Muskrat Falls Project Oversight Committee

Quarterly Project Update

Period Ending June 2022

October 24, 2022

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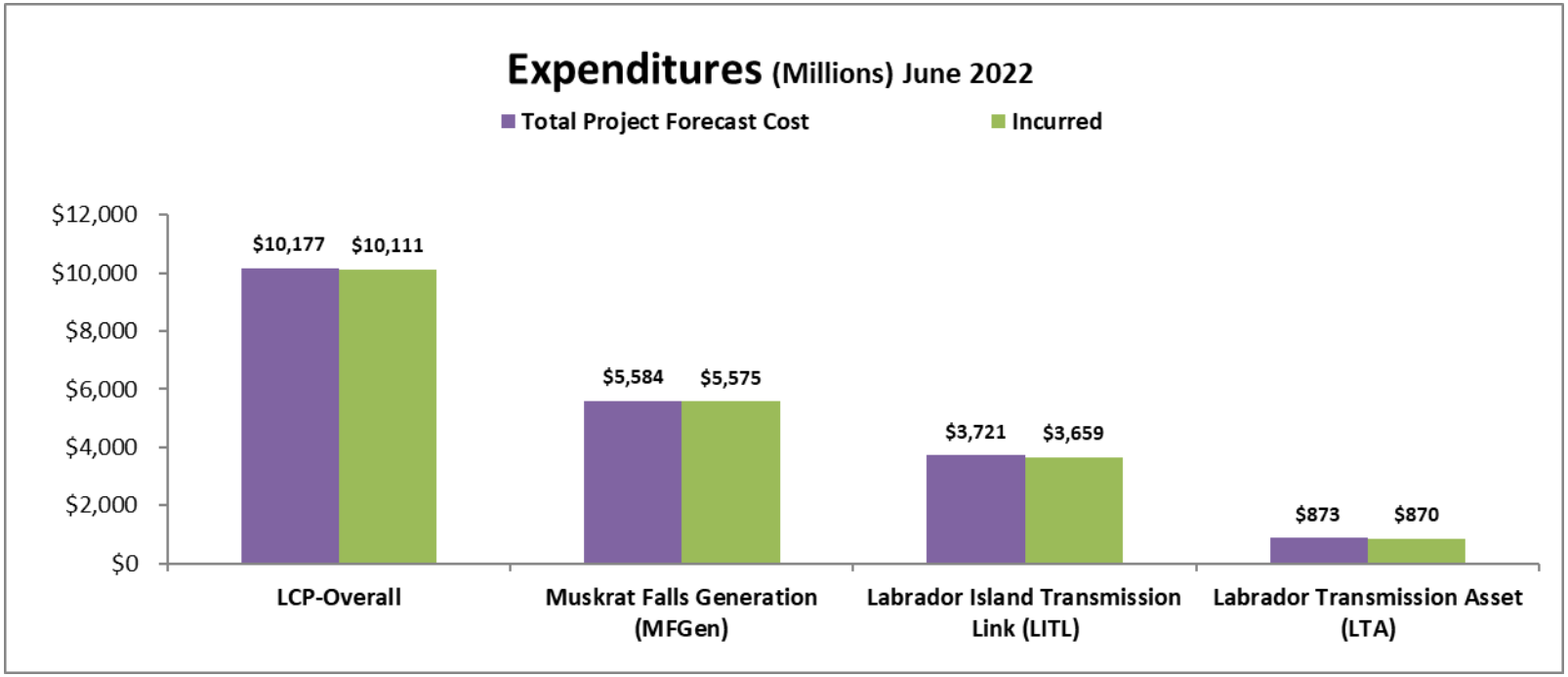
- Tables and figures may not total due to rounding

