Newfoundland and Labrador Hydro
Hydro Place. 500 Columbus Drive
P.O. Box 12400. St. John's. NL
Canada A1B 4K7
t. 709.737.1400 I f. 709.737.1800
nlhydro.com

March 22, 2023

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 and Board Secretary

Dear Ms. Blundon:

Re: Application for Consent to the Abandonment of the Hydrogen System Portion of the Ramea Wind-Hydrogen-Diesel Generation Project

Please find enclosed Newfoundland and Labrador Hydro's ("Hydro") application for consent to the abandonment of the hydrogen system portion of the Ramea Wind-Hydrogen-Diesel Generation Project.

Hydro has provided notice to the Town of Ramea, as indicated in the application. Hydro will also provide a copy of this application to the town.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

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

Encl.

ecc:

Board of Commissioners of Public Utilities
Jacqui H. Glynn
PUB Official Email

Consumer Advocate
Dennis M. Browne, KC, Browne Fitzgerald Morgan Avis & Wadden
Stephen F. Fitzgerald, Browne Fitzgerald Morgan Avis & Wadden
Sarah G. Fitzgerald, Browne Fitzgerald Morgan Avis & Wadden
Bernice Bailey, Browne Fitzgerald Morgan Avis & Wadden
Bernard M. Coffey, KC

Linde Canada Inc.
Sheryl E. Nisenbaum
Peter Strong

Newfoundland Power Inc.
Dominic J. Foley
Lindsay S.A. Hollett
Regulatory Email

Teck Resources Limited
Shawn Kinsella

Island Industrial Customer Group
Paul L. Coxworthy, Stewart McKelvey
Denis J. Fleming, Cox & Palmer
Dean A. Porter, Poole Althouse

Abandonment of Hydrogen System

Ramea Wind-Hydrogen-Diesel Generation Project

March 22, 2023

An application to the Board of Commissioners of Public Utilities

IN THE MATTER OF the *Electrical Power Control Act, 1994*, SNL 1994, Chapter E-5.1 ("*EPCA*") and the *Public Utilities Act*, RSNL 1990, Chapter P-47 ("*Act*"), and regulations thereunder; and

IN THE MATTER OF an application by Newfoundland and Labrador Hydro ("Hydro") for written consent, pursuant to Section 38 of the *Act*, to decommission and abandon the hydrogen system portion of the Ramea Wind-Hydrogen-Diesel Generation Project.

To: The Board of Commissioners of Public Utilities ("Board")

THE APPLICATION OF HYDRO STATES THAT:

A. Background

1. Hydro is a corporation continued and existing under the *Hydro Corporation Act, 2007*,[1] is a public utility within the meaning of the *Act*, and is subject to the provisions of the *EPCA*.

2. Hydro owns and operates an isolated diesel electrical system in the Town of Ramea, Newfoundland and Labrador; the town is located on a small island off the south coast of the Island. Hydro also purchases energy from a 390 kW non-utility-owned wind farm and uses this energy to displace its diesel fuel generation.

3. On October 10, 2007, Hydro filed an *Ex Parte* application with the Board requesting approval to proceed with the construction and installation of a wind farm, a hydrogen electrolyzer, a hydrogen storage system, five hydrogen generators, an energy management system, and associated equipment, referenced as the "Wind-Hydrogen-Diesel System," on the isolated diesel system. The Wind-Hydrogen-Diesel System was intended as a research and development project.

[1] *Hydro Corporation Act, 2007*, SNL 2007, c H-17.

4. In its application, Hydro noted that the total cost of the Wind-Hydrogen-Diesel System would be constructed using non-regulated funds mainly from third parties and that consumers would bear no costs associated with the proposed Wind-Hydrogen-Diesel System in any circumstance, including implementation, operation, or abandonment, as those costs would not be included in regulated rate base or regulated operating expenses without a further order of the Board.

5. Hydro further confirmed that the costs associated with the Wind-Hydrogen-Diesel System would only be included in Hydro's regulated rate base, subsequent to further application to the Board, if the system were proven used and useful.

6. Hydro noted that subsequent to the operational testing phase, Hydro would have adequate information to determine if the Wind-Hydrogen-Diesel System project provides safe and reliable power at least cost or other benefits to ratepayers. Hydro advised that if it was determined that the Wind-Hydrogen-Diesel System provided a benefit to ratepayers, an application would be made to add the cost of the system to rate base. Alternatively, if the determination was made that the system should be taken out of service, an application would be made to the Board for approval to abandon.

7. In Board Order P.U. 31 (2007),[2] the Board approved Hydro's proposal to proceed with the construction of the Wind-Hydrogen-Diesel System, based on the conditions that the costs of the system would be treated as non-regulated and that ratepayers would not bear any of the costs related to the system.

