IESO Response to Stakeholder Feedback

Hybrid Integration Project – April 21, 2021 meeting

Following the April 21, 2021 engagement webinar on the Hybrid Integration Project, the Independent Electricity System Operator (IESO) received feedback from participants on the proposed definitions, stakeholder information needs, the timelines and deliverables, and the engagement plan objectives and approach.

The IESO received feedback from:

- CanREA
- Capital Power
- Consortium of renewable generators, energy storage providers, and the Canadian Renewable Energy Association
- Electricity Distributors Association
- Energy Storage Canada
- Evolugen
- Hydro One
- Ontario Power Generation
- Power Workers' Union

The presentation materials and stakeholder feedback submissions have been posted on the Hybrid Integration Project engagement 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 response was required at this time.

Proposed Definitions – Co-Located Facility

Does the proposed definition of 'Co-located Facility' make sense? Is there anything further that should be considered? *"A combined facility consisting of electricity storage and generation facilities located behind a single connection point, that participates in the IESO markets as separate resources."*

Feedback

Submissions from eight different stakeholders included feedback on the proposed definition for Co-Located Facility.

Six submissions indicated the proposed definition makes sense, with additional considerations included in four stakeholder submissions:

- The Power Advisory and Capital Power submissions indicated support for the proposed definition, and also recommended the definition may need to evolve as we learn more throughout the stakeholder engagement, to ensure the definitions continue to reflect industry practice and definitions used at the Ontario Energy Board (OEB) relating to both transmission and distribution connected facilities.
- The Electricity Distributors Association (EDA) submission also indicated support for the proposed definition, and sought clarity on whether the IESO intends to apply this definition to distribution-connected facilities and to facilities consisting of generation and energy storage that are situated behind-the-meter (BTM) or if these configurations will be addressed in a different Enabling Resources work stream.
- Energy Storage Canada (ESC) indicated the proposed definition makes sense, but suggested the IESO clarify that 'Co-located Facilities' would be eligible to participate in Capacity Auctions, energy market, OR markets, and provide other ancillary services. With respect to Co-located Facilities, ESC also requested the IESO ensure there is an opportunity for front-of-the-meter (FTM) storage resources that can demonstrate the same or better hybrid integration value (e.g., through bi-lateral contracts, comms/SCADA, etc.).

Two stakeholder submissions did not indicate support for the proposed definition, and provided alternate recommendations:

- Evolugen recommended the adoption of definitions in line with other ISOs to maintain consistency.
- The Power Workers' Union (PWU) submission suggested allowance for co-located facilities should be deprioritized.

IESO Response

The IESO appreciates the general support for the proposed definition of "Co-located Facility". Regarding specific issues that were raised:

1) The proposed definition of a co-located facility is intended for transmission connected facilities and distribution connected facilities participating in the IESO markets. Opportunities for DER

aggregations including directly connected and customer sited resources will be addressed through the IESO's DER initiative under the broader Enabling Resources initiative.

2) The eligibility of co-located facility participation in various IAMs will be explored during the visioning and design phase for hybrids. The work will align with other IESO initiatives including Enabling Resources. Work on hybrids will align with our prior and ongoing work on energy storage which will serve as a good foundation for any future hybrid design.

3) The IESO has consulted definitions from other jurisdictions but has modified its definition where applicable to be less restrictive on technology type.

4) Prioritization of particular participation models should be determined through analysis work during the design vision phase of the project which explores the benefits and ease of implementation of all participation models.

Proposed Definitions – Hybrid Facility

Does the proposed definition of 'Hybrid Facility' make sense? Is there anything further that should be considered? *"A combined facility consisting of electricity storage and generation facilities located behind a single connection point, that participates in the IESO markets as a single bi-directional resource."*

Feedback

Submissions from eight different stakeholders included feedback on the proposed definition for Hybrid Facility.

Seven submissions indicated the proposed definition makes sense, with additional considerations included in four stakeholder submissions:

- The Power Advisory and Capital Power submissions indicated support for the proposed definition, and also recommended the definition may need to evolve as we learn more throughout the stakeholder engagement, to ensure the definitions continue to reflect industry practice and definitions used at the OEB relating to both transmission and distribution connected facilities.
- CanREA indicated the proposed definition is reasonable, but sought clarity on how certain technology types will be treated and which types of installation will count as a hybrid facility, with the specific example provided of hydrogen being produced at a wind or solar site and then shipped to another location for the generation of electricity.
- The EDA submission also indicated support for the proposed definition, and sought clarity on whether the IESO intends to apply this definition to distribution-connected facilities and to facilities consisting of generation and energy storage that are situated behind-the-meter or if these configurations will be addressed in a different Enabling Resources work stream.
- ESC indicated the proposed definition makes sense, but suggested the IESO clarify that 'Hybrid Facilities' would be eligible to participate in Capacity Auctions, energy market, OR markets, and provide other ancillary services.

