

Stakeholder Feedback and IESO Response

White Paper Part II: Exploring Expanded DER Participation in the IESO-Administered Markets – November 19 webinar

Following the November 19th public webinar to discuss Part II of the Exploring Expanded DER Participation in the IESO-Administered Markets (IAMs) white paper, the Independent Electricity System Operator (IESO) received feedback from participants on the draft paper, including on the participation options, which will inform planning for future work to enable DERs.

The IESO received feedback from:

- [Advanced Energy Management Alliance \(AEMA\)](#)
- [AMPCO](#)
- [BHC Canada](#)
- [CanREA](#)
- [Electricity Distributors Association](#)
- [Energy Storage Canada](#)
- [Hydro One](#)
- [Markham District Energy](#)
- [Ontario Waterpower Association](#)
- [Peak Power](#)
- [Power Workers Union](#)
- [SensorSuite](#)

- [Tesla](#)
- [Toronto Hydro](#)

This feedback has been posted on the [Innovation and Sector Evolution White Paper Series webpage](#).

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 response was required at this time.

DER Participation in IAMs – Effectiveness of the Options:

Summary

The evaluation of potential options to enhance DER participation in IAMs yielded eight options determined to merit further consideration or that would require a pilot project to test the feasibility of the option prior to making a decision on whether the option merits further consideration.

The IESO sought feedback on which options stakeholders feel would be most effective to encourage DER participation in the IAMs, and why. Each of the eight options was touched upon in one or more stakeholder submissions. For each option, the sections below indicate the quantity of stakeholders that provided support, and a brief summary on the rationale.

Feedback: Reduce the Minimum Size Threshold – Phased Approach

Six stakeholders commented on this option. Most stakeholders were supportive of the proposed phased approach, noting that it will help to ensure competitiveness and extracting value from current and future resources in the province. One stakeholder suggested the IESO should remove this barrier.

CanREA disagreed with the suggestion that a phased approach would be required, and is seeking further information on what the criteria, timeline and general process for selecting eligible resources in an equitable manner would be.

CanREA suggested a 100 kW participation threshold would be a reasonable and practical starting point, and disputed the assertion that this low of a threshold could risk overwhelming the IESO's market registration processes, suggesting that given the timeline for expiring resources, there would be enough lead-time to upgrade dispatching software and network management systems.

IESO Response

A phased approach to lowering the minimum size threshold would allow the IESO to test the capability of accommodating a larger number of individual resources in registration, modelling and dispatch systems. The IESO feels this is prudent to minimize the risk of potential impacts of expanding participation to a large number of smaller resources. For additional context, currently there are 2,266 contracted resources between 100kW and 1MW which could represent a significant increase in market participants and resources needing to be integrated into IESO processes and systems.

The IESO is developing a DER Roadmap to clearly identify and prioritize DER integration efforts and is engaging stakeholders on more broadly enabling resources in the future. The IESO will begin engaging with stakeholders on the DER Roadmap in Q2, 2021 and also expects that further discussions on how to proceed with the minimum size threshold will be had through that process. There is also an opportunity to learn from the integration efforts of US Independent System Operators/Regional Transmission Operators (ISO/RTOs) as they respond to Federal Energy Regulatory Commission (FERC) order 2222, which requires system operators under FERC jurisdiction

to implement participation models for DERs in wholesale markets and mandates a 100kW minimum size threshold for DER participation.

Feedback: Clarify Existing Aggregation Rules and Processes

Three stakeholders commented in support of this option and their rationale centered around the general benefits of added clarity in defining requirements and setting expectations on how applications for aggregation will be vetted by the IESO.

IESO Response

The IESO thanks respondents for their supportive comments on this option. Improving understanding of the rules and processes governing market participation will increase the pool of potential participants and enable more resources to provide value to the system. Increasing understanding of rules and processes is especially important in integrating smaller resources like DERs who may not have prior experience operating in the IAMs.

Feedback: Modify Aggregation Boundaries: Multi-Nodal Aggregations

Four stakeholders commented on this option, all supporting the consideration of multi-nodal aggregations.

Energy Storage Canada noted that enabling multi-nodal aggregation of energy storage could create a participation opportunity for existing embedded storage and customers with behind-the-meter storage that might not otherwise participate.

CanREA noted this option offers greater granularity and certainty to the system operator with respect to impacts of the dispatch of an aggregated resource as compared to the Zonal or Sub-Zonal options.

