NS Power Responses to Stakeholder Comments: Final evergreen IRP Modeling Results

Stakeholder	Comment	NS Power Response
Consumer Advocate	Hydrogen Production: Hydrogen is represented in the modeling in two ways: as a load (for production) and as a potential generation resource. Hydrogen is only briefly discussed in the final modeling results report. Only 50 MW of hydrogen-fueled peaking capacity is added in one scenario. As we understand it, NS Power modeled a 100% renewable electricity requirement for hydrogen production as an annual addition to its renewable energy standard. We understand that NS Power anticipates refining this modeling approach as the actual market requirements for "green hydrogen" become defined by actual projects. We also understand that the flexible load is optimized to minimize total costs, including those of the system and the hydrogen facility. This will also require refinement as a tariff design is developed. Development of a conceptual tariff should be included in the IRP action plan in order to provide potential projects with an indication of potential pricing and terms, even if such a tariff is subject to further review when submitted for Board approval.	As potential domestic hydrogen production projects progress and the scope and impact of these projects are better understood, NS Power will assess the potential impacts on the system. NS Power anticipates that the input which has the most significant impact on the addition of hydrogen CTs is the hydrogen fuel pricing. For future hydrogen developers to utilize the NS Power grid, the development of an applicable tariff structure, to meet the needs of the hydrogen developer and existing base customers, will be required. NS Power has added a Roadmap item (Roadmap Item 11) to monitor the development of tariff structures applicable to hydrogen development and any impacts to modeling assumptions for hydrogen as a result.
Consumer Advocate	Near Term Issues: • Expeditiously moving forward with the reliability tie • Cooperating with Nova Scotia's Green Choice Program, which is targeting 350MW of new wind in 2028 and may replace direct procurement of wind by NS Power. Shifting energy procurement outside the ACE planning process will require NS Power and the Board to give particular attention to the schedule and cost of supporting investments when interconnecting these resources. • Deciding whether to move ahead with the Atlantic Loop, which appears to depend on	• The updated Action Plan includes an updated time frame reflective of the range of outcomes of the evergreen IRP for the reliability tie (Action Plan Item 1a). To meet this, NS Power is continuing to progress the scope of work for the reliability tie (please see slides 11 and 12 of the 2023 Action Plan Update here for more details: PowerPoint

	whether a contract (or other commitment) can be established for bi-directional transactions with Hydro Quebec, which views itself as the "green battery of North America." When asked whether such contracts were available on commercially reasonable terms, NS Power's response was ambiguous. • Accommodating continued and increased reliance on gas and oil generation to partially replace coal units, including development of additional firm fuel supply arrangements (particularly gas pipelines and/or storage). • Enhancing its operational practices to support more complex dispatch decisions and to reduce the cost of maintaining system reliability. • Further evaluation of the hybrid peak strategy, which NS Power believes will reduce costs relative to the base scenarios. As noted above, those savings do not consider costs to customers or emissions from these systems. It is important to understand how customers will use secondary systems during less extreme weather conditions.	Presentation (nspower.ca)). • The Green Choice Program will be included when assessing the remaining wind procurement required on the system. • Commercial discussions related to the Atlantic Loop are confidential; NS Power will provide updates where available via its IRP Action Plan Update process. • Progressing the addition of fast acting generation is an Action Plan item (Action Plan Item 3c and 3e) and was defined to reflect the target capacity based on the outcomes of the evergreen IRP. • NS Power will continue to study the lowest cost options to satisfy the reliability requirements of the grid. This is reflected in the Action Plan item 3d which continues to assess the system requirements for the integration of variable renewable generation and explore solutions to reduce curtailment. • In the updated Action Plan, NS Power has included reference to further assessment of the Hybrid Peak mitigation scenario (Action Plan Item 4b). This will be considered in the context of NS

		Power's Demand Response strategy. NS Power will commit to engaging, where possible, in study work related to the use of dual-fueled heating systems. NS Power does not have estimates available for potential costs of a hybrid peak program.
Consumer Advocate	Longer-Term Issues In the longer term, NS Power will need to address the problem of providing clean resources for all loads. The modeling suggests a possible role for small modular reactors (SMRs). Other potential resources are geothermal, long-duration energy storage and offshore wind (which is potentially less variable than onshore wind). All those resources are evolving rapidly and there is no immediate need for NS Power to commit to any particular option at this time.	NS Power will continue to monitor the development of emerging resources, including the resources referenced by the Consumer Advocate (SMRs, Geothermal, long duration storage, hydrogen enabled CTs and offshore wind). This has been included as Roadmap item 8 in the updated Action Plan and Roadmap item summary.
Consumer Advocate	Forecasting Exports If the bi-directional approach to the Atlantic Loop is pursued, there will need to be consideration given to forecasting the value of export power, which is assumed to be zero in the current model. Forecast of the next decade's energy import and export prices on an annual average basis are a guess at best, let alone attempting to forecast hourly variations in those prices. Yet the mix of resources and transmission investments that makes sense to pursue depends very much on future market dynamics. The value of the storage is derived, in part, from the opportunity to arbitrage energy across low and high price hours. The load and price diversity that could be realized by the Atlantic Loop is both unknowable and yet critical to quantify when making an informed decision about its configuration and contracting terms.	NS Power agrees that there is uncertainty associated with market prices for energy during both periods of import and export opportunity. For modeling purposes, NS Power has used forecasts for ISO-NE Mass Hub energy and capacity for purchase prices. Under the bidirectional loop scenario modeled in the evergreen IRP, no pricing assumptions are used and rather an annual bidirectional energy target is used to model the potential transaction. This arrangement reflects the fixed cost nature of the supplying resource (i.e. new wind in Nova Scotia).
Consumer Advocate	Multi-Sector Issues	The electrification study proposes the benefits of

