Expert Evidence in New Brunswick's Energy and Utilities Board (EUB) Matter EL-002-2025

January 2026

Introduction and Purpose:

1. Please state your name, occupation, business address, and the nature of your business.
    a. Toby D. Couture, Founder and Director of E3 Analytics, Blücherstr. 55, 10961, Berlin, Germany

       I am an energy and financial analyst and provide advice to governments, utilities, and regulatory agencies focusing on a range of energy sector topics, with a strong focus on the power sector and power sector transformation. E3 Analytics is an independent energy consulting firm based in Berlin, Germany. It has no relation to other companies or consultancies that share the terms "E3", including "E3G", "E3", and others. For more information, see: https://www.e3analytics.eu/

2. On whose behalf are you testifying in this proceeding?
    a. I am testifying on behalf of the Conservation Council of New Brunswick (CCNB).

3. Please describe your professional and academic background and your field(s) of expertise.
    a. I have been working in the energy sector for 20 years and have advised governments and senior government officials in over fifty (50) countries worldwide, including in Europe, Asia, the Middle East, Pacific Island states, Africa, and the Americas. I have a Master's of Science (MSc.) in Financial and Commercial Regulation from the London School of Economics in the UK, as well as an MA from the Université de Moncton where I focused on wind power policy and financing models, and a BA First Class Honors from Mount Allison University in New Brunswick. I am a Fulbright Scholar, and have worked previously at the National Renewable Energy Laboratory (NREL) in the United States, the Department of Energy's foremost research lab focused on renewable energy technology and policy.

4. Have you previously testified before regulatory commissions or courts on matters within your field(s) of expertise?
    a. Yes. I have previously testified before the Utilities and Review Board (UARB) in Nova Scotia (NSUARB-BRD-E-R-10, IN THE MATTER OF: Renewable Energy Regulations under the *Electricity Act,* R.S.N.S. 2004, c. 25, s. 1, as amended -and- IN THE MATTER OF: Renewable Energy Community Feed-In Tariffs) as

well as before the Energy Resources Conservation and Development Commission of the State of California (Docket 09-IEP-1G relating to the implementation of the State's Renewables Portfolio Standard)

5. Please describe the nature of the expertise you have previously provided as an expert witness.
    a. I have provided expert witness testimony and evidence in matters relating to energy policy, tariff setting, and renewable energy deployment. I have also acted as an expert advisor to a range of governments on renewable energy technology costs as well as battery storage costs, including to the Governments of Vietnam, India, Indonesia, Lesotho, Brazil, and others.

Summary of Testimony:

Renewables backed by storage can deliver low-cost, and more reliable energy and capacity to NB's power system than the proposed dual-fuel plant.

As both gas plant and fuel supply costs have continued to rise in recent years, and the costs of alternatives like renewables and storage have continued to decline, the economics across the power sector increasingly favor renewables backed by storage.

Concerns around the inability of renewables and storage to meet adequacy requirements are unfounded.

Expert Submission

1. **Please provide your knowledge of the current costs of using battery storage to provide electricity system capacity, including in Canada.**

Global Costs:

In 2025, the global average price of a turnkey battery energy storage system (BESS) is C$161/kWh,[1] according to the Energy Storage Systems Cost Survey 2025 from BloombergNEF (BNEF), published December 10th 2025.[2] BNEF collected system costs and project data from 596 unique submissions, finding global averages for 2-hour duration systems at C$171/kWh and C$151/kWh for 4-hour duration systems.

These findings are corroborated by the International Renewable Energy Agency's recent cost report.[3] According to IRENA, costs for BESS systems have declined by 93% between 2010 and 2024. In particular utility-scale BESS costs have declined by an average of 38% for 2-hour systems and 32% for 4-hour systems between 2023 and 2024.

Turning to 2025 cost declines, the observed average decline in utility-scale BESS systems in 2024-2025 is estimated at Ember at 31%, adjusting for inflation. Taken together, this translates into a 59% decline between average utility-scale BESS costs in 2023 and in 2025 (namely, a decline from C$388/kWh to C$161/kWh).[4]

This significant and continued decline in BESS costs is being driven by several factors:

- **Falling material prices** (particularly lithium prices).
- **Increased competition:** Intense competition over market share, particularly among manufacturers in China.
- **Manufacturing scale-up:** The rapid scale-up of assembly plants has led to greater efficiency and greater economies of scale.
- **Technological advancements:** The industry shift toward lower-cost Lithium Iron Phosphate (LFP) chemistries and larger cell sizes has helped further drive cost reductions.

This notwithstanding, it is important to note that country-specific costs often differ. Regional differences persist due to local supply chain related factors, import duties, taxes,

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[1] Note : all currency conversions have been updated to January 2026, and have been converted using www.xe.com

[2] Energy Storage News (2025a). https://www.energy-storage.news/battery-storage-system-prices-continue-to-fall-sharply-bnef-and-ember-reports-find/

[3] IRENA (2025). https://www.irena.org/News/articles/2025/Aug/Battery-energy-storage-systems-key-to-renewable-power-supply-demand-gaps

[4] Energy Storage News (2025a). https://www.energy-storage.news/battery-storage-system-prices-continue-to-fall-sharply-bnef-and-ember-reports-find/

and other factors. Prices in China, for instance, remain well-below the global average of C$161/kWh at approximately C$100/kWh in 2025.

The cost of grid connection can also vary widely, with grid connection fees ranging from C$40/kWh in some cases to C$130/kWh in others.

In addition, larger battery cells have contributed to lower unit costs overall. In 2025, DC-side systems that used 300Ah or larger cells were found to be 50% cheaper than systems with smaller cells. At the container level, larger DC blocks with 4MWh capacity or more were found to be 39% cheaper than configurations between 2MWh and 4MWh in size. These developments underscore the enduring impact of economies of scale on the rapidly changing BESS industry landscape.

Canada-specific costs:
Evidence from recently constructed BESS projects within Canada indicates that costs remain markedly higher than in some of the more mature global markets with larger market sizes (see Table 1). The table below provides an overview of some of the recent utility-scale BESS projects currently under construction or recently completed in Canada.

Project Name	Location	Expected entry into commercial operation	Capacity	Total Project Cost in $C Million Cost in $/MWh
Jurassic BESS Project	Alberta, Canada	Late 2026	80 MW / 160MWh (2-hour) battery	120 C$ Million 750 C$/kWh
Skyview 2 BESS	Ontario, Canada	Q2 2027	390 MW / 1560 MWh (4-hour) battery	750 C$ Million 480 C$/kWh
Hagersville BESS	Ontario, Canada	Q4 2025	300 MW / 1200 MWh (4-hour) battery	538 C$ Million 448 C$/kWh
Oneida BESS Project	Ontario, Canada	May 2025	250MW / 1000 MWh (4-hour) battery	700 C$ Million 700 C$/kWh

Table 1: Overview of recent utility-scale BESS projects in Canada

Sources:

Jurassic BESS Project: Northland Power (2025). https://www.northlandpower.com/en/news/press-release/northland-power-secures-financing-to-advance-the-jurassic-battery-energy-storage-project-in-alberta.aspx

Skyview 2 Project: Power and Telecom (2025). https://powerandtelecom.ca/projects/skyview-2-battery-energy-storage-project-secures-contract-with-ieso/

Hagersville BESS Project: Energy Storage News (2024). https://www.ess-news.com/2024/12/18/hagersville-battery-park-energy-storage-canada-financing/

Oneida BESS Project: Northland Power (2023). https://www.northlandpower.com/en/news/press-release/northland-power-announces-commercial-operations-at-oneida-energy-storage-project-canadas-largest-bat.aspx#:~:text=The%20project%20was%20completed%20with,at%20financial%20close%20in%202023.

As the table above shows, the cost differential is significant, and ranges from 2-3 times global averages reported by BNEF, IRENA, and Ember. Such a large cost differential is difficult to account for on the basis of small market size alone. There are several reasons why the costs in Canada might be higher than in other global or regional markets and that may account (in part or in full) for the observed disparity:

- Canada continues to apply import tariffs, particularly on the lowest-cost sources of BESS-related components (which are often from China, which remains the global hub of BESS supply chains);[5]
- Some jurisdictions within Canada have introduced a range of ways to favor local producers and local manufacturers of batteries and battery-related equipment;[6]
- Projects financed in Canada typically have a slightly higher cost of capital than projects built in the EU, or the US, which tends to push up overall project costs.[7]
- And finally, it is possible that BESS project costs are somewhat higher due to the more stringent requirements for black-start capability and other ancillary services from the IESO (Ontario)[8] and the AESO (Alberta)[9] in particular.

