

January 20, 2021

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Regulatory Affairs Officer/Clerk
Nova Scotia Utility and Review Board
1601 Lower Water Street, 3rd Floor
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RE: M08929 – NSPI Integrated Resource Planning – IRP Report Comments

Heritage Gas has reviewed the 2020 Integrated Resource Plan (“IRP”), distributed to stakeholders on November 27, 2020, and notes that the IRP foresees a significant increased reliance on natural gas over its 25-year planning horizon. Specifically, the IRP highlights the need for additional firm natural gas based generating capacity to ensure that the system is reliable with sufficient generation available to meet expected demand, especially during periods of low renewable generation and peak loads.¹ Natural gas based generation also provides critical ancillary services needed to allow for increased levels of renewable energy. Below are specific comments relating to items that Heritage Gas has raised throughout the process.

Benefits of an Integrated Energy System

Nova Scotia Power Inc.’s (“NSPI”) 2020 IRP differs from prior IRP’s in that it envisions electrification of segments of the economy that previously used others forms of energy to meet their needs. The IRP by its nature considers only the electric system. It does not contemplate whether lower cost alternatives utilizing a combination of energy sources could meet policy and regulatory objectives. Increasingly governments are taking an integrated energy system approach to lower costs to energy consumers while enhancing energy system reliability, energy independence, and adding to the provincial economy. While the IRP looks at the electrical system, Heritage Gas notes that the IRP foresees a significant increased reliance on natural gas over its 25-year planning horizon.

¹ M08929 – Exhibit N-9 – Nova Scotia Power Inc. 2020 Integrated Resource Plan, November 27, 2020, page 21.



While natural gas underpins the transition of the electric grid to lower carbon intensity, natural gas infrastructure can also play an important role in supporting the transformation to a low-carbon economy over the next 25 years. There is a growing consensus that integrating natural gas infrastructure with the electric grids will accelerate the emission reductions, increase reliability and lower energy cost. For example, a study from ICF International states:

“GHG reduction policies that solely focus on electricity over gaseous fuels are more costly (\$289/tCO₂) than approaches which allow for an integrated energy system to achieve GHG emission reductions (\$129/tCO₂).”²

An integrated energy system supports the production of more renewable energy including wind power, solar, green hydrogen, and renewable natural gas (“RNG”). In the Nova Scotia context, it also provides the following benefits:

- The ability to more cost-effectively manage peak energy demand;
- A reduction in Nova Scotia’s reliance on other jurisdictions and a corresponding increase in local economic growth as well as energy independence;
- Increased energy resiliency; and
- Significantly lower costs to all Nova Scotia energy users.

The IRP scenarios show that increasing electrification will significantly increase the need for capacity additions to meet peak demand requirements. Depending on the scenario, peak capacity requirements will require a significant increase of NSPI’s currently installed generation. Much of this new capacity will operate at low capacity factors. Other jurisdictions are choosing an integrated approach to meeting emissions targets. Among these is the province of Québec:

² [Implications of Policy Driven Electrification in Canada](#) – Final Report (October 2019), page 2.

“The government is innovating by asking Hydro-Québec and Énergir to jointly propose better means of reducing the carbon share in heating buildings at the best cost to customers and the community as a whole.”³

“Indeed, 100% electrification of heating would not constitute a use of electricity optimal for Quebec. Such an approach would cause a significant peak, for some winter hours, when power consumption reaches a maximum level. This would have a negative effect on costs for all customers. It should be added that electricity cannot be the only option for all commercial buildings and institutional due to certain constraints. For example, in the event of a general power failure, hospitals must be able to count on an alternative energy source.”⁴ [Translated]

“Greenhouse gas emissions from building heat will be reduced by the gradual increase in the share of renewable natural gas in the Quebec gas network. Eventually, the injection of green hydrogen into the gas network could also contribute to greening the natural gas network.”⁵ [Translated]

NSPI has noted its view in the IRP that:

“Electrification is a key variable in this IRP and results indicate that under economic resource plans it can support provincial decarbonization while reducing upward pressure on electricity rates for customers.”⁶

³ [Plan pour une Économie Verte 2030](#) - Politique-cadre d'Électrification et de Lutte Contre les Changement Climatiques, page 6.

