

Stakeholder Feedback and IESO Response

Energy Storage Design Project – February 18, 2020

Following the February 18, 2020 Energy Storage Advisory Group (ESAG) meeting in which the IESO presented and sought feedback on the proposed interim design solutions.

The IESO received feedback from:

- [CanSIA](#)
- [Consortium of Renewable Generators, Energy Storage Providers, and Industry Associations](#)
- [EDF Renewables Canada](#)
- [Energy Storage Canada](#)
- [H2GO Canada](#)
- [Power Workers Union](#)
- [Storage Power Solutions](#)
- [TC Energy](#)

This feedback has been posted on the [ESAG engagement webpage](#).

Note on Feedback Summary

The IESO appreciates the feedback received from stakeholders on the proposed interim design decisions for the storage design project. These have been noted and will be considered as the engagement moves forward. The IESO has provided a summary table below, which outlines specific feedback or questions for which an IESO response was required at this time. The IESO has consolidated duplicative feedback and condensed comments wherever possible to manage the length and usefulness of this document.

Stakeholder comments and IESO responses

Design Feature Self-Scheduling 1

Maintain current capacity limit of 10 MW for Self-scheduling energy storage resources (ESRs) in the real-time energy market.

Feedback

IESO Response

A number of stakeholders suggested that the 'Design Feature Self-Scheduling 1' should remove the option for self-scheduling of energy storage facilities and instead mandate that all energy storage facilities be dispatchable resources, except those offering regulation services in the interim period. Stakeholders indicated that this approach supports the Market Renewal Program (MRP) design principles: efficiency (i.e., better dispatch instructions), competition (i.e., more participants in the IESO-Administered Markets (IAM)), implementability (i.e., does not require unique treatment for ESRs), certainty, & transparency (i.e., energy storage facilities participation is clear).

One stakeholder suggested that the self-scheduling threshold of 10 MW should be increased in the long-term design and another stakeholder suggested that if the 10 MW threshold is revisited, it should be done for a broad set of technologies not just for energy storage.

The IESO appreciates the well-reasoned feedback provided in relation to self-scheduling for storage resources. In a future with an increasing volume of small and responsive resources, the existing framework for self-scheduling resources may need to be revisited.

For the purpose of the interim Storage Design Project (SDP) design, and noting the range of stakeholder perspectives received, the IESO continues to believe it is appropriate to allow storage facilities to register as self-scheduling and to apply the existing 10 MW threshold to energy storage. This approach offers consistent treatment for storage resources relative to generators, providing storage resources with an equal opportunity to compete in today's wholesale markets.

In line with the interest demonstrated by stakeholders in this design question, the IESO believes it may be appropriate to further explore the 10 MW self-scheduling threshold for all resources in the future.

Design Feature Self-Scheduling 2

Raise current capacity limit of 10 MW for Self-scheduling ESRs providing regulation service only.

Feedback

IESO Response

Given the restrictions of the Automatic Generation Control (AGC) tool, stakeholders support the proposed design feature but recommend that once the AGC tool has been upgraded, that the self-scheduling option be eliminated.

The IESO agrees that once the required tool changes are made, storage resources will be required to be dispatchable (not self-scheduling) in order to provide regulation service.

Stakeholders recommend that upgrades to the AGC tool be prioritized and could be completed outside of the tool upgrade scope under the MRP.

As part of the SDP, the IESO will provide clarity on the tool changes required to allow a storage facility to both provide regulation service and participate in the energy market and will also provide clarity on when the changes will be implemented. A substantial part of this work will be undertaken through the existing EMS SCADA Upgrade project, which is targeting a nominal completion date in Q1, 2022.

Design Feature Facility Registration 1

Registration of self-scheduling energy storage facilities providing regulation service only.

Feedback

IESO Response

Given the restrictions of the AGC tool, stakeholders support the proposed design feature but recommend that once the AGC tool has been upgraded, that the self-scheduling option be eliminated.

As noted above, the IESO agrees that once the required tool changes are made, storage resources will be required to be dispatchable (not self-scheduling) in order to provide regulation service.

Design Feature Facility Registration 2

Registration of self-scheduling energy storage facilities in the real-time energy market.

