Non Emitting Resources Subcommittee

Modelling Exercise: Response to Stakeholder Feedback

Following the February 16th Non Emitting Resources Subcommittee stakeholder meeting, the IESO invited stakeholders to provide comments and feedback to help advance the modelling exercise. This feedback has been posted on the IESO stakeholder webpage for this engagement.

Note on Feedback Summary

The IESO appreciates the feedback received from stakeholders. This stakeholder feedback, along with the comments provided at the stakeholder engagement sessions, is important to the collaborative approach the IESO has committed to. All feedback received has been noted and will be considered as the engagement moves forward. Below, the IESO has provided a summary table which outlines responses in respect of specific feedback or questions for which an IESO response was required at this time.

Stakeholder comments and IESO responses

Focus Area	Company	Feedback	IESO Response
Participation	TransCanada	With regards to the model, the external consultants need to have a model capable of assessing both load and generation modes to effectively quantify the impacts of storage. We recommend looking at utility scale storage (greater than 1000 MW) to ensure the benefits of large scale storage on costs and operability are fully illuminated.	The modelling exercise will incorporate the intraday economics of storage and other resources including hydro, DR, and interties. The IESO and consultants will work with stakeholders to identify a suitable set of resources to consider when illustrating revenue opportunities for market participants

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Participation	TransCanada	The IESO should consider extending the time span of the model from 10 to 40 years to effectively capture the opportunity presented by utility scale storage technologies. These types of assets have working lifespans of greater than 50 years. They are capital intensive and thus their contribution needs to be compared over a longer timescale.	The modelling exercise will look to test the robustness of the markets being designed by MRP and assess a likely range of revenues available to market participants under different scenarios. The IESO is planning to use a set of non-time specific levers that can be altered to reflect market outcomes across different conditions. The IESO is not planning to provide an annual forecast of market prices.
Market Efficiencies	Power Advisory	While the NERSC Phase 2 modeling exercise should provide technical insights regarding implications to the IAM (e.g., reliability, operability, market efficiencies, price levels, etc.) resulting from the uptake of NERs, it is equally important that this modeling exercise be a key input to the NERSC's Phase 3 (Incentive Mechanisms) scope regarding NERs (i.e., appropriate and cost effective incentive mechanisms to ensure revenue adequacy for NERs already in commercial operation and for project development of NERs, within the IAM through applicable changes to wholesale market design and rules and/or appropriate mechanisms outside of the IAM).	The future market scenarios to be defined within the NERSC should provide insights on how resources can expect to participate within the constructs of Market Renewal under a range of conditions. The findings from the modelling exercise will also seek to highlight areas of the design which could be explored through future market development. It is, however, important to note that the IESO's objective is not to ensure revenue adequacy for any specific resource type(s). The goal is to provide open and competitive mechanisms that will effectively deliver what the system needs at the best price.

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Market Efficiencies	Power Advisory	The Consortium recommends IESO model integration and uptake of NERs within two parts: 1. Impacts and implications to the IAM and Ontario's power system (including customers); and 2. Impacts and implications to NERs.	The modelling exercise will aim to address implications and impacts to both the IESO Administered Markets and participants.
Market Efficiencies	Power Advisory	The following IAM scenarios are recommended to be included within the modeling exercise and should provide 'market' foundation for modeling. • IAM as is today (i.e., uniform energy prices (i.e., Hourly Ontario Energy Price (HOEP), Market Clearing Price (MCP)), no Day-Ahead Market (DAM)/Enhanced Real-Time Unit Commitment (ERUC), no Incremental Capacity Auctions (ICAs)) - "Base Case" • Market Renewal Program (MRP) as planned (i.e., Locational Marginal Pricing (LMP), DAM/ERUC, ICAs) - "Planned Case" • MRP Roadmap (i.e., MRP plus enhancements to ancillary services (A/S), Environmental Attributes (EAs) market (e.g., Renewable Energy Certificates), etc.) - "Roadmap Case"	The IESO thanks Power Advisory for these suggestions, which will be discussed at the July 24 meeting.