⁴ [Plan pour une Économie Verte 2030](#) - Politique-cadre d'Électrification et de Lutte Contre les Changement Climatiques, page 53.

⁵ [Plan pour une Économie Verte 2030](#) - Politique-cadre d'Électrification et de Lutte Contre les Changement Climatiques, page 54.

⁶ M08929 – Exhibit N-9 – Nova Scotia Power Inc. 2020 Integrated Resource Plan, November 27, 2020, page 26.

However, by its nature, the IRP process reviewed the electric system, in isolation, and did not evaluate other non-electric opportunities to cost-effectively meet provincial goals and targets in conjunction with other energy sources.

Natural Gas and Its Infrastructure Supports the Transition to Net-Zero Emissions

As shown in the 2020 IRP, natural gas is a low-carbon source of electrical generation and will be necessary in supporting renewable integration in the province:

“Low-cost, low emitting generating capacity may also be provided economically through redevelopment of existing natural gas-powered steam turbines or coal unit conversions.”⁷

Heritage Gas acknowledges that renewable electrification in certain sectors of the economy will be important for further decarbonization in Nova Scotia. However, electrification unaccompanied by other clean energy options will not be sufficient to meet the Sustainable Development Goals Act (“SDGA”) net-zero 2050 target for the full economy. Currently only 25% of the province’s end-use energy requirements are met by electricity and therefore other alternative energy options should be considered before making decisions that consider electrification as the sole means to achieve policy objectives.

Recently, the Offshore Energy Research Association (“OERA”), Liberty Utilities, Heritage Gas, Atlantic Canada Opportunities Agency (“ACOA”) and the provincial Department of Energy & Mines engaged Zen Energy Solutions (“Zen”) to determine the future potential uses of hydrogen in Nova Scotia. Governments around the world increasingly see hydrogen as imperative in meeting the net-zero targets - such as those described in the European Hydrogen Roadmap⁸:

⁷ M08929 – Exhibit N-9 – Nova Scotia Power Inc. 2020 Integrated Resource Plan, November 27, 2020, page 22.

⁸ [A Feasibility Study of Hydrogen Production, Storage, Distribution, and Use in the Maritimes](#), page ii.

"The EU will require hydrogen at large scale. Without it, the EU would miss its decarbonization objective."⁹

The study by Zen supports the development of a hydrogen economy in Atlantic Canada and shows that hydrogen could deliver up to 22% of the end-use energy by 2050.¹⁰ In addition to having an important role in building heat and energy storage, hydrogen can serve a central role in areas that are challenging to cost-effectively electrify. These include heavy vehicle transportation, and industrial and institutional processes. Hard to electrify segments constitute a significant proportion of the province's GDP.

Therefore, in addition to the role of natural gas in supporting the evolving transition of the electrical grid, the introduction of hydrogen and RNG into existing natural gas infrastructure will further support the province in reaching the net-zero emissions target set out in the SDGA.¹¹

Broader Energy Implications of this IRP

NSPI's IRP is strongly centered on widespread electrification with a broad spectrum of assumptions for electrification, which could play out in different ways in the coming years. Heritage Gas is supportive of electrifying some sectors in contemplation of the environmental goals set out by the province. However, it is important for members of the Board and all parties, to note that the intent of the IRP is to determine the transition of the electrical grid over the next 25-year period. If the IRP were to take a transition from the lens of all energy providers in the province into consideration, the outcome could be very different from the Action Plan in this proceeding.

The market dynamics in Nova Scotia have been constrained in many ways, including the limited options to Nova Scotian's in terms of energy sources. Heritage Gas cautions the adoption of an IRP mandate for

⁹ [Fuel Cells and Hydrogen Joint Undertaking, Hydrogen Roadmap Europe - A Sustainable Pathway for the European Energy Transition](#), 2019.

