

**Energy Storage ISO Rule
Amendments Session 2 – Open
Forum Q&A**
September 26, 2022

The AESO is consulting with Stakeholders on the development of the proposed Energy Storage ISO Rule Amendments that will:

- facilitate the integration of energy storage;
- improve the clarity required for market qualification and participation; and
- enable efficient, effective connection, monitoring, and control of energy storage when connected.

- Session 1 topics were based on the initial comments received from stakeholders on June 9, 2022:
 - Aggregated Facility Topics
 - Evolution of ISO rule facility definitions
 - Recap of transition from “aggregated generating facility” to “aggregated facility”
 - What is an aggregated facility?
 - 9MW size limit for resources within an aggregated facility
 - Power Measurement Definitions
 - Maximum authorized real power, maximum authorized discharging power, maximum authorized charging power
 - Allowable Dispatch Variance
 - Clarification of “variable energy resource”
 - Proposal to shift to “controllable/non-controllable” terms & implementation example

- The AESO posted a survey on September 13th inviting stakeholders to confirm topics they wish to discuss at the today's Q & A session
 - 5 stakeholders submitted questions/topics for discussion
 - The survey results informed the agenda for today's meeting
 - Stakeholders are invited to raise any other remaining questions related to the Energy Storage ISO Rule Amendments

- Section 303.1

“Fast Frequency Response for Imports to enable stakeholders to understand if the proposed changes to Rule 303.1 are complete/appropriate, please provide information on the FFR Pilot including the AESO’s Learnings”

- Co-located Technologies

“More clarification and Q&A would be helpful on the dispatching rules for ES/VER facilities”

“...more information and examples related to separate but co-located assets”

“Further examples on how a hybrid vs stand alone energy storage technology would bid in the energy and ancillary markets... Also, if the AESO could discuss the view of a DC and AC coupled energy storage device that would be great. Again, speaking to the idea of value stacking and allowing for the energy storage technology to take advantage of clipped losses (DC coupling) but also provide Ancillary Services on the AC side.”

Session 2 Agenda

Topic	Facilitator
Welcome / Introduction / Housekeeping	Jackie Gow
Proposed Section 303.1 <ul style="list-style-type: none">a. AESO refresher on FFR Pilot objectives, timing and plans for external reportingb. <i>Questions/Group Discussion on ISO rule amendments related to Section 303.1</i>	Dan McKeown
Co-located Technologies <ul style="list-style-type: none">a. AESO refresher on market asset configurations and physical facility configurationsb. <i>Questions/Group Discussion</i>	Steve Waller
Open Q&A	Stakeholders 😊
Next steps	Jackie Gow

- Dan McKeown, Senior Analyst, Commercial
- Steve Waller, Senior Market Advisor, Market Implementation
- Brad Coleman, Senior Engineering Analyst, Generation & Transmission
- Jackie Gow, Legal Manager, ISO Rules and Alberta Reliability Standards, Legal and Regulatory Affairs
- Melissa Mitchell-Moisson, Regulatory Analyst, Legal and Regulatory Affairs

- Alberta Energy
- Alberta Innovates
- AltaLink
- ATCO
- ATCO Electric
- Aura Power Renewables Ltd.
- BluEarth
- Boost Energy Ventures
- Capital Power
- Customized Energy Solutions
- DePal Consulting Limited
- Enbridge Pipeline Inc
- Enel North America
- Enerfin
- Energy Storage Canada
- Enfinite
- ENMAX
- ENMAX Corporation
- ENMAX Energy Corporation
- ENMAX Power
- EPCOR Distribution & Transmission Inc.
- Government of Alberta
- Heartland Generation Ltd.
- Hill + Knowlton Strategies
- Hitachi Energy Canada Inc.
- Imperial Oil
- IPCAA
- Lionstooth Energy
- Madstone Energy
- Market Surveillance Administrator
- Powerex
- Renewable Energy Systems (RES)
- Solas Energy Consulting
- Suncor
- Suncor Energy Inc.
- TC Energy
- TransAlta
- Voltus Energy Canada, Ltd.
- Wolf Midstream
- Zenith Power

In accordance with its mandate to operate in the public interest, the AESO will be audio recording this session. The accessibility of these discussions is important to ensure the openness and transparency of this AESO process, and to facilitate the participation of stakeholders. Participation in this session is completely voluntary and subject to the terms of this notice.