1. Q2 2022 Project Costs



3.0 Oversight Committee Reporting

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3.1 Overview

- The Oversight Committee (Committee) receives details on project costs incurred, schedule progress, changes in costs and milestone schedule, the status of construction, and manufacturing and installation contracts.
- The Committee identifies risks and issues and follows up with Hydro to obtain more detail and explanation.
- This report covers the April 2022 to June 2022 reporting period (Q2).
- Section 3 of this report contains information developed by the Committee.
- Section 3.5 of this report includes recent information on notable activity beyond the Q2 reporting period ending, and up to the date of drafting this report (September 15, 2022). Project update information in this section supersedes information as reported in other sections of this report.
- Section 4 contains project cost and schedule information as reported by Hydro for the reporting period ending June 2022 which includes project activity updates to mid-August 2022.
- The Annexes contain a more detailed accounting of the information provided in this report.
- The next Committee Report will cover the reporting period July 2022 to September 2022.
- The Committee notes that with commissioning of MFGen/LTA having occurred in November 2021, that the Committee reporting format has been adjusted to focus primarily on the remaining LITL work scope, cost and schedule risks.

3.2 Committee Activities

- The Committee met on three occasions during the Quarter to receive project updates and conduct other Committee business. Committee meeting minutes and reports are available on the Committee website @ Click here and Click here.
- The Committee Chair and/or Industry, Energy and Technology (IET) officials participated as an observer in two monthly calls on Hydro project reporting to the Independent Engineer (IE) and Natural Resources Canada (NRCan) and one call with NRCan.
- The Committee Chair participated in site visits and meetings during the week of June 13-17, 2022 with NRCan, the IE and Hydro.

3.3 Independent Engineer Activities

- The IE and NRCan held LCP project site visits and meetings during the week of June 13-17, 2022.

3.4 Risk and Issues being Monitored by the Committee

- In its project reporting, Nalcor identifies risks which may impact project cost and schedule. The Committee reviews these and other project information to assess project risks. These risks can be found on pages 9-10 of this report.
- Over the reporting period the Committee notes:
  - LITL bipole final software schedule delivery and commissioning delay risk continues;
  - Synchronous condenser unit 1 collector bearing damage root cause investigation continues;
  - Punchlist clearance remains ongoing on MFGen/LTA; Powerhouse unit 2 vibration investigation continues; and
  - Astaldi Arbitration is complete.

3.4 Risk and Issues being Monitored by the Committee

- The project is now in the dynamic commissioning phase.
- Risks that are being tracked by the Committee include:

A) Safety Performance

- Risk associated with simultaneous operations across multiple work sites and impact on project delivery.

B) Contractor Management and Productivity

- Nalcor ability to manage contractors and contractor ability to meet schedule;
- Contractor management and performance; and
- Potential commercial negotiations to settle claims.

C) Commissioning

- Completion of P&C software to enhance functionality and reliability;
- Final completion and testing of HVdc system under low and full power and timing of contractor release and effective warranty period; and
- P&C software delivery and final commissioning completion to meet project schedule; remaining software work beyond dynamic commissioning and long-term system performance.

D) Synchronous Condensers

- Remediation of vibration and other commissioning issues; potential impact on project schedule and long term performance.

3.4 Risk and Issues being Monitored by the Committee

E) Insurance Claims and Coverage

- Potential Coverage: Intake concrete repairs - LCP cost recovery confirmed as $1.4M. Payment expected in Q3 2022. Insurance claim closed pending receipt of final payment. Single payment pending.
- Valve Hall remediation – insurance only covers costs related to beam damage not defect. GE are working on a damage claim.
- Potential Coverage: Synchronous condenser bearing damage – GE working through claim related to bearing replacement.

F) LITL Commissioning and Powerhouse Punchlist Closure

- Commissioning of LITL and completion of powerhouse punch list clearance.

G) Additional Risks (above the June 2022 Project Budget)

- Failure to meet revised schedule milestones (unknown); and
- Any significant legal costs due to new disputes with contractors (unknown).

- Funds are not held within the June 2022 Project Budget for these additional risks.