	The findings regarding the "hybrid peaking" strategy, as well as the issues raised in Eastward's rate case, indicate a need for a coordinated multi-sector study to investigate the options for meeting customers' needs for heating, hot water, and other related needs. Such a study should seek submissions from Eastward, NS Power, Efficiency Nova Scotia, and other parties, such as businesses that install or supply propane and fuel oil systems. The study should ask whether peak winter heating load is best met by energy delivered via wires, pipelines, or trucks. The study should also ask whether energy to meet those peak demands should be stored in a battery, a tank, a lake or in a regionally linked, diversified energy system. The answer needs to involve clear standards for making trade-offs among the different resource options, because those choices have consequences for energy customers. Residential and small commercial customers have demonstrated a tendency to hedge their bets on heat pumps by retaining backup fuels. But with the forecast increase in carbon prices, and greater familiarity with heat pumps, customer behavior will likely change. The questions the study should ask are how customer behavior may change, and what its response should be to the challenges presented by decarbonization policy, the long-term financial requirements of Eastward and other businesses, and the preferences of its consumers.	various load profiles and starts the discussion on programming to support this. The IRP work has taken the carbon tax into account. The next step of this would be to work with E1 and other organizations to understand the needs to enable a scenario and the potential for adoption. Future assessment of the hybrid peak scenario would benefit from incorporating associated costs of retaining back up fuel systems. This would be an important element of the study and a valuable piece of information to include future modeling of the hybrid peak strategy.
Eastward Energy	Eastward Energy recommends that the hybrid peak approach warrants considerable early attention as part of NSPI's IRP Action Plan considering the order of magnitude of potential value of this scenario. Eastward Energy also recommends that working with Eastward and all other applicable stakeholders to analyze the potential value of collaboration on this issue be considered a component of the Action Plan item.	NS Power has added the further assessment of the hybrid peak scenario to the demand response Action Plan item (Action Plan Item 4b). NS Power supports a multi-stakeholder process to further analyze the hybrid peak scenario. This initiative could be led by a third-party organization with experience in leading multi sector energy studies.

Eastward Energy	Bi-Directional Atlantic Loop scenario It is unclear to Eastward the basis on which this scenario was developed and although it shows economic value, it is subject to numerous factors which require a greater degree of certainty before it would appear to be a scenario on which any level of further decision making could appropriately be premised.	The bi-directional Atlantic Loop evergreen IRP scenario was developed to further study an import/export opportunity that exports variable renewable generation and imports dispatchable renewable energy. If such a commercial arrangement develops, NS Power will consider and study all necessary components that underpin the bi-directional arrangement. This is captured as part of the Regional Integration Action Plan Item 1b.
Eastward Energy	In reference to the new gas capacity builds in the evergreen IRP scenarios, Eastward Energy highlights that “new gas resources (quite potentially significant new gas resources) will be integral to achieving 2030 and 2050 goals. Eastward Energy recommends an in-depth review of the appropriate timing and optimization of these builds should be noted as a discrete early Action Plan Item. Eastward Energy also feels this is supported by the need for earlier gas capacity additions if the Atlantic Loop is to be built after 2030 (example of 2035).	Please refer to responses to the Consumer Advocate feedback above. NS Power has updated the fast-acting generation Action Plan item to include a revised range of capacity additions to the system (Action Plan Item 3c).
Eastward Energy	Eastward Energy is highlighting the need to manage electric peak consumption in the Province in a holistic manner and ensure sufficient capacity resources to support the increase in non-dispatchable energy supply given the potential for import constraints (noted Quebec, NB and NL growing energy requirement needs).	NS Power has updated its demand response action plan item to include further assessment of the modeled hybrid peak scenario, which is intended to mitigate a portion of anticipated firm peak growth. NS Power agrees that ensuring sufficient firm capacity is added to the Nova Scotia system to support peak system loads is critical to maintaining system reliability.
Ecology Action Centre	**Optimizing wind for siting and not necessarily for capacity factor (counterintuitively)**	NS Power appreciates the reference material and the

	1. The following is a recent study on the siting of wind in Nova Scotia in a way that contributes to the demand on the grid in a cost-effective manner rather than simply building where the wind is strong and planning for curtailment upwards of ~1000 MW of wind on average annually. Location matters in this key assumption. "Adding wind power to a wind-rich grid: Evaluating secondary suitability metrics" Nathaniel S. Pearre, Lukas G. Swan, first published: 17 February 2023 https://onlinelibrary.wiley.com/doi/10.1002/we.2809	findings that have been provided. The PLEXOS model economically selected wind resources as part of the resource mix, even with the level of forecasted curtailment. NS Power notes that curtailment of wind is due to a combination of factors including transmission constraints at major transmission interfaces and load/generation balance (in addition to wind integration constraints) which appear to be considerations in the referenced study. As part of the updated Action Plan, NS Power has included an assessment of potential mitigation factors to reduce wind curtailment on the system (Action Plan Item 3d).
Ecology Action Centre	Sourcing cheaper energy storage (pumped hydropower) and co-benefits of CHP (combined heat and power) • Is the potential for pumped hydro (which could be 'put online' locally) included in the modelling, such as upgrading the Wreck Cove hydro station? • As big batteries become more common and cheaper to build is there a point in which the capital cost and operating costs intersect with that of combustion gas turbines based on the January 2023 Update page 18/19 capital and operating cost assumptions and estimated projections?	• NS Power included long duration (12hr) storage as a modeled resource; this resource option was not selected in any of the scenarios. • As battery storage capital costs are reduced, it may make battery storage more attractive given the level of curtailed wind on the system and the ability to utilize the otherwise curtailed wind and support energy

	• Is combined heat and power across sectors considered by Plexos in these scenarios?	arbitrage. However, Battery storage cannot be considered interchangeable with CTs given the storage capacity of the batteries selected (4 hour). As installed battery storage capacity on the system increases, the effective load carrying capacity (ELCC) of battery storage resources decreases as the contribution to meeting system peak decreases. • The value of cogen technology to support other sectors is not considered as part of the IRP.
Ecology Action Centre	Other energy strategies not selected by the model scenarios: Looking at demand side management (DSM) in the context of a Virtual Power Plant (VPP) work done in Nova Scotia – it would be of interest to understand what is the level of peak shifting available for swapping the majority of electric hot water tanks (for example) to controllable loads in Nova Scotia? To what degree has demand side management through virtual power plants been considered in the model? It would be valuable to explore if this could be incorporated, and if we could reduce the impact on the grid of these loads for a price that would benefit all? To get a general sense of the order of magnitude of the ability for a VPP to affect key assumptions in the model - this pre-IRP NSP reference case could help the Evergreen IRP team program in an input setting in Plexos based on NSP research data/timelines. NSP roughly estimated with maybe 10% - 31.5% uptake of the estimated electric hot water (EWH) or 50,000-160,000 hot water tanks at ~0.5 kW each (27-85 MW peak shifting) would cost about $37-117 M to install/upgrade and have an impact on the grid	Please refer to slides 51 – 53 of the February 2023 Action Plan Update here. NS Power is progressing a water heater DR pilot which uses temperature and machine based learning water heater controllers to shift peak load requirements. NS Power will explore how those results could be scaled up to larger penetrations.