IESO Response

The IESO is interested in further exploring the opportunity for, and potential impacts of, multi-nodal aggregation in the near future and is considering how best to proceed with this work. The IESO will also be closely monitoring Independent System Operator/Regional Transmission Organization's response to FERC order 2222. The IESO's focus will be on striking an appropriate balance between operator confidence and ability to find contributors for an aggregation when considering aggregation boundaries.

Feedback: Modify Aggregation Compositions: Mixed Aggregations of Dispatchable Generation or Mixed DR Contributors

Four stakeholders commented on this option, all supporting the consideration for mixed aggregations of dispatchable generation or mixed DR contributors

Peak Power noted that lowering the barriers to participation in IAMs will create new revenue streams for homeowners and businesses that invest in DERs for reliability or other reasons.

CanREA suggested mixed aggregations allowing for existing contracted DERs to be combined with energy storage will be a critical step in meeting resource adequacy needs. CanREA further suggested that a framework for the pilot project(s) should be set out as soon as possible.

IESO Response

The IESO is interested in exploring mixed or heterogeneous aggregations, through the Grid Innovation Fund (GIF) in the near future. Exploring the operating characteristics and abilities of a variety of combinations of resources will help the IESO and utilities better understand the impacts and limitations of dispatching heterogeneous aggregations. The IESO is currently planning on moving forward with DER related pilot project(s) through the Grid Innovation Fund, including a Joint IESO/OEB Targeted Call with the Ontario Energy Board's Innovation Sandbox. Initial details of this call can be found under the June 22, 2021 entry on the [DER Roadmap webpage](#).

Feedback: Create a Participation Model for Aggregated Non-Dispatchable Generation

Three stakeholders commented on this option. Two stakeholder submissions indicated support for the creation of a participation model for aggregated non-dispatchable generation, and one submission recommended against it at this time.

CanREA provided commentary on embedded FIT and RESOP wind and solar assets, and raised concerns with respect to resource adequacy absent post-contract participation options for these assets. CanREA suggested it is too broad of an assumption that all of these resources will have recovered their capital costs over their contract lifetime, and questioned the likelihood that all of these assets will remain available post-contract.

CanREA also questioned the assumption that existing wind and solar DERs will remain non-dispatchable post-contract.

PWU recommended the IESO not pursue IAM participation models for aggregated non-dispatchable generation at this time.

IESO Response

The existing fleet of DERs in Ontario contribute to resource adequacy. One way to unlock the value of these existing resources post-contract is to enable them to aggregate and operate within the IESO-Administered Markets much as they operate today which was the focus of this option. Variable generation (VG) resources may also increase their capability by adding technology that makes them more responsive (e.g. smart inverters) or they may combine with other resources to become more flexible (heterogeneous aggregations or hybrid resources). A number of market enablement opportunities are currently being considered by the IESO through the [Enabling Resources Program](#), including DER and hybrid participation models. The IESO will share a draft work plan for implementing the highest value resource enablement opportunities by the end of Q3 2021.

Feedback: Permit Alternative Telemetry Sources

This was the most commented on option, with seven stakeholders commenting on this option, all in support of permitting alternative telemetry sources.

Stakeholders noted that alternative telemetry sources can reduce complexity and expense, which could serve to level the playing field and make participation in the IAMs more economically viable.

IESO Response

The IESO is exploring the types of data that are available, how they can be collected and used, and if they provide the required amount of confidence in verifying what the resource is doing. For example, the IESO is currently exploring the business case for enabling “in-house” residential HDR Measurement & Verification (M&V) leveraging Smart Metering Entity data as well as exploring the potential to leverage telemetry collected by LDCs. Through the Joint IESO/OEB Targeted Call this year, alternative telemetry will be explored, including how device level data could be used for operational telemetry. Initial details of this call can be found under the June 22, 2021 entry on the [DER Roadmap webpage](#). The IESO recognizes there is a balance between the importance of gathering accurate operational data, the IESO’s ability to use it, and the cost to the participant of providing that data. Plans for further assessing the need for and potential of alternative telemetry will be communicated later this year.

Feedback: Enhance T-D Interoperability: Modifying Connection Process for Aggregations

Three stakeholders commented on this option, generally providing support for it, with Energy Storage Canada noting the complexity of the topic and that it will likely require additional stakeholder consultation

CanREA suggested there is a need for coordination with the OEB regarding linkages with the OEB’s ongoing DER Connections Review.