8. The Board also directed Hydro to provide a quarterly report on the status of the Wind-Hydrogen-Diesel System, which Hydro has provided in its quarterly regulatory reports since receiving approval for the project, and to file a report with the Board within 90 days of the conclusion of the operational testing phase addressing in detail Hydro's conclusions and plans concerning the Wind-Hydrogen-Diesel System.

[2] *Public Utilities Act*, RSNL 1990, c P-47, Board Order No. P.U. 31(2007), Board of Commissioners of Public Utilities, November 30, 2007.

9. In the "Quarterly Regulatory Report for the Quarter Ended March 31, 2014," Hydro included a report prepared by Nalcor Energy ("Nalcor") regarding the Wind-Hydrogen-Diesel System ("Phase I Report").[3,4] In the Phase I Report, attached to this application as Schedule 1, Nalcor summarized the quarterly reports that had been provided to that point and noted that the operational phase of the project had not started. Nalcor noted that one of the major challenges faced by the project was the reliability issues surrounding the hydrogen genset. Nalcor also noted that it had spent considerable time and resources troubleshooting the genset issues but an acceptable level of performance had not been obtained.[5]

10. The quarterly regulatory reports thereafter detailed difficulties with proceeding with the project. In the "Quarterly Regulatory Report for the Quarter Ended March 31, 2019," Hydro advised that after careful consideration, it had decided to change its approach to integrating renewable energy in Ramea. The report stated that rather than continue with Phase II of the Wind-Hydrogen-Diesel System, Hydro had decided to seek partnership opportunities with independent power producers. Hydro noted at that time that as a result of this decision, no future capital expenditures would be incurred and planning for the decommissioning of the hydrogen components was underway. Hydro further noted that the cost of the decommissioning work would be recorded as a Nalcor expense.

11. The hydrogen system has not been in operation since 2014 and, if steps to decommission are not taken, maintenance costs will be necessary in the future.

12. The specific equipment to be decommissioned includes:

    a) Hydrogen storage;

    b) Hydrogen genset (consisting of five units). The Quonset hut in which the genset is located is to remain onsite for additional storage;

[3] "Quarterly Regulatory Report for the Quarter Ended March 31, 2014," Newfoundland and Labrador Hydro, March 15, 2014.

[4] "Ramea Wind-Hydrogen-Diesel Project Update," Nalcor Energy, May 14, 2014.

[5] Hydro had entered into an agreement with Nalcor wherein Nalcor agreed to be responsible for all of the operating costs related to the Wind-Hydrogen-Diesel System, as well as any decommissioning costs that may be incurred.

c) Hydrogen Electrolyzer. The electrolyzer rests on a concrete pad which is to remain; and

d) Energy Management System, along with miscellaneous piping and supports, cable tray and stairs, electrical cable, and control panels.

13. Abandoning the hydrogen components in place is not an acceptable means of decommissioning these assets. The hydrogen equipment must be dismantled and removed from Ramea. The decommissioning work consists mainly of the breakdown, loading, and transporting of the equipment from Ramea to a metal recycling facility. The estimated project budget is $399,800, all of which will be a non-regulated expense with no impact to consumers.

14. Section 38 of the *Act* requires approval of the Board prior to any abandonment by a utility of part of its line or works after they have been operated and such consent will only be given after notice is given to an incorporated municipal body interested in the line or works. Hydro has provided correspondence to the Town of Ramea. A copy of the correspondence is attached hereto as Schedule 2.

15. As the hydrogen portion of the Wind-Hydrogen-Diesel System project had operational issues preventing any material supply to customers, and as these assets have been idle since 2014, there are no known existing or potential Hydro customers impacted by the removal of these assets.

16. Additionally, as none of the costs related to the purchase, installation, or use of the assets, or any costs related to the decommissioning of the assets, have been incurred by regulated Hydro or form part of Hydro's regulated rate base, there is no financial impact to ratepayers with respect to the decommissioning of these assets.

17. The wind farm assets that form part of the Wind-Hydrogen-Diesel System will remain in place while Hydro continues to pursue partnership opportunities with independent power producers. A further application will be made once there is a finalized plan regarding these assets. The operation of the wind farm assets is not impacted by the removal of the hydrogen assets.

B. Application

18. Hydro proposes to decommission the hydrogen components of the Wind-Hydrogen-Diesel System, as they are not used or useful and their removal will not adversely affect the reliability of the service Hydro provides.