Feedback

IESO Response

As noted in Design Feature Self-Scheduling 1, a range of stakeholder perspectives were received in relation to self-scheduling storage resources. A number of stakeholders commented that self-scheduling storage resources should not be allowed, one stakeholder commented that self-scheduling storage resources should be allowed and that the 10 MW threshold should be increased for the long-term design, and another stakeholder commented that self-scheduling storage resources should be allowed until such time as the self-scheduling registration model is revisited for all relevant resources.

The IESO appreciates the well-reasoned feedback provided in relation to self-scheduling for storage resources. In a future with an increasing volume of small and responsive resources, the existing framework for self-scheduling resources may need to be revisited.

For the purpose of the interim Storage Design Project (SDP) design, and noting the range of stakeholder perspectives received, the IESO continues to believe it is appropriate to allow storage facilities to register as self-scheduling and to apply the existing 10 MW threshold to energy storage. This approach offers consistent treatment for storage resources relative to generators, providing storage resources with an equal opportunity to compete in today's wholesale markets.

In line with the interest demonstrated by stakeholders in this design question, the IESO believes it may be appropriate to further explore the 10 MW self-scheduling threshold for all resources in the future.

Design Feature Facility Registration 3

Registration of dispatchable energy storage facilities.

Feedback

IESO Response

A stakeholder sought clarity regarding slide 43 of the presentation. The stakeholder highlighted that the slide states that a dispatchable energy storage facility in the real time energy market will be registered as a “single, self-scheduling generator resource and a single, non-dispatchable load resource.” and asked for the IESO to confirm if this is correct.

The IESO notes that an error was made in the presentation and regrets any confusion that may have resulted from this error. As reflected in the interim design document, a dispatchable energy storage facility in the real time energy market will be registered as a single, **dispatchable generator** resource and a single, **dispatchable load** resource. The IESO has corrected and re-posted the presentation for the February 18, ESAG meeting.

A stakeholder suggested that there may be benefits to have the ability for a storage facility to be dispatchable as a generator and non-dispatchable as a load and asks if the IESO is open to looking at this.

The IESO does not support a registration model for energy storage with a dispatchable generator and non-dispatchable load. The IESO believes it is of high importance that a storage facility be exposed to consistent prices signals on both the generator and load sides of the facility. A model with a dispatchable generator resource and a non-dispatchable load resource would result in the facility being charged the Hourly Ontario Energy Price for withdrawals and paid the 5-minute Market Clearing Price for injections, which may result in inefficient operational incentives for the resource, and a possible gaming opportunity for substantially-sized storage facilities where the load side bid price is not signaled to the rest of the electricity market.

Design Feature Day Ahead Commitment Process (DCAP)

1 – DCAP data submission requirements for each class of interim energy storage participation.

Feedback

IESO Response

Stakeholders are unclear on how the data submission requirements in the DACP will be transferred to the Day-Ahead Market (DAM) in the MRP detailed design and are concerned that those energy storage facilities will not be properly accommodated in the new IAM market design. It was recommended that the IESO clearly articulates how the DAM design will integrate energy storage resources.

As part of the SDP, the IESO will set out a vision for how storage will participate in the IAMs on an enduring basis, once IESO tool upgrades to fully integrate ESRs are deployed. As part of the SDP, the IESO will also provide clarity on when the enduring energy storage design will be implemented. If the enduring design is implemented alongside MRP, then DAM participation will align with the vision set out in the long-term design. If the enduring vision is implemented after Market Renewal, the IESO will undertake additional design work to clarify how the interim design proposed through SDP will be adapted to the new markets introduced through MRP (until such time as the enduring design is implemented).

A stakeholder indicated that the approach aligns with DACP participation requirements for other resources but inquired as to how Operating Reserve (OR) offers will be managed. Should the market participant offer OR on both resources or only on one? And if only on one resource would it be on the generator or load?

The IESO appreciates the request for clarification on OR offers in DACP. The IESO is proposing that OR offers for energy storage facilities in DACP will be optional as they are for other facilities. Storage facilities may provide OR offers from the load and/or generator resource in DACP. The IESO notes that the energy bids and offers from these facilities will result in an Availability Declaration Envelope that will enable them to compete to provide OR in real-time. The IESO will update the interim design document and any applicable market manuals to reflect this approach.

