Stakeholder Feedback and IESO Response

Distributed Energy Resources (DER) Potential Study – November 23, 2021

Following the November 23, 2021 engagement webinar on the DER Potential Study, the Independent Electricity System Operator (IESO) and the consultant, Dunsky supported by Power Advisory, received feedback from participants on the approach for technical, economic and achievable potential analysis, regional segmentation, market barriers, as well as input on the scenarios.

The IESO received feedback from:

- Coalition of Large Distributors
- Elson Advocacy
- EnergyHub
- QUEST and Low Carbon Thermal Network

The referenced presentation, associated MS Excel worksheet (with the full list of DER measures and the pre-assessment results), and stakeholder feedback submissions can be found on the DER Potential Study webpage. Please reference the material for specific feedback as the below information provides excerpts and/or a summary only.

Notes on Feedback Summary

The IESO appreciates the feedback received from stakeholders. The IESO has provided a summary below, which outlines specific feedback or questions for which an IESO and/or consultant response was required at this time.

Approach for technical, economic and achievable potential analysis

General input on the proposed approach for evaluating DER Potential.

Feedback	IESO/Dunsky Response
EnergyHub is supportive of the proposed approach to evaluating DER potential as summarized on slide 19, including the notion that achievable potential is not exclusively a subset of economic potential.	Thank you for your feedback.

General input on the proposed market and measure characterization approaches.

Feedback	IESO/Dunsky Response
EnergyHub is supportive of the proposed market and measure characterization approaches, including the technical measure sizing and baseline profile parameters (e.g., nameplate capacity and end-use load characterization for DR).	Thank you for your feedback.

Ontario-specific considerations or data sources that the team should employ in the study.

Feedback	IESO/Dunsky Response
EnergyHub estimates that there are 400k total internet-connected (i.e., controllable) thermostats in Ontario based on aggregated data shared by EnergyHub's thermostat partners. Of thermostats for which fuel source data was reported to us, approximately 95% were configured for central AC, implying that ~5% of all devices represent gas-only systems. In a subset of postal codes in the province, EnergyHub observed a 250% growth of the installed base from 2018 to 2021. The IESO and consultant can expect 0.5-1.0 kW of load shed per device on average, inclusive of offline devices and opt-outs (and otherwise incompatible devices) as input into the achievable potential of the AC thermostat resource. Actual load shed depends on regional characteristics (housing stock, climate), and the load control strategy used (e.g., depth of temperature setpoint offset, average event duration, event window). All customer segments (i.e., residential, small commercial) and end uses (e.g., ASHP in addition to central AC) are included in the estimated installed device base mentioned above.	Thank you for providing this data. The consultant has considered this data in the development of the market and measure characterizations.

Regional segmentation

Feedback	IESO/Dunsky Response
EnergyHub supports the notion that regional segmentation should account for similar characteristics/conditions, rather than geographic region. End-use load characteristics vary based on the climate, and therefore weather-sensitive loads like HVAC – and associated measures – are more sensitive to regional conditions than specific geographies. For example, climate influences building stock characteristics, which in turn influence residential measure potential. Cooler climates may facilitate the deployment of smaller HVAC compressor sizes, on average, relative to warmer climates. Even if compressor sizes were nearly equal among climate zones, cooler weather tends to yield lower baseline load for DR purposes, as HVAC units run less often (i.e., lower load factor). Similarly, the prevalence of single-family/detached homes to multi-unit dwellings or large apartment complexes will impact the achievable potential of AC thermostats, residential L2 EV chargers, BTM solar + storage and other measures that depend on certain housing conditions for interconnection (e.g., available land, rental agreements). Nameplate HVAC compressor size for single-family homes might average around 3kW, while equipment sizes for MUD/multi-family properties tend to be smaller.	Thank you for your feedback. Presently, IESO is planning to work with the consultant to disaggregate to the zonal level to support the IESO's Regional Planning work. In the future, the IESO may consider leveraging the consultant to pursue more targeted analysis to account for the attributes/sensitivities referenced in your feedback.