C. Newfoundland and Labrador Hydro's Request

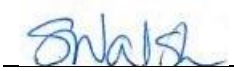
19. Hydro requests the Board provide its written consent, pursuant to Section 38 of the *Act,* for the abandonment, specifically the decommissioning and removal, of the hydrogen assets related to the Wind-Hydrogen-Diesel System, particularly the hydrogen electrolyzer, hydrogen storage system, hydrogen genset, energy management system and associated equipment.

D. Communications

20. Communications with respect to this Application should be forwarded to Shirley A. Walsh, Senior Legal Counsel, Regulatory for Hydro.

DATED at St. John's in the province of Newfoundland and Labrador this 22nd day of March, 2023.

NEWFOUNDLAND AND LABRADOR HYDRO



Shirley A. Walsh
Counsel for the Applicant
Newfoundland and Labrador Hydro,
500 Columbus Drive, P.O. Box 12400
St. John's, NL A1B 4K7
Telephone: (709) 685-4973

Schedule 1

Ramea Wind-Hydrogen-Diesel Project Update

A REPORT TO
THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

Ramea Wind-Hydrogen-Diesel Project Update

Nalcor Energy

May 14, 2014

Table of Contents

1 Project Description

In 2007, Hydro applied to the Board for approval to proceed with the construction of a Wind-Hydrogen Diesel Generation Project (the Project) at Ramea, pursuant to Section 41(3) of the Act. The Project is a research and development project focused on renewable energy generation, storage, and grid integration in an isolated diesel powered community. The main objective of the Project has been to integrate existing diesel generators in Ramea with wind turbines and hydrogen equipment. Integration is made possible through the use of the Energy Management System (EMS). The EMS is the control system developed by Nalcor Energy (Nalcor) that monitors operating conditions and dispatches the various generation sources. Nalcor owns all Intellectual Property associated with the EMS. Wind turbines provide energy to the Ramea electrical grid during high load periods. When the load is low, the wind energy is used to produce hydrogen gas. This gas is converted back to electricity through a hydrogen fueled generation source when wind speeds are too low to operate the wind turbines. The renewable generation provided by the wind turbines and the hydrogen system is used to offset diesel fuel consumption.

2 Project Reporting

In Order No. P.U. 31(2007), the Board granted the approval of the construction and installation of the Wind-Hydrogen-Diesel System as proposed. Hydro was directed to provide a quarterly update on the status of the Wind-Hydrogen-Diesel System in each quarterly report to the Board, setting out details as to implementation and operation of this system, capital and operating costs, variances from budget, reliability and safety issues. Hydro was also directed to file a report to the Board within ninety days of the conclusion of the operational testing phase addressing in detail Hydro's conclusions and plans in relation to the Wind-Hydrogen-Diesel System.

The initial schedule for the Project, as outlined in Order No. P.U. 31(2007), called for construction of the Project to be completed at the end of 2008, followed by a three-year operational phase, ending in 2011. However, as outlined in the quarterly reports that have been submitted to-date, these milestones have not been met and the operational phase of the project has not started. As with any research and development project, there have been challenges along the way and these challenges have resulted in project delays. One of the major challenges faced by the Project was the reliability issues surrounding the hydrogen genset. The genset is the hydrogen fueled generator that is used to generate electricity when there is no wind power available. It was provided by Natural Resources Canada as an in-kind contribution and it has not functioned with the reliability needed from a piece of equipment operating in a utility environment. Nalcor has spent considerable time and resources troubleshooting the genset issues but an acceptable level of performance has not been obtained.

3 Project Update

Installation and commissioning of all major equipment of Phase I was completed in 2012 and the capital component of the Project was closed at the end of 2013. In 2011, an operating business unit was established so that preventative maintenance could be performed on other project equipment as the genset issues were being dealt with. The costs associated with this business unit have not been included in the quarterly reports to-date. These costs are not considered part of the Operational Phase of the completed Project, as this phase had not started however, they are an important part of the overall financial picture and will be included in all future reporting.

The EMS has functioned as designed but has not been fully utilized. It is operating all systems in automatic mode except the hydrogen genset. The EMS has the ability to start and stop project equipment automatically. This is to ensure that the correct generation source is

dispatched according to current system conditions. Due to reliability issues, the hydrogen genset has been placed in manual mode which means that the EMS can only operate it when the operator turns it on. While the genset is in manual mode, the EMS will bypass it when dispatching generating sources. This is how the system has been running since the end of 2012. The operator has used the gensets in manual mode and generated electricity from hydrogen but the run times have been limited.

