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Board of Commissioners of Public Utilities
12 Torbay Road, P.O. Box 21040
St. John's, Newfoundland and Labrador, Canada
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Attention Jo-Anne Galarneau, Executive Director and Board Secretary

To whom it may concern,

In this letter we provide context and analysis on NL Hydro's application to the PUB for the construction of a 5.8 MW regional diesel-powered electricity generating station with a firm capacity of 4 MW, a service life of 40 years and an interconnected electricity grid servicing the communities of Charlottetown, Pinsent's Arm, Port Hope Simpson in Phase 1, and Mary's Harbour, Lodge Bay and St. Lewis in Phases 2 & 3. The focus of this letter is on NL Hydro's consideration of renewables in its evaluation of the lowest cost option for provision of additional electrical generation capacity for the selected southern Labrador communities.

Context: Climate warming is having devastating impacts across northern Canada, including in Labrador[1]. Ongoing warming trends are entirely caused by anthropogenic emissions of CO_2, CH_4, NO_2 and other greenhouse gases which warm the lower atmosphere through amplification of the Earth's naturally occurring greenhouse effect[2]. Anthropogenic emissions of CO_2 lead to a peak atmospheric warming effect ~10 years[3] after emission but importantly the warming effect of CO_2 molecules emitted is expected to continue for tens of thousands of years. The current scientific understanding is that further warming will continue until net anthropogenic emissions of greenhouse gases reach zero[4]. Correspondingly, the Federal Government of Canada has committed to achieving Net-Zero carbon emissions by 2050[5]. The Provincial Government of Newfoundland and Labrador has also committed to achieving Net-Zero by 2050[6].

[1] Barrette et al. (2020). Nunavik and Nunatsiavut regional climate information update. https://arcticnet.ca/wp-content/uploads/2022/06/Nunavik-and-Nunatsiavut-regional-climate-information-update_pdfversionFINAL_compress-min.pdf
[2] Canada's Changing Climate Report. (2019). https://changingclimate.ca/CCCR2019/
[3] Ricke, K.L. and Caldeira, K. (2014). https://iopscience.iop.org/article/10.1088/1748-9326/9/12/124002
[4] https://www.carbonbrief.org/explainer-will-global-warming-stop-as-soon-as-net-zero-emissions-are-reached/
[5] Canadian Net-Zero Emissions Accountability Act. https://laws-lois.justice.gc.ca/eng/acts/c-19.3/fulltext.html
[6] Newfoundland and Labrador Climate Change Action Plan Mid-Term Update. https://www.gov.nl.ca/ecc/files/ClimateChangeActionPlan_MidtermUpdate.pdf

To achieve decarbonization of the energy sector, the Federal Government of Canada has led a phase out of coal-fired electricity generation and introduced Clean Electricity Regulations for utility-scale electrical generation (December 13, 2024)[7]. The Federal Government has also created Clean Energy for Rural and Remote Communities support programs and has established a greenhouse gas emissions pricing program[8]. The proposed 5.8 MW diesel-generating station operated by NL Hydro would be a carbon intensive form of electricity generation (2.7 Kg of CO_2 per litre of diesel fuel utilized) but is unaffected by existing carbon pricing schemes because of an exemption for servicing remote communities. The Public Utilities Board and NL Hydro are both mandated to consider the least-cost option for electricity provision, regardless of carbon emissions. However, low-carbon forms of electricity generation are desired by residents in southern Labrador[9] and should be considered at the outset amongst the various options for provision of electricity.

According to a survey of residents in southern Labrador, diesel is the least preferred option for regional energy generation while renewables have broad community support[10]. Notably, in its original submission to the PUB (dated: 2021-07-16), NL Hydro provided no specific analysis of an option that included wind, solar or small-scale hydro generation. This exclusion of renewable energy alternatives from consideration repeated what had occurred in the evaluation of the Lower Churchill project where the Commission of Inquiry Respecting the Muskrat Falls Project found that wind generation and small-scale hydro were not adequately studied as an option for electricity provision by Nalcor[11]. In response to public and party comments, NL hydro commissioned a report by Midgard Consulting Inc. (dated: 2023-03-31) which did consider renewable energy integration amongst options for southern Labrador. Following this report NL hydro's submissions have suggested that renewable energy-based options were not the lowest cost option.

Analysis: In consideration of the above context, we set out to do a preliminary analysis of the decision by NL Hydro to exclude a primarily renewable-based energy generation system from consideration for serving southern Labrador communities. We have concluded that there are several deficiencies in the Midgard Consulting Inc. report that is relied on by NL Hydro (NLH) in their Integrated Resource Plan for Southern Labrador's electricity system. There is a notable lack of local weather information used to inform the availability of renewable resources throughout NL Hydro (NLH) and Midgard's analyses and shockingly there is no mention of the recent wind-battery-diesel generation project being undertaken in Labrador's most remote community (Nain, Nunatsiavut)[12]. Most concerning is NLH/Midgard's overestimate of the projected capital costs of renewable energy supply in northern rural communities. These estimates are significantly greater than projected costs for similar projects in other communities in Canada.