Market Barriers

Feedback	IESO/Dunsky Response
EnergyHub refers back to comments submitted by AEMA on October 13, 2021 in response to the DER Potential Study session on September 22, 2021. In summary, market barriers include the lack of availability of consistently formatted LDC meter data for M&V, lack of meter data granular enough to enable aggregated residential DR/DER resources to participate in the Operating Reserve market, market settlement at the retail delivery point (i.e., sub-metered loads or DER-level consumption data not allowed), minimum aggregation size for aggregated DR/DER greater than 100kW, any absence of DR baselines appropriate for weather-sensitive DR resources, requirements for real-time telemetry for participation in the IESO-administered markets, nodal aggregation requirements (e.g., is a DER resource restricted to a single pricing node, or can a DER resource be aggregated up to the Zonal level?), and capacity accreditation (do the IAMs assess DER/DR resources based on their technical and contractual capabilities, which may vary throughout a given capacity auction delivery year). Non-market barriers include incentives (or lack thereof) for LDCs to introduce retail DR programs/tariffs in their territories, enrollment requirements (e.g., customers being required to provide their LDC account number or other unique ID as part of DR enrollment), any separate data authorization step that might contribute to decreased enrollment/retention (e.g., Green Button authorization required for LDC DR program participation), low retail enrollment/participation incentives for DER/DR programs, a lack of LDC-administered time-varying rates that would promote DER adoption (especially batteries, EVs), and the extent to which LDCs are able to support program awareness marketing and contributor outreach for any DER/DR initiatives.	Thank you for your feedback. To account for the myriad of barriers you noted (which are too complex to model individually), the consultant took the approach of implementing a stepped removal of barriers in their assessment of DER achievable potential for each successive scenario. This took several forms: 1) A greater ability to capture the benefits of avoiding the build-out of generation capacity that would have otherwise been needed 2) For DR resources, a higher pass-through of the above benefits to the customer (which could be inferred to represent economies of scale from a program and/or reduced transaction costs related to a number of barriers highlighted in your feedback) 3) A higher 'propensity' to participate, as a proxy for reducing barriers (from such things as aggregation limits, metering requirements, etc.) In the forthcoming complete report, the consultant will provide an overview of the barriers experienced by promising DER measures (including as they pertain to certain sectors) and provide recommendations for enabling uptake of these high-value resources. Beyond the scope of the DER Potential Study, the IESO will also take the barriers identified in your feedback under consideration for other DER integration activities including the development of foundational and enhanced market participation models for DERs as part of the DER Market Vision Project.

Input on Scenarios

Are the five proposed scenario levers appropriate for this study?

Feedback	IESO/Dunsky Response
EnergyHub: We are supportive of the proposed levers. The IESO might consider an additional lever that reflects the regulatory environment's impact on the existence of DER/DR incentives and programs introduced by the local distribution companies. It can be the case that potential studies, even when illustrating high levels of achievable potential for DR/DER, don't materialize as real customer-facing DR/DER programs at the LDC level. A regulatory environment that would *require* the implementation of cost-effective measures by all LDCs (while considering equity and reasonable opt-out thresholds for small entities) - would be a crucial factor in determining whether the population of DR/DER resources proliferating at the grid edge can actually be made available to the grid	Thank you for your feedback. Although not directly correlated to your recommendation, the BAU+ and Accelerated scenarios assume that a regulatory environment is in place that allows DERs to be compensated for their distribution value. Further, as noted above, the three scenarios were developed to provide increasingly accessible environments for DER participation. Together these levers could be interpreted as a proxy for a more enabling regulatory environment for DER participation.

How might the project team incorporate and vary non-market participation related barriers in the three scenarios?