The collection of personal information by the AESO for this session will be used for the purpose of capturing stakeholder input. This information is collected in accordance with Section 33(c) of the Freedom of Information and Protection of Privacy Act. If you have any questions or concerns regarding how your information will be handled, please contact the Director, Information and Governance Services at 2500, 330 – 5th Avenue S.W., Calgary, Alberta, T2P 0L4, by telephone at 403-539-2528, or by email at privacy@aeso.ca.

- Meeting minutes will be prepared by AESO employees with the help of a minute-taking software program.
- Organization names will be used to identify contributions.
- Draft meeting minutes will be circulated to attendees for review and ultimately posted to the AESO website.

- Please introduce yourself, including the organization you work for, before asking your question
- If you are accessing the session via your computer or smartphone
 1. Click “Raise Hand” and the host will be notified that you would like to ask a question.
 2. You can also ask questions by clicking the “Q&A” button and typing them in. Please include the organization you work for when typing your question into the Q&A.
 - *You can up-vote questions that have been already asked.*
 3. Attendees are invited to turn on their cameras for this session, and are encouraged to do so when asking questions and participating in discussion.

The background of the slide is a blue-tinted photograph of two hands shaking in a firm grip. The hands are positioned in the center-left of the frame. The background also features a faint, geometric network of lines and dots, suggesting a digital or interconnected theme. The overall color palette is monochromatic, dominated by various shades of blue.

OUR ENGAGEMENT PRINCIPLES

Inclusive and Accessible

Strategic and Coordinated

Transparent and Timely

Customized and Meaningful

Proposed Section 303.1

- Stakeholder asked questions to understand if the proposed changes to Section 303.1 are complete/appropriate:
 1. What metrics and benchmarks is the AESO using to assess the performance of FFR/LSSi?
 2. What is the minimum performance level required to declare the FFR Pilot a success?
 3. How does the performance of energy storage participating in the FFR Pilot compare to the performance of load providing LSSi?
 4. Does the information gained through the FFR Pilot demonstrate energy storage providing FFR would overcome shortcomings of LSSi including lack of availability when pool price is high?
 5. What changes to the requirements of FFR/LSSi would improve performance of these services and their value to customers?
 6. When will the FFR Pilot be complete?
 7. When complete, will the AESO provide stakeholders a report containing a fulsome evaluation of the service?

- FFR Pilot Refresher:
 - Key objectives of the FFR Pilot are to validate the technical capability of new technology to provide FFR and to gather key learnings to determine how to remove barriers to new technology and advance the AESO’s Energy Storage Roadmap.
 - Technical requirements for FFR Pilot providers can be found on the Import Fast Frequency Response Agreement available on the AESO’s website.
 - There is a one-year Service Term for the FFR Pilot. The Service Start Date commenced in March 2022 for the two service providers.
 - The AESO has committed to providing a public update on the lessons learned from the FFR Pilot upon conclusion of the Pilot.

<https://www.aeso.ca/market/market-participation/ancillary-services/fast-frequency-response/>

- Changes to Section 303.1 enable technology agnostic FFR:
 - References to LSSi in Section 303.1 are replaced with technology-agnostic defined term “fast frequency response service”.

ISO Rules
Part 300 System Reliability and Operations
Division 303 Interties
Section 303.1 ~~Load Shed~~Fast Frequency Response
Service for Imports



Applicability

- 1 Section 303.1 applies to:
 - (a) a **market participant** that contracts with the **ISO** to provide ~~load shed~~fast frequency response service for imports; and
 - (b) the **ISO**.

Requirements

Providing Data

- 2 The **market participant** must provide the **ISO** with any information related to the provision of ~~load shed~~fast frequency response service for imports, that the **ISO** requires in order to properly administer the service and must do so in real time via systems the **ISO** designates.

Any questions or comments related specifically to the proposed changes to Section 303.1?



