Chris Milligan, Director, System Planning & Grid Integration

c/o Integrated Resource Plan (IRP) Team, Nova Scotia Power Inc.

Sent via email: IRP@nspower.ca; and Chris.Milligan@nspower.ca

June 23, 2023

Dear Mr. Milligan,

**RE: ESC Feedback to NSPI on Evergreen IRP Final Modelling Outcomes**

Energy Storage Canada (ESC) is the national trade association dedicated to accelerating the deployment of energy storage projects and technologies[1]. Further to ESC's written feedback on the Evergreen IRP Draft Results and Updated Assumptions (February 9), and participation in the final modelling stakeholder session (June 5), please find enclosed ESC's feedback to NSPI on the Evergreen IRP Final Modelling Outcomes in Appendix 1.

ESC looks forward to continued opportunities to being an active stakeholder in the Evergreen IRP process, and to contributing insights and perspectives on behalf of our members as to how energy storage projects and technologies can contribute to the province's clean, affordable and reliable future electricity supply.

Please do not hesitate to contact me should you have any comments or queries.

Thank you for the opportunity to participate in this important process.

Very best regards,

Robert Tremblay

Policy Manager, Energy Storage Canada

(robert.tremblay@energystoragecanada.org)

[1] For further information, please visit: www.energystoragecanada.org

## Appendix 1. ESC Feedback to NSPI on Evergreen IRP Final Modelling Outcomes (June 23, 2023)

According to both the 2020 IRP and recent modeling outputs of the Evergreen IRP, the implementation of bulk energy storage is expected to make key contributions to the phase out of coal-fired generation, increasing variable renewable energy resources, and expansion of transmission ties, including through the provision of: firm capacity; peak shaving; reduced wind curtailment; and support for ancillary services and essential grid services (e.g., regulation, operating reserve, and load following). These could include: the 200 MW standalone projects being developed by NSPI as part of NS Power's Eastern Clean Energy, and many projects (of varying storage durations) being developed by other proponents; and energy storage co-located with existing and new thermal and renewable generation assets to enhance their operational capabilities while optimizing the use of their point of interconnection. Energy storage co-located with load providing "demand-side management" also has significant potential yet to be fully explored in the province.

ESC believes that the role of energy storage in the province will be much greater than what is currently forecasted. In this context, ESC's comments and feedback to NSPI on the evolving role of energy storage in the province through the Evergreen IRP process, and on the Final Modelling Outcomes, is presented under the following headings:

1. Stakeholder engagement on energy storage assumptions and modelling
2. Sensitivity analysis to explore the role and value of energy storage
3. Include energy storage as a roadmap item in the Action Plan

1. **STAKEHOLDER ENGAGEMENT ON ENERGY STORAGE ASSUMPTIONS AND MODELLING:** ESC greatly appreciates NSPI's responses to our questions during the last round of stakeholder comment, including with relation to the assumptions on the operational characteristics of energy storage to: support system strength and stability; and to manage excess generation or reduce transmission congestion in place of curtailment. ESC also greatly appreciates NSPI's ongoing analysis, review and study to define: the system requirements that will enable a supply-mix with large penetrations of variable renewable generation, and the retirement of thermal generation; and the evolving role that energy storage (of varying durations, whether interconnected at the distribution- or transmission-level, and whether standalone, or integrated with generation, or integrated with load) can play to contribute to these system requirements. ESC looks forward to future updates on the wind integration studies, and other work that defines the evolving role of energy storage in: integrating variable renewable energy resources; enhancing thermal, hydro, and variable renewable generation assets; and optimizing transmission and distribution system planning, design and operation (including as demand side management), to reduce system costs and greenhouse gas emissions, and improve system reliability and resilience.

That energy storage is now selected in all but one scenario (i.e., average of 108 MW in 2030, and 162 MW in 2035) demonstrates that energy storage will have a role to play in the province in future. ESC believes that the role of energy storage in the province will be much greater than this. Model results are very sensitive to model inputs. It has been the experience that models in other regions have had difficulties accurately recognizing the stacked values and competitiveness of energy storage, commonly resulting in energy storage being underrepresented in modelling results.