Energy Storage Canada recommended the IESO re-consider the option for sharing day-ahead schedules with LDCs.

Hydro One noted that coordination with distributors will also be important for bridging the various stages to integrate DERs in IAMS, and that distributor tools and DER telemetry already collected by (as well as customer relationship) should be leveraged where possible to effectively enable DER participation in IAMS.

IESO Response

The IESO continues to work with the OEB on DER-related issues including the DER Connections Review. The IESO also recognizes that stakeholders have expressed a clear desire for increased collaboration and coordination with the OEB. The IESO will work with the OEB to identify options to improve coordination, including an OEB/IESO Joint Forum for engaging with stakeholders to be discussed at the [June 22nd DER Roadmap Engagement](#) discussion . Enhancing Transmission-Distribution interoperability will require effective collaboration between the IESO, OEB and utilities to ensure reliability and cost-effective utilization of DERs at all levels of the system.

The IESO notes Energy Storage Canada’s recommendation to reconsider sharing day-ahead schedule with LDCs. Currently the IESO is exploring potential models for enhanced T-D Interoperability through pilot projects including the York Region Non-Wires Demonstration and the GIF Carbon Free Embedded Microgrid Energy System demonstration project with Ameresco. Moving forward the IESO expects to work with stakeholders in greater detail on the level of coordination that is appropriate to enable greater DER participation in the wholesale markets. The IESO will share plans for this work through its [DER Roadmap engagement on June 22nd](#).

Feedback: Communicate System Capabilities and Needs

Three stakeholders commented on this option, with two providing support for exploring better ways to communicate system capabilities and needs, and one stakeholder submission indicating the business case identifying benefit to ratepayers should be completed prior to pursuing.

Energy Storage Canada noted that understanding hosting capacity and system needs is critical information for resources planning future developments.

CanREA suggested an additional benefit of capacity maps is that they can help inform pricing mechanisms for DERs based on their physical location on the grid and performance characteristics.

PWU recommended ratepayer funds should not be committed to identify and communicate host capacity without clearly identifying an equal or greater benefit to ratepayers.

IESO Response

The IESO appreciates the feedback provided by stakeholders on this topic. In the near-term, the IESO will seek practical opportunities to enhance the information shared about system needs. For example, the [Regional Planning Process Review \(RPPR\)](#) identifies a number of recommendations to improve the regional planning process and barriers to Non-Wires Alternatives being leveraged to meet system needs. Timing for addressing barriers within the IESO's scope of accountabilities will be explored through the DER Roadmap. The [Resource Adequacy engagement](#) seeks to identify short, medium and long term mechanisms for acquiring resources to meet system needs and provide greater clarity for where, when, and how these needs can be met by participants.

DER Participation in IAMs – Additional Potential Impacts to Stakeholders:

Feedback

Stakeholder feedback submissions identified a number of additional potential impacts to stakeholders that have not been explored in the white paper. These points are summarized below.

1. With respect to DERs currently operating outside of IAMs (e.g. FIT contracts), Hydro One noted they likely have a limited understanding of the requirements and obligations for participating in IAMs, and consideration should be given to how the IESO could support the education and transition of these resource operators.
2. Markham District Energy highlighted a perceived structural rates problem, suggesting that since DERs can reduce the need for LDC investments and growth, LDCs may be disincentivized to adopt DERs in their jurisdictions.
3. AEMA commented that any limits to competition will negatively impact the market, and as such, greater clarity and certainty should be provided to ensure all parties are competing on a level playing field.
4. OWA commented that the potential impact water resource management restrictions and requirements of provincial and/or federal agencies may have on small hydro facilities will often be inconsistent with maximizing dispatchability.
5. Toronto Hydro suggested that some concepts that work well in a bulk power system with a small number of large, sophisticated customers will not be effective when applied to a

