

No.	Topic	Comment	NS Power Response
CA-1	Load	<p>Recession - Residential loads will increase and commercial and industrial loads will decrease. It will take years to recover from recession. “Given the impact of the recession on electricity demand, the “Mid Electrification / Base DSM” and “High Electrification / Mid DSM” forecasts are unlikely to provide useful guidance for the next 5-10 years, at least. Without modification, the effort to model these two forecasts could be wasted.</p> <p>Even the “Low Electrification/Base DSM” forecast may not be relevant to near- or mid-term resource planning decisions. A 5% drop in annual energy in 2020, followed by a 1% per year growth rate, would return to the low forecast in roughly 2026. A 10% drop in annual energy in 2020 would require a 2% per year growth rate to return to that path in 2026. At best, peak demand could return to the “Low Electrification / Base DSM” path within a 2-3 years.</p> <p>If no changes are made to the three load forecasts, the resulting resource portfolios will not be optimized to the most plausible electricity demand in the near- and mid-term. Sensitivity runs to validate these portfolios under even lower load conditions could entirely miss a more optimal resource plan.”</p> <p>Recommend that NS Power develop a more expansive response to the recession.</p>	<p>NS Power has closely followed the ongoing effects of the COVID-19 pandemic in order to assess potential impacts on medium- and long-term load growth. While the effects of the pandemic are still very uncertain, NS Power has made the following adjustments to the IRP load forecast that reflect potential impacts; these adjustments will continue to ensure that the IRP tests a robust and appropriate range of potential outcomes, both in terms of load and firm peak.</p> <ul style="list-style-type: none"> • The Low Electrification forecast remains unchanged at all DSM levels • The Mid and High Electrification forecasts are adjusted to moderate the original steep ramp up in electrification over the first 10 years of the forecast; the end points remain unchanged as they are consistent with the established SDGA goals (as modeled in the PATHWAYS study) • The added COVID-19 Low sensitivity will test the robustness of certain resource plans to potential pandemic load impacts in the first 5 years (a reduction of 1% in firm peak and 5% in net system requirement in year one, returning to the base Low Electrification forecast by 2026)

NS Power Interim Modeling Results Stakeholder Feedback (May 2020)

CA-2	Load	Load shapes associated with Electrification. Difficult to correlate with the NYSERDA inputs. We would like to see the load shape graph(s) for EV charging compared to the NS Power peak day load shape. NS Power should evaluate electrification in the industrial and marine sectors	NS Power has not developed separate load shapes for electric vehicles, either as part of IRP modeling or other work. The NYSERDA inputs provide a range of potential peak load impacts for EVs based on the amount of peak mitigation assumed via rate structures or other methods. NS Power has selected a mid-range value for EV peak impact, which assumes that some level of EV peak mitigation will occur in the base case in order to avoid potentially over-stating the peak load effects of increased EV penetration.
CA-3	Technology options	Flexible solar and hybrid resource technology options should be added to the model. Update stakeholders on this discussion. Also consider the possibility of wind and solar being screened out too early because of low capacity benefit.	NS Power has continued to work closely with our consultant E3 on this item. E3's work has shown that, in general, wind and batteries do not pair quite as effectively as wind and solar but that there can still be some benefit. NS Power's PLEXOS assumptions did not model a downward ramping reserve requirement as this can be provided by renewables without pre-curtailing, assuming sufficient controls are in place. NS Power has considered the effects of diversity benefits on Planning Reserve Margin calculations.

NS Power Interim Modeling Results Stakeholder Feedback (May 2020)