- The PWU submission indicated that the proposed definition is appropriate, however, recommended consideration be given to virtual hybrids leveraging distributed storage.

One stakeholder submission did not indicate support for the proposed definition, and provided an alternate recommendation:

- Evolugen recommended the adoption of definitions in line with other ISOs to maintain consistency.

IESO Response

The IESO appreciates the general support for the proposed definition of "Hybrid Facility". Regarding specific issues that were raised:

1) Specifics about configuration and participation in IAMs will be determined through the design phase for hybrids. The IESO definition was developed with the intention of not being focused on particular generator or storage technologies and configurations but rather how to allow broad combinations of generator + storage to participate in IAMs.
2) The proposed definition of a hybrid facility is intended for transmission connected facilities and distribution connected facilities participating in the IESO markets. Opportunities for DER aggregations including directly connected and customer sited resources will be addressed through the IESO's DER initiative under the broader Enabling Resources initiative.
3) The eligibility of hybrid participation in various IAMs will be explored during the visioning and design phase for hybrids. The work will align with other IESO initiatives including Enabling Resources.
4) The IESO has consulted definitions from other jurisdictions but has modified its definition where applicable to be less restrictive on technology type.
5) The concept of virtual hybrids may have synergies with DER aggregations. DER aggregation compositions will be addressed through the IESO's DER initiative under the broader Enabling Resources initiative. Virtual resources connected at different points across the transmission network present their own unique challenges to incorporate into IAMs and cannot be included as part of the Hybrid Integration Project without a broader IESO initiative exploring aggregation of transmission connected resources.

Information required to evaluate investment potential

What information do stakeholders need to evaluate the potential of Hybrid Resource investments as we evolve our resource adequacy needs?

Feedback

All nine stakeholder feedback submissions received included commentary on the type of information that would help stakeholders evaluate investment potential. The following points summarize the primary themes.

- Several stakeholder submissions indicated that a clear understanding of system resource needs will be required, including total supply requirements, regional reliability considerations,

and the associated timing, to help distinguish how hybrid projects could help meet those needs.

- Several stakeholder submissions noted the need for clarity around procurement processes and plans and certainty on potential revenue models and contracts, including:
    - Clarity within the Resource Adequacy Framework will be needed to better understand which procurement mechanisms (e.g., contracts, etc.) will be used to enable development of hybrid projects.
    - Investors will need clear communication of the IESO's plan to ensure supply adequacy and regional reliability.
    - Investors will need to have a clear process for market participation including a viable revenue model to support their business plan.
    - Investments will need to be supported by dependable revenue streams (e.g. contracted) and have assurance that projects under consideration will be able to meet current and future market requirements.
    - For projects with existing contracts, investors will require assurance that participation as a hybrid resources would not de-value or put-at-risk expected contract revenues.
    - IESO should maintain its publicly announced procurement schedules and rules (e.g. capacity market participation timeline and allowed resource types), and refrain from ad-hoc changes that undermine investor confidence.
    - ESC recommended that the IESO clearly outline the barriers in place within the IAM today that restrict hybrids or co-located projects. IESO's tools may more easily enable co-located projects given that a participation model for variable generators and front-of-the-meter energy storage (per interim design) has been established in today's market – i.e., participate as separate resources at same connection point.
    - The IESO should provide proponents with clarity on the type of connection agreement that would need to be established for each facility based on its operation and type (i.e. Hybrid or Co-located), as well as the demand charges and rates these facilities will need to pay.
    - Hydro One recommends that the IESO work with OEB staff, transmitters and distributors to ensure that transmitters and distributors are clear on the types of agreements that will need to be entered into and that the IESO understands the types of rates customers will be charged.
    - Clarity on how an interconnection point be shared between facilities with regards to dispatch priority, constraining on/off mechanisms and Congestions Management Settlement Credits, and other Market Renewal related rules.
    - Clarify how ancillary service would be compensated.
    - On the grid side, the IESO and Hydro One should clarify how losses would affect individual facilities at the interconnection point, and specify how costs would be allocated from a transmission client's perspective.

