Nova Scotia Energy Board

IN THE MATTER OF The More Access To Energy Act

-And-

IN THE MATTER OF An Application by the Nova Scotia Independent System Operator for Approval of its proposed expenditure and revenue requirement for the test year ending March 31, 2026

M12412

Joint Evidence of Board Counsel Consultants Robert Fagan and Shelley Kwok, Synapse Energy Economics

October 28, 2025

NON-CONFIDENTIAL

Introduction and Qualifications

Q Please state your names and occupations.

A My name is Bob Fagan. I am a Senior Vice President at Synapse Energy Economics, Inc. ("Synapse"). My business address is 485 Massachusetts Avenue, Suite 3, Cambridge, Massachusetts 02139.

My name is Shelley Kwok. I am a Senior Associate at Synapse. My business address is 485 Massachusetts Avenue, Suite 3, Cambridge, Massachusetts 02139.

Q Please describe Synapse Energy Economics.

A Synapse is a research and consulting firm specializing in energy and environmental issues, including electric generation, transmission and distribution system reliability, ratemaking and rate design, electric industry restructuring and market power, electricity market prices, stranded costs, efficiency, renewable energy, environmental quality, and nuclear power.

Synapse's clients include state consumer advocates, public utilities commission staff, attorneys general, environmental organizations, federal government agencies, and utilities. Synapse also occasionally works on behalf of certain clean energy providers.

Q Mr. Fagan, please summarize your work experience and educational background.

A I have worked at Synapse for over 20 years, beginning as a Senior Associate and rising to my current position as Senior Vice President. I am a mechanical engineer by training, with a BS degree from Clarkson University (then Clarkson College) and an MA in Energy and Environmental Studies from Boston University. I have worked in

or adjacent to the electricity industry for over 35 years, and for the last 30 years in a consulting capacity. My work focuses primarily on examining the technical and regulatory aspects of electric utility industry integrated resource planning (IRP) and related matters.

I have worked on behalf of the Nova Scotia Utility and Review Board Counsel on numerous occasions since 2005, when I first addressed open access transmission tariff (OATT) issues in Nova Scotia Power's (NS Power) original filing of its OATT. Since then, I have worked on energy efficiency, resource planning, the Maritime Link application, interconnections policy and other matters in different proceedings before the Nova Scotia Utility and Review Board (NSUARB) or the Nova Scotia Energy Board (NSEB).

A copy of my current resume is provided as Exhibit 1.

Q Ms. Kwok, please summarize your work experience and educational background.

I have worked at Synapse for 6 years, beginning as a Research Associate and advancing to Associate (2021) and then to my current position as Senior Associate (2023). I have a BS degree in Mechanical Engineering from Tufts University. In my capacity at Synapse, I conduct analyses of the electric power and buildings sector using different models. I also review IRPs and have co-authored numerous reports and comments assessing utility IRPs and presenting best practices in IRP.

I have worked on behalf of the NSUARB since 2019, when I reviewed Nova Scotia Power's 2020 IRP and used the PLEXOS software to model the Nova Scotia system. Since then, I have been involved in reviewing subsequent Nova Scotia Power IRP updates on behalf of the Board.

A copy of my current resume is provided as Exhibit 2.

Q On whose behalf are you testifying in this case?

A We are testifying on behalf of Board Counsel, for the Nova Scotia Energy Board.

Q Mr. Fagan, have you previously testified before the NSUARB or NSEB?

A Yes. I testified on behalf of Board Counsel in several proceedings and participated and commented on issues present in IRP and other proceedings in Nova Scotia numerous times over the past two decades, beginning in 2005.

Q Ms. Kwok, have you previously testified before the NSUARB or NSEB?

A No. I have supported the testimony of Mr. Fagan and supported the development of comments in M08929 (Nova Scotia Power's 2020 Integrated Resource Plan), M11307 (2023 Evergreen IRP Updated Action Plan and Roadmap), and M12247 (2025 Evergreen IRP Action Plan and Roadmap Update).