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[5] Global Affairs Canada (2025). https://international.canada.ca/en/global-affairs/corporate/transparency/briefing-documents/parliamentary-committee/2024-10-21-ciit and Lashitew, A (2025). https://news.mcmaster.ca/analysis-canadas-tariff-wall-on-chinese-electric-vehicles-is-deepening-dependence-on-the-u-s/

[6] Energy Storage News (March 18 2025). https://www.energy-storage.news/the-more-local-we-produce-the-better-evlo-on-tariffs/

[7] RSM Canada (December 10 2024). https://rsmcanada.com/insights/economics/canadian-firms-in-an-era-of-a-higher-cost-of-capital.html

[8] IESO (2025). Ancillary Services, https://www.ieso.ca/ancillary-services#:~:text=Certified%20black%20start%20facilities%20help%20system%20reliability,re%2Denergize%20other%20portions%20of%20the%20power%20system.

[9] AESO (2025). https://aesoengage.aeso.ca/black-start-services-nw-procurement

Taken together, these factors likely contribute to pushing costs up for projects built in Canada versus other markets. By extension, this would be likely to be relevant for BESS projects planned or constructed in New Brunswick.

However, it is important to underscore that NB Power as well as the government of New Brunswick have tools at their disposal to help reduce this cost premium, specifically with regard to grid integration requirements, ancillary services requirements, and local construction costs. In its procurement processes, NB Power could also demonstrate its commitment to avoiding gold plating by ensuring that project design and interconnection requirements are aligned with international best practices. Further, making land available (e.g. Crown land) at a reduced cost (or leasing it) and streamlining approval procedures is a common strategy used elsewhere to further help reduce project costs,[10] which may help to close the gap with international benchmarks.

In addition, recent BESS projects built elsewhere in Canada have benefited from government support, including through the "Smart Renewables and Electrification Pathways" program which extends through 2036.[11] Financial incentives are also available through a federal Clean Technology Investment Tax Credit which is expected to extend through 2034.[12] Such policies and support programs could help further bring costs down.

2. **Evidence filed by NB Power in this proceeding indicates that NB Power should secure 400 MW of capacity by 2028 in order to maintain resource adequacy and ensure system reliability. NB Power asserts that using battery storage to meet this 400 MW capacity requirement would be far more expensive than using combustion turbines (see section 3.2.2 of NB Power's evidence). What is your opinion of NB Power's evidence concerning the costs of using battery storage to provide electricity system capacity?**

NB Power appears to be using outdated numbers and assumptions to make its case. NB Power claims that battery storage would be more expensive than the proposed RIGS plant. To justify this, it refers to a tender held in 2023. However, as highlighted above, global BESS costs have decreased by 59% since 2023 and continue to decline.

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[10] See : Sim, L., Young, K. E. (2025). What impedes solar energy deployment? New evidence from power developers in the Arab Gulf States, Energy for Sustainable Development, Vol. 84, https://doi.org/10.1016/j.esd.2024.101597. https://www.sciencedirect.com/science/article/pii/S0973082624002230

[11] Natural Resources Canada (2025). https://natural-resources.canada.ca/climate-change/sreps

[12] Government of Canada (2025). https://www.canada.ca/en/revenue-agency/services/tax/businesses/topics/corporations/business-tax-credits/clean-economy-itc/clean-technology-itc.html

According to a recent analysis from the Energy Transitions Commission (a UK-based research body established by the UK Government), battery storage prices are expected to halve again by 2035.[13]

Taken together, this suggests that a Request for Proposals launched in 2026 for plant construction in 2027 would yield substantially lower bid prices than bids submitted in 2023. In short, bid prices from 2023 are neither an accurate nor a reliable basis for determining the cost-competitiveness of different options in the 2026-2028 timeframe, given the rapid pace of change in the global and regional power sector.

The chart below (Figure 1) provides a range of generation and storage options drawing on data and sources from 2024 and 2025.

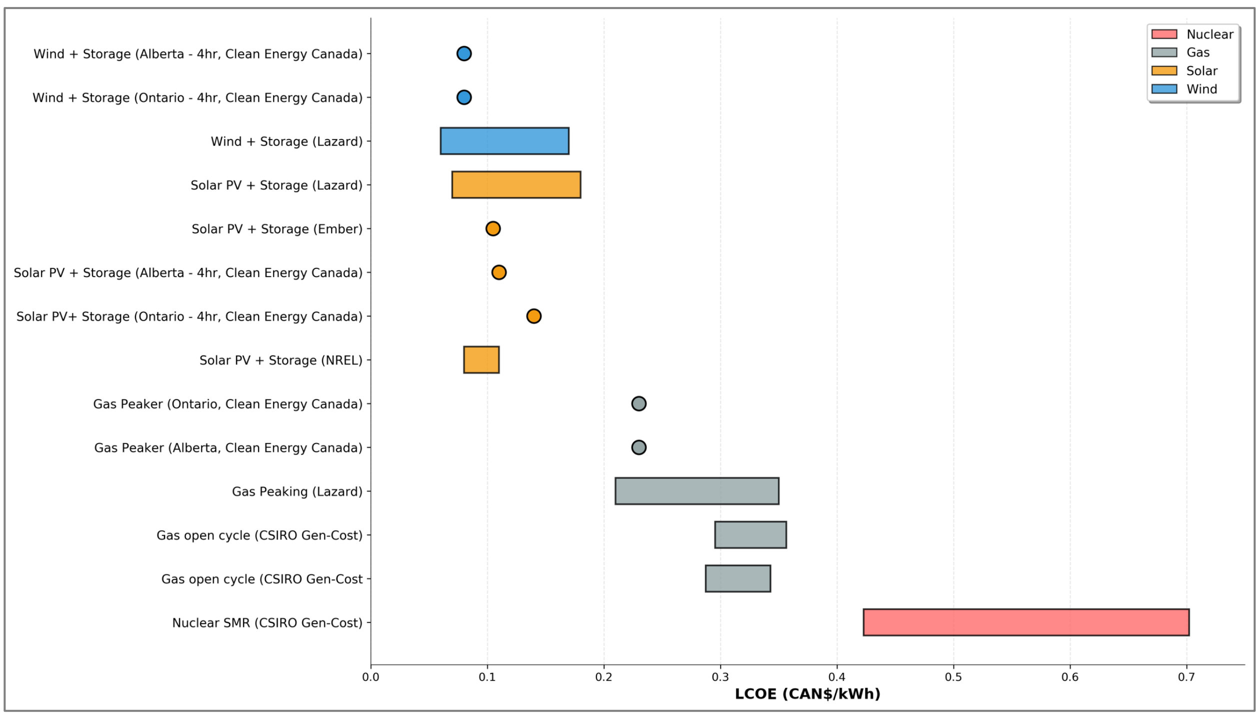

Figure 1: Levelized cost of energy (LCOE) comparison for utility-scale projects across generation technologies, in C$/kWh

Sources:

CSIRO Gencost:

GenCost: cost of building Australia's future electricity needs - CSIRO

Lazard - LCOE+ 2025

https://www.lazard.com/media/5tlbhyla/lazards-lcoeplus-june-2025-_vf.pdf

Clean Energy Canada

A Renewables Powerhouse - Clean Energy Canada

[13] Source: ETC (2025). https://www.energy-transitions.org/wp-content/uploads/2025/07/Power-Systems-Transformation_Main-report_vf.pdf

NREL (2025). Annual Technology Baseline, https://atb.nrel.gov/electricity/2024/technologies
Ember https://ember-energy.org/latest-insights/how-cheap-is-battery-storage/#3-with-a-65-mwh-lcos-shifting-half-of-daily-solar-

In terms of the levelized cost of capacity ($/kW-month or $/kW-year), this is a less widely used metric, as what keeps the lights on is ultimately useful energy, not capacity. Capacity-based metrics can also be misleading, particularly for plants whose costs are mainly driven by fuel costs. See table 2.