3.5 Subsequent Events to Q2 2022 and Other Notable Activity

- In July, August and September 2022, Hydro provided the Newfoundland and Labrador Board of Commissioners of Public Utilities (PUB) with monthly updates in response findings of the Liberty Consulting Group Eight Quarterly Monitoring Report on the Integration of Power Supply Facilities to the Island Interconnected System.
- In August 2020, the IE issued a July 13-17 project site visits and meetings report. The report is available on the Committee website @ Click here.
- In August 2022, the PUB released the Liberty Consulting Group Sixteenth Quarterly Monitoring Report on the Integration of Power Supply Facilities to the Island Interconnected System.
- In September 2022, Power Supply advised:
- Full Function Bipole Software Completion Status
  - Dynamic commissioning tests concluded in early September 2022
  - GE and Hydro have reviewed the test results and identified the requirement to repeat the 475MW test due to anomalous results
  - Coordination with the Newfoundland and Labrador System Operator (NLSO) and interconnecting partners is ongoing to schedule the test. After the 475MW test repeat, a determination on dynamic commissioning will be made, and if successful, the LITL will enter into the 30-day trial operations period
  - The new operating limit of the LITL will then be set at 675 MW; the NLSO will determine the actual power transfer level daily based on system conditions
  - Testing the LITL at power levels greater than 675 MW will require cold weather and elevated loads. Testing above 675 MW will trigger issuance of the Commissioning Certificate and NLSO acceptance
  - Risk remains high that further issues may be identified during further dynamic commissioning and testing

3.5 Subsequent Events to Q2 2022 and Other Notable Activity

- LITL Operation
  - LITL returned to bipole operations in July 2022
  - It operated at various levels, as determined by the NLSO, until August 16, 2022, when GE requested an outage to complete punchlist items prior to commencing Dynamic Commissioning on August 22, 2022
  - LITL is currently online
- Synchronous Condensers
  - SC2 and SC3 are in service
  - SC1 commissioning tests are ongoing
  - GE has moved the Return to Service to October 2022 to accommodate additional testing
  - SC1 synchronization to the grid is currently scheduled for late September 2022
  - GE submitted a plan to resolve the bearing tilt issue; LCP rejected the plan as it did not address the root cause of the issue; LCP requested that GE resubmit a plan that actually addresses the root cause. GE's plan remains outstanding and is not expected until testing is complete

3.5 Subsequent Events to Q2 2022 and Other Notable Activity

- In September 2022, Muskrat Falls Operations advised:
  - Muskrat Falls Units 1, 3, and 4 are in operation and dispatched as required by the NLSO
  - Unit 2 is ready to return to service pending final balancing, which is expected to be complete in the coming days
  - To mitigate vibration in Unit 2, the output will be fixed at approximately 200MW; the actual output will be determined once the unit is online
  - The Final Unit 2 root cause analysis report is pending from Andritz

4.0 Hydro Reporting

*Information in this section was provided for period ending June 2022 project reporting which includes project activity updates to mid-August 2022. Recent updates to this section can be found in Section 3.5.

4.1 Summary – Quarter Ending June 2022

Project Capital Budget (June 2022)	($Millions)
MFGen	$5,584
LITL	$3,720
LTA	$873
Total	$10,177

June 2022 Summary:

- $10,111 Million in incurred costs;
- The current forecast contingency budget at June 2022 is $7.2 Million, a decrease of $5.3 Million from the previous Quarter.

- For further detail see Section 4.2, 4.3 and Annex A
- Project capital forecast cost remains $10,177

4.1 Summary – Quarter Ending June 2022

Quarterly Planned vs Incurred Cost Variances:

LITL	
Cumulative Planned: $3,721M	Q2 2022 Planned: $0M
Cumulative Incurred: $3,659M	Q2 2022 Incurred: $8M
Variance: -$62M	Variance: $8M

- The planned expenditure by month was set in June of 2020.
- During Q2 2022, the variance in planned vs. incurred cost is due to project schedule delay. Existing project budget is being incurred later than planned.
- See Section 4.2 for further detail.

4.1 Summary – Quarter Ending June 2022

- Power Supply [1]:
  - Full Function Bipole (FFB) Software
    - During dynamic commissioning in June 2022, GE identified issues that required fixes to the software. GE advised in late July 2022, that the software fixes and regression tests were complete
    - Hydro resources witnessed the Factory Acceptance Tested (FAT) in Stafford, UK. After review of the FAT results it was determined that the software would not be released due to one new issue discovered. Once GE resolves the issue, the software will be subject to another round of regression tests and FAT
    - GE has advised that the software fix and testing will be complete by late August 2022
    - The decision to proceed with dynamic commissioning will be based on the outcome of the FAT. Once a determination is made, GE will issue a schedule for dynamic commissioning. Dynamic commissioning is expected to take 2-3 weeks to complete followed by a 30 day trial operations period
    - High power testing, will be required to trigger issuance of the Commissioning Certificate and NLSO acceptance. This cannot be completed until the island grid conditions are suitable
    - Risk remains high that milestone dates may not be achieved