Design Feature State of Charge 1

Restriction against overlapping or equal bid/offer prices.

Feedback

IESO Response

A stakeholder was looking to better understand the implications for the no overlap rule for bids and offers for certain scenarios. For example, would this rule feasibly allow a dispatchable ESR (e.g. an ESR > 10 MW and/or one that wishes to provide OR service) to provide regulation services? Specifically, would an ESR be permitted to charge the battery during the dispatch day to compensate for cycle efficiency losses? If so, what would be the acceptable bid/offer combination permitted to charge the battery?

In the interim design, due to IESO tool limitations, an energy storage facility is unable to both compete in the energy and OR markets and provide regulation service. In the interim period, an energy storage facility that provides regulation service must be registered as self-scheduling and will only be able to provide regulation service. Once the underlying tool limitations requiring this arrangement are addressed, storage facilities that provide regulation service will be registered as dispatchable storage facilities and will be enabled to both compete in the energy market and provide regulation service (should the facility be contracted for this service).

The quality of regulation service provided by an energy storage facility is affected by a number of factors including its duration of service, cycle efficiency, and the regulation capacity offered. The IESO's approach towards these matters was disclosed in the 2017 Regulation RFP whose materials may be found on the IESO website. The IESO reserves the right to adjust its policies towards compensation and quality of service in any future regulation procurement it may conduct. The scope of the Storage Design Project does not include these policies.

Design Feature OR 1

No simultaneous offers of operating reserve from the two resources comprising a dispatchable energy storage facility.

Feedback

Some stakeholders indicated the design feature OR 1 is appropriate due to IESO tool restrictions; however, recommend that the IESO determine how to allow the full OR offer capability from withdrawal to maximum injection of energy storage to be allowed as an OR product.

Stakeholders indicated it is not clear how this restriction will work. For example, if an energy storage facility has sufficient charge and is currently dispatchable to consume at full capacity; the energy storage facility should be able to be scheduled for OR for twice the maximum capacity. The IESO should clarify what the restriction is and if the example above is capable with the IESO's existing tools.

IESO Response

Due to the fact that the IESO's current tool set does not recognize the withdrawing and injecting sides of a storage facility as a single resource, the IESO is unable to allow storage to offer its full OR capability from withdrawal through to injection. For example, because IESO tools do not see the two resources comprising a storage facility as connected, a facility could get scheduled to withdraw energy from its load resource at the same time as it is scheduled to provide OR from its generation resource. This is clearly an infeasible schedule and one which could lead to adverse reliability outcomes. It is for this reason that the interim design does not allow for simultaneous offers of OR.

Through the long-term design portion of the SDP, the IESO will seek to identify a design which appropriately reflects the ability of a single energy storage resource to both withdraw and inject energy and provide operating reserve over this full operating range.

Feedback**IESO Response**

A comment specific to slide 72 “prerequisites to offering OR” was that a stakeholder is looking to understand the logical restrictions on dispatch/self schedule imposed by the decision rules. For example, is a self-scheduling resource < 10 MW permitted to offer OR? Slide 26 may need to be broken out into 3 slides to match the types of ESR’s contemplated on slide 34: (1) self scheduling resources < 10 MW; (2) self-scheduling resources providing regulation only service up to 50 MW; (3) dispatchable energy resources.

A prerequisite of providing OR is that the facility be registered as dispatchable. As a result, self-scheduling resources and self scheduling resources providing regulation service only are not eligible to provide OR. As noted above, once related tool limitations are addressed as part of the enduring/long-term solution, storage facilities that provide regulation service will be registered as dispatchable storage facilities and will be enabled to both compete in the energy market and provide regulation service (should the facility be contracted for this service).

Design Feature OR 2

OR requirements specific to a dispatchable load resource comprising a dispatchable energy storage facility.

Feedback**IESO Response**

The implication of this rule is that the participant must have state-of-charge (SoC) for 70 minutes. It was requested that the IESO confirm that the payment for the OR reserve requirement would match 70 minutes.

The Storage Design Project has been scoped to provide access for dispatchable energy storage facilities to Operating Reserve – but not to change the nature of Operating Reserve payments themselves in order to treat all classes of market participants equally.