In the past, I have testified in Virgina on behalf of the Sierra Club on resource planning issues.

Q Please briefly summarize Synapse's participation in NS Power's Integrated Resource Planning efforts in the recent past.

A In December 2020, Synapse provided recommendations and key findings related to NS Power's Action Plan and Roadmap elements from its 2020 IRP, filed in November of 2020.[1] In September of 2023, Synapse provided comments on NS

[1] Nova Scotia Power, *Powering a Green Nova Scotia, Together - 2020 Integrated Resource Plan*, November 27, 2020.

Power's updated Action Plan and Roadmap, which it published in August of 2023.[2] In August of this year, Synapse provided comments on NS Power's 2025 IRP Action Plan Update.[3] Synapse also provided Evidence in the Reliability Tie proceeding (M12217) this year, focusing on the energy and capacity modeling aspects of WTI's Application. Years prior, Synapse provided comments on NS Power's 2014 IRP in October of 2014.[4] Synapse prepared and submitted these comments on behalf of Board Counsel of the NSUARB or the NSEB.

Q What is the purpose of your Joint Evidence before the NSEB in this NSIESO Matter 12412?

A Our purpose as Board Counsel Consultants is to ensure that technical aspects of NSIESO's initial IRP are prepared in accordance with its obligations under the Nova Scotia *More Access to Energy Act*, including, for example, to "evaluate the range of energy resources capable of meeting the needs of the integrated electricity system, including nonelectric energy resources that can work in combination with electric resources to satisfy the integrated electricity system."[5] In this Evidence, we summarize key IRP modeling considerations we recommend the NSIESO include when structuring its approach to completing the IRP.

[2] Nova Scotia Power, *Powering a Green Nova Scotia, Together – 2023 Evergreen Integrated Resource Plan*, August 8, 2023.
[3] Synapse Energy Economics, *Comments on Nova Scotia Power's 2025 Integrated Resource Plan Acton Plan and Roadmap Update*, Matter No. 12247, August 5, 2025.
[4] Those comments were filed with the NS UARB in October 2014 in a Synapse Energy Economics report entitled "*Key Planning Observations and Action Plan Elements*." The focus at that time was primarily the level of energy efficiency incorporated into NS Power's resource planning.
[5] Nova Scotia, More Access to Energy Act, S. 11 [Integrated Resource Planning Exercise], 2 (b).

Q Has NSIESO begun its IRP modeling?

A No. In response to discovery from Synapse, NSIESO indicated that all of the major steps required before commencing IRP modeling and developing the sets of input parameters and a scenario analysis structure have yet to be completed.[6]

Q Given that NSIESO has yet to commence IRP modeling, what can you say at this stage of the proceeding concerning NSIESO's IRP planning approach?

A We reiterate the IRP modeling recommendations we made in the Reliability Tie case, Matter M12217.

Q What were Synapse's modeling recommendations for the next IRP, as presented in the Reliability Tie case?

A Synapse made recommendations concerning input assumptions and scenario structures within the modeling framework across six areas: (1) supply-side costs; (2) regional coordination approach; (3) energy export to and from New Brunswick, and capacity imports from New Brunswick; (4) portfolio ELCC; (5) demand response representation and how to consider a "hybrid peak mitigation"[7] scenario; and (6) emissions costs representation. We reiterate the importance of those recommendations and further describe them below.

- **Costs for new supply-side resources**. NSIESO should research and analyze the capital and operating and maintenance (O&M) costs for new supply-side resources, including wind, solar PV and battery resources, in addition to the costs

[6] NSIESO Response to Synapse Energy Economics IR-1.
[7] See, for example, NS Power's 2022 Evergreen IRP Updated Modeling Scenarios presentation, July 29, 2022, noting electrification as a key driver to consider different modeling scenarios; and defining hybrid peak mitigation to "reflect a mix of heat pump adoption and retaining back up fuel heating for peak (cold weather) conditions; has the impact of reducing peak load requirements."

for new combustion turbines or any other considered fossil-fueled resource. NSIESO should directly consider ongoing industry uncertainty concerning these resource costs and use multiple sources for projections of such costs if or as available. NSIESO should be fully transparent to stakeholders in publishing the set of cost assumptions to be used, and the sources for those costs.

