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IESO DER Potential Study

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Purpose

To introduce the IESO's Distributed Energy Resource (DER) Potential Study.

Context for a DER Potential Study

- The emergence of DERs is a major trend impacting wholesale electricity markets
- DERs can provide competitive and clean alternatives to transmission-connected solutions, and can deliver benefits beyond the bulk system
- IESO-contracted DERs (for example FIT and microFIT) are beginning to come off contract towards the end of this decade, and in parallel, resource adequacy needs are emerging
- The IESO needs to understand the breadth of resources that can be drawn upon to meet the growing needs of Ontario

Context for a DER Potential Study - continued

- Identifying the types of DERs that are cost-effective and/or are likely to emerge in the near- to mid-term is a key input for the IESO's DER integration efforts, and can provide useful insight for the sector as a whole

Uses for the DER Potential Study

- To establish the case for DER integration into wholesale markets where appropriate
- To inform wholesale market design
- To identify circumstances where wholesale market participation is untenable or suboptimal, and identify alternative opportunities to capture DER value (e.g. programmatic approaches, etc.)
- To identify and quantify greenhouse gas reduction opportunities associated with DERs

Unique Elements of this Study

Will account for potential from the dynamic capabilities of DERs, including their ability to maneuver on a 5-minute basis (in-line with the operations of our real-time market)

Will determine the potential of advanced demand response and distributed energy storage – the first time these technologies' potential will be studied by the IESO

Will estimate wholesale market revenue opportunities for DERs in assessing achievable potential

Will model several scenarios including different carbon pricing trajectories and will quantify GHG mitigation associated with DER potential

Will incorporate electrification in conjunction with DER capabilities (e.g. managed EV charging, grid-interactive hot water systems, etc.)

DER Technologies to be Studied

- The IESO is interested in technologies and use cases that are likely to yield the most system value and/or will have the likeliest uptake
- The list on the next slide will be investigated by the consultant and a subset will proceed to the potential analysis stages (based on IESO and stakeholder direction and consultant's findings of value versus effort)

DER Technologies to be Studied - continued

| Technology Categories | DER Technology Types |
|---|---|
| <p>Mandatory DER Technology Types</p> <p>These DER Technology Types will be assessed for potential.</p> | <p>Conventional Demand Response</p> <p>For example smart thermostats, building automation systems, pool pumps, lighting control, etc.</p> |
| | <p>Novel Demand Response</p> <p>For example EV charge management, smart storage electric water heaters, thermal electric storage for space heating, etc.</p> |
| | <p>Behind-the-Meter Battery Electric Storage</p> |
| <p>Optional DER Technology Types</p> <p>At the discretion of the IESO, based on consultant advice and stakeholder input, these DER Technology Types may be assessed for potential.</p> | <p>Front-of-the-Meter Battery Electric Storage (<10 MW)</p> |
| | <p>Behind-the-Meter Solar Photovoltaic</p> |
| | <p>Front-of-the-Meter Solar Photovoltaic (<10 MW)</p> |
| | <p>Other</p> <p>For example Front-of-the-Meter generation, Behind-the-Meter generation, etc.</p> |

Tasks to be Included in the Study

1. Distributed Energy Resources Pre-Assessment

- Promising DER technologies and uses will be identified, as will a subset relevant to the Ontario context that is recommended to proceed to the analysis stage
- Baselines will be determined for DER technologies selected to proceed to the potential analysis stages

2. Technical Potential

- Technical potential will be determined (where appropriate) for the assessed DER technologies
- This potential shall accommodate the efficient electrification of space heating, water heating, and transportation as demand responsive DERs

Tasks to be Included in the Study – continued 2

3. Economic Potential

- The economic potential will be determined based on an advanced total resource cost (TRC) approach that account for the dynamic capabilities of DERs
- Three scenarios will be developed (that may vary technology costs, load growth, carbon regulations, etc.)

4. Achievable Potential

- The achievable potential shall estimate the market penetration rates of the DER technologies and include DERs that pass the economic screen as well as DERs deemed not economic but where adoption is still likely due to market conditions or consumer preferences
- Three scenarios will be developed

Tasks to be Included in the Study – continued 3

5. Recommendations

- Recommendations on how the IESO should focus efforts to unlock the potential revealed through this study is effectively nurtured and leveraged

Consultant Secured to Undertake Study

- After extensive market research, the IESO developed an RFP incorporating the unique and complex requirements of the study
- On April 8th, the IESO posted the RFP for the study on MERX and received several proposals
- In early August, the IESO executed an agreement with Dunsky Energy + Climate Advisors, supported by Power Advisory

Draft Study Timelines

| | |
|---|-----------------------------------|
| Preliminary Project Plan Presented to Stakeholders | September 20 th , 2021 |
| <ul style="list-style-type: none">• The draft project plan will be presented, as well as the DER technologies and use cases recommended for this study• Stakeholders will be asked to provide general feedback on the DERs proposed for the study, the study's high level-methodology, and the scenarios to be included | |
| Draft Detailed Project Plan Presented to Stakeholders | November 22 nd , 2021 |
| <ul style="list-style-type: none">• The detailed project plan will be presented, describing all key components of the study including inputs, methodology, and scenarios.• Stakeholders will be asked to provide feedback on appropriateness of detailed methodology, final scenario assumptions and baseline assumptions for DER technologies. Major deviations to methodology may not be accommodated. | |
| Final Results | May / June 2022 |
| <ul style="list-style-type: none">• Final results and recommendations will be presented to the stakeholders• Feedback will be sought on the study's recommendations and on next steps to shape further areas of exploration | |

Thank You

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