¹⁰ [A Feasibility Study of Hydrogen Production, Storage, Distribution, and Use in the Maritimes](#), page x.

¹¹ RNG originates from organic waste from farms, landfills, source separated green bin waste, or wastewater treatments plants, which decomposes as it releases biogas. This raw biogas is captured and cleaned to create carbon neutral Renewable Natural Gas.

electrification that would subsume other energy providers, which would be suggestive of electrifying the general economy as an ultimate climate-focused solution.

NSPI describes potential pilots and programs that will shift to electrification:

“Develop and propose pilots and/or programs that focus initially on the transportation and building electrification sectors identified in the Pathways report as key sectors for early electrification adoption. These pilots and programs will be subject to NSUARB oversight.”¹²

The pilots and programs discussed above should be released to stakeholders in more detail as to the effect this electrification will disrupt the current energy marketplace, in addition to the recent market shifts with provincial and federal climate policy.

In light of the major shifts contemplated in this IRP, Heritage Gas recommends that a separate holistic review may be useful for the province to determine the development of a collaborative and broad based energy approach as it relates to meeting 2050 targets. Leveraging each long-term resource plan in an integrated approach.

The massive momentum toward meeting net-zero goals will require changes in the way that we produce and use energy, and it will require that we utilize a variety of existing and anticipated technologies. Different scenarios can be evaluated to determine the optimal scenarios / roadmap to achieve Nova Scotia’s emissions targets while considering the feasibility, affordability, acceptability and environmental impact of each scenario.

¹² M08929 – Exhibit N-9 – Nova Scotia Power Inc. 2020 Integrated Resource Plan, November 27, 2020, page 26.

Regional Intertie/Integration

The IRP Report identified the need for further study on the Intertie to provide firm capacity and ancillary services:

“Nova Scotia Power notes that any resource plans which go beyond the findings of the pre-IRP Renewables Stability Study will require further analysis to confirm they can be operated reliably.”¹³

Regional Integration is predicated on the availability of affordable imported energy from a neighbouring jurisdiction(s). Heritage Gas submits that NSPI has not provided specific insight into how this energy would be sourced, nor have they provided information on the carbon intensity of that energy. This is particularly relevant as Heritage Gas understands that the Province of Québec is also forecasting shortfalls in both energy and capacity; with shortfalls within the next 5-7 years.

“Québec’s electricity demand will continue to grow over the 2020–2029 period, driven by the vigor of the economy and the development of new markets such as the data center sector. As a result, unused heritage pool electricity, often referred to as a surplus, will gradually decrease.”¹⁴

“HydroQuebec anticipates that all of this surplus will be needed in the coming years to meet Quebec’s growing demand...”¹⁵

Increased reliance on tie-line connections to neighboring jurisdictions will also increase exposure to more frequent and more severe weather events related to climate change impacts that extend beyond the province’s borders. The reliability of electrical grids and the impact of electrification on sectors of the economy that have previously not been electrified needs to be very carefully considered in light of the province’s experience with multi-day outages.

¹³ M08929 – Exhibit N-9 – Nova Scotia Power Inc. 2020 Integrated Resource Plan, November 27, 2020, page 45.

¹⁴ [Overview of Hydro-Quebec’s Energy Resources](#), page 2.

¹⁵ [Overview of HydroQuebec’s Energy Resources](#), page 4.