Applying the Levelized Cost of Capacity Metric
On a capacity basis ($/kW-month), a back-up diesel generator for one's home may seem like good value for money. Assuming an 8kW diesel generator costs C$ 8,000, lasts for 15 years, and is never used, it would have a levelized cost of capacity of C$ 4.40/kW-month. However, this is misleading, as it ignores how expensive it is to operate. At current diesel prices of C$ 1.69/L in New Brunswick, and a consumption rate of roughly 3L/hour at full output, this works out to C$ 5.07/hour to produce 8kWh of electricity. Leaving aside conversion losses, this results in a fuel-only generation cost of $0.63/kWh. The more the diesel generator is operated, the higher the real cost to the user. This illustrates why the levelized cost of capacity is a misleading metric, and why it is more common to use the levelized cost of energy (LCOE) as a basis for comparison, particularly for plants whose operating costs are highly dependent on fuel prices. Source for NB diesel prices: https://www.ctvnews.ca/atlantic/article/no-change-in-nova-scotia-pei-gas-prices/

Table 2: Applying the Levelized Cost of Capacity (LCOC) Metric

In Lazard's latest Levelized Cost of Storage analysis (v.10 from June 2025), it includes the levelized cost of storage expressed in $/kW-year. Converting to months, the values for both 2-hr and 4-hr batteries are provided below.

	Levelized cost of capacity (USD $/kW-month)	**Levelized cost of capacity (C $/kW-month)**
Utility-Scale BESS (100MW, 2-hr)	6.75 – 14.50	9.37 – 20.13
Utility-Scale BESS (100MW, 4-hr)	12.08 – 26.58	16.77 – 36.90

Table 3: Summary of the Levelized Cost of Capacity

Source: Lazard (June 2025). https://www.lazard.com/media/5tlbhyla/lazards-lcoeplus-june-2025-_vf.pdf

USD : CAD = 1.3886 (January 8 2026), xe.com

It is noteworthy that the values included here in Table 3 (namely, of C$9-37/kW-month) remain in-line with the numbers put forward by NB Power's own IRP (between C$ 19-38/kW-month).

Returning to a more common benchmark, LCOE (in the case of storage, the Levelized Cost of Storage (LCOS), Table 4 below provides a separate comparison of the LCOS drawing on a wider range of sources.

LCOS (US$/MWh)	Converted to C$/MWh*	Notes	Source (see References)
65	90	Global	Ember (2025)
115 - 254	160 – 352	Global (100 MW, 4-Hour)	Lazard (2025)
100	138	Global	Wood Mackenzie (2025)
93	128	Global (4-hr systems)	BNEF (2025b)
126	174	US	US Energy Information Administration (2025).

Table 4: Summary of the Levelized Cost of Storage (2025)

Table 5 below features the costs put forward in NB Power's own Integrated Resource Plan (IRP) in 2023, both in LCOE terms and in terms of the levelized cost of capacity (see Table 5).

Technology	Levelized Cost of Energy – Total (C$/MWh)	Levelized Cost of Capacity ($/kW-month)
Solar – Utility-scale	80	111
Onshore Wind	47	93
Offshore Wind	102	222
Wave	704	267
Tidal	502	191
New Biomass Boiler	294	59

Geothermal	111	77
Gas – Combined Cycle Gas Turbine	118	13
Combustion Turbine – Dual-fuel	418	9
Combustion Turbine – Gas	389	8
Combustion Turbine - Hydrogen	909	23
Lithium-Ion Battery (1-hour)	248	19
Lithium-Ion Battery (4-hour)	193	20
Lithium-Ion Battery (12-hour)	195	38
Belledune Biomass Conversion	179	7
Bayside Gas Turbine Extension	253	3

Table 5: Levelized Cost of Energy and Capacity according to NB Power's 2023 IRP
Source: NB Power (2023). Integrated Resource Plan, https://www.nbpower.com/media/1492472/2023-integrated-resource-plan-en.pdf

Given that four of the five main sources above indicate a Levelized Cost of Storage of between C$90 – C$174 in 2025 (see Table 4), and that the levelized costs outlined in NB Power's 2023 IRP are estimated to be between C$389/MWh (gas-only) and C$418/MWh (dual-fuel), it is difficult to conclude that the proposed RIGS dual-fuel plant is more economically competitive than renewables backed by storage.

3. In your opinion, could battery storage be deployed in New Brunswick by 2028 to meet the 400 MW capacity need identified by NB Power, whether alone or in combination with demand response programs and strategic integration of renewables?

In its submission, NB Power suggests that any alternative other than the proposed dual-fuel plant would be impossible to deliver on this timeframe. This position is not substantiated by any evidence, nor do the examples of other jurisdictions provide grounds to suggest that the required volume of capacity (or more) could not be delivered by 2028.

It is well-known across the industry that solar, wind and storage technologies offer significant advantages in terms of construction and deployment speed. They also experience among the lowest cost-overruns (see Table 6).

How Big Projects Performed
Source: Flyvbjerg Database

Project type	Mean cost overrun (%)	Projects (A) with ≥50% overruns (%)	Mean overruns of A projects (%)
Nuclear storage	238	48	427
Olympic Games	157	76	200
Nuclear power	120	55	204
Hydroelectric dams	75	37	186
IT	73	18	447
Nonhydroelectric dams	71	33	202
Buildings	62	39	206
Aerospace	60	42	119
Defence	53	21	253
Bus rapid transit	40	43	69
Rail	39	28	116
Airports	39	43	88
Tunnels	37	28	103
Oil and gas	34	19	121
Ports	32	17	183
Hospitals, health	29	13	167
Mining	27	17	129
Bridges	26	21	107
Water	20	13	124
Fossil thermal power	16	14	109
Roads	16	11	102
Pipelines	14	9	110
Wind power	13	7	97
Energy transmission	8	4	166
Solar power	1	2	50

Table 6: Mean cost-overrun for major projects
Source: Flyvbjerg, B., cited in Engineering News Record (2023). https://www.enr.com/articles/55774-oxford-professors-latest-book-examines-roots-of-project-failure

Battery storage benefits further from the development of modular, containerized designs that enable staged deployment and rapid scaling. Industry analysis confirms that batteries are more straightforward to deploy than traditional generation assets, with lower construction risk and greater timeline certainty.[14] This flexibility and modularity means that renewables backed by storage can add firm power capacity more rapidly than other options.

The UK's storage strategy envisions the country adding 23-27GW of shorter duration energy storage by 2030, plus an additional 4-6GW of long-duration energy storage, up from

[14] PV Magazine (2026). https://www.pv-magazine.com/2026/01/02/battery-technology-outlook-for-2026-sharpens-beyond-lithium-ion/

roughly 6.9GW today.[15] This represents annual BESS deployments of roughly 5-7GW per year, and on current trajectories, with a BESS project pipeline of 83GW currently waiting in the connection queue, the UK appears on track to achieve its objectives.

Ontario's Independent Electricity System Operator (IESO) states that "By 2028, Ontario's entire battery storage fleet is expected to consist of 26 facilities with total capacity of 2,916 MW."[16] This would represent a nearly 7-fold increase from its total current installed BESS capacity of 430MW and suggests annual deployments in each of the coming years (2025-2028) of over 600MW. The IESO signals that this BESS capacity is specifically intended to meet the province's resource adequacy requirements.

Massachusetts (US) plans to bring on 5GW of BESS capacity by 2030, including 3500MW of shorter duration storage (four- to ten hours), totaling 14 GWh to 35 GWh.[17] An additional 750 MW targets long-duration storage (10- to 24-hour), and another 750 MW requires capacities exceeding 24 hours. This represents annual deployments of roughly 1GW per year.

Battery storage assets are available on a containerized basis on project timelines as short as 3-6 months.[18] Larger-scale BESS projects on the order of 400MW/1600MWh are currently being built across North America within 10-18 months.[19]

In light of these examples, it is difficult to conclude that achieving BESS capacity in the range of 400-800MW in New Brunswick by 2028 would be unachievable on this timeframe.

What about solar PV?