The intent of the 70 minute requirement is to ensure that storage facilities are able to meet their OR obligation if called upon. Having sufficient SoC to meet this obligation will not result in payment to a storage facility, rather it is a prerequisite to offering OR capacity into the market. As with other technology types, storage facilities will be paid for OR when they receive an OR schedule over the course of each applicable interval in the dispatch hour.

Design Feature OR 3

OR requirements specific to a dispatchable generator resource comprising a dispatchable energy storage facility.

Feedback

IESO Response

The implication of this rule is that the participant must have SOC for 130 minutes. It was requested that the IESO confirm that the payment for the OR reserve requirement would match 130 minutes.

The Storage Design Project has been scoped to provide access for dispatchable energy storage facilities to Operating Reserve – but not to change the nature of Operating Reserve payments themselves in order to treat all classes of market participants equally.

The intent of the 70 minute requirement is to ensure that storage facilities are able to meet their OR obligation if called upon. Having sufficient SoC to meet this obligation will not result in payment to a storage facility, rather it is a prerequisite to offering OR capacity into the market. As with other technology types, storage facilities will be paid for OR when they receive an OR schedule over the course of each applicable interval in the dispatch hour.

Clarity on Engagement Forums

Feedback

IESO Response

Stakeholders indicated that there are a number of IESO engagements underway that impact both energy storage facilities and hybrid projects (e.g., capacity auction, innovation white paper series, demand response working group, etc.). Stakeholders indicated a lack of clarity on ownership of specific issues between the different engagements. It was recommended that the IESO clearly articulate which energy storage issues are being treated by which engagements and should consider a regular stakeholder engagement where issues that straddle multiple engagement can be discussed with the responsible directors within the IESO all in a single room so that actions are moved forward.

The IESO will undertake a new stakeholder engagement framework starting in Q2 2020 that is intended to bring together multiple engagement topics/forums at one time so as to support a shared understanding of linkages between initiatives.

Stakeholders recommended a joint engagement session between the IESO and OEB to tackle issues that are not seen to fit discreetly within either the IESO's or OEB's mandate and are required to support the development of ESRs.

In the 2018 report, Removing Obstacles for Storage Resources in Ontario, the IESO together with ESAG identified a set of barriers to storage resources in Ontario and identified the parties within whose scope of responsibility those barriers fell. The IESO is interested in hearing more about the specific issues that stakeholders believe have shared accountability between the IESO and OEB. In one example cited in feedback from the February 18 meeting, a stakeholder identified transmission tariffs as an area of shared accountability. As set out in the 2018 report, transmission and distribution charges fall solely within the OEB's scope of accountability. Should the OEB engage with stakeholders on the application of these charges to storage resources, the IESO remains open to participating in such an engagement.

Scope

Feedback

IESO Response

Stakeholders continue to advocate for expanding the scope of the SDP to include both hybrid projects and behind-the-meter storage. Stakeholders suggest that the IESO undertake a subsequent phase of the SDP to address direct and indirect participation of non-market participant energy storage within the IAM including facilities embedded within the distribution system and/or behind the meter. Stakeholders also advocate for a subsequent phase of the SDP to address the integration of hybrid energy storage projects.

The IESO agrees that there may be opportunities to expand participation of behind-the-meter storage and hybrid storage facilities in the IAMs. The IESO's Expanding Participation in Operating Reserve and Energy (EPOR-E) initiative will begin to explore these questions in 2020, starting with the April 2 Market Development Advisory Group webinar (at which the topic of hybrid participation will be introduced). The IESO is also exploring models for expanded participation of Distributed Energy Resources in the IAMs, including behind-the-meter resources, in the IESO's Distributed Energy Resources: Models for Expanded Participation in Wholesale Markets whitepapers available at [Innovation and Sector Evolution White Paper Series](#).

Clarification of IESO statements during February ESAG meeting

Feedback

IESO Response

In written feedback, a stakeholder mischaracterized some of the discussion led by the IESO at the February 18 ESAG meeting. The IESO would like to take this opportunity to provide clarity in relation to the following comments (submitted through stakeholder feedback):

The statement referred to in this comment was made in relation to the Market Renewal Program, not the SDP. The MRP is likely the most impactful change to the IESO-administered markets since market opening

“In the February 18th meeting, IESO stated that integrating storage is the greatest transformation to the IAMs in a long time.”