    - Developers require open, clear, and consistent collaborations between the IESO, the OEB, and Hydro One. Public information and consultations must be coherent and jointly provided by all regulatory entities to encourage investment.

- Noting the LDC role in connecting, metering and settling distribution connected resources, the EDA proposed the IESO's evaluation and consideration of distribution connected Hybrid Resources consider the existing connection infrastructure and how it may evolve as storage is deployed, as well as related enabling matters (e.g., metering, changes to settlement processes). Hydro One recommended that the IESO work with distributors to understand this issue and incorporate into the program design in order to avoid customer dissatisfaction.
- Capital Power identified the types of information required from the IESO's planning and forecasting processes to evaluate the potential of Hybrid Resource investments:
    - Forecasted supply and demand
    - Available revenue mechanisms with appropriate risk allocation
    - Energy market performance
    - Opportunities to compete for capacity revenues
    - Design of competitive processes
    - Transmission congestion
    - Timelines for procurement
    - Product and attributes required by the system
    - Intended economic function of the energy market
    - Principles establishing and guiding the evolution of the energy market and capacity revenue mechanisms
    - Dispatch and settlement treatment of co-located and hybrid facilities

IESO Response

The IESO hopes to provide stakeholders with a more transparent view of Ontario's resource adequacy needs (including timelines, constraints, supply requirements) through the development of the Annual Acquisition Report and continued work on the Annual Planning Outlook and Reliability Outlook documents.

The intended purpose of the Hybrid Integration Project and subsequent design work is to provide stakeholders with much of the information outlined in their responses. This includes: fully detailed participation models (including ancillary services), barriers to participation, settlement process & demand charges, details for existing contracted facilities, guidelines for participating in procurements, etc.

Timelines and deliverables

Do the timelines and deliverables for the Hybrid Integration Project make sense?

Feedback

Six stakeholders provided feedback on the timelines and deliverables.

- The EDA does not have any concerns with respect to the timelines and deliverables, and anticipate that the proposed timelines will be adjusted as the issues are identified and clarified.
- ESC is supportive of the timelines proposed and noted that ideally, IESO would be positioned to identify a potential timeframe for enabling hybrids or co-located projects in advance of finalizing the design vision.
- Power Advisory recommended IESO more closely examine how the Alberta wholesale electricity market is enabling hybrid projects.
- CanREA indicated the timing makes sense given the expectation for post-MRP participation, however, also identified a potential risk of developers investing in other jurisdictions in the meantime, and suggested the IESO may be able to maintain investor interest by engaging in pilot projects to remove potential barriers.
- Capital Power recommended that timelines for design and integration (including the design and administration of RFPs and competitive procurements) should be driven by forecasted energy and capacity needs, not by Market Renewal implementation. To the extent that the current Market Renewal design may limit the participation and integration of Hybrid Facilities and Co-located Facilities, market design and market rules should be updated on an ongoing basis to ensure that Hybrid Facilities and Co-located Facilities can both participate in eligible competitive processes, and be dispatched efficiently by the market.
- PWU suggested timelines be accelerated as much as practicably possible to support the AAR and mid-term competitive mechanisms by advancing simpler IAMs solutions first.
- ESC recommend IESO ensure alignment of HIP deliverables with upcoming RFPs as described in the Resource Adequacy Engagement.

IESO Response

The IESO appreciates the general support for the proposed timelines. Regarding specific comments:

1) Resource Adequacy framework timelines will be a critical input into the Enabling Resources work plan under development.
2) The hybrid team has recently opened dialogue with the AESO to learn more about their enabling hybrids project.
3) The Hybrid Integration Project will explore a less resource intensive participation model (a foundational model) that can provide market functionality but allow for timely implementation.

4) Regarding alignment with MRP timelines, implementation of any hybrid participation model will occur after the November 2023 MRP go-live date in order to ensure successful implementation and testing.

Engagement Plan

Are stakeholders supportive of the objectives and approach detailed in the draft Hybrid Integration Project Engagement Plan?

Feedback

Feedback submissions from Power Advisory, CanREA and EDA indicated support of the draft engagement plan, with CanREA expressing additional support of the IESO efforts to engage stakeholders on the design of the plan in the first place.