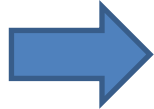
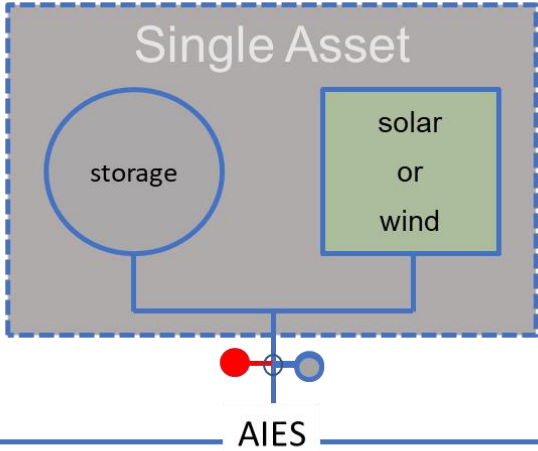
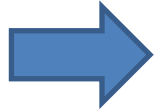
Co-located Technologies

- Limited rule changes
- Update Information Documents to explain
 - Offer discharge capacity only
 - Acceptable operating reason for restatement
- State of charge requirements
 - Included in the functional specification

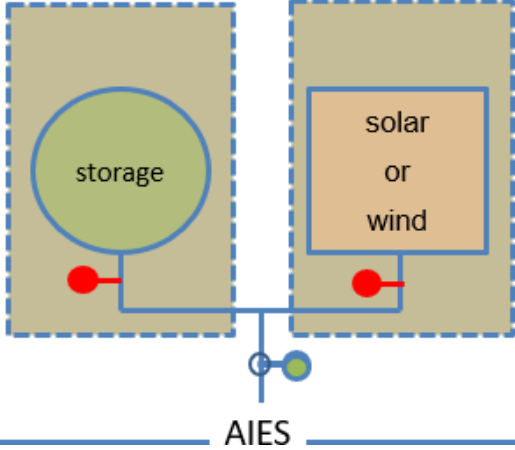
- [Long-term Energy Storage Market Participation Draft Recommendation](#) published February 17, 2021 and consulted on with stakeholders.
- Allow for hybrid asset configurations and VER block submissions for those assets in order to facilitate dispatch of variable energy resources and ensure required visibility.
- Optional full-range participation using the linked-assets submission option for those participants that choose to submit the entire range of the resource, and a must communicate charging levels requirement for participants that choose not to participate with their full-range.
- State of charge will be defined as an aggregate measurement from the site as a percent charge ranging from zero to one hundred percent that will be provided to the AESO and updated in real-time via SCADA.

- Co-located Technologies
 - *“More clarification and Q&A would be helpful on the dispatching rules for ES/VER facilities”*
 - *“...more information and examples related to separate but co-located assets”*
 - *“Further examples on how a hybrid vs stand alone energy storage technology would bid in the energy and ancillary markets... Also, if the AESO could discuss the view of a DC and AC coupled energy storage device that would be great. Again, speaking to the idea of value stacking and allowing for the energy storage technology to take advantage of clipped losses (DC coupling) but also provide Ancillary Services on the AC side.”*