In addition, the Board Counsel's consultant in the recent FAM Audit (NSUARB Matter No. M09548) issued their Rebuttal Evidence on January 12, 2021 noting the risks of relying on other parties:

*"In our December 23, 2020 comments on NSPI's final IRP report, we noted that the modeling results show a reliance on regional solutions, a positive result but one that introduces **"a key risk in that they require voluntary cooperation from at least one other third party, be it utilities, regulators, governments, or some combination of the three."** This involved risk because such third parties **"are not under the control of NSPI,"** and that any such third-party cooperation may come "in the form of less favorable cost allocation for any joint investments" or "after significant delay;" we noted, too, that "NSPI's pre-IRP regional integration efforts have not always proved fruitful or expedient, underscoring this risk." To mitigate this risk, we made three suggestions: (1) to include a circuit breaker in the event that progress on regional solutions reach an impasse; (2) that NSPI not link any thermal unit retirements to the success of its regional strategy; and (3) that NSPI should consider using competitive procurement to spur the success of its Regional Integration strategy. Given the importance and modeled economic benefits of regional solutions in the IRP modeling results, we would suggest that NSPI's regional efforts take on a more urgent role than simply business as usual."¹⁶[Emphasis Added]*

The final IRP report notes that the studies for firm import options requiring new transmission investment and strengthened regional interconnections:

"...will proceed in parallel with the wind procurement strategy (Action Item 3d, below) and will include supporting transmission planning studies."¹⁷

¹⁶ Bates Whit Rebuttal Evidence – 2020 FAM Audit (M09548), January 12, 2021, pages 14-15.

¹⁷ Action Plan Item #1, page 112.

Heritage Gas suggests that transmission planning and reliability studies, such as the PSC study¹⁸ conducted in 2019, be completed in advance of the wind procurement strategy and released to stakeholders for review.

Given that the proposed Regional Integration and Reliability Strategy plays a key role in most of the optimal resource plans developed for the key scenarios, these studies should present the results related to grid stability, prior to prescribing these sources as the ultimate solution.

Full Cost Impacts of Electrification

The true cost of load growth has not been discussed in detail throughout this process. NSPI previously noted that additional load would lead to lower rates given the increased contribution to fixed costs. This now states, the following.

“Finally, in response to stakeholder feedback, Nova Scotia Power has used its relative rate impact model to identify an order of magnitude level of costs that may be acceptable for utility customers to bear in order to promote electrification to the benefit of customers. This question cannot be resolved through the IRP process with precision; however, using the rate model, Nova Scotia Power is able to provide an order of magnitude estimate of annual investment before upward pressure on rates is evident. This was accomplished in the relative rate impact model by solving for the potential program spend in 2021, escalated annually with inflation, that would result in an equivalent 25-year average rate change to the Low electrification case as modeled. This is directionally helpful in informing an Electrification Strategy as further described in Section 7.”¹⁹

¹⁸ Nova Scotia Power Stability Study for Renewable Integration Report, July 24, 2019.

¹⁹ M08929 – Exhibit N-9 – Nova Scotia Power Inc. 2020 Integrated Resource Plan, November 27, 2020, page 84.

This suggests that load growth in and of itself is not necessarily beneficial in all circumstances, without the complete picture as the fully burdened cost of load growth (including the costs noted in the section below); there are few inferences to be made from electrification effects on the ratepayer. With the pressures of coal plant closures and other environmental constraints, the recovery of under depreciated assets in addition to vast new capital investments will ultimately have an effect on either the ratepayer, other energy providers in the province, or both.

Transmission & Distribution Costs

NSPI's modeling shows the potential for large increases in peak energy demand.²⁰ Increased electric load and increases in peak demand will have significant cost implications for NSPI's transmission and distribution ("T&D") assets. These costs have not had to be considered in previous IRPs. NSPI's consideration of T&D cost implications has been limited to avoided T&D Costs with respect to DSM.²¹

Given that IRP outcomes can influence long-term capital investments and policy directions, total T&D costs need to be developed to determine the total cost of the IRP scenarios. This investment is driven by potential increased electrification of end-use energy, such as transportation and building heat. As noted above, significant investment in T&D is also expected to arise from the large potential increases in peak energy demand.²²

Heritage Gas understands that a process related to Matter No. M09471 has concluded related to the avoided T&D costs of Demand Side Management ("DSM"). This matter considers only a fraction of total T&D costs and so, it would be prudent to discuss these findings with the larger stakeholder group and also include a continued study of T&D costs in the context of the increasing electrical load envisioned in the IRP.