	where we could potentially avoid building 1-2 more expensive peaker plant unit(s) for that cost.	
Ecology Action Centre	How to finance these projects/scenarios? How do assumptions in setting up Plexos consider differences between funding for decarbonizing the grid coming not only from ratepayers and the rate base, but potentially supported by taxpayers in departments where it can lower the provincial government's budget spending? This concept was brought up at the recent CAMPUT 2023 conference for energy regulators working on the energy transition. This is one way to have equitable scenarios built into the collective budget at large with savings from another area. A secondary effect of reducing emissions from coal, oil, natural gas, propane, and gasoline is reducing local air pollution. This could also contribute to reduced healthcare costs, both for the province and at the household level for the approximately 80,000-100,000 Nova Scotians (Reference 2) that live with Asthma as an example, not including other respiratory and cardiovascular health issues positively impacted.	The NPVRR for each scenario is intended to provide a basis of comparison between scenarios and to highlight the resources required to provide the lowest system cost for each combination of key drivers (basis of the scenarios modeled). The only considerations for decarbonization funding in the model are related to Government or partner funding for the Atlantic Loop costs beyond those modeled in PLEXOS, and the recently announced investment tax credits which are modeled as a decrease to the capital cost for the applicable resource types. Any additional impacts to government budget spending for decarbonization efforts or societal impact costs are not considered as part of this planning exercise.
Ecology Action Centre	As we electrify all sectors, we can also reduce future combustion turbine NOx and SOx emissions (Reference 4), perhaps after the 2035 forecasts by half or more annually, which have their own co-benefits. This may help to build understanding in justification of selecting specific Evergreen IRP scenarios when approaching Nova Scotians. a. Has Nova Scotia Power considered potential societal savings relating to, for example cleaner air and resultant reduced hospital visits and costs for those with asthma? b. If the provincial energy transition for example only helped 25% of people with Asthma in avoiding known triggers (Reference 6) it could save the Nova Scotia economy approximately \$62 M annually (Reference 3). \$62M for 27 years is \$1674 M in	Please refer to the previous response. The IRP models the electricity system costs and impacts only; additional societal costs or benefits are captured only through the integration of policy measures such as renewable electricity targets and carbon pricing.

	simple payback terms, this funding could come from the tax base and not the rate base. c. If more systemic considerations such as health effects - along with their societal costs due to burning of fossil fuels - were incorporated into the model this may lead it to select a scenario with larger and faster uptake of grid scale batteries, which with current assumptions are considered 'more expensive'.	
Ecology Action Centre	If not possible to integrate directly into the model, could NSP compare the expected range of annual energy costs, alongside DSM and air quality healthcare savings per household in each of these scenarios (including the heating oil and natural gas transition etc.)? If these factors are considered in isolation, we miss out on co-benefits provincially, for example a household with solar in the HDER scenarios would have a minimal electricity bill.	It would not be in NS Power's scope of work to complete an assessment of this nature. However, for each of the scenarios, NS Power has provided the system emission trajectory, which could potentially inform an analysis of air quality impacts.
Ecology Action Centre	It was mentioned one of the reasons natural gas and oil are so useful on the grid is because they can moderate the power quality on the grid quickly and prevent brownouts and blackouts. How much battery energy storage and other decarbonized technologies would technically be needed to provide the same functionality and reliability just considering a typical day of operation (and not considering multi-day needs for combustion turbines)? If this were run in the EnergyPLAN model it would be considered a technological optimization and not (necessarily) an economic optimization. This misses savings at the household level.	Please refer to previous responses addressing the comparison of batteries to fast acting generation capacity. Since the current selected batteries are 4-hour battery storage units, battery storage and combustion turbines cannot be directly substituted. 4hr Battery storage, similar to other energy limited resources, demonstrates declining ELCC as the installed capacity increases (as the installed capacity increases, the contribution to peak will decrease).
E1	Recommendations/Requests	The NPVRR outputs are intended to provide a basis of comparison of the relative NPVRR value of differences between scenarios. The

	1. E1 recommends that stakeholders use caution with the presumption that NPVRR results are entirely prescriptive with respect to economically optimal levels of DSM.	information provided by E1 was used as input assumptions into the relevant scenarios, the outcomes of which provide an understanding of the impacts of both DSM savings and associated programming costs.
E1	2. E1 requests NS Power provide any insight into the resource build-out between CE1-E1-R2 and CE1-E2-R2 MMDSM. Detail with respect to whether and how the model makes specific determinations about the timing of coal requirements is important in this regard.	The differences between the CE1-E1-R2 and the CE1-E2-R2 MMDSM specific scenarios are the electrification profiles modeled. The E1 notation represents current policy and trends and the E2 notation represents the hybrid peak mitigation scenario. The hybrid peak mitigation scenario reflects the value of retaining back up fuel heat sources during the colder periods when heat pumps are less efficient. The effect of this is a similar annual energy requirement but a reduction in the firm peak capacity requirements.
E1	3. E1 recommends treating scenarios that include the Atlantic Loop with caution until more details are known about the project and its risks can be appreciated, managed, and mitigated.	The intent of the evergreen IRP is to model a range of scenarios that represent potential planning environment outcomes. The Atlantic Loop is one of those potential outcomes and has been modeled in approximately half of the scenarios. The specific project risks and mitigative factors will be addressed by the project management team outside of the evergreen IRP process.