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Market Efficiencies	Power Advisory	The following Ontario power system scenarios are recommended to be included within the modeling exercise and should provide 'system' foundation for modeling. • Planned nuclear generation refurbishments and retirements - "Planned Nuclear Case" • 'Off ramps' exercised due to issues with nuclear generation refurbishments - "Less Nuclear case" • Higher utilization of existing gas-fired generation - "Gas Utilization Case" (i.e., result of Less Nuclear Case, etc.) • Increase NERs (not including nuclear) - "NERs (Non-Nuclear) Case" (i.e., result of Less Nuclear Case and opposite to Gas Utilization Case) • Low demand forecast - "Low Demand Case" • Moderate demand forecast - "Moderate Demand Case" • High demand forecast - "High Demand Case"	At a high level, the IESO expects that scenarios for the modelling exercise will provide 3-5 visions of the future for Ontario's electricity sector and demonstrate how resources can expect to participate in those futures. The Market Renewal Working Group undertook a similar exercise to comprise a set of future market visions for the development of the Market Renewal Benefits Case. The scenarios from the Benefits Case along with the planning work informing the Ontario Planning Outlook provide a platform on which to develop the NERSC modelling scenarios. The IESO encourages NERSC participants to review the scenarios developed by the MRWG prior to the July NERSC session. Link to Benefits Case
Market Efficiencies	Power Advisory	Based on results of scenario modeling from Part 1, impacts and implications to NERs should then be modeled, including, but not limited to, the following. • Capabilities of NERs to supply multiple electricity products/services to meet demand/supply and operability power system	The IESO anticipates that the modelling exercise will provide insights on these impacts and implications.

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		needs - including 'paired' NERs (e.g., wind generation plus storage, etc.) • Competitiveness (e.g., capabilities, costs, etc.) of NERs meeting needs relative to other resources (e.g., gas-fired generation, imports, etc.) • Identification of any barriers to cost-effective NERs meeting needs, including revenue adequacy (i.e., relating initially to IAM revenues, with and without planned MRP changes to IAM)	
Market Efficiencies	Power Advisory	The recommended modeling approach should identify initial impacts and implications to NERs regarding revenue adequacy, which then begins to address scope of NERSC Phase 3 (Incentive Mechanisms) (e.g., based on Part 1 modeling integrated with Part 2 modeling through the above recommended scenario analyses, if NERs cannot achieve revenue adequacy from IAM (even with implementation of MRP and potentially Roadmap IAM enhancements), then 'outside' IAM mechanisms should necessarily be explored (e.g., EA market, contracts, etc.)).	One important outcome of the modelling exercise will be to illustrate the potential revenue opportunities for resources under the proposed MRP market design. This will be explored over a range of scenarios, with a part of the process also being to identify areas of potential enhancements to the future market design.

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Market Efficiencies	Power Advisory	Potential policy impacts can be taken into account through different power system scenarios (e.g., decisions to exercise 'off-ramps' resulting in less refurbishment of nuclear generation resulting in other resources being maintained and/or developed), as well as recommended demand forecast scenarios (e.g., level of CDM driven (or not) by Government policies (e.g., Conservation First)).	The IESO acknowledges that policies are a key factor in determining how resources will participate in the future market. The IESO will work with stakeholders at the July NERSC meeting to develop appropriate scenarios for the modelling exercise.
Market Efficiencies	Power Advisory	Technology costs should be accounted for through the inclusion of different resources within recommended scenarios. Similarly, carbon prices should be accounted for through applicable different resources (e.g., gas-fired generation) and their associated costs (e.g., natural gas tariffs including cost impacts from Ontario's cap-and-trade program).	The IESO thanks Power Advisory for its feedback and looks forward to discussing modelling inputs further at the July NERSC.
Market Efficiencies	Power Advisory	There should be low, moderate and high demand forecast scenarios. Low - continued uptake of conservation and demand management (CDM), distributed energy resources (DERs), moderate economic growth or even slight downturn, etc. Moderate - less uptake of CDM and DERs to	The IESO agrees that a range of demand outlooks should be reflected in the modelling exercise within a set of defined scenarios.

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		Low Demand Case, moderate economic growth High - electrification, more than moderate economic growth	

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