²⁰ 2020 IRP Assumptions Set (January 20, 2020), page 9.

²¹ E-ENS-R-19– M09471 – Efficiency One – 2019 Historical Rate and Bill Impact Analysis (March 27, 2020 Letter).

²² 2020 IRP Assumptions Set (January 20, 2020), page 9.

Heritage Gas suggests that NSPI establish a timeline for a robust study of all T&D costs associated with the key IRP scenarios. Significant increases in electric use will affect most aspects of NSPI's system including: substations, the number of type of transformers, conductor size, etc.

Combustion Turbine Fleet

Throughout the IRP process, Heritage Gas has raised concerns regarding the continued reliance on the aging infrastructure of the 1970's-era Light Fuel Oil fired Combustion Turbine ("CT") fleet. NSPI has indicated that continued sustaining capital investment in these units is a lower cost alternative to replacing them.

Since the opportunity to provide comments in October, the Consumer Advocate's consultant, Bates White, has provided comments in the 2018-19 FAM Audit. As discussed in the evidence, the diesel fleet was found to be less reliable than expected, and they were called upon more frequently than forecasted to provide fast-acting generation.²³ Bates White highlights two issues with the continued use of the CTs:

"First, in the IRP, NS Power mentions ongoing investments in the diesel CT feet, such as oil cooling systems. However, it is not yet clear that the extent to which these investments might improve the poor performance of these units identified in the 2018-19 FAM audit.

*Second, if the diesel CTs continue to operate more than estimated in the Plexos modeling, the O&M and sustaining capital costs may be higher than Plexos reports. Depending on the amount that the diesel CTs are used and the resulting costs, as well as the future cost of distillate oil, adding new storage or other resources may be less expensive than continued operation and rebuilding of the diesel CTs."*²⁴

Also noted by Bates White is a recommendation to further investigate the economic replacement of the CT fleet, where there is potential for an economic retirement of the fleet prior to 2045.

²³ M09548 - Nova Scotia Power Inc. (NSPI) Fuel Adjustment Mechanism (FAM) Audit – Direct Evidence of John Wilson, page 17.

²⁴ M09548 - Nova Scotia Power Inc. (NSPI) Fuel Adjustment Mechanism (FAM) Audit – Direct Evidence of John Wilson, page 17.

“Recommendation XIV-6: In the Power Plant Performance chapter of this report, we have a recommendation to implement more regular and robust IRP planning. Subject to identifying the need for peaking and fast ramping resources in that study, NSPI should compare the economics of preserving the serviceability of its CT current fleet to the economics of replacing them with newer CTs or another type of fast ramping generation.”²⁵

“NSPI’s discussion of “combustion turbines” toggles between “new” combustion turbines – which NSPI accurately describes as “the lowest-cost domestic source of new firm capacity” – with its “existing combustion turbines,” which NSPI describes as “provid[ing] similar services and economic benefit to customers.” Significant differences exist, however, between the lowest-cost new frame combustion turbines and NSPI’s 45-year-old existing assets. The new turbines are gas-fired and 50 MW (as opposed to NSPI’s fleet of 33 MW, 45-year-old diesel fired units). The new resources would likely strongly outperform the existing assets across a range of performance factors, such as heat rate, forced outage rate, and availability factor.”²⁶

Heritage Gas echoes these comments and agrees that ongoing monitoring is very important considering the recent history and vintage of these units. The IRP should specifically provide for such monitoring and reporting on the results during the evergreen nature of the IRP, particularly in light of the value of new gas-fired CTs evidenced by the IRP analysis.

In addition to these comments, the Consumer Advocate’s Consultant, John Wilson, provided comments on the commitments made by NSPI regarding further evaluation of the diesel CTs:

*“In response to my request for the data promised above, it is my understanding that NS Power views it as premature to supply those data as it was awaiting further review of the IRP by Bates White. **Without these data, I am unable to confirm that the modeling of the diesel CTs reasonably reflects their current operational profile.**”²⁷ [Emphasis Added]*

²⁵ Bates White Economic Consulting’s Comments On Nova Scotia Power, Inc.’s Final Integrated Resource Plan Report (2020), page 13.