E1	4. E1 recommends that the Atlantic loop should not be included in the reference scenario(s) for the 2022 Evergreen IRP.	NS Power has used the "No Atlantic Loop" scenario (CE1-E1-R2) as the basis for the 2023 10 year system outlook. As the system planning environment changes, NS Power will reassess the evergreen IRP reference for future modeling exercises and regulatory proceedings.
E1	5. NS Power should recognize the risk inherent in the Hybrid Peak Mitigation scenarios.	NS Power has committed to further assessment of the hybrid peak scenario as part of the updated Action Plan (Action Plan Item 4b), which will include the assessment of the potential for the forecasted retainment of non-electric back up heating systems.
E1	6. E1 recommends keeping policy risks in mind when interpreting plans with nuclear technology at present.	NS Power is aware of the policy constraints of SMRs in Nova Scotia and has included a reference to those constraints in the final modeling results. These additions occur late in the planning horizon and so no immediate action is required.
E1	7. E1 recommends that NS Power develops, and provides stakeholders with, a risk matrix for each scenario.	Risk matrices are established at the project execution level. The evergreen IRP is intended to highlight common elements among a range of planning environment outcomes to inform the long-term strategy and near-term action items. The risks and mitigation practices are addressed at the project level once it is progressed beyond the conceptual stage.

E1	8. Please provide evidence and support for the increase of 82% with respect to unitary capital costs (i.e., $/MW) between the 2020 IRP and the 2022 Evergreen IRP proceedings. As part of this analysis please provide all cost assumptions for the first and second estimates, as well as the change.	All cost estimate assumptions for both the 2020 IRP and the evergreen IRP are available on the IRP website. The increase in cost estimates since the 2020 IRP are attributed to a number of different factors, including inflation, increased demand and improved understanding of technology costs.
E1	9. E1 reiterates the requirement for updated avoided costs for energy efficiency and demand response for the development of its 2026-2030 DSM Plan by the end of 2023.	NS Power will assess the scope and support development of avoided costs through the DSMAG (please refer to Action Plan Item 5).
E1	10. E1 requests that NS Power provide a minimum of two scenarios from the Evergreen IRP, and one scenario from the "R2" group of Evergreen IRP scenarios for the purposes of generating avoided costs.	Please see the response to E1 item 9.
E1	11. To the extent possible, E1 requests that considerations around avoided costs in the context of DERs and Electrification activities are considered, as they represent significant areas of current interest in NS.	Please see the response to E1 item 9.
E1	12. E1 continues to request that NS Power propose an appropriate methodology for valuing the avoided costs of demand response.	NS Power will review/discuss the approach to calculating the avoided costs as part of the DSMAG (please refer to Action Plan Item 5).
E1	13. E1 recommends that stakeholders and NS Power qualitatively contextualize the differences between the assumptions within the 2019 DSM Potential Study and current DSM activities.	Please refer to the input assumptions (IRP Evergreen - Updated Assumptions (nspower.ca)). The 2019 DSM potential study pointed to the potential for 75MW of value attributable to Demand Response (DR) initiatives. The current DR related pilot projects underway, with

		support from E1, are intended to assess the value of DR and progress the value into programming to achieve the 75MW of system wide DR benefit.
E1	14. E1 recommends that the 2022 IRP Evergreen acknowledge the utility benefits of distributed energy resources such as solar PV. Further work should be undertaken to study the full costs and benefits of DERs and how these resources can be optimized to maximize grid benefits.	Since the rooftop solar was modeled as a resource option in the High DER scenario (as opposed to a reduction in load), the model considers the impacts to the grid and system costs associated with variable renewable generation in the form of solar PV resources. Since solar PV is not generating at the time of system peak, distribution system benefits of solar PV are limited and not considered in the evergreen IRP.
E1	15. E1 requests quantified estimates of the peak reduction in the "hybrid peak scenario" from the IRP Action Plan update.	The data set provided to E1 includes the hybrid peak scenario data assumptions in the format requested.
E1	16. E1 requests estimates for the additional GHG emissions attributed to the use of hybrid fuel alternatives over the IRP time horizon.	NS Power has not completed this analysis and cannot provide the information requested.
E1	17. E1 requests NS Power provides the workbooks and/or model input/output information associated with the load shape analysis for buildings, conducted as part of the Electrification Strategy Development work with E3.	The data set provided to E1 includes the heating assumptions for both the current policy and trends and hybrid peak mitigation scenarios in the format requested.
E1	18. E1 recommends that any Action Plan items related to the hybrid peak mitigation scenario consider all customer costs and benefits, required utility program costs, and all-fuel GHG	NS Power is supportive of further study of the hybrid peak mitigation scenario and has included it in the

	emissions, in addition to any utility benefits. E1 is open to working with NS Power to further explore this strategy, particularly as it relates to on-going demand response initiatives.	Updated Action Plan and Roadmap (please refer to Action Plan Item 4b).
E1	19. Please provide the workbooks and/or model input/output information associated with the load shape analysis for buildings, conducted as part of the Electrification Strategy Development work with E3.	Please refer to the response to item 17.
E1	20. Upon release of the final Electrification Strategy Roadmap, E1 requests that NS Power and E3 provide full technical support and detail (e.g. modeling results if appropriate) alongside the document.	NS Power acknowledges the request.
E1	21. Based on current weather trends, or current weather forecasts, please provide the following: a. The percentage of time NS Power expects, for both winter and summer, CE1-E1-R1 and CE1-E1-R2 to have a 'low wind' generation profile. b. The percentage of time NS Power expects, for both winter and summer, CE1-E1-R1 and CE1-E1-R2 to have a 'high wind' generation profile.	NS Power acknowledges the request but does not have the data requested at this time.
E1	22. E1 requests that NS Power share the load shape information associated with electric vehicle (EV) charging profiles (both managed and unmanaged) and heat pumps (i.e. electrification load shapes) that formed the additional electrification assumptions.	The EV load shapes were provided as part of the data set sent to E1.
E1	23. E1 requests that NS Power provide the adjusted DSM cost streams to E1 with all formulas intact.	The DSM cost streams reflect the information that was provided by E1.
E1	24. E1 requests that NS Power provide stakeholders with details on the capacity limitations imposed on each generating resource, if any, alongside the assumptions and development methodology of said limitations.	Please refer to the NS Power Pre-IRP Final Report for the effective load carrying capacity for existing (slide 32) and additional resources (slides 48 – 54). The report can be accessed here.

