.2	595.7	-	76.8	736.7	(0.0)	0.00%	(76.8)	-11.41%	
Total Administrative	-	-	-	-	89.1	24.9	1,106.3	1,131.2	938.5	2,134.0	-	-	-	-	64.2	948.6	938.5	166.5	2,117.8	(16.2)		(182.7)		

Table A-15: 2021 Capital Expenditures By Category ($000)

Allowance For Unforeseen — Capital Budget

Allowance For Unforeseen	A					B	C	D (B+C)	E	F (A+C+E)
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total
2021 Projects										
Contingency Fund	-	-	-	-	-	-	1,000.0	1,000.0	-	1,000.0
Unit 3 Boiler Waterwall Tube - Holyrood	-	-	-	-	-	-	-	-	-	-
Replace Holyrood Thermal Generating Station T2	-	-	-	-	-	-	-	-	-	-
Engine Replacement - Port Hope Simpson	-	-	-	-	-	-	-	-	-	-
Allowance for Unforeseen - Top-Up P.U. 17(2021)	-	-	-	-	-	-	108.0	108.0	-	108.0
Allowance for Unforeseen - Top-Up P.U. 34(2021)	-	-	-	-	-	-	1,000.0	1,000.0	-	1,000.0
Total Allowance For Unforeseen	-	-	-	-	-	-	2,108.0	2,108.0	-	2,108.0

Allowance For Unforeseen — Actual Expenditure and Forecast

Allowance For Unforeseen	G					H	I	J	K (G+H+I+J)	K-F		H-D		
	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects														
Contingency Fund	-	-	-	-	-	-	-	-	-	(1,000.0)	-100.00%	(1,000.0)	-100.00%	
Unit 3 Boiler Waterwall Tube - Holyrood	-	-	-	-	-	2,249.8	-	-	2,249.8	2,249.8	N/A	2,249.8	N/A	
Replace Holyrood Thermal Generating Station T2	-	-	-	-	-	1,649.1	-	-	1,649.1	1,649.1	N/A	1,649.1	N/A	
Engine Replacement - Port Hope Simpson	-	-	-	-	-	108.0	-	-	108.0	108.0	N/A	108.0	N/A	
Allowance for Unforeseen - Top-Up P.U. 17(2021)	-	-	-	-	-	-	-	-	-	(108.0)	-100.00%	(108.0)	-100.00%	
Allowance for Unforeseen - Top-Up P.U. 34(2021)	-	-	-	-	-	-	-	-	-	(1,000.0)	-100.00%	(1,000.0)	-100.00%	
Total Allowance For Unforeseen	-	-	-	-	-	4,006.9	-	-	4,006.9	1,898.9		1,898.9		4.14.1

Supplemental Projects — Capital Budget

Supplemental Projects	A					B	C	D (B+C)	E	F (A+C+E)
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total
2021 Projects										
Holyrood Overhaul Unit 1 Boiler Feed Pump	-	-	-	-	-	-	443.0	443.0	-	443.0
Valentine Gold Interconnection	-	-	-	-	-	-	3,479.3	3,479.3	12,335.3	15,814.6
Replace Unit 2047 Ramea (2021)	-	-	-	-	-	-	307.7	307.7	2,129.1	2,436.8
Phase 2 - Electric Vehicle Charging Network	-	-	-	-	-	-	1,410.1	1,410.1	171.4	1,581.5
Charlottetown Purchase Diesel	-	-	-	-	-	-	350.0	350.0	-	350.0
2020 Projects										
Construction and Installation of an Electric Vehicle Fast Track Network	-	-	-	-	2,059.4	435.9	-	435.9	-	2,059.4
Integrate Renewable PH2 - Mary's Harbour	-	-	-	-	332.9	76.0	165.1	241.1	-	498.0
Wabush L34 and L35 Protective Relays	-	-	-	-	43.7	19.0	215.6	234.6	-	259.3
Total Supplemental Projects Approved by PUB	-	-	-	-	2,436.0	530.9	6,370.8	6,901.7	14,635.8	23,442.6

Supplemental Projects — Actual Expenditure and Forecast

Supplemental Projects	G					H	I	J	K (G+H+I+J)	K-F		H-D		
	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects														
Holyrood Overhaul Unit 1 Boiler Feed Pump	-	-	-	-	-	554.7	-	-	554.7	111.6	25.20%	111.6	25.20%	4.15.1
Valentine Gold Interconnection	-	-	-	-	-	826.1	12,103.3	2,885.2	15,814.6	0.0	0.00%	(2,653.2)	-76.26%	4.15.2
Replace Unit 2047 Ramea (2021)	-	-	-	-	-	49.0	2,129.1	258.7	2,436.8	-	0.00%	(258.7)	-84.06%	4.15.3
Phase 2 - Electric Vehicle Charging Network	-	-	-	-	-	59.0	171.4	1,351.1	1,581.5	-	0.00%	(1,351.1)	-95.81%	4.15.4
Charlottetown Purchase Diesel	-	-	-	-	-	350.0	-	-	350.0	-	0.00%	-	0.00%	
2020 Projects														
Construction and Installation of an Electric Vehicle Fast Track Network	-	-	-	-	1,623.5	514.3	-	-	2,137.8	78.4	3.81%	78.4	17.98%	
Integrate Renewable PH2 - Mary's Harbour	-	-	-	-	256.9	182.1	-	-	439.0	(59.0	-11.85%	(59.0)	-24.47%	
Wabush L34 and L35 Protective Relays	-	-	-	-	24.7	231.7	-	2.9	259.3	(0.0	-0.01%	(2.9)	-1.22%	
Total Supplemental Projects Approved by PUB	-	-	-	-	1,905.1	2,766.9	14,403.8	4,497.8	23,573.6	131.0		(4,134.8)		