- **Regional system coordination scenarios**. NSIESO should explicitly include modeling scenarios that presume an enhanced regional approach[8] to unit commitment and unit dispatch has been accomplished (inclusive of the New Brunswick and Prince Edward Island regions as part of the New Brunswick balancing area) commencing with the completion of the Reliability Tie interconnection, presuming Reliability Tie approval and availability in 2029.

Synapse does not underestimate the efforts that will be required to establish an enhanced regional approach to dispatch and unit commitment in the Maritimes region. However, while such efforts are challenging, it is reasonable to model the potential outcomes of such efforts and include them as part of the next IRP analysis.

As noted in Synapse's Evidence in the Reliability Tie Matter 12217,[9] regardless of the uncertainty or the timing of such an enhancement, we recommend that

[8] See, e.g., Wasoqonatal Transmission Incorporated, *NS-NB Reliability Intertie Project Application*, April 10, 2025, Section 14.4.6, Regional Joint Dispatch, pages 102-103: "The additional benefits discussed above derive from consideration of a more regional approach by NS Power, and going forward the Nova Scotia Independent Energy System Operator (NSIESO) created by the Nova Scotia *Energy Reform (2024) Act,* to both extra-jurisdictional resource acquisition and to supporting and maximizing the value of indigenous Nova Scotia generation resources. Reinforcement of the interconnection between the NS Power system and the NB Power system is a foundational component for, and required to support, an enhanced regional approach." And, "NS Power believes that reinforcement of the interconnection between the Nova Scotia electricity system and the broader Eastern Interconnection which will result from the Reliability Intertie is a basic and foundational component of any form of enhanced regional resource cooperation, whether market driven mutually beneficial electricity trade as currently takes place, or some more formal regional cooperation agreement(s) or dispatch mechanisms."

[9] Synapse Energy Economics, *Evidence of Board Counsel Consultant Robert Fagan*, July 18, 2025.

NSIESO use the IRP modeling environment to effect a form of analysis that addresses enhanced regional system coordination approaches described and addressed in the "*Atlantic Energy Gateway Transmission Modeling Study Report*" and the "*Atlantic Energy Gateway Report on Regional Electricity System Operations.*"[10] As Synapse noted in the Reliability Tie matter, such an effort should unfold in recognition of the changes seen in the Atlantic region and in the electric industry (e.g., technology options) over the 14 years since those analyses were completed. Scenario options could also include consideration of a reduction in "pancaked" transmission rates between the provinces, for export energy, in addition to other coordination.

- **Export and Import Capability to / from New Brunswick and New England**. For all scenarios modeled, NSIESO should include a carefully considered structure to reflect the constraints and costs associated with importing and exporting energy to or through New Brunswick. This should include a robust modeling approach to allow for economic export of "surplus" wind energy, and clear parameters for wind curtailment practices used in the PLEXOS or other modeling environment under consideration. Given the proximity of the New England energy market to Nova Scotia, and that the Massachusetts electric hub price influences Maritime Link surplus energy amounts determinations (for import to Nova Scotia), it is reasonable for NSIESO to consider a modeling

[10] See "Atlantic Energy Gateway Transmission Modeling Study Report" and the "Atlantic Energy Gateway Report on Regional Electricity System Operations" in March of 2012. While dated, the substantive material in those reports remains relevant today. The reports remain available at https://energy.novascotia.ca/sites/default/files/aeg_transmission_modeling.pdf. and https://energy.novascotia.ca/sites/default/files/aeg_regional_electricity_system_operations.pdf. Notably, the system operations report contains options for "Enhanced Regional System Coordination (ERSC)" which include structural alternatives and descriptions for how unit commitment and joint dispatch, among other areas, could be addressed under an enhanced regional approach to better coordination across the Atlantic Energy Gateway region (at *Schedule 5: Matrix of Regional Electricity Systems Operations Options*, pages 54-66).

framework that includes how the Massachusetts hub price might influence decisions in Nova Scotia for energy export or import.