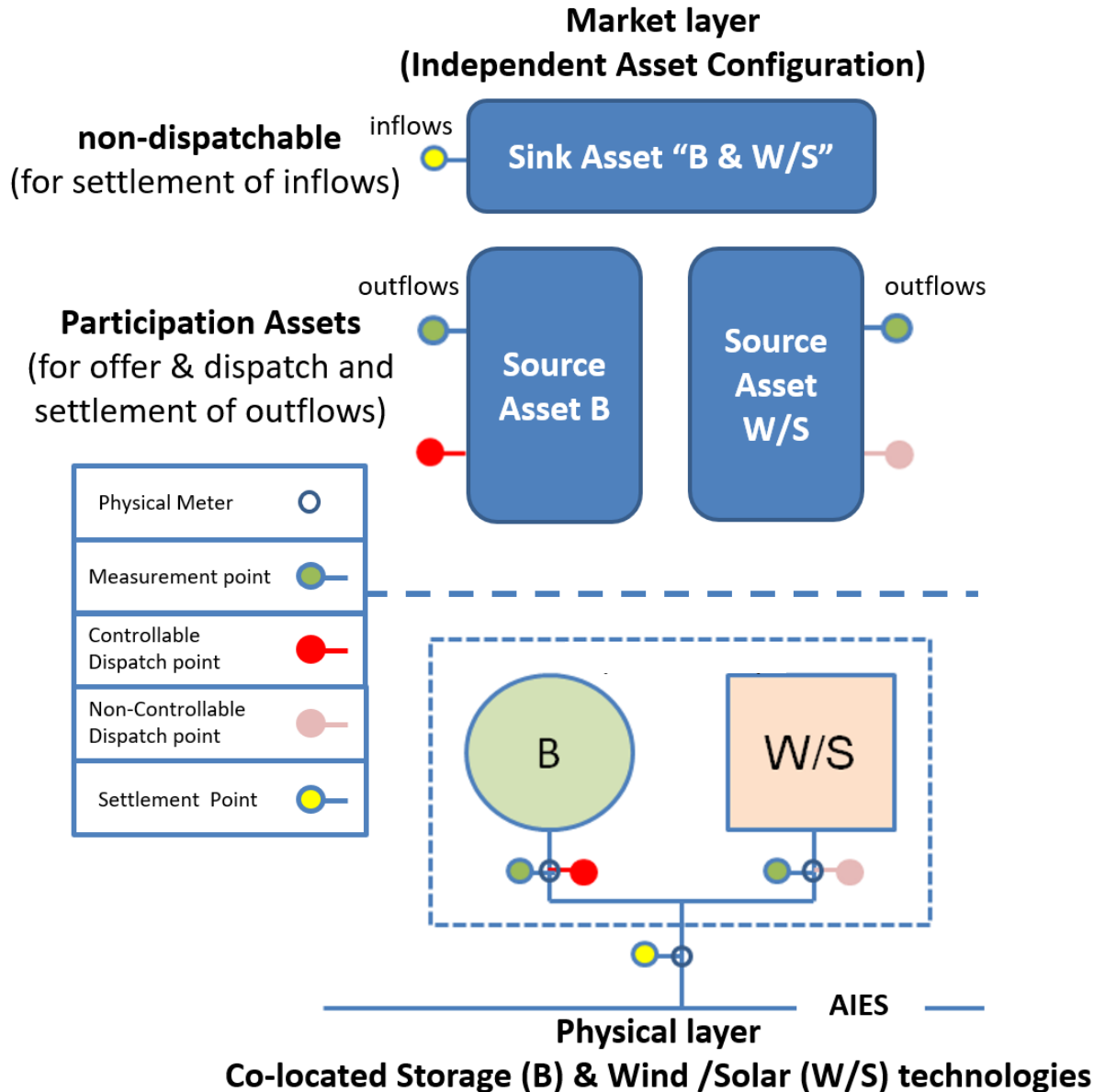
Co-located Technologies – Single Asset vs. Co-located Assets