- distribution system that supplies hundreds of thousands of small customers with diverse needs from the distribution system.
6. The EDA's feedback submission contained a number of points characterized as not being identified or adequately scoped in the white paper:
 - a. The need for amendments to the statutory framework (e.g., so that distribution-integrated resource planning can support LDCs owning and operating DERs, whether connected directly to the distribution system or behind-the-meter; to eliminate restrictions based on capacity).
 - b. The position of the IESO's operating demarcation point appears to be solely within its discretion and control. We encourage the IESO to revisit this position.
 - c. Whether the IESO can procure DERs or DER provided services through centralized procurements.
 - d. Whether the ownership of a DER is a relevant consideration (e.g., LDC ownership vs third-party ownership).
 - e. The IESO's dispatch systems are claimed to have capacity constraints that are neither scoped nor quantified; the EDA proposes that the IESO quantify the maximum number of devices that it can dispatch and the processing time that would be required to generate dispatch instructions to every device.
 - f. The IESO's materials reference that more market participants increase competitiveness. What the IESO's materials do not address is whether including DERs in the IESO administered market will have a significant or material impact on competition, and conversely if the IESO is concerned that its market lacks adequate levels of competition that can only be addressed by permitting DERs to participate.

IESO Response

1. The IESO accepts this feedback and will consider how best to provide the appropriate guidance to service providers. In the past, the IESO has provided support to market participants through the production of resource specific guides and through engagement and training sessions. As the IESO and stakeholders make progress on integrating DERs, the appropriate approaches can be explored in greater detail.
2. While the scope of this white paper is focused on the wholesale market integration of DERs and the barriers that are in the IESO's control, there are other areas outside of IESO's control that can impact the success of those efforts. The IESO notes that the incentives for Local Distribution Companies (including incentives for wires vs. non-wires alternatives) will be explored through the [OEB's Framework for Energy Innovation \(FEI\) engagement](#) . The IESO is a member of the FEI Working Group and has a strong interest in enabling non-wires solutions as an option for meeting local needs. The recent RPPR identifies potential improvements to IESO processes as well as barriers outside of the IESO's control. The OEB has reconstituted the [Regional Planning Process Advisory Group \(RPPAG\)](#) to assist in the review of the regional planning process including consideration for the recommendations in the IESO's RPPR.
3. The IESO's objectives in integrating DERs, and more broadly in enabling resources, is to enable competition of resources that are technically capable of providing services. This technology neutral approach should level the playing field for resources to participate and help maintain reliability and cost effective operation of the system. The IESO is currently

undertaking a process to prioritize market enablement opportunities through the [Enabling Resources Program](#). The IESO also plans to release a DER Roadmap in the near-term to communicate integration efforts and will continue to stakeholder integration efforts in the future.

4. The IESO appreciates this observation and understands that some distribution connected resources may experience challenges participating as dispatchable resources. This is a topic that merits further conversation as progress on DER integration is made.
5. Expanding participation of DERs in the IAMs impacts the transmission system but also the distribution system. Part of the effort to enable these resources in the wholesale markets is to work with the OEB and utilities to develop interoperability protocols across the transmission-distribution interface. Accounting for the behaviours, operating characteristics and effect on local system conditions are all critical to safely and reliably dispatching DERs. The IESO is actively working on this topic ([Development of a Transmission-Distribution Interoperability Framework white paper, IESO York Region Non Wires Alternatives Demonstration Project](#)) and intends to collaborate with impacted stakeholders as this work progresses.
6.
 - a. The focus of this whitepaper is to address barriers within the IESO's jurisdiction to enhance wholesale participation of DERs. Distribution system planning, operations and markets are largely out of scope of this effort but are related and very important. The potential for new roles and responsibilities in a high DER future is an important topic but not one that must be fully resolved prior to enhancing participation of DERs in the wholesale market.
 - b. The IESO acknowledges that clarity around connection point to the IESO-controlled grid (ICG) is an important part of enhancing participation of DERs as discussed in Section 3.2 of the whitepaper.
 - c. The IESO currently has contracts with thousands of distribution connected resources and hundreds of MW of distribution connected resources participate in the capacity auction (e.g., as hourly demand response resources). DERs already provide valuable bulk services. The questions of who should procure distribution level services and how procurement should occur are important, but are outside the focus of enhancing participation in the IAMs. However, ensuring that appropriate interoperability frameworks are in place for distribution level resources that participate in the IAMs will be an important part of DER integration moving forward.
 - d. DER ownership is an important consideration for future integration and participation of DERs. Ensuring equal access to information and a level playing field between resources is critical to ensuring transparent and efficient market outcomes. This topic has been explored through ETNO's Structural Options for Ontario's Electricity System in a High DER Future whitepaper as well as through the OEB's consultation on Utility Remuneration (now a part of the Framework for Energy Innovation consultation) and should be considered in the development of participation models in the IAMs as well.
 - e. The number of resources that can participate directly within the IESO markets depends on the participation models being used by those resources (e.g. how complicated is it to model resources characteristics and how many resources of each type are participating). As the IESO makes progress on DER integration, further validation of software impacts will be required. The IESO is currently considering

options to assess the impacts of DER participation on our market software to better understand and quantify potential impacts.