Solar PV is now recognized as the fastest growing source of new power generation worldwide, both in absolute terms (overall global deployment), as well as on a project-by-project basis.[20] Recent research on project timelines shows that the bulk of utility-scale projects worldwide are built between 6-18 months.[21]

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[15] UK Government (2025). Clean Power 2030 Action Plan, https://assets.publishing.service.gov.uk/media/677bc80399c93b7286a396d6/clean-power-2030-action-plan-main-report.pdf

[16] IESO (2024). https://www.ieso.ca/-/media/Files/IESO/Document-Library/resource-adequacy/ieso-resource-adequacy-update-May2024.pdf

[17] ESS Storage News (2025). https://www.ess-news.com/2025/06/18/us-tender-alert-massachusetts-takes-steps-toward-40-gwh-energy-storage/

[18] Wärtsila (2026). https://www.wartsila.com/energy/energy-storage/technology/quantum-bess

[19] ESS Storage News (2024). https://www.ess-news.com/2024/12/18/hagersville-battery-park-energy-storage-canada-financing/

[20] IEA (2025). https://www.iea.org/reports/renewables-2025

[21] Gumber, A., Zana, R., Steffen, B., (2024). A global analysis of renewable energy project commissioning timelines, Applied Energy, Volume 358, https://doi.org/10.1016/j.apenergy.2023.122563 https://www.sciencedirect.com/science/article/pii/S030626192301927X

In both 2024 and 2025, over 500GW of solar PV capacity have been added worldwide, which represents a daily deployment level of over 1.5GW per day. Globally, the world now has nearly 3TW of installed solar PV capacity representing approximately 20% of the global installed power generation capacity.

Markets like Germany have been installing over 1GW per month every month for several years in a row. Smaller jurisdictions in North America like Vermont now have over 450MW of solar PV capacity installed,[22] and are adding over 50MW per year, while neighboring Maine has a total of 1,862MW installed as of Q3:2025.[23] Both Vermont and Maine meet roughly 17% of their annual power demand from solar PV today.

By comparison to both global and North American trends, New Brunswick is lagging behind, with total utility-scale solar deployment to date of only 1.6MW. While a further 10MW is under construction near Saint John and expected to enter into commercial operation in 2026, this still leaves New Brunswick with per capita solar PV capacity of around 13W compared to a per capita installed solar capacity of 694W in Vermont, and 1,330W/capita in neighboring Maine.

In sum, NB Power has not provided evidence demonstrating that renewables backed by storage could not provide the required firm capacity on time. Evidence from international and North American cases, as well as from projects in other jurisdictions within Canada, suggest that there is no reason to believe it could not do so.

4. NB Power's evidence in this proceeding describes potential shortcomings of using battery storage to meet the 400 MW capacity requirement that NB Power has identified, including the possibility that a generation outage might occur while a battery was depleted and the possibility that the system could require energy for more hours than a battery can provide (see section 3.2.2 of NB Power's evidence). What is your opinion of NB Power's representation of these potential shortcomings?

The primary driver for the proposed RIGS plant according to NB Power's submission is the need for new firm capacity to meet the province's resource adequacy requirements. The peak demand period that occurred in the winter of 2023 during which neighboring

[22] Vermont Legislative Services Committee (2025). https://www.uvm.edu/d10-files/documents/2025-12/Financial-Features-of-Large-Scale-Solar-Array-Projects-in-Vermont.pdf
[23] SEIA (2025). https://seia.org/state-solar-policy/maine-solar/#:~:text=According%20to%20the%20SEIA%2C%20Maine%20has%20the,SEIA%20also%20has%20a%20National%20Solar%20Database

suppliers were unable to provide additional power supply on request, put considerable strain on NB Power's system, and has fueled concerns that the utility may be unable to maintain reliable power system operation if such a confluence of circumstances were to occur again in the future.

As battery storage spreads and starts to play an increasingly important role in supporting the grid and in providing ancillary services, the legal and regulatory obligations imposed on BESS plant operators are growing. In certain cases, regulators have begun introducing penalties on BESS operators for failing to maintain charge levels sufficient to provide the ancillary services for which they are compensated.

In California, the California Public Utilities Commission (CPUC) has expanded General Order 167-C to include BESS assets.[24] The Order requires BESS projects larger than 50MW to maintain accurate logbooks of charging and discharging and operators can face fines for non-compliance. In parallel, CAISO is implementing new "state-of-charge" management requirements to ensure that BESS assets can reliably and consistently meet their bid obligations.[25] These orders currently apply mainly to ancillary services provision and are designed to ensure that BESS assets retain sufficient charge to meet the grid's ancillary services needs, including system reliability and adequacy requirements. Similar "state-of-charge" requirements have also been implemented by NYISO.[26]

In New Brunswick's case, the addition of BESS assets could be accompanied by state-of-charge requirements, particularly during the winter months when system needs are likely to be higher. While such a regulatory approach limits operator flexibility, it has the advantage of ensuring that BESS assets retain the levels of charge needed to support the system. In the absence of a formal rule or regulation, such requirements could also be incorporated directly into individual BESS contracts.

This notwithstanding, concerns may remain that in order to maintain their required level of charge, BESS assets would be placing strain on the grid. This is one reason why a growing number of BESS projects are co-sited with a nearby renewable energy project.

NB Power's highest peak demand was reached in February 2023 at just under 3,100MW.

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[24] Sidley (2025). https://www.sidley.com/-/media/publications/california-approves-major-overhaul-of-battery-storage-om-standards.pdf%3Frev=752c6d3c03fa414e88a940a70a13fafa&sc_lang=en

[25] Modo Energy (2025a). https://modoenergy.com/research/caiso-five-key-policy-market-design-initiatives-follow-2025-stakeholder-process-timeline-impact-battery-energy-storage

[26] Modo Energy (2025b). https://modoenergy.com/research/en/nyiso-ancillary-service-beginners-guide-to-operations-battery-energy-storage-frequency-regulation-reserves

A newly-built renewables + storage system would not, however, have to meet or replace ***all*** of NB Power's 3100MW of peak demand requirements. The proposed 400MW RIGS plant would not accomplish this either. What is in question is the need to provide additional capacity to the system, enabling NB Power to go from for instance, 2800MW of available power generation capacity to as high as, e.g., 3200MW, to reliably and adequately supply peak demand, should peak demand rise again to 3,100MW or beyond. This is the use case being discussed, and the use case for which the RIGS plant in question is being proposed.

If the BESS system needs to recharged using available power generation within the system, or from power imported from either Nova Scotia, PEI, Maine, or Hydro Quebec, this would still represent power that could be otherwise used to directly supply electricity demand in New Brunswick. Seen from this perspective, the presence of a new BESS system charging from the grid could be seen to be competing with NB Power for kWh.

While this competition with NB Power's own power supply needs would not pose a problem during normal operating hours (for instance, during off-peak or even shoulder periods), it could pose a potential conflict during critical peak times.

In order to avoid this scenario, most utility-scale BESS systems being built both in North America and worldwide adopt one of two approaches:

1. either they are co-sited with a nearby renewable energy project, such as a solar project or a wind farm; or
2. they sign an agreement with a third-party player who owns such an asset (or a fund or aggregator that owns a portfolio of such assets) for the power supply needed to charge the battery, either directly from an adjacent site, or via a wheeling or "direct power purchase" agreement.

In order to avoid potential conflicts with NB Power's own supply needs during critical peak periods, a utility-scale BESS system could be coupled either to a nearby wind farm, to a utility-scale solar PV project, or both, in order to enable the batteries to be charged from nearby renewable electricity supply without coming into conflict with NB Power's own power supply needs. To avoid creating, or exacerbating, local congestion issues in the grid, co-location is becoming the most common approach.

Despite the presence of shorter winter days (and sunlight hours), a co-sited BESS system located near a utility-scale solar PV project could be charged during the daytime using the output from the nearby solar project, without putting strain on the grid. This energy could then be stored to support with evening peaks, or with early morning peaks the next day, or both, depending on the operating strategy of the BESS asset.

Such a solar (and/or wind) charged BESS asset would help alleviate pressure on the grid and support New Brunswick's power reliability during critical peak demand periods.

With regard to the duration of BESS operation, the conventional wisdom is that BESS assets cannot provide firm capacity to back-up the system for more than a few hours. However, real-world experience with operating BESS systems demonstrates that by operating at less than maximum output, their power supply can be extended over a period of 8, 12, or even 24 hours or longer (see Table 7 below).

Duration	**Max Firm Capacity / Power Output of a 400MW/1600MWh BESS project**
4	400MW
8	200MW
12	133MW
16	100MW
32	50MW

Table 7: Illustrative duration of 400MW/1600MWh battery asset over longer timeframes

While utility-scale BESS assets are often built for 4-hours of storage, this represents the storage duration at maximum power discharge. However, by adjusting the operation of the battery to system needs, the discharge rate can be spread out over time, and can be stretched to supply power for significantly longer. This flexibility enables BESS to support the grid over longer periods of time, including overnight.