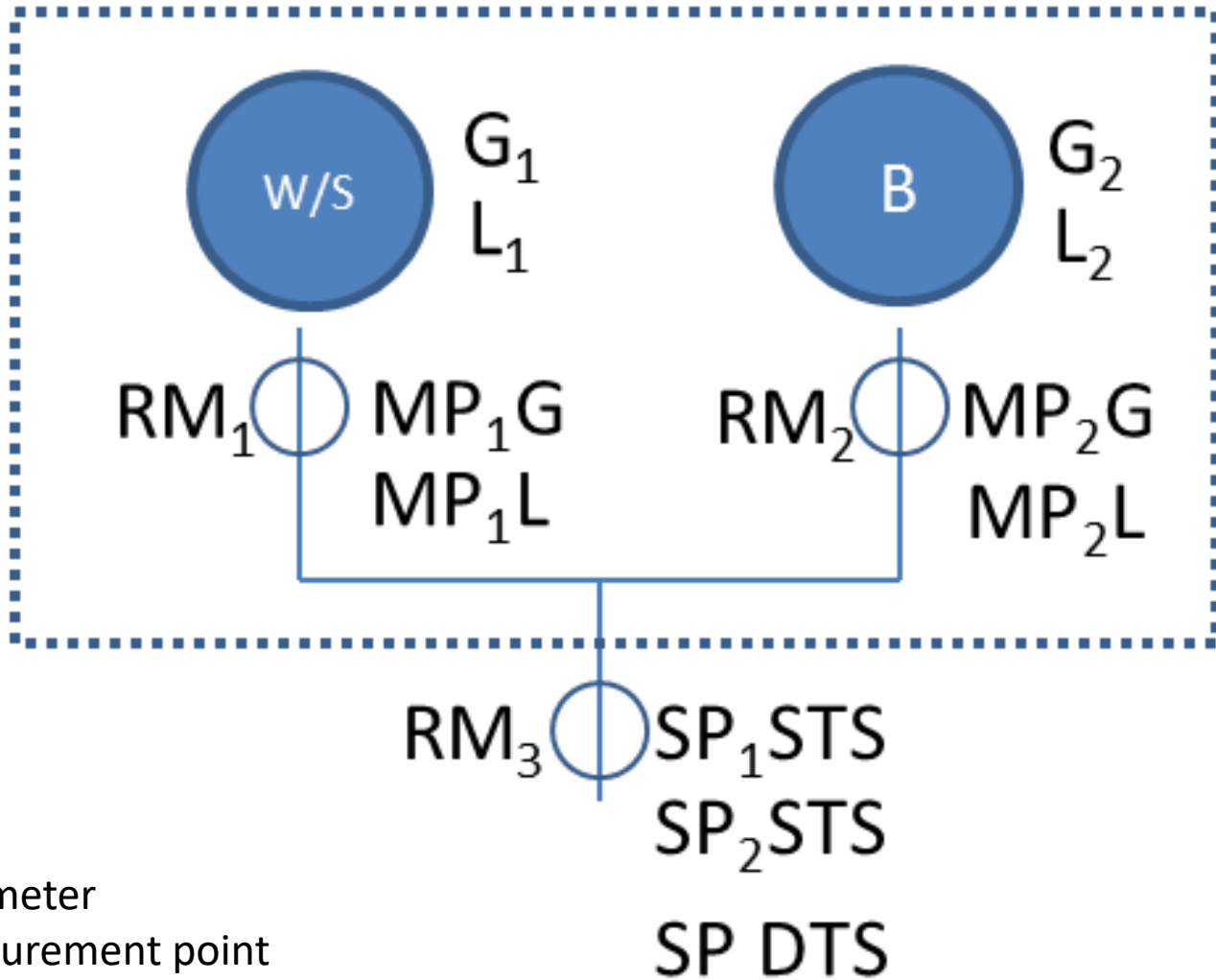
Independent co-located assets



Co-located Technologies – Independent Co-located Assets

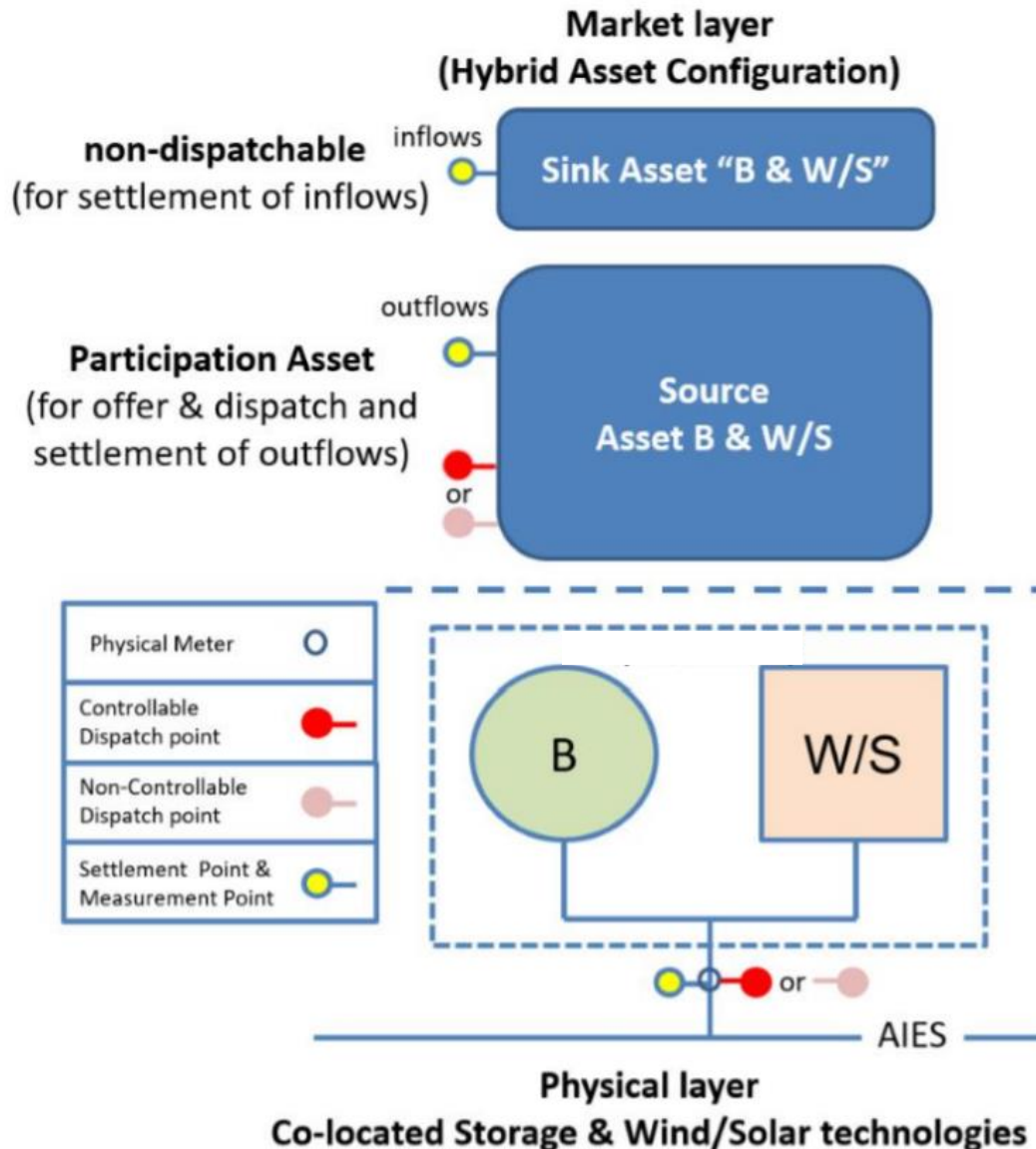


Co-located Technologies – Metering for Independent Co-located Assets

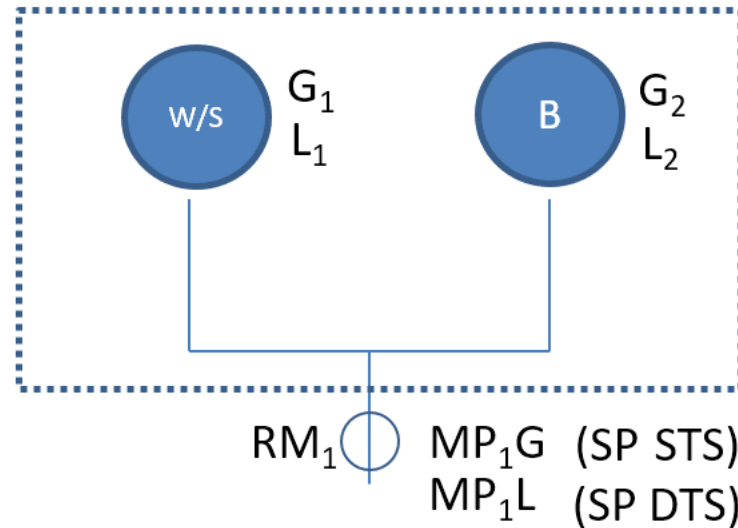


RM – real meter
 MP – measurement point