Feedback	IESO/Dunsky Response
EnergyHub: Example illustrated below, as a basic starting point: Scenario 1 (Low) – LDC DR program implementation remains voluntary, burdensome customer enrollment requirements, low retail incentives Scenario 2 (Med) – Some LDC DR program implementation required, seamless customer enrollment via LDCs/aggregators, moderate retail rates or incentives for DER/DR program participation Scenario 3 (High) – LDC DR program implementation required for all cost-effective measures, seamless enrollment, attractive retail DER/DR program incentives	Thank you for your feedback. While we have incorporated a stepped increase in incentives and reduction in barriers (as detailed in our responses above), we have not modelled the implementation for a requirement of all cost-effective measures to be implemented through LDC programs via attractive incentives per your suggestion for Scenario 3.

The three scenarios are intended to reflect distinct futures where the role of DERs may vary significantly. How could the levers be changed across scenarios to derive the most useful results from this study?

Feedback	IESO/Dunsky Response
EnergyHub: A regulatory requirement to implement customer programs reflective of the cost-effective measures identified in the study is critical to translate potential into reality. Achievable potential can only be realized if DER have viable pathways to deliver value to the distribution system or IESO-administered markets. Simply put, if LDC DR programs remain voluntary, DER/DR are unlikely to reach their economic potential. Varying the extent to which customer-facing programs or tariffs are implemented at the retail level could be a logical way to incorporate this concept into the scenarios.	Thank you for your feedback. Please see our responses above.

General Comments/Feedback

All stakeholder submissions included general comments and feedback for consideration. The following table summarizes these points.

Feedback	IESO/Dunsky Response
Coalition of Large Distributors: • The DER APS is limited to province-wide potential. The OEB's Framework for Energy Innovation is essential to understand the feasibility of DERs at the local level, and the OEB's determination of distribution-level benefits will have important implications in evaluating the overall potential of DERs within an immediate local and by extension system-wide when those opportunities are considered in aggregate. In addition, the OEB is establishing value-driven regulatory frameworks, which may further impact OEB's work.	The IESO acknowledges that more specific information regarding local distribution-level benefits may impact the overall province-wide economic and achievable potential. In the absence of such information, the consultant took a reasonable approach in estimating the total volume of distribution deferral available in the province, and assigned a distribution deferral avoided cost value to a portion of DER potential until that estimated volume of need was satisfied. This represents a proxy for the aggregate local distribution deferral needs in the province.

Feedback	IESO/Dunsky Response
Elson Advocacy: • We would strongly encourage you to look at a use case where residential EV chargers are not dispatchable and are instead incentivized with dynamic rates (TOU or more precise price signals sent by the IESO). This could be implemented far more widely because it wouldn't require giving up control over the vehicle and would not require complicated ongoing contractual arrangements.	Thank you for your feedback. This study did not model dynamic rate structures on EV charging behaviour of residential customers. One of the main goals of this study was to determine the ability of these resources to avoid the need for generation capacity and the benefits of 5-minute responsiveness - which implied the certainty and dispatchability associated with direct load control. The consultant will take this feedback under consideration in developing the recommendations in the final report.
QUEST: There is significant untapped thermal DER and CHP application potential in many sectors, including the built environment, infrastructure, industrial (forestry, agriculture, manufacturing, logistics), energy (oil & gas, petrochemical) and mining/metals. The IESO has concluded that more firm capacity is required to maintain system reliability as the nuclear plants are refurbished. CHP is one solution that offers a unique value proposition by providing extremely resilient, efficient generation with low emissions – lower than grid-supplied marginal emission factors as concluded by several studies, including those conducted by Power Advisory and The Atmospheric Fund. QUEST and the Low Carbon Thermal Working Group members would be keen to meet with the DER potential study project team to provide direct input to ensure this untapped thermal DER and CHP potential is considered as part of this study.	Thank you for your feedback. CHP facilities were not recommended via the consultant's Pre-Assessment due to new-build CHP facilities' low anticipated cost-effectiveness and GHG impacts. Additionally, we note that the IESO commissioned a detailed CHP potential analysis, delivered by consulting firm Navigant, as part of the 2016 Energy Efficiency Potential Study. For the reasons above, CHP was not selected as a DER to be assessed through this study. However, district cooling/heating flexibility was assessed as a DER through this study.