NB Power's assessment of the shortcomings of renewables backed by storage do not reflect common industry practice. A host of regulatory, contractual, and operational solutions exist to address these challenges.

5. Did your review of NB Power's evidence concerning renewables integration, demand response programs, and battery storage performance identify any assumptions that you believe to be incorrect?

There are four main areas where NB Power's assumptions appear to deviate from current industry trends.

The inability of RE technologies to provide capacity:
NB Power writes in its submission that "*Generally, intermittent renewable generation sources are not considered to be significant sources of capacity*." (page 20, lines 13-14). While this is broadly correct, it remains the case that renewables like wind and solar are attributed some capacity value, with onshore wind power often being attributed a capacity value of between 10-30%,[27] offshore wind between 15-40%, and solar PV between 5-25%, depending on the location, whether trackers are used in the case of solar PV, and the degree of correspondence with a jurisdiction's demand curve.[28]

The most common metric used to assess the contribution of a particular resource to system capacity is the "effective load carrying capacity," or ELCC. The ELCC of a generating resource is a measurement of that resource's ability to produce electricity during periods of shortfall.

The ELCC values put forward by NB Power in its 2023 IRP are not in line with current industry realities. A related issue is that NB Power considers the resources in isolation (solar, wind, and batteries) rather than together. To gain a more accurate picture of the real ELCC of variable renewables like wind and solar combined with storage, it is common to consider the joint operation of hybrid wind, solar, and storage plants. A recent analysis from NREL concludes that the ELCC of such hybrid renewable plus storage projects can readily exceed 80% (see Table 8).[29]

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[27] Holttinen, H., et al. (2016). Assessing capacity value of wind power, https://iea-wind.org/wp-content/uploads/2021/08/2016_WIW16_Capacity-value_paper_final_web.pdf

[28] Pham, A., Cole, W., Gagnon, P. (2024). Average and marginal capacity credit values of renewable energy and battery storage in the United States power system, NREL, https://docs.nrel.gov/docs/fy25osti/89587.pdf

[29] Ericson et al. (2022). Influence of hybridization on the capacity value of PV and battery resources, NREL, https://docs.nrel.gov/docs/fy22osti/75864.pdf

ELCC Class	2023	2024	2025	2026	2027	2028	2029	2030
4-hr Battery	83%	84%	77%	70%	72%	70%	69%	76%
PV hybrid loosely coupled 4-hr battery component	82%	80%	73%	65%	69%	72%	74%	87%
PV hybrid tightly coupled 4-hr battery component	82%	80%	72%	63%	69%	72%	74%	86%
PV fixed	38%	36%	32%	31%	29%	27%	25%	21%
PV tracking	54%	52%	48%	44%	42%	39%	36%	31%

Table 8: ELCC factors from the PJM system
Source: Ericson et al. (2022). https://docs.nrel.gov/docs/fy22osti/75864.pdf

Similar findings have been established showing ELCC values for BESS systems of over 80% in the Southwest Power Pool (SPP) system in the US.[30]

On a stand-alone basis, BESS assets consistently rank high in evaluations of ELCC. Analysis submitted by Siemens PTI as part of recent regulatory hearings in the US State of Minnesota concludes that the ELCC values for the first 500MW of BESS in the state can achieve an ELCC of 90%.[31]

Recent research from the IESO in Ontario indicates a similar result, with the first 500MW block of storage capacity added yielding ELCC values of over 80%, with longer duration storage assets showing higher ELCCs than shorter duration projects.[32]

Similarly, in analyses prepared for the ERCOT system in Texas, the ELCC value reported for BESS assets was found to be between 74-79%.[33]

Role of BESS in Supporting with Capacity and Resource Adequacy:

In recent years, the North American Electricity Reliability Council (NERC) has begun to acknowledge BESS assets as vital for resource adequacy and is in the process of establishing standards to ensure greater harmonization in capacity accreditation and the

[30] SPP (2023). https://www.spp.org/documents/68930/2022%20elcc%20esr%20report.pdf; See also: SPP (2022). https://www.spp.org/documents/68930/2022%20elcc%20esr%20report.pdf
[31] Siemens PTI (2024). https://www.lrl.mn.gov/docs/2024/mandated/240414.pdf
[32] IESO (2025). https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://ieso.ca/-/media/Files/IESO/Document-Library/Technical-papers/ELCC-of-Energy-Storage-in-Ontario.pdf&ved=2ahUKEwiL-qTTuv6RAxWXB9sEHf_IIbIQFnoECB0QAQ&usg=AOvVaw30Rl2GjjouJXqhObb2S2g2
[33] ERCOT (2024). https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.ercot.com/files/docs/2025/02/12/2024ERCOT_ELCC_Study_Final_Report02112025.pdf&ved=2ahUKEwjO14mAvv6RAxUN7QIHHSWKNKIQFnoECBwQAQ&usg=AOvVaw3BrXTOio5VvUmdowSMmOo1

calculation of the ELCC.[34] These standards have converged on the so-called "rigid core, flexible edge" methodology that factors in core modelling parameters like weather, temporal and geospatial factors, which are surrounded by a set of more flexible, jurisdiction-specific parameters like energy policy and local resource characteristics (see Figure 2).

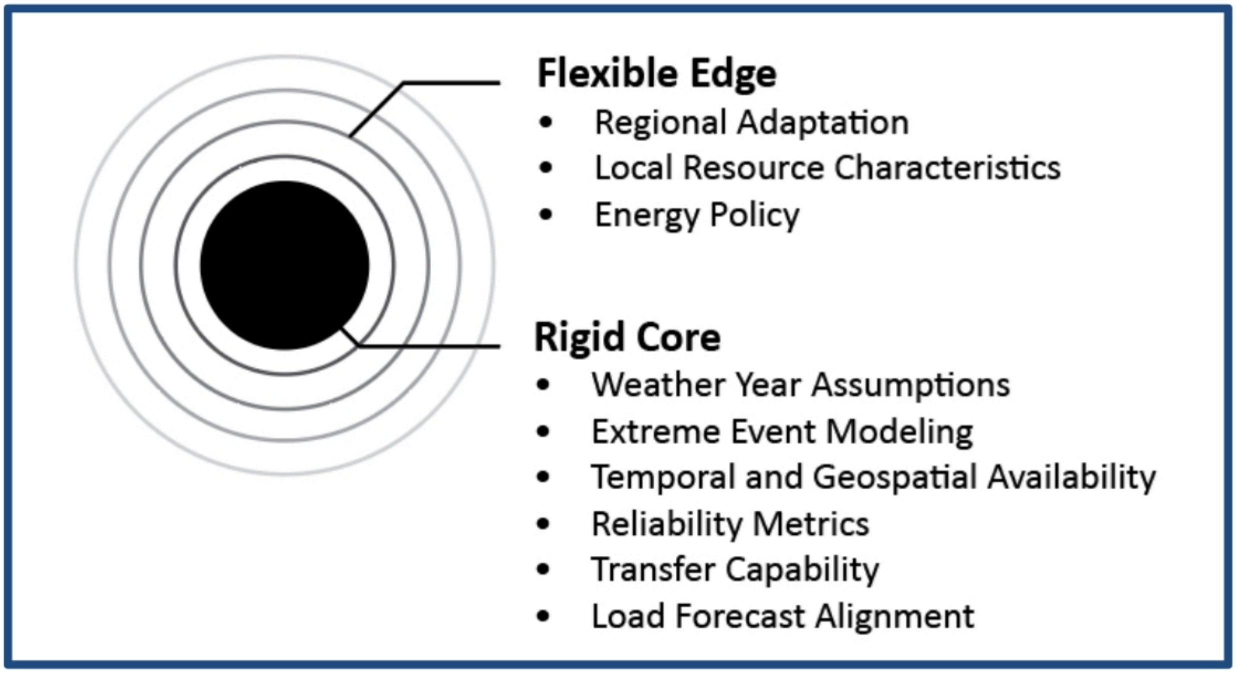

Figure 2: Overview of Rigid Core, Flexible Edge Methodology
Source: NERC (2025). Evaluating Resource Contributions for Reliability and Capacity Supply, https://www.nerc.com/globalassets/our-work/reports/special-reports/elcc_report._september_2025.pdf

Part of this methodology is intended to enable utilities and load-serving entities across North America to better evaluate the performance characteristics of co-located hybrid systems (specifically solar + storage, and wind + storage) as well as the capacity characteristics of long-duration storage options. It is also providing greater consistency in how the dispatchability and reliability contributions of demand-response resources are calculated, and attributed.