4 Ramea Wind-Hydrogen-Diesel Project Phase II

A major milestone for the project is the development of a fully utilized EMS that controls all project equipment. In order to achieve this, the EMS will need to operate all equipment in automatic mode for a continuous period of time. This will allow Nalcor to collect valuable data that will be studied to inform decisions regarding future installations of the EMS and renewable generation and energy storage in other communities. To achieve this goal, it has been determined that a reliable hydrogen fueled generation source is required. In 2012, Nalcor submitted a proposal to the Atlantic Canada Opportunities Agency (ACOA) through the Atlantic Innovation Fund (AIF) for Phase II of the Project. Phase II of the Project will be a five-year project that will include installation, optimization and commercialization of the components. Phase II will build on the work completed in Phase I and will include the installation and integration of a hydrogen fuel cell to the existing system, modifications to the EMS and upgrades to existing equipment to increase the penetration of wind and hydrogen generated energy into the isolated community energy supply mix.

In 2013, ACOA accepted the proposal and approved approximately $2.3 million (representing 55.5 per cent of the total Project cost) towards Phase II of the Project. Work on Phase II began in early 2014 and commissioning of the fuel cell is expected to be completed during the spring of 2015. The operations phase of the Project will begin after

the fuel cell is commissioned and will run until March 31, 2017. Once this operations phase is complete, Nalcor will provide the report as directed in Board Order No. P.U. 31(2007).

5 Future Reporting

Beginning this quarter, Nalcor will include updates on Phase II in its quarterly reports to the Board. This will include an update on the operating costs associated with maintaining existing equipment and a summary of the capital expenditure associated with the addition of the fuel cell. It is important to note that these operating costs are Nalcor specific costs and are not part of Hydro's regulated operations. If desired, Nalcor can provide an updated presentation to members of the Board to discuss the Project in more detail.

Schedule 2

Letter to the Town of Ramea

Newfoundland and Labrador Hydro
Hydro Place. 500 Columbus Drive
P.O. Box 12400. St. John's. NL
Canada A1B 4K7
t. 709.737.1400 I f. 709.737.1800
nlhydro.com

Via email: rameatowncouncil@gmail.com

March 10, 2023

Town of Ramea
P.O. Box 69
Ramea, NL A0N 2J0
Canada

Attention: Ian Stewart, Mayor
Ann Margaret, Town Clerk/Manager

Dear Mr. Stewart/Ms. Margaret:

Re: An Application by Newfoundland and Labrador Hydro pursuant to Section 38 of the *Public Utilities Act* for Written Consent to Remove from Service Hydrogen Assets related to the wind-hydrogen-diesel generation project in the Town of Ramea.

In 200, Hydro launched a research and development project in the Town of Ramea known as the Wind-Hydrogen-Diesel System project. This project included the construction and installation of a wind farm, a hydrogen electrolyzer, a hydrogen storage system, five hydrogen-generators, an Energy Management System, and associated equipment which was intended to demonstrate that hydrogen could be used as a storage medium to assist with the variability of wind farm energy production. There were delays and issues with the project over the years, and the hydrogen part of the project ended operations in 2014. Since then the hydrogen assets have been idle. Hydro intends to decommission the hydrogen assets by dismantling and removing them from the Town of Ramea. To do so, Hydro requires approval from the Board of Commissioners of Public Utilities, and is in the process of applying for that permission. The removal of the hydrogen assets has no impact on Hydro's service to the Town of Ramea, and the costs of the decommissioning are not included in Hydro's rate base and will not impact customers.

The wind farm assets will remain at this time, while Hydro examines alternatives for their future use.

If the Town of Ramea has any questions or concerns regarding Hydro's proposal, please contact the undersigned at 709 685 4973.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

Shirley A. Walsh
Senior Legal Counsel, Regulatory

Affidavit

IN THE MATTER OF the *Electrical Power Control Act, 1994*, SNL 1994, Chapter E-5.1 ("*EPCA*") and the *Public Utilities Act*, RSNL 1990, Chapter P-47 ("*Act*"), and regulations thereunder; and

IN THE MATTER OF an application by Newfoundland and Labrador Hydro ("Hydro") for written consent, pursuant to Section 38 of the *Act*, to decommission and abandon the hydrogen system portion of the Ramea wind-hydrogen-diesel generation project.

AFFIDAVIT

I, Robert Collett, of St. John's in the province of Newfoundland and Labrador, make oath and say as follows:

1. I am Vice President, Engineering and the NL System Operator for Newfoundland and Labrador Hydro, the applicant named in the attached application.
2. I have read and understand the foregoing application.
3. To the best of my knowledge, information, and belief, all of the matters, facts, and things set out in this application are true.

SWORN at St. John's in the province of Newfoundland and Labrador this 22nd day of March, 2023, before me:)

Commissioner for Oaths, Newfoundland and Labrador

Robert Collett

SAMANTHA KEATS
A Commissioner for Oaths in and for the Province of Newfoundland and Labrador.
My commission expires on December 31, 2027