CA-4	ELCC Tufts Cove	<p>Share NS Power’s calculated ELCC values such that renewable and non-renewable resources are handled on an equivalent basis.</p> <p>Longer averaging period for TUC DAFOR. Unless NS Power has some reason for treating the recent high DAFOR as the base case, a longer base line should be used, and the recent anomaly should be treated as a sensitivity.</p>	<p>Please see Page 7 – ‘ELCC Factors for Existing Resources’ from NS Power’s 2020 IRP Modeling Results Release – June 26, 2020</p> <p>NS Power believes using a three-year average produces a good forecast of TUC Performance based on the current asset risks and how the company manages these risks. NS Power has however updated its DAFOR calculations to the most recent three-year period (2017-2019). These updated DAFORs are reflected in the calculated UCAP firm capacity assumptions used in the capacity expansion modeling. For the TUC units in particular, the updated DAFORs has resulted in the removal of the anomalously high DAFOR for TUC1 in 2016.</p> <p>These updated DAFOR forecasts were used in the reliability/operability study using E3s RECAP tool, which evaluate the required Planning Reserve Margin to meet the reliability standard for select resource portfolios from the capacity expansion modeling.</p>
CA-6	Inertia	<p>Provide the modeling assumptions for the inertia constraint, especially how much each resource contributes to meeting this requirement and the nature of any operational restrictions (such as ramp rates, or the effect of generation output on inertia contribution) on that limit the contribution of each resources to meeting the constraint.</p>	<p>Please see Page 8 – ‘Inertia Constraint’ from NS Power’s 2020 IRP Modeling Results Release – June 26, 2020. The only inertia constraint is that units that can contribute to the aggregation of the minimum online requirement (3266MW) must be generating or flowing (in the case of transmission interconnections) at unit minimum output. In the case of synchronous condensers, units are assumed to always contribute.</p>

NS Power Interim Modeling Results Stakeholder Feedback (May 2020)

No.	Topic	Comment	NS Power Response
SBA-1	Scenarios	Least Cost Portfolio should be the comparative/comparator scenario; consider modeling 1.0C	NS Power has added the 1.0C scenario as part of the set of scenarios being examined in the 2020 IRP.
SBA-2	Scenarios	<p>No evaluation of the full use of economic DSM and economic Regional Integration under these scenario assumptions.</p> <p>Why are there no cases in in Scenario 2 or Scenario 3 without Regional Integration. Is Regional integration a given and if so provide explanation.</p>	<p>In all scenarios with Regional Integration (resource strategy “C”), the tie lines that provide access to firm capacity and energy from outside of Nova Scotia are available to the model, but must be selected economically. This means the model could select a resource portfolio equivalent to the Current Landscape resource strategy by choosing not to build interconnections.</p> <p>In addition there are several Scenario 2 (Net Zero 2050) scenarios that do not allow Regional Integration (2.0A, 2.1A, 2.2A); this structure allows us to compare with equivalent scenarios 2.0C, 2.1C, and 2.2C to understand the value of Regional Integration.</p> <p>NS Power has incorporated model runs using the Low, Base, Mid, and Max DSM profiles in the modeling plan.</p>

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No.	Topic	Comment	NS Power Response
SBA-3	Scenarios	Provide details about all costs performance and potential amounts of the various distributed generation that are assumed to be available when NSPI refers to Distributed Generation.	<p>The DER Promoted Scenarios (“Scenario Bs”) assume NS Power’s Net System Requirement load is partially displaced by behind the meter generation. The calculated Partial Net Present Value of Revenue Requirements for Scenario Bs does not calculate costs associated with developing this generation nor avoided costs to the utility. Please see page 41 – <i>Distributed Energy Resources (DERs) of the 2020 Integrated Resource Plan (IRP): Final Assumptions Set – March 11, 2020</i> for cost and operational estimates for DERs.</p> <p>The range of costs estimated for Scenario Bs in the <i>Initial Portfolio Study Results</i> (page 51) of the <i>NS Power 2020 IRP modeling Results Release – June 26, 2020</i> are based on the Behind the Meter solar cost assumptions (High and Low Capacity Factor).</p>
SBA-4	Resolve	How Resolve co-optimizes investments and operations. Over what period of years are the economics tested?	E3’s Resolve model completes runs in 5 year increments and then produces an NPV cost stream by weighting the 5 year runs proportionally to estimate the costs for intermediate years. End effects are calculated as an increased weighting on the final model year (2045).
SBA-5	T&D	Stakeholders must see T&D Avoided Cost information in the June modeling review sessions.	Consultations respecting the T&D Avoided Cost methodology development have been ongoing through the Demand Side Management Advisory Group (DSMAG). NS Power will advise the IRP stakeholders on the outcomes of the methodology discussions.
E1-1	Modeling results	Provide further updates on scenario modelling with draft results at such point as they become available, which would allow for a more substantive review in advance of the next stakeholder session.	NS Power provided a detailed results release on June 26, ahead of the July 9 stakeholder workshop and continued to accept feedback from stakeholders on those results and provided additional modeling results were provided in September in advance of the stakeholder workshop.