Taken together, these undertakings by NERC are establishing BESS assets as a key resource in providing both capacity and in meeting local resource adequacy needs in the North American power system. In NERC's latest reliability assessment for the Summer of 2025, it points specifically to the role of BESS assets: "Battery resource additions are

[34] NERC (2025). Evaluating Resource Contributions for Reliability and Capacity Supply, https://www.nerc.com/globalassets/our-work/reports/special-reports/elcc_report._september_2025.pdf

helping reduce energy shortfall risks that can arise from resource variability and peaks in demand."[35]

To understand the specific role that BESS assets are playing in supporting resource adequacy, it is helpful to consider the case of states with higher volumes of BESS.

In several states across the US, including in Texas, New York, Massachusetts, and California, batteries now play an important role in providing resource adequacy.

Battery storage capacity in California has grown from roughly 500 megawatts (MW) in 2020 to 17,000 MW at the end of 2025, and state-level targets envision a total of 52,000MW of BESS capacity by 2045.[36]

The California Public Utilities Commission counts solar backed by storage toward resource adequacy obligations, now treating renewables backed by storage as dispatchable capacity.[37] As a result, solar backed by storage is starting to play a growing role in meeting resource adequacy needs.

A further regulatory development in California is the establishment by the California Public Utilities Commission (CPUC) of new resource adequacy rules and the creation of the 24-hour "slice-of-day" (SOD) methodology.[38] Under these new rules, power retailers (or load serving entities, or LSEs) need to demonstrate that they have sufficient capacity to satisfy demand for every hour on the "worst day" — the day of the month with the highest forecast peak load for the system as a whole. This means that LSEs are required to address renewable energy variability by focusing on hourly reliability, and that they need to ensure that storage assets can charge (and discharge) when needed. This obligation has led to a rapid growth in investments in BESS systems to meet this peak adequacy requirement, as well as to a greater regulatory oversight of BESS assets' state-of-charge.

Similar examples of utilities relying on renewables backed by storage to meet adequacy requirements include Xcel Energy, a large US-based utility with operations spanning the country.

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[35] NERC (May 2025). 2025 Summer reliability assessment, https://www.nerc.com/globalassets/programs/rapa/ra/nerc_sra_2025.pdf

[36] California Energy Commission (2025). https://www.energy.ca.gov/news/2025-11/californias-battery-storage-fleet-continues-record-growth-strengthening-grid#:~:text=California%20has%20nearly%2017%2C000%20megawatts%20of%20battery,record%2Dbreaking%20heat%20and%20extreme%20weather%20without%20outages**

[37] Agarwal, P., Wooley, D. (June 2025). https://gspp.berkeley.edu/assets/uploads/page/Draft_Resource_Adequacy_Primer.pdf

[38] California Public Utilities Commission (2025). https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/resource-adequacy-homepage/resource-adequacy-compliance-materials/guides-and-resources/2026-ra-slice-of-day-filing-guide.pdf

In 2023, Xcel recently launched a competitive tender for up to 800 megawatts (MW) of firm dispatchable resources in Minnesota as authorized by the Commission and envisioned in the Company's 2019 integrated resource plan (see Docket E-002/CN-23-212).[39] According to Xcel, firm dispatchable resources would assist the Company in meeting the utility's capacity needs. In Minnesota's case, the push is being driven by the planned phase-out of several large thermal units, including most of the remaining coal units on the Upper Midwest System.

Initially, the utility proposed a large gas plant to meet this adequacy need. However, upon thorough examination by the Public Utilities Commission (PUC), the proposed Sherco gas plant was deemed uneconomic compared to other lower-cost resources, including renewables backed by storage (see Docket E-002/RP-19-368).[40]

In reaching its decision, the Minnesota PUC summarized its conclusion as follows:

> "*...various parties and commenters argued that the record failed to demonstrate that building a combined-cycle generator at the Sherco site would be a prudent investment, and therefore ratepayers should not have to bear the cost of the plant. Ultimately Xcel withdrew its combined-cycle proposal. The Commission concurs with this choice and finds no basis in the record that would justify Xcel recovering the cost of such a project from Minnesota ratepayers*." (p.14, E-002/RP-19-368)

Demand forecasts:
Demand growth forecasts based on growing electrification in the province do not appear sound.

According to recent data, N.B. Power's Enhanced Energy Savings program reported 2,985 homes converting from electric baseboard heaters to mini-split heat pumps in the last year. This is part of a larger trend, as overall heat pump adoption in New Brunswick has increased significantly, with a total of 12,211 heat pumps installed through the federal Greener Homes Initiative as of November 2024.[41] Since electric heat pumps operate more efficiently than the resistance or "baseboard" heating common in NB homes, the growing "electrification" in this sector should (ceteris paribus) serve to reduce peak demand, not

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[39] Minnesota Public Utilities Commission (2023). https://efiling.web.commerce.state.mn.us/documents/%7BD038968B-0000-CE1E-9643-CFF068E843FA%7D/download?contentSequence=0&rowIndex=442
[40] Minnesota Public Utilities Commission (2022). https://efiling.web.commerce.state.mn.us/documents/%7B202C2F80-0000-C11A-BA52-EC8AB5636CD4%7D/download?contentSequence=0&rowIndex=169
[41] Natural Resources Canada (2025). https://natural-resources.canada.ca/energy-efficiency/home-energy-efficiency/canada-greener-homes-initiative/greener-homes-initiative-progress-update-november-2024

increase it, as heat pumps have significantly lower peak wattage than traditional resistance heating systems.[42]

A typical home equipped with either an electric furnace or with electric baseboard heaters generally requires between 10kW and 50kW of electricity depending on the size of the home; a comparable heat pump system typically uses between 3.5kW to 7 kW to provide the same amount of heat.

The exception to this is the conversion from oil, propane, or gas heating to a heat pump: in these cases, the conversion would result in a net increase in electric demand.

Based on StatsCan data, there were 32,500 homes relying on oil heating and 15,700 relying on natural gas in 2022, which represents roughly 14% of households in the province.[43] Converting the 32,500 homes currently heating with fuel oil would therefore represent an increase in peak demand of approximately 200MW (assuming 6kW heat pump systems on average). However, when conversions of homes with baseboard heating to heat pumps are factored in (which represent 133,000 homes in total), the net effect is likely to be far lower, depending on the level of uptake, and could even be netted out depending on the levels of heat pump uptake.

With regard to electric vehicles, a halt to the federal ZEV program combined with the halt to a similar provincial program as of July 1 2025, is likely to temper EV sales growth in the province.[44] Stats Can reports an over 50% drop in battery electric vehicle sales nation-wide between Q3:2024 and Q3:2025.[45] In the absence of further policy changes on electric vehicles either at the provincial or the federal level, it is unlikely that electric vehicles will experience a substantial surge in sales on the horizon to 2027-2028.

At the current EV market share of 7.4%, and annual new vehicle sales in the range of 34,000 province-wide, this represents an annual addition of approximately 2,500 battery electric vehicles. Assuming this market share holds, and assuming annual charging-related electricity demand of approximately 5,000kWh, this represents an annual demand growth impact of 12,5 GWh per year, or less than 0.1% of NB Power's total annual electricity sales.

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42 See: Clean Air Alliance (2023). https://www.cleanairalliance.org/wp-content/uploads/2023/11/Heat-Pump-Peak-Report-FINAL.pdf. See also: BMP (2025). https://bpmhvac.com/home-energy/heat-pump-energy-usage-guide/#:~:text=Heat%20pumps%20typically%20use%203%2C000,system%20age%2C%20and%20usage%20habits.

43 Statistics Canada (2025a). https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=res&juris=nb&rn=21&year=2022&page=0

44 CBC (2025). https://www.cbc.ca/news/canada/new-brunswick/nb-electric-vehicle-program-ends-focus-shifts-to-chargers-1.7602450

45 Statistics Canada (2025b). https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2010002501

While this level of annual growth will no doubt have an impact, it is unlikely to fuel run-away growth in peak electricity demand in the coming years.