Exports from Nova Scotia were not allowed in the modeling framework used by NS Power for the 2020 IRP, or in the Evergreen IRP updates. With substantial increases in wind resources in Nova Scotia there will be times when exports to or through the New Brunswick system will be economic. It will be important for the next IRP modeling to include representation of energy export paths to or through New Brunswick.

- **Portfolio ELCC Analysis**. NSIESO should complete and incorporate the outcomes from the ELCC portfolio analysis update currently in progress in Matter 12247, the 2025 Evergreen IRP Action Plan and Roadmap Update. A "portfolio ELCC" approach implies a careful analysis of how combinations of demand response, wind, solar PV, and battery energy storage can contribute to meeting peak load requirements in Nova Scotia.
- **Demand response / hybrid peak scenarios**. In addition to incorporating the portfolio effect associated with demand response resources in the ELCC analysis update, NSIESO should also directly consider all expanded demand response opportunities. Those opportunities include the use of AMI-enabled resources and the effect of existing or new time-of-use rate designs, especially those that can capture peak load reductions during normal winter system conditions and during extreme high impact, low probability (HILP) events. NSIESO should include at least one specific "hybrid peak mitigation" scenario in its analyses.
- **Emissions cost**. NSIESO should ensure that all emissions offset purchase costs, carbon costs, and any ongoing use of the output-based pricing system are dynamically linked in the capacity expansion optimization modeling to ensure the model captures these effects when deciding among fossil (e.g., CTs) and non-

fossil (e.g., battery storage, demand-response, or adjusted renewable resource) options to meet requirements.

Q Does Synapse recommend specific modeling input values, or approaches, to address the six issue areas noted above?

A No. The recommendations we make at this stage do not include such specificity. We will provide comments or further detailed recommendations for these issue areas if or as necessary as NSIESO develops its approach and provides input assumption parameters.

Q Do you believe that NSIESO has the technical expertise necessary to conduct a reasonable IRP study?

A Yes. Based on what NSIESO has stated in its application and in discovery, it appears that it will have sufficient support between internal staff and external consultants to conduct the IRP, although there is uncertainty around the exact technical expertise of the team. In response to our discovery questions about whether the resource planning team will be made up of former Nova Scotia Power employees, NSIESO said: "we don't yet know the exact make up of staff that will be involved in the planned undertaking of the IRP."[11] Depending on the final team's level of experience with resource planning and Nova Scotia context, this may impact how efficiently NSIESO is able to conduct the IRP.

We think it is appropriate for NSIESO to rely on external consultants to support the development of the IRP. NSIESO has budgeted $0.50 million for consulting fees for IRP-related tasks, though has yet to select a consultant or set a scope of work.[12]

[11] NSIESO Response to Synapse Energy Economics IR-2.
[12] NSIESO Response to NSEB IR-17.

Q Do you have any further comments related to NSIESO's ability to carry out the IRP in a timely manner based on the information it has provided in its Application and in discovery?

A NSIESO's expectation to complete the first IRP exercise by the end of 2026 may be reasonable if it acts expeditiously to issue an RFP for consulting services and finalize the necessary pre-IRP studies. We have witnessed situations where contracting delays with IRP consultants have had large impacts on IRP study timelines, which is not ideal.

Q Do you have any further comments?

A Yes. In general, we encourage NSIESO to take the necessary steps to begin and complete the IRP as expeditiously as it can. The IRP results are crucial for informing near-term procurement decisions and ensuring that future investments are in the best interest of ratepayers.

Q Does this conclude your testimony?

A Yes.