 SP – settlement point

Co-located Technologies – Single Asset



Co-located Technologies – Metering for Single Asset



RM – real meter

MP – measurement point

SP – settlement point

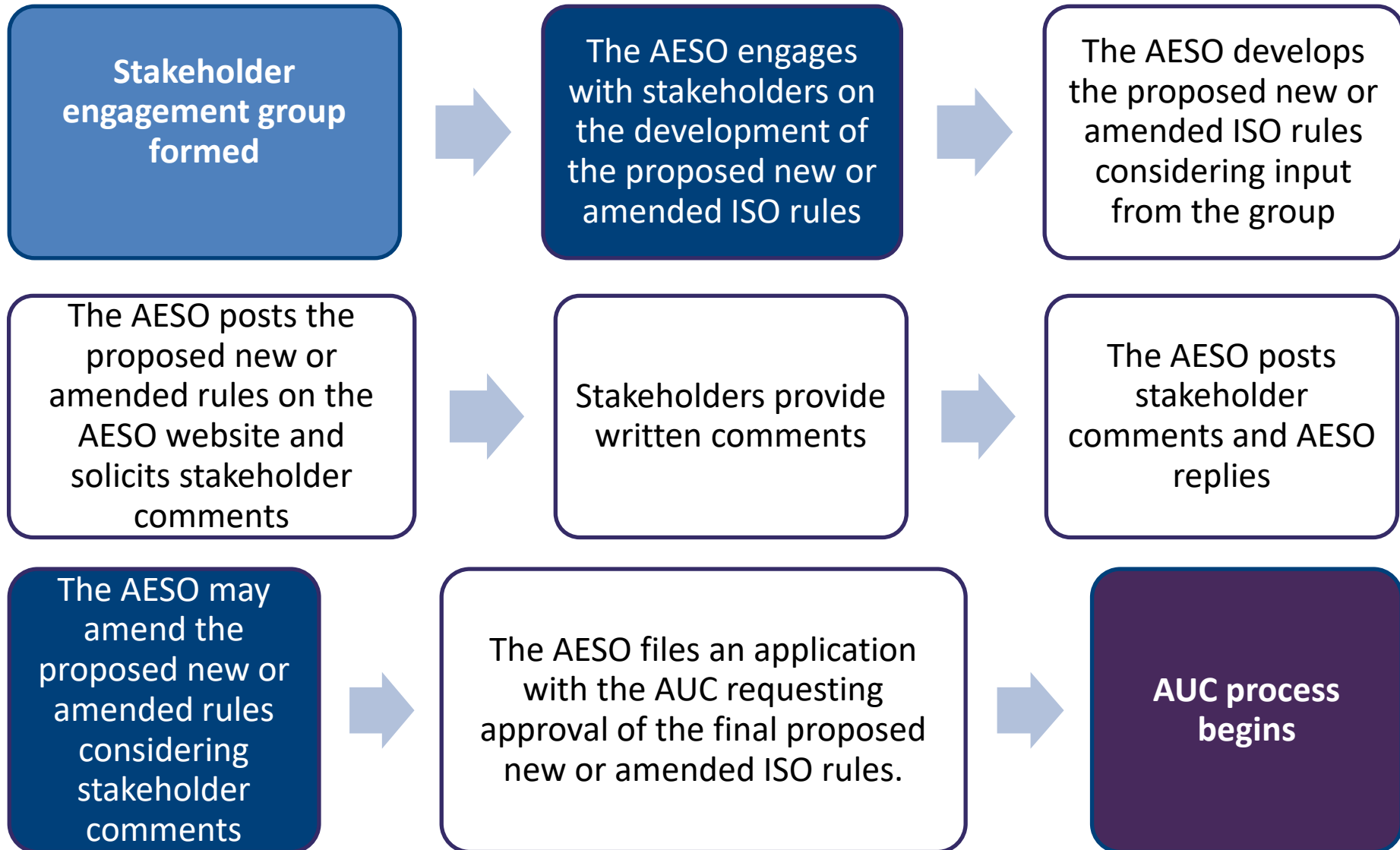


Open Q&A

Any Additional Comments or Questions?



Next Steps



Target Engagement Timeline

Dates	Consultation Step
October 28, 2022	Final ES ISO Rule Amendments and Session 1&2 meeting minutes posted
November 21, 2022	Stakeholder comments on final proposed ES ISO Rule Amendments due
December 2022	AESO responses to Stakeholder comments; ES ISO Rule Amendments finalized
January 2023	AUC application filed

Any Additional Comments or Questions?



Thank you