E1	Questions 1. When does NS Power intend to complete the wind integration studies?	NS Power is targeting the release of the report in 2023.
E1	2. Does NS Power intend to share the results of the wind integration studies with stakeholders? If so, when?	Yes, once the study is complete it will be shared with stakeholders for their review and feedback.
E1	3. How much additional cost, if any, NS Power anticipate the results of these studies could allocate to future wind resources?	We have included wind integration assumptions in the evergreen IRP, which are reflective of currently anticipated requirements. The costs directly attributed to individual wind resources will be dependent on the site specific system impact studies to be completed as projects are proposed/brought forward to NS Power.
E1	4. In general, why do certain scenarios maintain higher planning reserve margins than others?	The resources are added in capacity increments, which results in an increase in PRM at certain periods during the planning horizon than others. For example, CTs are added in increments to reflect realistic plant sizes. Since resources are not added in smaller increments to align with the exact additional firm capacity and PRM needed at that time period in the modeling horizon, there will be periods where the PRM is in excess of the 9% UCAP minimum. It is also possible that an optimal energy resource mix given the constraints being modeled will result in a PRM above the minimum; the

		minimum PRM is not necessarily optimal.
E1	5. It appears that CE1-E1-R1 and certain sensitivities (i.e., CE1-E1-R1 BD) have very low planning reserve margin values of circa 9-11%. What is the cause of these relatively low PRM values?	The system is planned for firm capacity requirements. Since the 9% UCAP (equivalent to a 20% ICAP) is the minimum PRM in the evergreen IRP, the system will be planned to reach at least the 9% and in some cases, will exceed this for the reason referenced in response to question 4.
E1	6. Why in certain cases is the planning reserve margin above 9% when a new resource addition is triggered?	Please see the response to question 5.
E1	7. Do additional resource additions beyond the required planning reserve margin cause the required investment in a given scenario to increase?	For each scenario, the ultimate resource mix represents the optimized lowest total cost option for that given scenario considering capital costs and production costs. Therefore, the fluctuations in the PRM reflect the optimized system cost for that configuration of planning environment and are not related to an increase in investment.
E1	8. Has NS Power estimated the customer cost of retaining their non-electric heating system (in addition to a heat pump system) through to 2050?	NS Power has not completed this analysis.
E1	9. Should the Dual-Fuel case from the IRP Action Plan be interpreted as equivalent to the Hybrid-Peak mitigation scenario from the 2022 IRP evergreen process?	Dual fuel refers to the fuel configuration for new natural gas combustion turbines. Any future gas CTs would be enabled to burn both natural gas and a secondary liquid fuel to ensure fuel supply is not a limiting factor when these units are required to support peak capacity needs. As noted in the Action Plan, consideration for non-emitting fuels like hydrogen

		will also be integral to this work.
E1	10. What additional analysis is currently planned with respect to building electrification load shapes? Are daily load shapes contemplated?	The load shapes for building electrification are reflected in the data provided to E1. They are hourly load shapes and reflect the heat pump adoption forecasts.
E1	11. Have heat pump lock-out temperatures been updated from -15 C as part of this work?	No, the lock out temperature has not been updated.
E1	12. Has this work been integrated into the 2022 Evergreen IRP modelling process?	Yes, the EV and heating assumptions are included in each scenario and are reflected in the load profile assumptions.
E1	13. What will the average generation profile for non-firm imports, BESS generation, gas, and wind be for CE1-E1-R1 and CE1-E1-R2?	Please refer to the evergreen IRP model output data here for all annual generation values by resource type.
E1	14. Given the variance in generation profiles for CE1-E1-R1 and CE1-E1-R2 can NS Power further explain the methodology used to estimate CO2 emissions for these scenarios? Does this methodology differ from other scenarios? If so, how?	The methodology to estimate CO2 emissions is consistent between all scenarios. Each resource type is assigned an emissions intensity based on the fuel type. The emissions are calculated in the model by using the emissions intensity and the total generation for each unit.
E1	15. Was the End Effects analysis requested by Resource Insights Inc. ever completed? If not, why? If so, was it distributed to all stakeholders?	NS Power is not aware of the analysis referenced by E1 in this question.
E1	16. Has NS Power completed a similar analysis for the end effects modelled in the final scenario outputs? If not, why?	No, NS Power has not completed an analysis of the end effects. Please see response to E1 question 15.
E1	17. Can NS Power detail how DSM is integrated into the end effects calculation?	The end effects account for future investment beyond the end of the modeling horizon for existing resources

	a. Can NS Power provide an example of a DSM end effects calculation in a chosen scenario? b. Can NS Power provide an example of thermal plant end effects for specific scenario, in this example please include commissioning schedules for two similar plants thermal plants in such a way that it clearly shows how the end effects NPVRR for each thermal plant differs.	in perpetuity and are calculated using the investment values in the final year of the modeling horizon.
Energy Storage Canada	Stakeholder Engagement on Energy Storage Assumptions and Modeling *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.*	NS Power is happy to participate in working group discussions with Energy Storage Canada (ESC).
Energy Storage Canada	Sensitivity Analysis to Explore the Role and Value of Energy Storage *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*	The modeling in support of the evergreen IRP process is complete and no further modeling will be completed following the issuance of the updated Action Plan and Roadmap.

	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.	
Energy Storage Canada	Include Energy Storage as a Roadmap Item in the Action Plan: ESC respectively requests that NSPI consider creating a standalone Roadmap Item in the Action Plan for energy storage broadly.	NS Power has included an Action Plan item that includes the addition of battery storage (please refer to Action Plan Item 3f). Also, NS Power has included a Roadmap item intended to track the installed costs of renewable resources, including battery storage (please refer to Roadmap Item 4).
Kristen Overmyer	Can NSPI provide any quantitative evidence that the absolute errors in energy generation, emissions, and cost for the IRP scenarios is likely less than 20%? (A simple "yes" or "no" will suffice.) PLEXOS modeling scenarios that represent the Nova Scotia grid operating over at least two one-year periods (e.g., 2012 and 2021) for which the resulting power generating mix, costs, and emissions are known should be performed and compared to NSPI empirical results for those same years. This should help to provide an indication of the PLEXOS models' accuracy, shed light on any needed model improvements, and aid in interpreting the scenario results.	NTD: the response below was included in the last round of feedback. Dragan approved. As discussed in the prior round of feedback, Plexos software simulation accuracy is dependent on the accuracy of assumptions supplied to the model. If all assumptions provided to Plexos at the time of forecast held true over the study period, actual system dispatch would closely mimic Plexos optimization, with achieved emissions and costs ending up at where they were forecast to be. As system parameters diverge from the forecast assumptions, emissions and costs may diverge from the forecast. The impact of system parameters changes on the achieved versus forecast costs and emissions is lessened by the flexibility of NS Power's fleet, illustrated by the interchangeability of

