



Coalition for Responsible Energy Development in New Brunswick

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Alexandre Vassiliev, Clerk
Standing Committee on Natural Resources
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Re: Brief to Standing Committee on Natural Resources for the Study on Canada's Electricity Grid and Network

Introduction

The Coalition for Responsible Energy Development in New Brunswick (CRED-NB) is fighting for a nuclear-free renewable energy future. Our mission is to advocate for responsible energy development in New Brunswick to address the climate crisis. CRED-NB represents over 150 individuals and 24 organizations (www.crednb.ca/about).

CRED-NB is working on the specific issues outlined in the Committee's study on the Electricity Grid: to understand inter provincial tie-ins and gaps, opportunities, and challenges to improve electrical production and distribution across Canada. We offer our brief to assist the Committee with its deliberations leading to a report to Parliament.

Canada's target is a net-zero electricity grid by 2035.

Summary of our recommendations

1. Canada should use the fastest and most affordable pathway to a zero GHG emission power grid in Canada: replacing fossil fuel-fired generation solely with renewable energy sources complemented by energy storage, transmission interties and demand-side management.
2. Canada should minimize the time and resources spent on developing new nuclear reactors, especially risky new experimental reactors, as they are not required to build a zero GHG emission energy grid in Canada.

3. All federal funding for research and development of new nuclear reactors and all grid energy technologies should be moved to government research granting agencies.

Renewables are reliable, cost effective and quick to deploy

The use of renewable energy is the most affordable and fastest transition path to a clean energy system. The accelerating adoption of renewable energy confirms that it will be the dominant energy source, and quite possibly the only source, in a low emissions world. Here is some of the evidence which supports that conclusion:

1. **Renewable energy is the lowest cost:** The levelized cost of energy (LCOE) from wind turbines and solar photovoltaic panels (solar PV) have dropped so much over the last 15 years that they are now recognized as the least expensive sources of electricity. (ref: International Renewable Energy Agency (IRENA) via Our World in Data ourworldindata.org/grapher/levelized-cost-of-energy?time=2010..latest)
2. **Renewable energy is rolling out quickly across the globe:** In the last ten years, the world has responded enthusiastically to those price improvements.
 - a. Global installations of solar PV increased ten-fold from 137 GW to 1,412 GW. (ref: IRENA www.irena.org/Energy-Transition/Technology/Solar-energy)
 - b. Global installations of wind power more than tripled from 292 GW to 1,016 GW. (ref: IRENA www.irena.org/Energy-Transition/Technology/Wind-energy)
3. **Energy storage systems ensure a stable grid:** Flexible sources of power, aka load-following sources, are needed to successfully integrate cheap solar and wind power. Load-following power sources ensure that a grid remains reliable by matching load with supply.

Energy storage systems such as batteries and pumped-hydro are excellent at providing a load-following service as they can save surplus energy to fill in the lulls in renewable energy production. The success of this approach plus a rapid drop in the cost of battery energy storage systems (BESS) has resulted in an exploding global BESS market. The cost of lithium-ion batteries packs has dropped from US\$780 in 2013 to US\$139 in 2023. (ref: BloombergNEF about.bnef.com/blog/lithium-ion-battery-pack-prices-hit-record-low-of-139-kwh/)

The annual amount of BESS installations has risen from 10 GWh in 2020 to 43 GWh in 2022 and expected to reach 420-442 GWh annually by 2030. (ref: Rystad Energy www.rystadenergy.com/news/new-battery-storage-capacity-to-surpass-400-gwh-per-year-by-2030-10-times-current and BloombergNEF about.bnef.com/blog/global-energy-storage-market-records-biggest-jump-yet/)

Nuclear energy is unsuitable for meeting Canada's 2035 target

Nuclear builds are too slow: Despite the optimism of nuclear proponents, the only new nuclear project that has a chance to be connected to the grid by 2035 is Ontario Power Generation's BWRX-300 boiling water reactor. However, at 300 MW of power, it will fall far short of making a significant impact. Based on the best available research, the non-light water reactors proposed in other jurisdictions will have difficulty reaching commercial viability before 2050, much too late (ref: National Academies of Sciences, Engineering, and Medicine www.nationalacademies.org/our-work/merits-and-viability-of-different-nuclear-fuel-cycles-and-technology-options-and-the-waste-aspects-of-advanced-nuclear-reactors).