NS Power Interim Modeling Results Stakeholder Feedback (May 2020)

No.	Topic	Comment	NS Power Response
E1-2	Modeling results / data transparency	Provide stakeholders with all inputs and outputs for Plexos LT for a sample Candidate Resource Plan, as part of the June 5 release of IRP modelling results.	Subsequent to submitting these written comments, E1 inquired if NS Power would agree as a compromise to provide a detailed tutorial on the Plexos LT model for E1 and its consultant. NS Power agreed and a session was held on July 22, 2020.
E1-3	T&D at DSMAG	NS Power to provide a schedule of engagement to the DSMAG for the facilitation of the Avoided Costs of T&D process. It is recommended the process meet certain minimum requirements in terms of stakeholder engagement, as further detailed in the body of this memorandum. (included list of activities)	Consultations respecting the T&D Avoided Cost methodology development have been ongoing through the Demand Side Management Advisory Group (DSMAG). NS Power will advise the IRP stakeholders on the outcomes of the methodology discussions.
E1-4	DSM Potential	Modify qualitative assumptions for the contents of the DSM Potential Study, clarifying that the DSM Potential Study contains only estimates of programmatic DSM. NS Power's current assumptions do not reflect the methodology used to develop the 2019 DSM Potential Study.	NS Power has used the E1 DSM Potential Study estimates of programmatic DSM as its modeling assumptions.
E1-5	Mid-DSM	Confirm the scope contemplated for energy efficiency (EE) through sensitivity analyses will include in many cases Mid DSM. In the event EfficiencyOne's understanding is incorrect, we request that NS Power use a sensitivity analysis methodology that, at minimum, meets the characteristics set out in the body of this document.(list provided)	NS Power completed 7 DSM sensitivities which reflected E1's input on additional appropriate DSM sensitivities to prioritize.

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E1-6	Demand Response	<p>A recommendation that only one demand response (DR) case be permitted for selection for each eligible Candidate Resource Plan.</p> <p>Is NS Power maintaining the continuous (25-year) nature of the DR cases from the 2019 DSM Potential Study? If not, is there any tolerable bound to how fragmented DR operation is 'allowed' to become?</p> <p>How will the NS Power generated cases compete against cases from the Potential Study?</p> <p>Will all DR cases be allowed to compete in every scenario?</p> <p>Can multiple DR cases be allowed to stack? (e.g. one NS Power case, and one Potential Study case).</p>	<p>NS Power has matched DR Cases with Energy Efficiency cases, as recommended by E1.</p> <p>NS Power has allowed the optimizer to choose a DR resource in 2021, 2025 or 2030. The cost and performance characteristics have not been modified (other than costs were escalated at inflation to the in-service year for the case with a 2030 start year.)</p> <p>NS Power generated DR cases have not been offered to the model.</p> <p>A DR case is allowed to compete in every scenario, as applicable to the EE case.</p> <p>Only a single DR case, as developed by E1, is offered for each IRP scenario, as applicable to the Energy Efficiency case.</p>
E1-7	Demand Response	<p>A recommendation against the use of small fragments of the DR cases (e.g. operation for a few years, cessation, restart), on the basis that costs and potential estimated were reflective of continuous operation as opposed to frequent starts and stops.</p>	<p>NS Power has not modeled fragments of DR. If a program is chosen, the full annual cost and performance characteristics are incurred as applicable (note- if the resource is chosen in 2030, only the first 15 years of costs and benefits are modeled.).</p>

No.	Topic	Comment	NS Power Response
E1-8	DER	A recommendation that cost estimates be put in place for DER resource strategies.	<p>NS Power has estimated a range of costs estimated for Scenario Bs in the <i>Initial Portfolio Study Results</i> (pg. 51) of the <i>NS Power 2020 IRP modeling Results Release – June 26, 2020</i> which are based on the Behind the Meter solar cost and operational assumptions (High and Low Capacity Factor).</p> <p>These costs are not part of the calculated partial net present value of revenue requirement as this is not currently modeled as a utility cost.</p>
E1-9	Electrification	Confirmation that NS Power will avoid cost comparisons across differing electrification scenarios, and to provide their stated means of selection amongst scenarios for the purposes of generating the avoided costs of capacity and energy - key inputs for DSM in Nova Scotia.	NS Power recognizes that comparisons of NPV across different electrification levels could be misleading and will endeavour to structure all results presentation to ensure this is properly recognized. Per the Terms of Reference, as part of the IRP process, NS Power will select a Reference Plan on which to base avoided costs of capacity and energy for DSM.