- f. Through the [Enabling Resources Program](#), the IESO is working with stakeholders to identify priority market enablement opportunities and timelines for implementing those opportunities.

Implementation Considerations:

Feedback

With respect to implementation considerations not contemplated in the white paper, stakeholders suggested the following:

1. ESC recommends that the IESO should add “Electricity pricing and cost allocation policy” to the list of implementation considerations.
2. Hydro One suggested the following:
 - a. Consider the cyber security requirements that would need to be met at the DER and aggregator level to ensure the reliability/security of the IAMs.
 - b. The roles and requirements for aggregators may need further definition and clarity as the scope of eligible resources expands. Considerations include what types of services they will be able to provide and whether distributors can act as aggregators to enable participation of smaller resources.
 - c. Further detail on how unforced capacity (UCAP) will be determined for smaller resources that may participate in IAMs.
 - d. When it analyses the scope of future potential market participation, the IESO should consider the impact of existing rate design on customer decision-making.
3. Markham District Energy highlighted that costs imposed by LDCs on DERs, such as standby charges and gross load billing, can be major impediments to DER growth.
4. AEMA suggested the following be considered:
 - a. To enable an understanding of risk to the market participant, reforms need to occur with governance and the decision-making process.
 - b. Best practices for M&V need to be introduced for DER resources (including the HDR resource). This includes the evaluation of baselines calculations and the impact of in-day adjustments; choice for baselines; and the allowance of multiple aggregations per zones.
5. PWU suggested further study and assessment to determine when IESO investments are most appropriate and whether ratepayers should bear the cost.
6. Toronto Hydro noted concerns regarding the technical feasibility and administrative and operational challenges of aggregations that are not limited to a single node.
7. Toronto Hydro suggested further dialogue should occur on whether DER aggregation location rules would be better established by the IESO or by LDCs.

IESO Response

1. The IESO agrees that pricing and cost allocation is an area that merits further consideration as work on integrating DERs progresses. Given these issues are within the scope of the OEB's work, the IESO will continue to participate in OEB efforts on these topics as appropriate.

2. The IESO agrees that these are important considerations to take into account as work on DER integration progresses.
3. The IESO appreciates that the costs and charges faced by DERs can challenge their economic viability. The IESO is open to further exploring relevant issues that fall within the IESO's scope of accountability (e.g. considering the viability of alternative forms of telemetry). The IESO notes that the two charges identified in the comment do not fall within the IESO's jurisdiction.
4. The IESO is engaging stakeholders to set priorities for market enablement opportunities through the [Enabling Resources Program](#) work. The IESO is also developing a [Resource Adequacy framework](#) to establish a regular, transparent, competitive approach to acquiring resources. At the [February 12th Demand Response Working Group](#), the IESO presented a draft list of priorities for DR for feedback to guide future work in this area. The IESO intends to engage stakeholders on the M&V methodology effectiveness evaluation approach, and the alternative M&V methods that will be tested.
5. The IESO is focused on enabling resources to participate where they contribute to maintaining a reliable and cost effective system and the IESO will prioritize the enhancements that provide benefit to ratepayers. Through the [Enabling Resources Program](#), the IESO is working with stakeholders to identify priority market enablement opportunities and timelines for implementing those opportunities.
6. The IESO agrees that the impacts and challenges with multi-nodal aggregations are an important implementation consideration. As discussed in the white paper, aggregating across more than one node can increase the complexity of modeling and dispatching these resources. The IESO is currently considering opportunities to explore the impacts of multi-nodal aggregations through pilots.
7. The IESO agrees that further discussion with utilities, the OEB, and others in the sector will be necessary to develop approaches in relation to aggregation rules and processes. DER owners have been clear that consistency in rules regardless of where a DER is sited in the province is key.

Looking Ahead to Implementation:

Feedback

Three stakeholders submitted comments on the types of wholesale products/services DER owners/aggregators would seek to provide in the IAMs, as well as some commentary on specific options that would allow these products/services to be offered.