		the coal based generation, fuel switching, and imports flexibility
NRR	The IRP results include various parameters, but the rate impact in Cents/kWh for different scenarios over 2025-2050 is not available. A particular scenario may look optimal based on the results given, but it may not be practically feasible considering the cost per unit to the ratepayers. Therefore, it would be essential to include rate impact in Cents/kWh for effective costs and benefits evaluation of all the IRP scenarios.	The intent of the evergreen IRP modeling NVPRR outcomes is to provide a relative comparison between scenarios. This metric provides an understanding of the relative impacts of various planning environment conditions from a “least cost” perspective and is not intended to directly inform cost of service rate impacts. This distinction was made as part of the 2020 IRP Terms of Reference based on feedback from stakeholders.
NRR	It is observed that there is a big difference between values of NPVRR w/EE + Solar and NPVRR 2025$. The Sum of NPVRR End effects as a percentage of 26-Year NPVRR (2025$) ranges from 36% (CE1-E3-R1) to as high as 75% (CE1-E1-R2 HDER). Comparing two scenarios for NPVRR and NPVRR+EE gives a vast difference. Can you please provide the reasons of high NPVRR End effects?	The end effects are calculated using the investment values in the final year of the modeling horizon. Since those values could vary from scenario to scenario, this would influence the variation in end effect values observed between scenarios.
NRR	Capacity Additions • It is observed that major capacity additions are happening in terminal years 2049, 2050. For example, Nuclear - 450 MW, Gas - 450 MW and likewise for Wind, Solar and Battery in some scenarios. It is not clear why these additions have come up in the last few years of the period. It would be worth to see the impact of NPVRR with end effects, if these additions are made in the immediate years after 2030. • What would be the impact on NPVRR with end effects if these investments (Say 450 MW nuclear) are pushed after 2050. • It is also observed that Wind and Solar capacity additions are minimal or nil for substantially long period of time. For example, in CE1-E1-R2 Scenario, during the 15 years period (2036-2050)	• The addition of resources at the end of the planning horizon is a reflection of increasing load requirements and the retirement of existing firm capacity. The addition of nuclear closer to the end of the modeling horizon, for example, is observed as gas conversion and HFO units are retired (reach their operational end of life). The model has economically chosen these resources later in the planning horizon to

	only 300 MW is added and Solar addition during 2025-2042 is only 90 MW. These are low-cost options and RBP would further bring down the costs in future. Can you explain why there is minimal or no capacity additions for such a long duration after 2030? How the results change if we consistently add wind and solar after 2030?	meet capacity and generation needs as the load increases and other units are required, while taking into account carbon pricing and other environmental policy requirements. • Since the resource mix chosen by PLEXOS reflects the lowest system cost for any given scenario, moving the investments out beyond 2050 would require replacement with other resources to meet system requirements and would be anticipated to result in an overall system cost increase. • For each scenario modeled, PLEXOS adds resources to meet both generation and firm capacity requirements while optimizing system costs (including fuel and carbon tax). NS Power has noted that there are large variable renewable builds in the early period of the planning horizon; these generally correspond to the period in which the investment tax credits are available to the model. Since the effective cost of these resource rises once the tax credits expire in 2034 (please see slide 21 of the evergreen IRP input assumptions here), the model pulls investments ahead into the period where they are eligible to receive tax credits

		until the advantage of delaying a build (due to NPV effect and declining resource cost curves) begins to outweigh the ITC value.
NRR	In the Wind + Solar curtailment results, it is observed that the curtailment is very high. For e.g., CE1-E1-R1 scenario, curtailment on average is 58% and maximum goes up to 78% in 2041. Likewise, in CE1-E1-R2 scenario, curtailment is average 41% and maximum goes up to 49% in 2037-2039. Can you please explain why there is a such a high rate of curtailment? Can we optimize these low-cost options with minimal curtailment?	For CE1-E1-R1, the max curtailment is 40% and slightly greater than 30% for CE1-E1-R2 (please refer to slide 18 here). The level of curtailment can be contributed to three main factors: wind integration constraints (please see slide 48 here), transmission limit constraints and load/generation balance (if load is less than the wind generation, wind will be curtailed). In order to reach the 80% RES target with a large buildout of variable renewable resources, it is anticipated that curtailment will become more common due to the inherent variances between of variable renewable generation and system load. Exploring curtailment mitigation options is part of NS Power's updated IRP Action Plan (see Action Plan item 3d).
NRStor	Recommendation for Further Engagement on Modelling Methodology for Energy Storage As a new technology that has not yet been implemented or fully evaluated in Nova Scotia, NRStor are interested in having an opportunity to comment on how energy storage is being modelled to ensure its parameters are accurately reflected. An opportunity for stakeholders to review and discuss the assumptions and operational characteristics of energy storage can provide valuable knowledge into the IRP process and help to deliver the best outcomes for Nova Scotia ratepayers. In addition, limitations in the modelling capability should be	The battery storage added in the evergreen IRP modeling scenarios are all 4 hour duration utility scale batteries. 4hr BESS representation in the PLEXOS model includes the full value stack of applicable services from a hourly generation dispatch model perspective (energy arbitrage, firm capacity value, operating reserve