A further factor that counteracts NB Power's demand growth thesis is the growing self-sufficiency of municipal utilities, most notably Saint John Energy, which is developing its own wind, solar, and battery storage projects in partnership with stakeholders with a view to reducing its own purchases from NB Power.[46] In fact, Saint John Energy's latest annual reports shows that its annual purchases from NB Power have already started to decline.[47]

Demand response:
With regard to demand response, NB Power appears to be underestimating the existing potential considerably. It states in its submission that it has achieved an increase in demand response of just 5MW in 2023 to 85MW in 2025, which suggests that further potential could be tapped if further effort were invested. In its summary of the remaining potential, NB Power writes that "Further growth of demand response is being considered, but the opportunity is limited by the scope of the programs."

In short, it appears that the demand response potential is limited by the presence of "programs" to support it – programs that NB Power itself (along with the province) is ultimately responsible for implementing (or not implementing, as the case may be).

The example of Massachusetts demonstrates the range of what is possible to achieve in terms of reducing peak load through efficiency, demand response, and storage.[48]

Demand response entails multiple different forms of intervention, including some targeting residential, commercial, industrial, and institutional electricity customers. Most utility programs to date have focused on the large "low-hanging" fruit in the industrial sector. However, as experience with demand response grows, the potential of other applications and customer types is becoming more apparent and often far outstrips the potential of industrial demand response.

Analysis conducted for Massachusetts shows the potential for passive load management measures such as heat pumps and building insulation can reduce peak demand by 2.7 to 3.7 GW by 2030. In addition, adding active load management such as smart EV charging and building load flexibility can further flatten peak demand by 300 to 800 MW by 2030.[49]

[46] Saint John Energy (June 17 2025). https://sjenergy.ca/about/news/saint-john-energy-announces-provinces-largest-solar-farm and https://zero30.ca/projects-products/#burchill
[47] Saint John Energy (2024). Annual Report 2023-2024, https://sje-cms.s3.ca-central-1.amazonaws.com/SJE_Annual_Report_Spring2024_bf60b3c2fb.pdf
[48] Massachusetts Department of Energy (2025a). Peak Potential: Load managements for an affordable net zero, https://www.mass.gov/info-details/peak-potential-load-management-for-an-affordable-net-zero-grid
[49] Massachusetts Department of Energy (2025b). Technical potential of load management, https://www.mass.gov/doc/e3-technical-potential-of-load-management-summary-slides/download

Given Massachusetts has a population roughly 9 times larger than New Brunswick, it is reasonable to assume that there are several hundred MW of active and passive demand reduction potential remaining to be tapped. NB Power's assessment appears to ignore this potential or exhibit little interest in tapping it.

Taken together, there are a few aspects of NB Power's submission that downplay, or ignore altogether, well-established trends and developments in other electric utilities across North America.

6. **In your opinion, could battery storage be used to meet the 400 MW capacity need that NB Power has identified at a lower cost than that of the proposed RIGS Project, whether alone or in combination with demand response programs and strategic integration of renewables?**

For a more detailed overview of the comparative costs of battery storage, solar, wind, and dual-fuel plants, see the response to Question 2 above.

In short, yes, alternatives such as renewables backed by storage can deliver lower cost power than the proposed RIGS plant.

At an estimated price tag of between C$1.2 and 1.4 Billion, the proposed RIGS plant represents a major capital commitment. The fact that a third-party company has been identified to build the plant does not remove NB Power's financial responsibilities associated with the deal, including volume payments related to actual energy generation, capacity payments, as well as any payments awarded in relation to ancillary services.

Based on reported installed BESS prices in Canada of around C$450/kWh[50] (which remain more than double global averages, and are likely to decline in the years ahead as economies of scale continue to grow, and performance improves), a comparable financial commitment would enable the construction of a BESS asset on the order of 750MW/3GWh. Such a BESS project would arguably exceed New Brunswick's storage need based on current system realities.

Scaling down the BESS asset would enable the addition of a utility-scale solar PV project to charge the battery system, including during the winter months, without putting undue strain on the grid, or limiting NB Power's own power purchase options.

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[50] ESS Storage News (December 18 2024). https://www.ess-news.com/2024/12/18/hagersville-battery-park-energy-storage-canada-financing/

With the scale of capital commitment currently on the table, NB Power could procure a 400MW/1600MWh BESS asset, and still have enough left over for a 400-500MW solar PV project, which would be more than sufficient to charge the battery, even during the shorter winter days. By introducing contractual requirements relating to the minimum state of charge during winter months, NB Power could meet its capacity and adequacy needs without exposing itself, and NB ratepayers, to sizeable fuel price risk.

The cost-competitiveness of renewables backed by storage is supported by several major international reports published in recent years, including from BNEF,[51] NREL,[52] Ember[53], and others,[54] as well as by the findings of the latest report of the UK's Energy Transitions Commission:

> "*It is technically and economically possible to manage system balancing challenges in systems with very high (e.g., 80%+) wind and solar penetration, delivering round-the-clock electricity at costs below those of today's fossil fuel-based systems*."[55]

A further difference is that renewables and storage projects are generally less exposed to price spikes caused by geopolitical factors, as seen when Russia invaded Ukraine in the winter of 2022. Once built, renewables backed by storage provide stable, reliably priced energy and services to the power system over the lifetime of the assets.

7. In your opinion, and based on your review of NB Power's evidence, would the proposed RIGS Project provide any cost benefits or system capacity benefits that could not be provided by battery storage, whether alone or in combination with demand response programs and strategic integration of renewables?

There are two potential co-benefits that the proposed RIGS plant could bring from the perspective of energy security. However, closer inspection shows that both co-benefits can be achieved without adding a dual-fuel plant to the mix.

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[51] BNEF (2025a). https://about.bnef.com/insights/clean-energy/how-pv-plus-storage-will-compete-with-gas-generation-in-the-u-s/
[52] NREL (2024). Annual Technology Baseline, https://atb.nrel.gov/electricity/2024/technologies
[53] Ember (2025). https://ember-energy.org/latest-insights/how-cheap-is-battery-storage/#3-with-a-65-mwh-lcos-shifting-half-of-daily-solar-
[54] Clean Energy Council (2021). https://cleanenergycouncil.org.au/cec/media/background/resources/battery-storage-the-new-clean-peaker-report-2021.pdf
[55] Energy Transitions Commission (2025). https://www.energy-transitions.org/wp-content/uploads/2025/07/Power-Systems-Transformation_Main-report_vf.pdf

First, the planned addition of a liquid fuel storage facility at the plant provides additional energy security, as liquid fuel storage provides a valuable buffer against potential future interruptions to fuel or energy supply. Most countries maintain some form of strategic oil reserve, and a growing number are now expanding their natural gas storage facilities to provide greater protection against future disruptions to fuel supply.

To the extent that the RIGS plant features additional liquid fuel storage capacity, it can be seen to increase the province's energy security. That said, it is important to underscore that fuel storage capacity can be added on a stand-alone basis without needing to take on the substantially larger financial commitment of investing in a new power plant.

Indeed, NB Power already owns considerable diesel and gas-fired capacity, totaling nearly 2,000MW of electricity generating capacity (see Table 9).

Plant	Capacity (MW)	Fuel type
Courtenay Bay	160MW	Oil
Coleson Cove	972MW	Fuel Oil
Bayside	277MW	Gas
Millbank	397MW	Diesel
Sainte-Rose	99MW	Diesel
Grand Manan	29MW	Diesel
Total	**1,934MW**	

Table 9: Overview of the main power plants operating on liquid fuels in NB Power's generation fleet

Source: NB Power (2024). Annual Report 2023-2024[56]

In addition, NB Power's own fuel-based generation plants are complemented by additional gas- and oil-fired capacity located at industrial facilities across the province.

Taking a step back and considering NB Power's generation portfolio from a comparative perspective, it is not liquid fuel plants that are missing from NB Power's mix; it is rather solar power and storage that are conspicuous by their absence.

[56] NB Power (2024). Annual Report 2023-2024, https://www2.gnb.ca/content/dam/gnb/Gateways/ABCs/Annual-reports1/2023-2024/NRED-NBPC-2023-2024-annual-report-E.pdf

Second, the proposed RIGS plant includes the potential addition of synchronous condensers, which could add value to NB Power's system, particularly with regard to the supply of ancillary services. However, like with fuel storage, synchronous condensers can be contracted at a substantially lower cost when built as a stand-alone asset (i.e. without a gas plant).