Projects less than $50,000 — Capital Budget

Projects less than $50,000	A					B	C	D (B+C)	E	F (A+C+E)
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total
2021 Projects										
St. Brendan's 578 Generator	-	-	-	-	-	-	46.9	46.9	-	46.9
Hydro - Mobile Devices	-	-	-	-	-	-	48.2	48.2	-	48.2
Total Projects less than $50,000	-	-	-	-	-	-	95.1	95.1	-	95.1

Projects less than $50,000 — Actual Expenditure and Forecast

Projects less than $50,000	G					H	I	J	K (G+H+I+J)	K-F		H-D		
	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects														
St. Brendan's 578 Generator	-	-	-	-	-	40.0	-	-	40.0	(7.0)	-14.85%	(7.0)	-14.85%	
Hydro - Mobile Devices	-	-	-	-	-	47.1	-	-	47.1	(1.1)	-2.19%	(1.1)	-2.19%	
Total Projects less than $50,000	-	-	-	-	-	87.1	-	-	87.1	(8.0)		(8.0)		

Table A-16: 2021 Capital Expenditures By Category
($000)

Budgeted Contribution in Aid of Construction (CIAC's) 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)						
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																									
Remote Area Extensions - All Areas - CIAC	-	-	-	-	-	-	(200.0)	(200.0)	-	(200.0)	-	-	-	-	-	(215.6)	-	-	(215.6)	(15.6)	7.81%	(15.6)	7.81%	
Upgrade Distribution Systems - All Areas - CIAC	-	-	-	-	-	-	(90.0)	(90.0)	-	(90.0)	-	-	-	-	-	(117.7)	-	-	(117.7)	(27.7)	30.74%	(27.7)	30.74%	
Total Distribution Projects	-	-	-	-	-	-	(290.0)	(290.0)	-	(290.0)	-	-	-	-	-	(333.3)	-	-	(333.3)	(43.3)		(43.3)		
Supplemental and Carryover Contribution in Aid of Construction (CIACs) 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)**						
	2016	2017	2018	2019	2020	Carryover to 2021	Original 2021	Revised 2021	2022 and Beyond	Total	2016	2017	2018	2019	2020	2021	2022 and Beyond	Carryover to 2022 and Beyond	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)	Report Section
2021 Projects																									
Valentine Gold Interconnection - CIAC	-	-	-	-	-	-	(3,730.0)	(3,730.0)	(12,085.0)	(15,815.0)	-	-	-	-	-	(3,730.0)	(12,085.0)	-	(15,815.0)	-	0.00%	-	0.00%	
Phase 2 - Electric Vehicle Charging Network - Federal CIAC	-	-	-	-	-	-	(441.4)	(441.4)	(53.6)	(495.0)	-	-	-	-	-	-	(53.6)	(441.4)	(495.0)	-	0.00%	441.4	-100.00%	4.16.1
Phase 2 - Electric Vehicle Charging Network - Provincial CIAC	-	-	-	-	-	-	(107.6)	(107.6)	(13.1)	(120.7)	-	-	-	-	-	-	(13.1)	(107.6)	(120.7)	-	0.00%	107.6	-100.00%	4.16.1
IOC - Circuit Breaker Replacement and Associated Projection - CIAC	-	-	-	-	-	-	(750.0)	(750.0)	(1,565.0)	(2,315.0)	-	-	-	-	-	(412.5)	(1,565.0)	(337.9)	(2,315.4)	(0.4	0.02%	337.5	-45.00%	4.16.2
2020 Projects																									
Contribution and Installation of an Electric Vehicle Fast Track Network - CIAC	-	-	-	-	(1,800.0	(435.9)	-	(435.9	-	(1,800.0)	-	-	-	-	(1,364.1	(405.9)	-	-	(1,770.0)	30.0	-1.67%	30.0		
Integrate Renewable PH2 - Mary's Harbour - CIAC	-	-	-	-	(332.9)	165.1	(165.1)	-	-	(498.0)	-	-	-	-	(698.0)	59.0	-	-	(459.0)	59.0	-11.85%	59.0	0.00%	
Walbash L34 and L35 Protective Relays - CIAC	-	-	-	-	(43.7	(19.0)	(215.6)	(234.6	-	(259.3)	-	-	-	-	(24.7)	(231.7)	-	(2.9)	(259.3)	0.0	-0.01%	2.9	-1.22%	
Total Supplemental Projects Approved by Board	-	-	-	-	(2,176.6)	(289.8)	(5,409.7)	(5,699.5)	(13,716.7)	(21,803.0)	-	-	-	-	(1,886.8)	(4,721.1)	(13,716.7)	(889.8)	(21,214.4)	88.6		97.8.4		