- CanREA suggested that the majority of DER owners/aggregators participation will be limited to the energy market due to the complexity of ancillary service market participation.
- CanREA noted that some DER facilities may consider expanded participation, especially with on-site or aggregated energy storage, and that this will be more appealing for larger facilities.
- AEMA highlighted the following resource types, and associated efforts, as being able to provide value to the IAMs and that are technically capable:
 - Eliminating data barriers to enable residential DR to participate in the Capacity Auction
 - Allowing aggregated HDR to participate in Operating Reserve similar to other markets

- Decreasing minimum participation size of dispatchable loads to allow for participation in energy and OR of smaller demand side resources including those with behind-the-meter energy storage systems
- Non-wire alternatives for transmission needs – procurement of energy storage.
- The EDA suggested that the IESO prepare that DERs generally can provide any and all of the products/services that are the subject of IAM. Some DERs will be capable of instantaneous responses in energy markets and others will be capable of participating in black start markets. The IESO should consider whether its products/services markets are designed too narrowly for DERs to participate (e.g., rotating machine Operating Reserve excludes photovoltaic devices, several storage technologies would need to be coupled with suitable inverters to participate in such a market).

IESO Response

The IESO thanks the respondent for their input on this question and looks forward to further discussion on these topics as DER integration and other market enablement opportunities identified through the [Enabling Resources Program](#) proceed.

General Comments/Feedback:

Feedback

Stakeholders suggested the following be added to the white paper:

- OWA suggested the information on DER contract expiry timelines should include details by resource type.
- ESC recommended including additional background information on the deployment of energy storage in Ontario to-date, including the drivers for that deployment.
- ESC recommended the IESO include a high-level timeline or work plan within the final whitepaper to communicate expectations for additional industry consultation on the various options proposed. This desire for clarity with respect to timelines was raised by Peak Power as well.

IESO Response

The IESO is prioritizing efforts for enabling resources based in part by which contracted resources are expiring when and what type they are. This Enabling Resources work will take a broad look at existing resources and what value they can continue to provide. In the [February 17th SAC presentation on Enabling Resources](#), the appendix includes contract expiries by technology type for this purpose.

The IESO acknowledges the potential value in the suggested background information. The relevant section of the white paper will be updated to add additional context.

The IESO is developing a DER Roadmap to communicate its plans for enhancing participation of DERs over the next five-ten years. This roadmap will set out objectives for DER participation, identify current initiatives and how they work toward those objectives and propose new projects to reach

those objectives. The project timeline of this roadmap will clearly communicate IESO's plans for moving this work forward.

Feedback

Stakeholders provided some additional general comments for consideration. Those are summarized below:

1. AMPCO posed questions related to whether IESO should be leading innovation and sector evolution work, ratepayer funding for Grid Innovation Fund (GIF) projects, and if there are potential landmines in the area of innovation that have been overlooked.
2. Hydro One and the EDA provided a number of general comments centred around LDCs role in the process, suggesting they should have an increasing role in the connection and operation of DERs in order to preserve reliability of the grid. It was suggested that LDCs are best positioned to maximize the value and benefits of DERs, as well as to coordinate dispatchable DERs.
3. The EDA encouraged the IESO to explore all options that foster the responsible adoption of DERs, whether connected to the IAM or a distributor's infrastructure.
4. Markham District Energy noted the importance of certainty of revenue sources for potential DER owners.
5. PWU provided a number of general comments centred around further assessing DER potential before proceeding with discussions.
6. PWU recommended the IESO leverage the OEB's DER Connections Review consultation proceedings to help inform the interoperability and aggregation of DERs of less than 10 MW.
7. PWU also recommended the IESO seek legislative and regulatory clarity for accommodating DERs on Ontario's electricity system.
8. Toronto Hydro encouraged the IESO to consider matters that intersect with the purview of the OEB.
9. Toronto Hydro suggested the White Paper does not adequately consider the potential for DERs to produce value beyond IESO-administered markets.
10. Toronto Hydro noted that stakeholders, particularly at the distribution level, need a clear understanding of technical and operational issues with respect to DER participants to understand the full impacts the proposed options may have on T-D infrastructure.
11. OWA recommended the potential local socioeconomic benefits from water resource management be considered in the design of the option for these resources to participate in IAMs.
12. SensorSuite suggested DER integration requires a change in business model, and that it is imperative to move from traditional planning to an "Integrated Distribution Planning" process.