Synchronous condensers are large spinning devices that are used to support grid stability and provide ancillary services. Since synchronous condensers can make it easier and cheaper to integrate larger shares of wind and solar power in particular, they are becoming increasingly common in power systems around the world. In contrast to a conventional power plant, synchronous condensers can operate without needing onsite generation.

A recent project developed in the UK is adding synchronous condensers to the grid on a stand-alone basis, without linking it to a gas plant.[57] In Ireland, synchronous condensers have recently been added to a large-scale BESS asset to help stabilize the grid.[58]

In a similar way, adding a stand-alone synchronous condenser to support the integration of higher shares of wind and solar in NB's power grid could be done without incurring the considerable financial liability and associated fuel-price risk of contracting a dual-fuel plant.

8. In your opinion, how do the cost risks of the proposed RIGS Project compare to the risks of battery storage, demand response, and renewables integration alternatives?

One of the most substantial risks stemming from the proposed project from the perspective of ratepayers relates to the associated fuel price risk. This has important implications for NB Power's efforts to increase the share of equity in its overall capital structure to 20%, as outlined in Section 68 of the Electricity Act.

Increasing NB Power's exposure to fuel price risk creates another (potentially large) competing claim for the proceeds generated by future rate increases. Any portion of future rate increases that is used to offset rising fuel prices represents revenue that NB Power cannot use to meet its 20% equity target.

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[57] Uniper (2025). https://www.uniper.energy/news/grid-stability-technology-without-the-need-to-generate-power-comes-into-operation-at-unipers-killingholme-site

[58] Siemens Energy (2025). https://www.siemens-energy.com/global/en/home/press-releases/two-become-one-siemens-energy-combines-two-technologies-to-stab.html

This becomes relevant when considering analysts' expectations with regard to future natural gas prices. According to the US National Bureau of Economic Research (NBER), natural gas prices are expected to rise in the years ahead as US exports of liquified natural gas (LNG) continue to grow (NBER 2025). This expectation is corroborated by NB Power's own estimates included it its 2023 IRP, which expects the price of gas to roughly double by the early 2040s (see Figure 3):

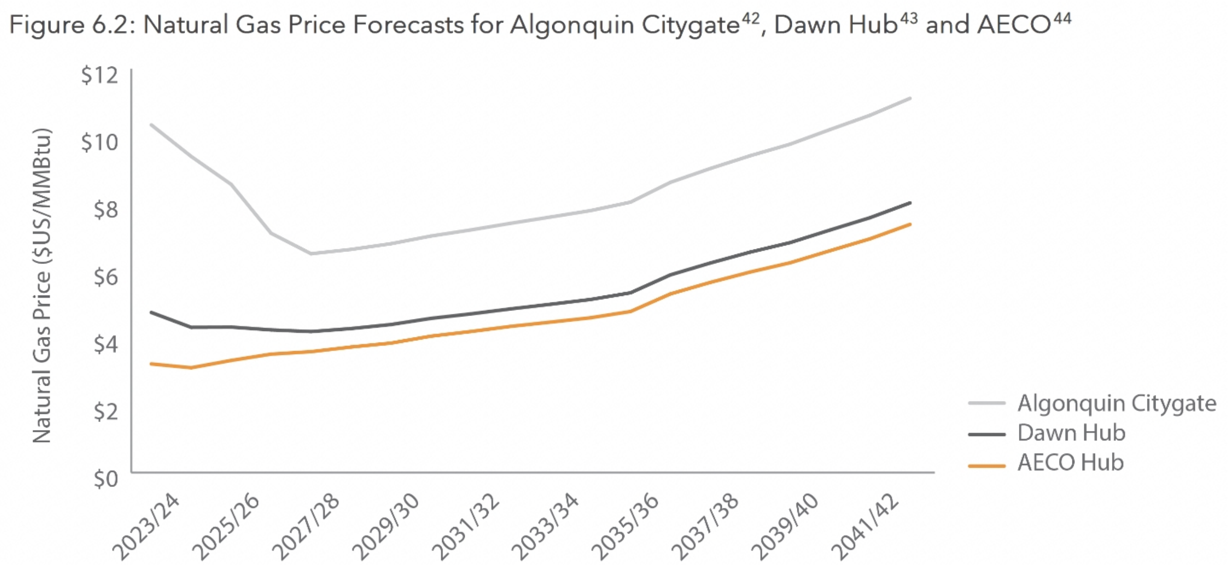

Figure 3: Natural Gas price forecast from NB Power's IRP 2023
Source: NB Power (2023). Integrated Resource Plan, https://www.nbpower.com/media/1492472/2023-integrated-resource-plan-en.pdf

The likelihood of future price increases clearly poses a material financial and economic risk both for NB Power and its ratepayers.

These considerations notwithstanding, NB Power claims in its submission that the plant will offer "predictable operating costs": careful consideration indicates that the proposed dual-fuel plant cannot provide predictable operating costs, as a substantial portion of the plant's operating costs are not fixed, but variable, and are determined by the cost of fuel.

In other words, while the associated capacity payments stipulated in the Tolling Agreement may be predictable, the costs associated with actual electricity generation from the plant are not. For ratepayers, and the province, this remains an important risk, one that NB Power appears to downplay in its submission.

Compared to the proposed dual-fuel plant, renewables backed by storage provide stably priced electricity and ancillary services over the lifetime of the assets, without the associated fuel-price risk.

9. Are there any other issues within the scope of your expertise that you would like to bring to the Board's attention in this proceeding?

Challenges operating at partial load: A further issue that merits being raised is the challenges that peaking plants like the proposed RIGS project have operating at partial load. NB Power claims that one of the functions of the proposed RIGS project is to help integrate growing shares of wind power in the province. However, peaking plants experience significant performance drops when operating at partial load:[59] specifically, plant efficiency declines and the emissions associated with the plant increase.

By contrast, BESS assets operate equally efficiently at any state of charge or discharge, maintaining 95–99% efficiency regardless of output.[60] In the case of BESS assets, there's no performance penalty for partial load operation – in fact, batteries tend to operate more efficiently at lower discharge rates.[61]

Role of grid-forming inverters:

Another area that remains undiscussed in NB Power's submission is the transformative role of **grid-forming inverters** in supporting vital grid functions. Inverters are the link between a wind, solar, or battery asset and the rest of the grid.

Traditional so-called "grid-following" inverters follow the grid's voltage and frequency, shutting down during outages. By contrast, grid-forming inverters create their own stable voltage and frequency, enabling them to support the grid and even re-establish stability by providing virtual inertia during system disruptions.[62]

As solar and wind energy start to replace traditional synchronous generators (like coal and gas plants), the grid loses part of its inertia and voltage control, which can lead to greater instability in the system. Grid-forming inverters, which are widely available on the market today and being deployed at scale in markets like the US, Australia and Europe, mimic traditional generators by providing synthetic inertia, frequency control, and voltage support, helping to keep the grid stable.

Grid-forming inverters are becoming an increasingly important tool in power systems worldwide and could support the stability and reliability of NB Power's grid in the years ahead, particularly as ageing assets are retired.

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[59] Ipieca (2022). https://www.ipieca.org/resources/energy-efficiency-compendium/open-cycle-gas-turbines-2022

[60] Redondo-Iglesias, E., Pelissier, S. (2022). On the efficiency of LFP Lithium-ion batteries, https://www.researchgate.net/publication/366551786_On_the_Efficiency_of_LFP_Lithium-ion_Batteries

[61] LFP Battery (2025). https://www.lifepo4batteryshop.com/blogs/understanding-c-rate.html

[62] Kroposky, B. (2024). Introduction to Grid Forming Inverters, https://docs.nrel.gov/docs/fy24osti/90256.pdf

Curtailment: Experience from power systems that have introduced significant BESS capacity indicates that BESS systems have one important advantage that fuel-based plants do not have, namely, their dual function in helping integrate variable resources like wind and solar, and in mitigating curtailment.

According to NB Power's 2023 IRP, curtailment already poses a significant problem under its existing contracts with independent power producers and represents an issue that is likely to grow with the addition of more wind power capacity in the coming years.[63] Adding battery storage would therefore carry an important co-benefit for NB Power's system: it would enable NB Power to reduce curtailment, while mitigating the losses (both electrical and financial) associated with it.

[63] NB Power (2023). Integrated Resource Plan, https://www.nbpower.com/media/1492472/2023-integrated-resource-plan-en.pdf

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