Final Engagement Summary Report
Date: April 13, 2021

Energy Storage Advisory Group: Storage Design Project

Engagement Initiated: October 2019

Engagement Description

The Energy Storage Advisory Group (ESAG) was created several years ago to perform an advisory role to support and assist the IESO in evolving policy, rules, processes and tools to better enable the integration of storage resources within the current structure of the IESO-administered markets (IAMs). Activities within the advisory group's mandate included: identifying potential obstacles to the fair competition for energy storage resources and proposing mitigating strategies, providing input to the IESO's work plan and/or list of priorities to address storage related issues and opportunities within the current IAMs, and advising, consulting and coordinating discussions on issues which may affect storage participation in the existing IAMs.

The Storage Design Project (SDP) was borne out of ESAG, as an important step towards ensuring energy storage can fully compete to reliably and efficiently provide needed system services. The SDP intended to clarify how energy storage resources can participate in today's IAMs (the interim period), and provide a vision for how storage resources will participate on an enduring basis in markets resulting from the Market Renewal Program (the long-term period – once investment in IESO tool upgrades to fully integrate storage resources are made).

The SDP engagement was launched to ensure that stakeholders and communities understood the initiative and had the opportunity to provide feedback to inform the formal design for storage participation in IAMs.

Engagement Objective

The objective of the SDP engagement was to ensure that stakeholders and communities understood the initiative and had the opportunity to inform the formal design for storage participation in IAMs.

The IESO sought feedback from stakeholders on key questions as to how the IESO will treat storage participation in IAMs, as well as on draft (red-lined) market rules and market manuals changes for near term design decisions.

Engagement Approach

This stakeholder engagement was a public engagement process and was conducted in accordance with the IESO's approved engagement principles. The approach for this engagement initiative included opportunities to provide input through various channels such as in-person meetings, webinars, and written feedback. All materials, public feedback and commentary from stakeholders, and IESO responses to feedback was posted on the dedicated IESO engagement webpage for this initiative. Consultation on the SDP initiative occurred mainly through the ESAG, with participation open to all interested parties.

The SDP produced a number of key deliverables including:

Design Documents

- Answer key questions about how IESO will treat storage in IESO-Administered Markets (IAMs)
- Reflect different timeframes (e.g. greater detail for the interim period and higher-level design discussion for the long-term period)

Market Rules and Manuals

- Draft, and invite stakeholder feedback on, market rule/manual language required to implement interim measures

Schedule for Market Updates

- Provide clarity on next steps for storage design enhancements, with a focus on alignment between storage design enhancements and Market Renewal

Conclusion

Stakeholders actively participated and provided feedback throughout this engagement. Organizations such as: CanREA, Capital Power, Electricity Distributors Association, Energy Storage Canada, Hydro One, Ontario Power Generation, Power Workers' Union, and TC Energy were consistent participants in the discussion and feedback cycle.

Stakeholders provided overall support for the notion of an interim period along with the interim design proposals to expedite the participation of energy storage resources. There existed an appreciation of the tool limitations that necessitate an interim design, but a desire for the IESO to address these limitations quickly, for both pure storage resources and also hybrid resources (e.g. combination of renewable and storage facilities). The Market Surveillance Panel and many stakeholders called on the IESO to move quickly on the enduring design.

The following sections provide details on the stakeholder engagement touchpoints throughout SDP, and highlight the feedback received and areas where it resulted in a change of approach or design element.

Engagement plan and design questions

The first formal SDP stakeholder engagement meeting took place on October 28, 2019, following which the IESO sought stakeholder feedback on the draft engagement plan as well as the appropriateness of the design questions posed. The following key themes emerged, with IESO's response at the time also included:

- Timing of storage integration into markets: Ensure storage is fully enabled in first iteration of new energy markets resulting from Market Renewal
    - Relationship between storage design and Market Renewal was provided prior to project completion, including the decision that the long-term design would be implemented after Market Renewal go-live and that the interim design would be updated to reflect the Market Renewal design in time for Market Renewal go-live
- Scope of SDP: Expand project scope to include behind-the-meter storage and hybrid (e.g. storage/ generation) facilities
    - Integration of behind-the-meter resources (distributed energy resources more generally) and hybrid facilities were looked at in other IESO forums
- Distribution System Coordination: Suggestion that SDP should address issues related to coordination of transmission and distribution operations related to storage
    - Transmission/Distribution (T-D) coordination is an issue larger than the scope of storage design project and IESO noted enhanced T-D coordination would be explored via multiple forums and projects (e.g. IESO York Region Non-Wires Alternative Demonstration Project)
- IESO Coordination: Request that IESO ensure appropriate coordination across related initiatives
    - IESO noted the important relationships between the SDP and the Capacity Auction and Market Development Advisory Group and worked to ensure appropriate alignment across initiatives
- Different Timeframes: Desire to separate design proposals into different timeframes and release design document in parts
    - IESO agreed with this approach; the initial iteration of draft design document was focused on interim-proposals, long-term proposals to be addressed at future meetings
- Jurisdictional Review: Desire to learn from storage integration in other jurisdictions as an input into storage design in Ontario
    - IESO agreed this is an important consideration and built on learnings from other jurisdictions, including an educational webinar in March, 2020

- Storage Charges: Desire to explore application of Global Adjustment and delivery charges for storage resources
    - The SDP explored the application of uplift charges within the IESO's purview to energy storage

Interim design features

In the February 28, 2020 ESAG meeting, IESO presented an overview of the interim design features, and sought stakeholder feedback on whether they offered pragmatic solutions for integrating energy storage into the IAMs in the near term. Key feedback themes from stakeholder submissions included:

- Self-scheduling storage resources
    - IESO believes it may be appropriate to further explore the 10 MW self-scheduling threshold for all resources in the future
    - The IESO agreed 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 recommended 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 clarified how storage facilities can provide regulation service today and provided clarity on the tool changes required to allow a storage facility to both provide regulation service and participate in the energy market; the IESO continues to explore timelines for related tool changes
- Inquiries as to how Operating Reserve (OR) offers will be managed in DACP
    - IESO updated the interim design document and applicable market manuals to reflect the approach where OR offers for energy storage facilities in DACP will be optional as they are for other facilities, and storage facilities may provide OR offers from the load and/or generator resource in DACP

Long-term design questions and state-of-charge (SoC) management

On March 26, 2020, IESO held a stakeholder engagement meeting to reintroduce the long-term design questions, and to seek input on a key design feature: state-of-charge (SoC) management. Electric Power Research Institute (EPRI) also participated in this meeting to provide an update on US storage integration efforts, how long-term design questions were being addresses in US jurisdictions, and to discuss and provide perspectives on SoC management options. Key feedback themes following the meeting included:

- Stakeholder support for a range of SoC management options, including: self-scheduling, self-managed, and optionality between ISO-managed/self-managed SoC
- A desire to ensure that storage participants can manage their own operations through their offers
- A desire to include state-of-charge in the IESO's tools in order to drive feasible and efficient schedules and dispatch instructions

- Offer Curve: The long-term solution should model storage resources as a single resource (from maximum withdrawal to maximum injection)
- Uplift: Propose storage resources should not be subject to uplift if they are providing grid services and that OEB should also review application of network charges for storage resources
- Schedule: Expressed a desire for enduring storage design to be implemented within MRP

The above stakeholder inputs were considered and discussed and/or reflected in the subsequent design proposals.

Long-term design proposal and SoC-Lite Framework

On May 20, 2020, IESO outlined its proposal for a SoC-Lite framework, as well as other aspects of the long-term design proposal: Market and Facility Registration, Offer Curve, Price Setting and Regulation Service. Following this meeting, IESO sought stakeholder feedback on whether the proposals offered pragmatic solutions for the participation of energy storage in the IAMs in the long-term. Stakeholder feedback and IESO's response included the following:

- Requests for more information on the IESO's SoC proposal prior to providing an opinion
    - This was subsequently provided in the July, 2020 meeting
- Concern with the fairness of the IESO's SoC proposal, in some cases perception that it could provide an unfair advantage to storage resources, and in others, a potentially unfair disadvantage
    - The IESO clarified that the SoC-Lite proposal would schedule and dispatch storage resources based on their submitted offers (as is the case for other resources); SoC would be included as a physical characteristic of storage resources to ensure the resource won't be dispatched if it is incapable of following the instruction; this concept was spoken to in detail at the July 23 engagement session described below
- Whether a continuous offer curve could be implemented in the interim design, the need for design details on Market Power Mitigation, and the desire to introduce a competitive regulation market
    - The IESO agreed that Market Power Mitigation for storage resources must be explored through future design work for both storage integration phase 2 (i.e. in advance of implementation of the Market Renewal Program) and for the long-term design

Interim design Market Rule and Manual changes and uplift charges proposal

On June 24, 2020, IESO presented the initial schedule details for market updates, draft interim rule and manual changes and uplift proposal, and sought stakeholder feedback on the same. Stakeholder feedback resulted in a number of wording changes to the market rules and manuals, details of which are captured in the document Changes to Market Rules and Manuals ESAG Posting.

SoC-Lite framework

In the July 23, 2020 stakeholder engagement meeting, IESO presented further details on the mechanics of SoC-Lite, to examine the aspects of fairness, control, and reliability from previous stakeholder feedback and again sought stakeholder feedback on whether the SoC-Lite proposal offers

a pragmatic solution for the participation of energy storage in the IAMs in the long-term. Following the July 23 meeting, the majority of stakeholders were supportive of the SoC-Lite proposal, however, the IESO and stakeholders agreed that SoC management and the other long-term design proposals that have been stakeholdered through the SDP will be subject to continued, more detailed discussion in the future.

Technical Panel

At the September 15 Technical Panel meeting, Technical Panel voted unanimously to post the proposed market rule amendments for stakeholder review and comments. The amendments were posted on the Proposed Market Rule Amendments webpage for two weeks. The IESO made the following changes in response to stakeholder feedback:

- The defined term called capacity export
    - The suggestion was that there might be a need to create a defined term related to injection capacity. To minimize the number of defined terms, we have instead reworded to say the "capacity for injection of an electricity storage unit". Some reference to injections is required to delineate from the withdraw side of an electricity storage unit, which is not pertinent for capacity exports.
- Aggregated electricity storage unit size
    - This term was italicized within the defined term major electricity storage facility. As aggregated electricity storage unit size is not a defined term, the defined term major electricity storage facility was reworded to alleviate the need for such a term. IESO staff noted this same point in the following defined terms; small electricity storage facility, significant electricity storage facility and minor electricity storage facility. A similar edit has been made to all of these instances.
- Testing of Operating Reserve
    - In Chapter 5, section 4.9.2.1 was inconsistent with the new section 4.5.13B that permits storage resources to provide operating reserve from the curtailment of its withdraws of energy. It was inconsistent in that section 4.9.2.1, that relates to the testing of operating reserve, only permitted testing by the ramping-up of a facility. This was corrected to indicate that operating reserve can also be tested by reducing demand.
- Storage and the provision of frequency regulation services
    - In section 21 of Chapter 7, the section dedicated to the Interim design, it was noted that to provide frequency regulation a storage resource must be registered as a self-scheduler. However, the definition of a self-scheduler indicates that such a resource can operate independently from dispatch instructions. To correct this inconsistency, an exception has been added to the definition of a self-scheduling electricity storage facility to indicate that when providing regulation services, a self-scheduling electricity storage facility shall follow dispatch instructions.

The SDP engagement was concluded with the posting of the Energy Storage Design Project Long-Term Design Vision document September 15, 2020, which details the long-term design proposals developed through the SDP which will serve as the foundation for future storage design efforts. For the interim design, the Market Rules came into effect on January 18, 2021, while the associated manuals, operating guide and other documentation were published on February 26, 2021. The Market Rules and associated documents apply to all energy storage facilities that are registered to participate in the IESO-Administered Markets, including facilities that are embedded within a distribution system.

Thank you to all stakeholders for your participation. All materials will continue to be available on the IESO website under Completed Engagements.