**1.1.** ***ESC would appreciate continuing opportunities to facilitate the review and discussion of the assumptions on the operational capabilities of energy storage with NSPI and our Members to improve the stakeholder understanding of the work that is being undertaken by NSPI, and to contribute additional expertise into the process. Initial topics of discussion could include the operating capabilities of: battery energy storage in comparison to other generation options including the new investments in thermal generation being considered; and the potential of co-locating battery energy storage with existing and new renewable generation such as wind power facilities.***

***1.2. ESC does not have comments on the capital and operating cost assumptions for short- and long-duration energy storage projects and technologies at this time, but may in future.***

2. **SENSITIVITY ANALYSIS TO EXPLORE THE ROLE AND VALUE OF ENERGY STORAGE:** Technical and economic assumptions for energy storage, and how they interplay with the model (and all of its other inputs), will continue to evolve. ESC believes that the role of energy storage will continue to grow as a result of this in successive modelling rounds. In addition to evolving technical factors, ESC expects that policy factors that cannot be predetermined by the model will also play a key role shaping the future outlook for energy storage in the province. In addition to the Minister of Natural Resources and Renewables stating the government's objective to "*…accelerate the use of battery storage in Nova Scotia to help us get off coal and meet our renewable electricity targets*" with the introduction of amendments to the *Electricity Act* in Bill 264[2], other potential policy drivers could include:

- In the current Evergreen IRP results, the average share of electricity served by imported energy sources across all scenarios reaches more than one third in 2035 (i.e., an average of 25% electricity, and 11% fossil fuels across all scenarios). It could be reasonably expected that future provincial-level policies would support the deployment of in-province energy storage to: increase energy security; capture more of the economic benefits associated with the in-province development, construction and operation of infrastructure; and hedge more against global future fossil fuel price fluctuations and availability.

[2] https://novascotia.ca/news/release/?id=20230322004

- In the current Evergreen IRP results, an enormous amount of in-province renewable electricity would be curtailed (i.e., an average of 3.4 TWh/year in 2035 across all scenarios). It could be reasonably expected that future provincial-level policy would support the deployment of in-province energy storage to limit the amount of renewable electricity curtailed through both time shifting renewable energy and through assisting legacy thermal assets with ancillary services and ramping in response to fluctuations in renewable supply.

- In the current Evergreen IRP results, significant investment in new unabated greenhouse gas emissions-intensive natural gas, and heavy fuel oil would be required, and electricity sector greenhouse gas emissions would remain persistent post-2035. It could be reasonably expected that future policy that does not avoid or mitigate these investments (and the risk of stranded assets in the face of mounting climate change impacts), or seek to further reduce greenhouse gas emissions, would be challenged by very limited public confidence and support.

*2.1.* ***In addition to the on-going stakeholder engagement to refine technical assumptions, ESC asks that NSPI undertake sensitivity analyses to consider future scenario with more meaningful levels of energy storage (e.g., 500 MW by 2030, and 1,000 MW by 2035). This would generate valuable learnings about the technical and economic potential of energy storage in the province. ESC would appreciate opportunities to facilitate the review and discussion of the assumptions for these sensitivity analyses with NSPI and our Members to improve the stakeholder understanding of the work that is being undertaken, and to contribute additional expertise to the process.***

3. **INCLUDE ENERGY STORAGE AS A ROADMAP ITEM IN THE ACTION PLAN:** A significant deployment of energy storage represents a very material change to the planning environment in the province. Given the technical role that energy storage could play to enable a supply-mix with large penetrations of variable renewable generation, and the retirement of thermal generation. And given the myriad of policy drivers that could be reasonably expected to accelerate the deployment of energy storage capacity in the province beyond NSPI's current expectations. ***ESC respectfully requests that NSPI consider creating a standalone Roadmap Item in the Action Plan for energy storage broadly.*** Doing so would enable more continued focus to be allocated to tracking and refining the trajectory for energy storage (whether interconnected at the distribution- or transmission-level, and whether standalone, or integrated with generation, or integrated with load) in the Evergreen IRP process. ESC expects that undertaking the sensitivity analysis addressed in comment "2" above would demonstrate that energy storage is a variable that requires dedicated and focused ongoing exploration and examination.