Nuclear builds are much more expensive than renewables: The proposed novel small modular nuclear reactors are not even a match for the price and deployment speed of existing renewable energy technology. The latest independent research on small reactors found that they are too expensive, too slow, and too risky (ref: Institute for Energy Economics & Financial Analysis ieefa.org/articles/small-modular-reactors-are-still-too-expensive-too-slow-and-too-risky).

Nuclear plants do not mix well with renewables on a grid: Nuclear power plants (NPPs) do not help integrate solar and wind power as they can not fill the role of a flexible load-following source of power. A NPP depends on being able to run at a constantly high output, both technically and financially. A NPP is technically limited in how quickly and how often it can increase and decrease output. Financially, much of the cost of a NPP is in its creation so if it does not achieve a high capacity factor then the already high LCOE goes even higher. For example, Lazard calculates the LCOE for nuclear power using a capacity factor range of 89-92%. (ref: Lazard www.lazard.com/media/xemfey0k/lazards-lcoeplus-june-2024-vf.pdf)

The world has chosen renewables over nuclear energy: In the race to transition to a reliable net-zero energy system, renewables outcompete nuclear power both in terms of cost and development speed. Globally, the combination of solar and wind power plus storage systems has already eclipsed nuclear power. During the last 15 years (2006-2022) the annual electricity generation from nuclear power has remained in the range of 2,400-2,800 TWh. During that period the output from wind and solar steadily increased from less than 200 TWh, surpassed nuclear power in 2021 and outperformed nuclear power by over 700 TWh in 2022 (ref: International Energy Agency World Energy Outlook reports for 2006-2023).

In addition, renewable power and energy storage technology continue to ride the technological learning curve which has resulted in huge gains in effectiveness and cost. This is reflected in the priority models place on the development of solar, wind, and storage in 2050 net-zero scenarios. (ref: Navius Research canadaenergydashboard.com/view.html?policy=netzero®ion=Canada&view=electricity&setings=open&p_wss=1&p_hyd=1&p_dac=0&p_ccs=1&p_oil=1&p_lul=1)

Federal research agencies should be responsible for funding research and development on novel grid energy technologies

CRED-NB is concerned that federal funding for research on novel grid energy technologies currently does not meet the highest international standards for research funding. For example, most of the funding for research on new nuclear reactor technology to date has been provided by Innovation, Science and Economic Development Canada (ISED), from their Strategic Innovation Fund (SIF) and the SIF Net-Zero Accelerator stream, as well as by Natural Resources Canada. Their mechanisms for funding are not transparent and do not meet the highest international research standards. [Other federal agencies](#) have the expertise and capacity to ensure rigorous assessment of research funding requests.

We recommend that all federal funding for nuclear energy research and development, as well as development of all other novel grid energy technologies, should be moved from ISED and NRCan to the National Research Council and the Natural Sciences and Engineering Research Council of Canada (NSERC), institutions with the [capacity to properly adjudicate and assess proposals](#) for technology development. This will ensure that the research funding will be transparent and match the high quality of other federally funded research granting programs.

Conclusion

The urgency to reduce greenhouse gas emission has never been higher. Speed and cost are of the essence as Canada and the world limit the impacts from climate change by transitioning to a net-zero economy and electrical grid. Renewable energy technologies provide the most affordable sources of grid power as documented by Lazard and IRENA. In only 15 years, the fast deployment speed of wind and solar has enabled the global generation of electricity from renewables to eclipse that from nuclear power. Research shows that novel designs for small modular reactors will still leave nuclear power as a technology which is too slow and too expensive. Energy modeling points to focusing on renewable energy sources, complemented by appropriate energy storage, as the best way for Canada to meet its 2035 net-zero electricity target.

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