Qulliq Energy Corporation in Nunavut produced a report in 2016 investigating wind energy potential for all Nunavut communities. This report estimated that up-front project costs for the top

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[7] Clean Electricity Regulations. SOR/2024-263 https://www.gazette.gc.ca/rp-pr/p2/2024/2024-12-18/html/sor-dors263-eng.html
[8] Greenhouse Gas Pollution Pricing Act. https://laws-lois.justice.gc.ca/eng/acts/g-11.55/page-1.html
[9] Mercer et al. (2024). https://www.sciencedirect.com/science/article/pii/S221462962400330X
[10] Mercer et al. (2024). https://www.sciencedirect.com/science/article/pii/S221462962400330X
[11] Commission of Inquiry Respecting the Muskrat Falls Project. https://www.muskratfallsinquiry.ca/final-report/
[12] Nain Wind Micro Grid Project. https://www.gov.nl.ca/ecc/files/env_assessment_y2021_2118_registration.pdf

five best-fit communities (Iqaluit, Rankin Inlet, Baker Lake, Arviat, and Cambridge Bay) were between $5.3 million and $12.2 million ($CAD2016) per installed MW of capacity – depending on whether 2.3 MW or 100 kW turbine installations were deemed appropriate for the community's geographic and energy needs[13].

However, NLH/Midgard's estimate of $87,000,000 in capital cost for 14 MW of wind energy installation draws[14] on even older studies from 2009 and 2015. Further, while the reported capital cost ($87 million CAD in 2023 dollars) is within the range from Qulliq Energy's 2016 report, this estimate fails to reflect three realities:

1. The cost of wind energy has fallen considerably since 2016[15] when Qulliq Energy's report was produced and recall that NLH/Midgard used even older estimates.
2. Southern Labrador communities are accessible by paved roads from Quebec and Newfoundland (via Ferry) and these communities are far more accessible than any Nunavut communities or even many communities elsewhere in Labrador. Qulliq Energy's report assumes turbine assembly and shipping from the port of Montreal (at $300/tonne to Iqaluit, $375/tonne for more remote regions, and $250/tonne returning cranes and equipment to Montreal) so considerable shipping cost savings would be available for the exact same logistics path to southern Labrador.
3. Wind-battery-diesel systems were included in the Qulliq Energy study and their analysis suggested considerable (18-34%) diesel displacement potential with levelized cost of energy (LCOE) below $0.35/kWh in all communities.[16] Several communities in the Qulliq Energy study have estimated hybrid energy system costs below $0.30/kWh – equivalent to the target price in NLH's study of $300/MWh for 90% diesel cost parity.

The above points suggest that the interconnected renewable-based modelling included in the NLH/Midgard report did not adequately consider changing economic realities nor the full range of economically viable (and lower cost) energy system configurations for southern Labrador communities. Several additional factors must also be considered in this evaluation.

First, the NLH/Midgard report presumes renewable energy would have to be produced by a third party and purchased by Power Purchase Agreement. As a publicly owned Crown Corporation, there is no reason for this assumption to be true, as infrastructure costs could be lowered through public development. Even if a construction partner is selected, there are different ownership and profit arrangements that could significantly reduce electricity delivery costs relative to private development, including community ownership, energy cooperatives, and the

[13] Table 3, page 22. Qulliq Energy Corporation, 2016. Potential for Wind Energy in Nunavut Communities. Available at: https://www.qec.nu.ca/sites/default/files/potential_for_wind_energy_in_nunavut_communities_2016_report_0.pdf
[14] Page 66, lines 5-6. Midgard Consulting, 2023. Southern Labrador Communities – Integrated Resource Plan. Available at: http://www.pub.nf.ca/applications/2021/NLH2021Capital/NLH2021Capital_SUPP_Phase1SouthernLabrador/reports/From%20NLH%20-%20Midgard%20Consulting%20Inc.%20Report%20-%202023-03-31.PDF (report begins page 8 of PDF)
[15] National Renewable Energy Laboratory, 2024. Annual Technology Baseline. Available at: https://atb.nrel.gov/
[16] See ref. in footnote 1, Table 10, p.39.

establishment of non-profit public interest companies. The presumption of a PPA with a private developer unnecessarily inflates the cost of projected wind energy development (we restrict our critiques to wind energy here as Labrador has higher-quality wind than solar resources, but off-grid solar costs have fallen by similar rates to wind[17]). The claim that "past experience suggest that the preferred approach to obtaining renewable energy is through PPAs with third parties"[18] does not cite sources for this past experience, simply asserts it, and the only cited sources for renewable energy costs are respectively 16 and 10 years old as of January 2025 when this public comment period closes. The data on which the NLH/Midgard report makes this claim is thus very likely to be woefully out of date.