IESO Response

1. The IESO's work in the area of innovation is set out in the [Innovation Roadmap](#) which was developed with extensive input from a wide variety of stakeholders through an open engagement process. The focus of IESO's innovation work is on understanding, evaluating and unlocking the potential of emerging and existing solutions to improve electricity reliability and affordability. A significant portion of this work focuses on more fully

- enabling existing customer-connected distributed energy resources, including those owned by industrial customers, to participate in the IESO-administered electricity markets (IAMs), thereby increasing competition in the IAMs, leveraging investments in existing assets, and creating potential new revenue sources for these resources. Through the Grid Innovation Fund, the IESO has supported some of Ontario's largest electricity consumers (e.g. in mining, steel manufacturing, and automotive) to evaluate and deploy energy management and process improvement solutions that have enabled customers to manage their energy costs while reducing demand on the grid.
2. As DERs continue to grow in Ontario, it is likely that distributors will need to take on increased responsibilities and the coordination between distributors and the IESO will need to increase. The IESO's [Development of a Transmission-Distribution \(T-D\) Framework](#) whitepaper outlines many of these potential enhanced functions. The OEB has also recently completed a study outlining how quickly distributed storage and solar PV may emerge in Ontario and in which the consultants who authored the report outline recommendations and timing related to increasing roles for LDC. As discussed in the Options for Expanded DER Participation white paper, coordination between the IESO and utilities in the planning, day ahead, and real time timeframes can help mitigate risk to reliability and efficiency of dispatch. Work to enhance T-D interoperability will be identified through the DER Roadmap later this year and the IESO looks forward to working with stakeholders to make progress in this important area.
 3. While DERs can provide value at the transmission and distribution levels as well as to customers, a key part of unlocking the total value these resources can offer is to provide them with pathways to provide wholesale services. The focus of these white papers was to explore the barriers to participation within the IAMs and IESO's control. Through the IESO's DER Roadmap, the IESO intends to clarify the next steps it will take to further integrate DERs in Ontario.
 4. The IESO acknowledges the value of certainty for DER providers. Currently, the IESO is developing a [Resource Adequacy framework](#) to establish a regular, transparent, competitive approach to acquiring resources. Additionally, the [Regional Planning Process Review \(RPPR\)](#) identifies potential improvements to the Regional Planning process including better identification and characterization of needs and removing barriers to resources to provide non-wires value.
 5. The IESO is planning to assess the potential for DER uptake in the future to help prioritize initiatives to enhance participation.
 6. (6-8) The IESO continues to work with the Ministry of Energy, Northern Development and Mines, as well as the OEB on DER related issues. Since DERs represent a shift from the traditional centralized model of providing electricity to Ontarians and based on their location within the distribution system, this work spans across legislative, regulatory and operational areas and requires a coordinated approach to ensure a cost effective and reliable system into the future. At the June 22 DER Roadmap Engagement session the IESO and OEB will seek stakeholder feedback on a proposed approach to enhancing OEB/IESO coordination.
 9. The focus of this whitepaper is to address barriers within the IESO's jurisdiction as the wholesale market administrator in Ontario and thus that would enhance wholesale participation. Additional value potential of DERs outside of the IAMs is largely out of

scope, though market enablement and the transmission-distribution interoperability required for that participation may enable DERs to provide more value as those markets or services emerge.

10. The IESO acknowledges there are a number of technical and operational challenges that can emerge from participation in the IAMs. As DER integration progresses, determining how to mitigate these issues will be explored with stakeholders including distributors. For effective market participation, a transmission-distribution interoperability framework will need to be in place to ensure cost-effective and reliable operation of the system.
11. While socioeconomic benefits are largely not captured in the IAMs, the IESO works with distributors and communities through the Regional Planning process to weigh these and other benefits with the cost of potential solutions.
12. Enhancements to distribution system planning are beyond the IESO's jurisdiction. However, as DER penetration increases, so does the need for co-ordination between the IESO and LDCs. The IESO has been engaging on collaborative planning activities as can be seen in the [Integrated Regional Resource Plans](#) (IRRP) the IESO conducts with the transmitter and distributors. The RPPR report identifies improvements to these processes that will further enhance the potential solutions to meet the needs of these regions. Further co-ordination across the planning and operational timeframes will be required to ensure cost-effective and reliable operation of the system in the future.

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