	understood and any resulting impact on the results being selected.	provision, interactions with variable renewable energy via reduced curtailment). Other BESS value services related to system strength and stability have been captured to the extent currently understood via the Renewable Integration constraints. For utility scale storage and solar, NS Power models a diversity benefit which increases their Effective Load Carrying Capability reflecting the synergies between these resources. All ELCC values are consistent with the 2020 Pre-IRP Planning Reserve Margin and Capacity Value Study, which can be found in the NS Power IRP site (irp.nspower.ca/files/key-documents/pre-irp-deliverables/20191018-NS-Power-Pre-IRP-Final-Report-updated.pdf)
NRStor	Recommendation for a more detailed comparison of energy storage and new gas generation. We feel strongly that a thorough assessment and comparison with modern energy storage technologies should take place prior to moving forward with any new gas generation in Nova Scotia. New gas generation will lock Nova Scotia into fossil fuel electricity generation past the 2035 targets for achieving net zero electricity across Canada. Energy storage technologies present a viable alternative to achieve the electricity system objectives of system reliability and integration of renewable energy. Nova Scotia has the opportunity to avoid making long-term investments in carbon emitting gas generation. Jurisdictions around the globe are now retiring gas generation in favour of clean energy storage solutions. Battery storage projects are now cost competitive with gas generation on a capital cost basis.	Although batteries do provide firm capacity, that firm capacity value, or ELCC, is limited due to the storage duration (4 hours or 12 hours in the IRP) and it declines as additional storage is added to the system. NS Power's modeling demonstrates that while batteries can contribute to firm capacity requirements, fast acting generation will also be required to ensure the system has sufficient resources during peak periods. To maintain system reliability and integrate the level of variable renewable

		resources observed in the IRP scenarios.
NRStor	Recommendation to Include Additional Energy Storage Scenarios. In order to address the various items provided in this document, we respectfully request that the IRP process assess additional exploratory scenarios with increased amounts of energy storage. The scenarios could assess varying amounts (i.e. 500MW, 1000MW, 2000MW) and varying durations of energy storage. We believe that running these energy storage scenarios will generate valuable learnings about the benefits of a greater role for energy storage in the province. We would appreciate the opportunity to discuss scenario and sensitivity development, as well as the energy storage modelling approach, with NSPI.	With the publication of the final modeling results, the evergreen IRP modeling portion of the evergreen IRP process has been finalized. If significant changes are observed in resource assumptions, NS Power will revisit the IRP assumptions and the potential need for future modeling work, as described in Action Plan Item 3f and Roadmap Item 4.
NRStor	Avoiding Curtailment of Renewable Energy. The model results currently show renewable energy curtailment in range of 30%-45%. These unprecedented levels of wasted energy can be mitigated through the effective deployment of energy storage. We would like to better understand how the costs of this curtailed energy is currently being modelled. If a take-or-pay agreement is assumed, there are significant cost savings for ratepayers from using energy storage in order to capture unused clean energy. Alternatively, if curtailed renewable energy is not compensated by the system, attracting development of renewable energy at a competitive price with these significant levels of expected curtailment will be extremely challenging. One key advantage of energy storage is its ability to support the integration of renewable energy sources. By storing excess electricity generated from wind, solar, and hydro, energy storage systems ensure a stable and continuous power supply. This promotes grid reliability, reduces the need for fossil fuel-based backup generation, and accelerates the transition to a clean energy future. Investing in energy storage aligns with the goals of reducing	NS Power agrees that energy storage can avoid renewable curtailment which is advantageous to the system when economic. The wind generation added in the evergreen IRP model is assumed to be take or pay; this is considered in the co-optimization of battery storage and wind expansion.

	greenhouse gas emissions, combating climate change, and meeting our sustainability targets.	
NRStor	Underestimation of Gas Related Costs. We believe the costs associated with both new gas generation and coal-to-gas conversion are underrepresented as they do not currently account for firm gas service fees necessary to ensure sufficient gas supply is available to the Nova Scotia system at the precise times gas generation will be required, in order for gas generation to be relied upon as a firm source of power generation. Fixed gas service fees include but are not limited to: - Firm gas transportation and distribution - Firm gas storage - Firm gas balancing services As a result, we believe the Fixed O&M costs associated with both new gas and coal-to-gas conversions are underestimated by approximately $60/kW-yr. This estimate is based on the acquisition of similar services in the Ontario market.	Please refer to the evergreen IRP fuel pricing assumptions on pages 36 and 37 (IRP Evergreen - Updated Assumptions (nspower.ca)). The natural gas prices are based on LNG pricing for peaking gas. This source does not have firm transportation therefore NS Power has required that new gas resources will include a secondary liquid fuel in order to ensure reliable fuel supply and mitigate the risk associated with a single natural gas transmission pipeline bringing gas to the Maritimes.
NRStor	Feasibility of Coal-to-Oil Conversion. We believe the intention to convert coal generation to oil generation should be examined more closely. From an environmental perspective, we suggest there should be further analysis on what the emissions reductions would be, if any, from converting coal facilities to heavy oil facilities. In addition, the current cost associated with coal-to-oil conversion is estimated to be very low; we are interested in further understanding the feasibility of these costs. For example, are oil tanks already in place at the coal facilities? If yes, do the existing tanks meet modern standards for usability or are refurbishments of the tanks required? Are permits already in place for the coal facilities to burn heavy oil? If not, what is the feasibility of securing these permits with current environmental regulations? How will oil tanks be maintained and heated, and are these costs taken into account?	NS Power is committed to continuing to work toward the federal and provincial climate goals of phasing out coal by 2030 and reaching 80% renewable energy by 2030. We know it will take a mix of energy solutions, including wind and solar, battery storage, and other generation sources to get there. The potential fuel conversion at three units at Lingan is just one small piece of the puzzle. Because the three units considered for HFO operation are already in service today (already have the capability to h operate on HFO), they can provide a relatively low-cost source of

		capacity compared to the cost to build a new facility. These HFO units would be used only when energy demand is at its highest. Given these units would be used in limited situations, the emissions impact would be low and would not impact reaching 80% renewable energy or meeting legislated emissions targets. They also provide a bridge to meet firm peak capacity needs while emerging technologies develop.
NRStor	Reliance on Direct Air Capture (DAC). We are concerned with the proposed reliance on DAC technology to achieve Net Zero Emissions targets. Currently, DAC technology is unproven and not commercially available. In addition, the energy usage associated with DAC is expected to be significant; if relying on this technology NS must also consider the increased load associated with DAC. We believe the inefficiency of generating electricity using fossil fuel sources and using that same electricity to power DAC technology to reduce atmospheric carbon prohibits this from being a viable long-term strategy to achieve net zero emissions.	The Direct Air Carbon Capture (DACC) scenario was intended to provide to assess the additional system costs to bring the emissions to "zero". DACC was used as a cost reference point to demonstrate the potential system cost impact to remove the remaining emissions on the system at $500/tonne. NS Power will continue to assess advancements in other technology options to reach net zero including the emerging technologies that have been included as part of the evergreen IRP assessment (hydrogen CTs, SMRs, etc.)
PHP	It is clear from the scenarios studied that significant wind resources will be required in every scenario and that the Reliability Tie is generally valuable for all scenarios as well. This is generally consistent with NSPI's prior IRP analysis. As such, PHP believes that the Action Plan being prepared based on the Modeling Results should highlight and emphasize the importance of early and continued progress in	NS Power agrees; variable renewable generation additions are included in the IRP Action Plan under item 3d and the Reliability Tie is included under item 1a.