[1] Some activities in this and the following Power Supply slides have occurred since June 2022

4.1 Summary – Quarter Ending June 2022

- LITL Operation
  - Due to the issues discovered during dynamic commissioning in June 2022, the latest version of software was removed from the system and replaced with the previous version to allow LITL to operate while GE completed the software fixes
  - LITL operated in monopole mode while GE conducted hardware checks on Pole 1 to ensure all equipment was functioning correctly after dynamic commissioning stopped, which GE confirmed in July 2022
  - LITL is currently operating in bipole mode
  - GE requested a bipole outage from August 8-9 to clear punchlist items
  - The 450 MW power transfer limit is still applied to this version of software, and the NLSO determines the actual power transfer level daily based on system conditions

- Synchronous Condensers
  - SC2 and SC3 are in service
  - SC1 re-assembly complete; unit is balanced; rotated at max speed; commissioning tests ongoing
  - GE Power's Return to Service for SC1 is August 2022
  - GE submitted a plan to resolve the bearing tilt issue; LCP rejected the plan as it did not address the root cause of the issue; LCP requested that GE resubmit a plan that actually addresses the root cause

4.1 Summary – Quarter Ending June 2022

Power Development[1]

- Muskrat Falls Plant
  - Has been released to the NLSO for dispatch
  - All four units are operational

- Unit 2
  - Andritz's internal inspection of unit 2 turbine completed during the summer shutdown has revealed that damage has occurred to linkages connecting to the unit runner blades
  - A root cause investigation is ongoing and a temporary repair has been proposed by Andritz. LCP are reviewing information provided by Andritz to determine next steps

[1] Some activities in this Power Development slide have occurred since June 2022

4.2 LITL Project Expenditures

June 2022 ($000)	Project Revised Budget September 2021	Cumulative $			Cumulative %		
		Plan	Incurred	Variance	Plan	Incurred	Variance
Description	*A*	*B*	*C*	*C-B*	*D=B/A*	*E=C/A*	*E-D*
NE-LCP Owners Team, Admin and EPCM Services	$396,095	$395,165	$391,238	($3,927)	99.8%	98.8%	-1.0%
Feasibility Engineering	$18,679	$18,679	$18,684	$5	100.0%	100.0%	0.0%
Environmental & Regulatory Compliance	$11,664	$11,664	$11,571	($93)	100.0%	99.2%	-0.8%
Aboriginal Affairs	$625	$625	$542	($83)	100.0%	86.7%	-13.3%
Procurement & Construction	$3,256,529	$3,265,615	$3,203,735	($61,880)	100.3%	98.4%	-1.9%
Commercial & Legal	$29,350	$29,031	$32,787	$3,756	98.9%	111.7%	12.8%
Contingency	$7,837	$0	$0	$0	0.0%	0.0%	0.0%
TOTAL	$3,720,778	$3,720,778	$3,658,556	($62,222)	100.0%	98.3%	-1.7%

June 2022 ($000)	Project Revised Budget September 2021	Incurred Cumulative Costs June 2022	Project Forecast Cost June 2022	Variance PFC from Budget
Description	*A*	*B*	*C*	*D=A-C*
NE-LCP Owners Team, Admin and EPCM Services	$396,095	$391,238	$396,520	($425)
Feasibility Engineering	$18,679	$18,684	$18,684	($5)
Environmental & Regulatory Compliance	$11,664	$11,571	$11,664	$0
Aboriginal Affairs	$625	$542	$542	$83
Procurement & Construction	$3,256,529	$3,203,735	$3,255,149	$1,380
Commercial & Legal	$29,350	$32,787	$34,599	($5,249)
Contingency	$7,837	$0	$3,620	$4,217
TOTAL	$3,720,778	$3,658,556	$3,720,778	$0

