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Dear Barbara,

Power Advisory LLC has coordinated this submission on behalf of a consortium of renewable generators, energy storage providers, and industry associations (i.e., the "Consortium"<sup>1</sup>) regarding suggestions for the scope of modeling that is planned to be done within the Independent Electricity System Operator's (IESO's) Market Renewal Working Group's (MRWG's) Non-Emitting Resources Sub-Committee (NERSC) Phase 2 (Market Efficiencies).

### **Scope of NERSC Phase 2 Modeling**

During the February 16, 2018 NERSC meeting, IESO discussed the purpose of a planned modeling exercise, potential approach and timelines for the modeling exercise, and sought input regarding potential scenarios that should be considered for inclusion within the modeling exercise.

IESO stated that the scope of the NERSC Phase 2 modeling exercise is to explore potential: 1) revenue opportunities for NERs within the IESO-Administered Markets (IAM); 2) outcomes within the IAM (e.g., wholesale prices, supply mix, greenhouse gas (GHG) emissions, etc.) resulting from uptake of NERs; and 3) power system reliability impacts and challenges resulting from uptake of NERs.

The Consortium applauds IESO for preparing to undertake critically needed modeling of NERs within the IAM. In addition to the suggestions regarding the scope of this modeling exercise

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<sup>1</sup> The members of the Consortium are: Algonquin Power; BluEarth Renewables; Boralex; Brookfield Renewable Power; Canadian Wind Energy Association; EDF Renewables; EDP Renewables; Enbridge; Energy Storage Canada; ENGIE; H2O Power; Kruger Energy; NextEra Energy Canada; Pattern Energy; Suncor; wpd Canada; and, Canadian Solar Industries Association

described in the section below, responses to the questions IESO posed at the February 16, 2018 NERSC meeting are included within Appendix A of this submission.

## **Recommendations – Scope of NERs Modeling within the IAM**

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 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.

### Part 1 – Impacts and Implications to IAM and Ontario's Power System

Part 1 modeling should undertake a broad market-wide and system-wide analysis of potential results, along with implications for NERs.

The following IAM scenarios are recommended to be including 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 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”

The above proposed 'market' and 'system' scenarios will result in a matrix of modeling outcomes. That is, modeling outcomes should provide results regarding the following impacts and implications to the IAM and Ontario's power system along with implications to NERs.

- Demand/supply balance (i.e., reliability, adequacy, etc.)
- Operability of Ontario's power system (i.e., reliability, flexibility, etc.)
- Impacts on wholesale prices (energy, A/S, capacity), including market revenues
- Impacts on customers (reliability, quality of service, costs, etc.)

## Part 2 – Impacts and implications to NERs

Part 2 modeling should undertake analysis on specific impacts and implications for NERs.

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 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)

Based on the Consortium's recommended modeling approach identified above, IESO and stakeholders should then have new technical insight regarding how NERs may or may not be effectively integrated within IAM. In addition, 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.)).

The Consortium will be happy to discuss the contents of this submission with IESO, MRWG, and/or NERSC at a mutually convenient time.

Sincerely,



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Managing Director  
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cc:

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## **Appendix A – Answers to IESO Posed Questions from February 16, 2018 NERSC Meeting**

### **What demand scenarios would be most helpful to explore?**

Low demand forecast – “Low Demand Case” (i.e., continued uptake of conservation and demand management (CDM), distributed energy resources (DERs), moderate economic growth or even slight downturn, etc.)

Moderate demand forecast – “Moderate Demand Case” (i.e., less uptake of CDM and DERs to Low Demand Case, moderate economic growth)

High demand forecast – “High Demand Case” (i.e., electrification, more than moderate economic growth)

### **How should technology costs and carbon prices be accounted for?**

Technology costs should be accounted for through different resources to be included within modeling the 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) to be included within modeling the recommended scenarios.

### **How can we best account for potential policy impacts?**

Potential policy impacts can be taken into account through different power system scenarios as recommended (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)).

### **What else should be considered in developing modeling scenarios?**

See recommendations contained within this submission for considerations