“In the February 18th meeting, IESO stated that they would not consider how integrating storage in the IAMs would affect the Global Adjustment (GA).”

The discussion referred to in this comment related to which charges would be applied to storage resources when withdrawing energy, not how integrating energy storage resources more fully into the wholesale markets would impact GA costs for other consumers. The point the IESO was making was that the application of uplift charges that fall within the IESO’s jurisdiction would be explored through the SDP. Other charges, like GA or transmission charges, that are not within the IESO’s scope of accountability will not be within scope for the project.

"IESO has already stated that allowing storage to participate in multiple markets may be sub-optimal for the system"

The IESO's position is that, due to current tool limitations, energy storage is not able to participate as fully or efficiently as it would if these limitations did not exist. The IESO does not believe that enabling more resource types (including energy storage) to participate in more markets results in sub-optimal outcomes for the system, nor did it make any such statement to that effect. Enabling fair and robust competition by any resource that is technically capable of providing a given product or service is central to an efficient market that delivers cost-effective outcomes for consumers.

Coordination with MRP and Timing for Implementing Long-Term Design

Feedback

IESO Response

Stakeholders advocated for SDP to be brought within the scope of the MRP and for storage to be fully integrated into the first iteration of the new markets that are put in place a result of MRP. Stakeholders indicated that the MRP has lacked clarity on the inclusion of energy storage facilities in the design decisions under way. The SDP states that many of the stage 1 design features will be changed during the MRP process; however, it is not clear how the SDP design feature decisions will be incorporated with the current detailed design engagements in MRP. Stakeholders have requested that the IESO describe the process and timing for including energy storage facilities in the MRP design process and describe how the SDP design features and an enduring solution for storage will be incorporated as well.

The interim design proposals presented at the February 18th stakeholder engagement meeting are aimed at clarifying how energy storage facilities can participate in today's wholesale markets (i.e. before Market Renewal is implemented). As part of the SDP, the IESO will also answer key questions regarding how and when storage will be enabled to participate in the IAMs resulting from Market Renewal on an enduring basis, once investments in IESO tool upgrades to fully integrate storage resources are deployed (this integration may occur alongside Market Renewal or after Market Renewal).

Stakeholders also asked for IESO to clarify how a decision will be made on timing for implementing the long-term design (and associated tool changes) in the new energy markets resulting from MRP, and for the opportunity to participate with the IESO in the decision making process.

In the near future, and prior to completion of the SDP in Q3 2020, the IESO expects to provide clarity on when the enduring energy storage design will be implemented. As noted above, if the enduring design is implemented alongside MRP (i.e. fully enabled in the first iteration of the new markets currently targeted to be in place in Q1 2023), then the long-term SDP design proposals that will be discussed with stakeholders in Q2, 2020 will replace the interim design proposals once MRP is implemented. If the enduring vision is implemented after the first iteration of the new markets resulting from Market Renewal are put in place, the IESO will need to undertake additional design work to clarify how and when the interim design proposals brought forward in February will be adapted to the new markets introduced by MRP (until such time as the enduring vision is implemented).

The IESO has not yet made a decision on whether the enduring energy storage design (and associated tool changes) will be implemented alongside MRP or at a later time. The feedback and preferences provided by stakeholders through the SDP to date provide helpful input for the decision making process. The IESO will provide clarity on when the enduring design will be implemented and the rationale for the proposed timing in the near future. Based on that decision, the IESO will also seek to clarify how storage design efforts will be coordinated with MRP moving forward.

Cost-benefit analysis

Feedback

A stakeholder recommended that the IESO form a business case for the SDP, including a cost-benefit analysis that considers the full implications to the global adjustment and recommend delaying the integration of storage into the IAMs until the benefits of doing so are proven.

IESO Response

The interim design proposals brought forward in February were developed with the aim of minimizing tool changes (and related investments) while enabling storage resources to participate in today's IAMs. The long-term design, to be discussed with stakeholders in Q2 2020, is likely to require more substantial tool changes and will result in more efficient participation of energy storage resources in the IAMs. As noted above, a decision on when to implement the enduring design as well as associated rationale will be shared with stakeholders in the near future.

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