Second, although section 7.1[19] notes that renewable energy was considered "up to 50% penetration", several variables are not disclosed within the report. In particular, the asset lifetimes of state-of-the-art battery, solar and wind energy devices are not reported in Tables 20 or 22, nor on page 76 (lines 5-11) where other component lifetimes are reported. The replacement costs, projected service lifetimes, and other parameters relevant to economic estimates depending on these technologies should be disclosed, and their exclusion limits the ability of the public to understand how these costs are being reported.

Third, the presumption of stabilizing and decreasing diesel fuel prices for Labrador over a 25-year time horizon[20] is not sufficiently explained. Projected prices collapse by 20% by 2030 in NLH/Midgard's estimates; while oil is a volatile market, long-term planning for infrastructure based on an assumed near-term price reduction of 20% with a future 2040s increase to 2023's higher baseline prices is wildly optimistic. Greater variation in diesel price fluctuations – low, medium, and high future price scenarios – would lead to more nuanced and well-informed planning analysis. The sensitivity analysis considers one risk here (a 1.4-fold increase in price), but more scenarios are needed. Optimism in the face of volatile markets is especially ill-advised.

Fourth, the consideration of renewables only in the context of regional interconnection rather than smaller community diesel-displacement and battery system hybrid efforts (and resulting diesel fuel savings) is a major limitation of the study. It is not made apparent in the report where proposed wind (or solar) farms would be built, which communities have better or worse renewable resources in their local areas, nor how renewable energy facilities would be distributed across southern Labrador to meet these communities' needs. As renewable energy resources are inherently geography-dependent, the opaque nature of this analysis gives significant reason to doubt its utility. It is also worth noting that no effort was undertaken to provide comparison with the Nain Wind Micro Grid project, an isolated wind-battery-diesel system nearing construction.

Finally, the earlier point (#1) on wind costs must be reiterated. Wind energy costs have fallen substantially since the reports on which NLH/Midgard's analysis relies. We will draw on the United States National Renewable Energy Laboratory's Annual Technology Baseline (henceforth,

[17] See ref. in footnote 3.
[18] Page 91. Midgard Consulting, 2023. Full ref. in footnote 2.
[19] Starts page 70. Midgard Consulting, 2023. Full ref. in footnote 2.
[20] Table 31, page 81. Midgard Consulting, 2023. Full ref. in footnote 2.

ATB) (2024 edition) for comparison, looking specifically to the costs of distributed wind.[21] For small, community-scale distributed wind projects, the ATB reports expected levelized cost of energy of $149 to $214 USD/MWh. Assuming a stable conversion rate of approximately $1 CAD to $0.70 USD, this amounts to $213 to $306 CAD/MWh. The NLH/Midgard report considers only an assumed cost of wind at $300/MWh, and the sensitivity analysis considers only a 10% increase. ATB data shows a conservative estimate could instead entail up to a 30% decrease in renewable cost. Considering the strongest average wind speeds for which distributed wind costs are reported in the ATB[22], levelized costs for community scale wind projects could be between $102 and $151 USD/MWh – or, using the prior conversion rate, $146 to $215 CAD/MWh. This suggests cost reductions of >50% compared to assumed wind energy system costs in the NLH/Midgard report may be attainable if appropriate wind energy generation sites could be found. On these grounds, the reliance of the Midgard Consulting report on data from 2009 and 2015 for renewable energy cost estimation is a fundamental flaw that NL Hydro should have identified.

Conclusion: Renewable-based energy generation was wrongly excluded from consideration by the project proponent in its first submission to the Public Utilities Board continuing a legacy of failing to embrace emerging energy technologies for political or social rather than technological reasons[23]. The follow-up analysis submitted to the Public Utilities Board by the proponent did not accurately estimate wind generation costs for southern Labrador. NL Hydro should be required to update cost estimates for renewable-based energy options for southern Labrador to ensure alternative options have been considered before locking residents and utility ratepayers across the province (due to rate normalisation programs) into volatile fuel prices beyond their control for the foreseeable future. It is worth noting that the proponent's estimated costs have increased from ~88 million in October 2023 to ~110 million in November 2024 which represents a significant cost escalation and further necessitates this re-evaluation of the previously excluded renewable options.

Without an updated cost benefit analysis, this plan should not be approved as the proponent did not fairly consider renewable energy generation options, and thus failed to avoid the same pitfalls identified in the Commission of Inquiry Respecting the Muskrat Falls Project.

Regards,

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[21] As the ATB reports costs for different classes of wind, we will conservatively consider only residential and commercial distributed wind costs for average annual wind speeds of 7.36 m/s at 110 m above ground, known as "Residential DW – Class 7" and "Commercial DW – Class 7" in the ATB report itself.
[22] Class 1, average annual wind speeds of 9.52 m/s at 110 m above ground, using the same residential and commercial categories.
[23] Mercer et al. (2017). https://www.sciencedirect.com/science/article/abs/pii/S0301421517303762