²⁶ M08929 – Exhibit N-10 – Bates White Comments on NSPI IRP Report, pages 15-16.

²⁷ M09548 - Redacted Direct Evidence of John Wilson, pages 18-19.

In North America there are most likely limited existing CT units of this vintage and Heritage Gas views the release of this information as beneficial to all stakeholders.

Reliability issues associated with maintaining units out to their sixth decade of operation should be considered independently of the economics of replacement vs. sustaining capital costs. The CT's rely on on-site light fuel-oil tanks to support their operation. When called upon to provide critical ancillary services, these tanks must be replenished by a limited number of tanker trucks that are suitable for the transport of fuel. The pool of available trucks is constrained in winter months by competing demands for delivery of fuel oil products to support heating demands.

Availability of local fuel supply has changed following the closure of local refineries as noted in the recent Interim Order regarding wholesale petroleum products pricing, the Board notes:

*"Industry has recently expressed concerns that the current wholesale margin is not enough to guarantee security of supply in the current challenging COVID-19 global environment."*²⁸

*"The Board is satisfied that an emergency situation may exist in the Province, which could threaten the security of the petroleum supply, including a shortage of supply of a petroleum product to wholesalers and wholesaler-retailers that affects one or more zones, and that an increase in the wholesale margin is warranted on an interim basis pending the completion of a full investigation by the Board."*²⁹

²⁸ M09952 – Interim Order, page 1.

²⁹ Et al.

Coal-to-Gas Conversions

Roadmap item 1 discusses the need for:

“Advance engineering study work on coal to gas conversions at Trenton and Point Tupper Generating Stations. Monitor cost outputs of this work relative to IRP assumptions and update the balance of new and converted capacity resources accordingly.”³⁰

Heritage Gas reiterates that the Action Plan should reflect a timeline of completion of this study and scope of the work included in the coal-to-gas conversion scenario, and should keep stakeholders engaged and apprised in this process.

General Comments

Heritage Gas believes that NSPI’s approach to an evergreen IRP will be valuable in allowing all parties to continue to participate as NSPI conducts the numerous follow-up analysis the IRP calls for and the status of underlying assumptions becomes clearer. That said, it is critically important for the province and for the achievement of the sustainable development called for by the SDGA that there are vibrant competitive alternatives to electricity available in the marketplace. Heritage Gas believes it is imperative for all energy providers in the province to work together and with government and other stakeholders to ensure the most cost-effective, reliable, and sustainable energy solutions are put in place.

Heritage Gas is open to collaborating with NSPI on the process to achieving an integrated energy system, which will achieve lower emissions and reduce costs to the benefit of all ratepayers. We look forward to the *“summary of updates as part of IRP Action Plan reporting and will incorporate the opportunity for stakeholder comment and feedback as part of the update process.”³¹*

³⁰ M08929 – Exhibit N-9 – Nova Scotia Power Inc. 2020 Integrated Resource Plan, November 27, 2020, Page 114.

³¹ M08929 – Exhibit N-9 – Nova Scotia Power Inc. 2020 Integrated Resource Plan, November 27, 2020, Page 29.

In consideration of these fundamental changes all parties will need to closely monitor developments in the electric and broader energy sectors to ensure Nova Scotian residents and business have access to competitive alternative energy supplies and to cost effectively meet the goals of the Province.

Heritage Gas appreciates the opportunity to comment and the efforts of all parties on the IRP Report and the continued collaboration with all stakeholders. We especially recognize the effort by NSPI to continue an open process, and look forward to the consideration of these comments reflected in the evergreen updates to stakeholders and the Board.

Regards,

HERITAGE GAS LIMITED



John Hawkins

Cc: M08929 Participants