Columns in tables may not total due to rounding

4.3 Contingency

June 2022 ($000)	Project Revised Budget	Project Forecast Cost March 2022	Project Forecast Cost June 2022	Change from Previous Quarter	Variance PFC from Budget
	A	*B*	*C*	*C - B*	*C - A*
Total Project	$45,044	$12,485	$7,176	($5,309)	($39,735)

Columns in tables may not total due to rounding

Annex A

I. Project Capital Budget
II. Project Milestone Schedule

Columns in tables may not total due to rounding

I. Project Capital Budget – June 2022 Update

Project Capital Budget (June 2022)	($Million)
MFGen	$5,584
LITL	$3,720
LTA	$873
Total	$10,177

II. September 2020 Project Milestone Schedule

Muskrat Falls Generating Facility	Sep 2020 Planned Dates
North Spur Works Ready for Diversion	Oct-16
River Diversion Complete	Feb-17
Reservoir Impoundment Complete	Sep-19
Powerhouse Unit 1 Commissioned - Ready for Operation	Oct-20
First Power from Muskrat Falls	Sep-20
Powerhouse Unit 2 Commissioned - Ready for Operation	Dec-20
Powerhouse Unit 3 Commissioned - Ready for Operation	May-21
Powerhouse Unit 4 Commissioned - Ready for Operation	Sep-21
Full Power from Muskrat Falls	Sep-21
Commissioning Complete - Commissioning Certificate Issued	Oct-21

Labrador-Island Transmission Link	Sep 2020 Planned Dates
SOBI Cable Systems Ready	Dec-16
Soldiers Pond Switchyard Ready to Energize	Aug-17
Ready for Power Transmission (LTA)	Apr-18
Muskrat Falls Converter Station Ready to Energize (Pole 1)	May-18
HVdc Transmission Line Construction Complete	Nov-17
Soldier's Pond Converter Station Ready to Energize (Pole 1)	May-18
1ST Power Transfer (Pole 1)	Jun-18
Soldiers Pond Synchronous Condenser Ready for Operation	Aug-21
Ready for Power Transmission (Low Load Testing Complete Pole 1)	Jun-19
Muskrat Falls and Soldiers Pond Converter Stations - Bipole Dynamic Testing Complete	Sep-21
Commissioning Complete - Commissioning Certificate Issued	Oct-21

Labrador Transmission Assets	Sep 2020 Planned Dates
HVac Transmission Line Construction Complete	Jun-17
Churchill Falls Switchyard Ready to Energize	Feb-18
Muskrat Falls Switchyard Ready to Energize	Apr-18
Ready for Power Transmission	Apr-18
Commissioning Complete - Commissioning Certificate Issued	Oct-21

Date Certain – Nov-2021

Annex B

Project Milestone Schedule Forecast

I. Muskrat Falls Generation - No longer being reported (Commissioned)
II. Labrador Island Transmission Link
III. Labrador Transmission Assets - No longer being reported (Commissioned)

II. Labrador Island Transmission Link

June 2022	Planned Date September 2020	June 2022 Actual/forecast
Project Sanction	17-Dec-12	Complete
SOBI Cable Systems Ready	9-Dec-16	Complete
Soldiers Pond Switchyard Ready to Energize	24-Aug-17	Complete
Ready for Power Transmission (LTA)	27-Apr-18	Complete
Muskrat Falls Converter Station Ready to Energize (Pole 1)	10-May-18	Complete
HVdc Transmission Line Construction Complete	27-Nov-17	Complete
Soldier's Pond Converter Station Ready to Energize (Pole 1)	16-May-18	Complete
1ST Power Transfer (Pole 1)	11-Jun-18	Completion of 45 megawatt heat run
Soldiers Pond Synchronous Condenser Ready for Operation	31-Aug-21	Complete
Ready for Power Transmission (Low Load Testing Complete Pole 1)	4-Jun-19	Complete
Muskrat Falls and Soldiers Pond Converter Stations - Bipole Dynamic Testing Complete	30-Sep-21	29-Nov-22*
Commissioning Complete - Commissioning Certificate Issued	1-Oct-21	30-Nov-22*
Date Certain	November 2021	30-Nov-22*

* Updated forecast from last reporting period

End of Report