	adding significant wind resources to the system and advancing the construction and commissioning of the Reliability Tie.	
PHP	PHP notes however that as referenced on slides 11 and 18 of the Modeling Results "Wind curtailment between 10% and 45% is observed across the range of scenarios in the long term (average of ~30%)". This appears to be the case even in the "No Wind Integration Constraints" scenario (CE1-E1-R1-WI). Curtailment of a valuable renewable energy resource at such levels (even if the developer is paid for such curtailed energy, which PHP understands is the assumption in the modeling) is obviously problematic and inefficient. PHP believes that a critical early action item for the Action Plan should be the development of a specific and detailed plan to review the curtailment levels noted and explore and evaluate all available options to limit such curtailment to the fullest extent technically and economically possible. PHP believes there will be numerous avenues open to achieve this and that as part of the Action Plan item on this matter early consultation with all stakeholders in this regard should be specifically required. PHP would also request that NSPI specifically confirm that in fact the developers of the future wind energy are assumed to be paid for all curtailed energy in the modeling. If that is not the case, then at the curtailment levels identified the economics supporting the development of such wind resources would not in PHP's view appear likely to be viable.	NS Power has included an Action Plan item (Action Plan item 3d) to assess/study operational practices to reduce wind curtailment. NS Power can confirm that the wind modeled as part of the evergreen IRP is modeled as "take or pay" and the economics of wind curtailment are evaluated as part of the modeling exercise.
PHP	Re: Atlantic Loop and BiDirectional Sensitivity: On this point, at this stage PHP would suggest that the scenarios that anticipate an operational Atlantic Loop by 2030 should be considered unlikely and that the 2035 scenario analysis is more appropriate for option comparisons, especially with respect to a Bidirectional Atlantic Loop scenario that calls for an additional 750MW of installed onshore Nova Scotia wind. This issue is further heightened by the ongoing potential for third parties to be seeking to add significant additional wind resources in the Province to support potential large scale hydrogen production. PHP also understands from the technical conference that none of the wind that supports this scenario is located offshore due to its higher pricing, which	Please refer to Action Plan Item 1b. NS Power will continue to progress the necessary elements of the Atlantic Loop in collaboration with government and utility partners and will provide any updates as part of the annual Action Plan Update to stakeholders. Although the evergreen IRP modeling did not select offshore wind as part of the resource mix, in the event offshore wind projects are

	would presumably impact the economic analysis if offshore wind is ultimately required. Confirmation of this understanding and potential impact of incorporating some offshore wind to meet the wind capacity addition requirements would also be useful	developed and become future resources, NS Power will update the modeling assumptions to include approved offshore wind resources and assess the impact on the overall resource mix. It is anticipated that any offshore wind added would largely replace an equivalent amount of onshore wind (on an annual energy basis).
PHP	As there may be multiple options for hybrid peak mitigation regardless of the overall amount of electrification, as with the curtailment issue noted above PHP believes that as part of the Action Plan item on this matter early consultation with all stakeholders in this regard should also be specifically noted.	NS Power has added the additional assessment of the hybrid peak scenario to the updated Action Plan supports a multi-stakeholder process for this assessment.
PHP	PHP also notes the significance of non-firm imports and the limited additional external firm capacity options now being shown as available. This further heightens the need to reduce peak consumption and ensure manageable in Province or otherwise economically accessible capacity resources such as coal plant conversions, synchronous condensers or energy storage to support the increase in non-dispatchable energy supply.	NS Power agrees with the importance of reducing peak consumption and will continue to progress demand response programming in support of this. In addition, each scenario assessed as part of the evergreen IRP includes coal plant conversions, synchronous condensers and energy storage as part of the resource mix, all of which are included in the updated Action Plan.
Small Business Advocate	Policy constraints and economic conditions have narrowed portfolio results. NS Power's analysis demonstrates that over the long term, most of the portfolios look very similar across scenarios. This is primarily due to the resource constraints imposed by policy, requiring coal unit retirements and imposing costs on emissions. The expected relative economics of new near-term resources (wind, solar, batteries, combustion turbines) are also contributing to a relatively narrow set of portfolios. These conclusions support a continued focus by NS Power on the implications of	As part of the updated Action Plan and Roadmap, NS Power will continue to monitor the planning environment for changes to federal and provincial regulations and the impacts this may have on the planning environment (please refer to Roadmap item 7).

	federal and provincial regulations on the timing of key resource decisions and potentially additional planning scenarios for future IRPs.	
Small Business Advocate	Resource procurement schedule should reduce risks. Given the narrow set of likely portfolios, NS Power should structure a resource procurement schedule that will reduce customer risks.	NS Power has updated the action plan to include specific procurement targets and timing based on the common outcomes across the range of scenarios assessed.
Small Business Advocate	Key risks need constant monitoring. While many of the modeled portfolios look similar over time, there are key differences in the near-term, particularly related to the Atlantic Loop. The assumption around the availability and timing of the Atlantic Loop is such a major assumption, that NS Power should focus particular attention on assessing the risks associated with this project to ensure that if there is a delay or acceleration, the implications for other portfolio decisions are well-understood.	NS Power agrees and will progress any work related to the Atlantic Loop with consideration for project risks and other resources or actions required to mitigate those risks.
Small Business Advocate	Demand response and energy efficiency should get more attention as deployable alternative. As electrification progresses, we encourage NS Power to continue to explore demand response and energy efficiency as resource options, particularly as options that can be deployed on a shorter development timeline than other alternatives. As technology and software improve, utilities in other regions have seen notable successes in using aggregated demand response to meet resource adequacy needs. NS Power should investigate pilot programs and other research and development efforts to take advantage of the latest advances in this sector of the market.	NS Power is currently progressing pilot work in support of demand response initiatives. Please refer to the February 2023 Action Plan update, which can be accessed here.