Submissions from three stakeholders included additional considerations with respect to the engagement plan:

- ESC noted they are supportive of the approach in general, but suggested the work plan also establish metrics for success. For example, while the outcome of this engagement may be the development of a hybrid participation model, a measure of success would be the implementation of changes to market rules/manuals, stakeholder buy-in and support of the participation model, and development of hybrid resources.
- ESC suggests that the IESO should clarify the scope of the HIP:
    - For example, hybrid facilities or co-located facilities may be located behind-the-meter of a customer (e.g., BTM storage + solar).
- ESC believes there is also opportunity for hybrids consisting of storage and variable generation on the same distribution feeder:
    - For example, one distribution-connected storage resources with multiple renewable facilities on the same feeder could provide significant value and flexibility.
- PWU indicated support of the objectives, with some caveats on the approach included in other feedback areas.
- Hydro One recommended the IESO engage directly with transmitters and distributors on the project to ensure the IESO's design is reflective of real-world constraints and informed by technical requirements to ensure operational integrity of the grid. The proposed work plan should include collaborative engagement with utilities to develop the standards and operating guidelines necessary to ensure the grid can accommodate these resources without degrading reliability. This could be achieved through the formation of an IESO-utility (i.e. distributors and transmitters) working group or dedicated utility-focused meetings.

IESO Response

The hybrid team will continue to evolve the scope of their integration plan and, along with other Enabling Resources initiatives, outline connection arrangements that fall into the objectives of the

DER initiative as opposed to the Hybrid Integration Project (like some of the arrangements outlined above).

The hybrid team agrees with Hydro One's recommendations and notes that a similar effort needs to be made internally at the IESO through the IESO's CAA, facility commissioning and market registration processes to ensure that reliability standards are assessed and upheld.

General Comments / Other

Feedback

Several stakeholders provided additional comments for the IESO's consideration. These additional points include:

- CanREA is encouraged by IESO efforts to identify the value provided by hybrid resources and include such resources in the Ontario market. CanREA encourages IESO to consider which aspects of hybrid participation can or should be included in the Market Renewal Process and to ensure that, at a minimum, MRP development and implementation will not include elements that interfere with hybrid project participation post MRP deployment.
- EDA is supportive of this engagement in principle. As detailed in our past submissions, many of our LDC members are considering the possible use of DERs as non-wires solutions. We recognize that there is a potential that hybrid facilities may be evaluated as options within future distribution system plans. We also acknowledge that there may be potential distribution-system benefits associated with the addition of storage to new or existing variable renewable generation facilities (e.g., improved power quality).
- ESC commended the IESO on this undertaking, and are strongly supportive of the IESO's planned targeted call per the Grid Innovation Fund.
- ESC noted they believe there is significant opportunity to "firm" capacity of existing variable generators to cost-effectively meet future capacity needs in Ontario. In addition to existing resources coming off-contract, they suggest that the opportunity for hybrids is greater that IESO indicates in its presentation, given the potential for new development or expansion at existing renewable energy sites.
- Hydro One provided commentary on operational realities with respect to DER hosting capacity that the IESO will need to consider when designing the Hybrid Integration Project and that should be communicated to customers in advance as part of the project design to reduce customer dissatisfaction, including:
    - When batteries are added to existing generation resources it will be important to be clear on how those batteries can be charged (i.e. from both the onsite generation and from the grid or just from the onsite generation), as this could impact loading on the distribution system.
    - Adding storage to existing generation facilities may not be technically feasible if they aim to increase the total DER capacity on a feeder that is already at its maximum limit.

- Proposals designed to increase energy output with co-located generation and storage facilities discharging simultaneously to the grid may require the LDCs to restrict the use of the assets to protect the system to a degree that the project is no longer viable for the customers.

- PWU's submission included four primary recommendations, further details of which can be found in their original submission:
  - Maintain a technology-neutral definition of hybrid resources
  - Develop rules that permits the procurement and participation of low-carbon generation paired with distributed storage.
  - Require hybrids to be dispatchable and de-prioritize treatment of separately controlled co-located facilities.
  - Accelerate the schedule to align this IESO initiative with the Annual Acquisition Report (AAR) process and the associated objectives for the mid-term and long-term competitive mechanisms.

IESO Response

As mentioned through previous responses:

1) Resource Adequacy framework timelines will be a critical input into the Hybrid Integration Project and the broader Enabling Resources work plan under development.
2) The Hybrid Integration Project will explore least resource intensive participation models to accelerate timelines wherever possible.
3) The hybrid team is understanding of Hydro One's concerns and shares similar concerns not only related to the impact on distributions networks but also the impacts on the IESO's own processes.
4) Decisions regarding prioritization of certain participation models and detailed design decisions for the implementation of those models should be determined through analysis work during the design vision phase of the Hybrid Integration Project.