

- AltaLink
- CanREA
- Capital Power
- Direct Energy
- Energy Storage Canada
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- Greengate Energy
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- Turning Point Generation
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- Summary of stakeholder feedback and AESO response [Posted: Dec. 7, 2020]

# Stakeholder Comment Matrix – Oct. 1, 2020

Request for Feedback on *Long-term Energy Storage Market Participation Options Paper*



<b>Period of Comment:</b> Oct. 1, 2020 through Oct. 30, 2020 <b>Comments From:</b> AltaLink <b>Date:</b> [2020/10/30]	<b>Contact:</b> <b>Phone:</b> <b>Email:</b>
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Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed matrix per organization.**
4. Email your completed comment matrix to [energystorage@aeso.ca](mailto:energystorage@aeso.ca) by **Oct. 30, 2020**.

**The AESO is seeking comments from Stakeholders with regard to the following matters:**

	Questions	Stakeholder Comments
1.	Are there additional issues to energy storage market participation within the current ISO rules that AESO did not identify?	<p>On Page 5, the paper stated that “The current assumption is storage will be a market asset that may provide non-wires solutions, rather than a regulated asset capable of participating in the energy and AS markets”. Under the non-wires solution based approach, it is expected that the market asset will receive payments out of energy and AS markets in exchange for providing non-wires solutions while participating energy and AS markets. This may create a FEOC concern. It is recommended that AESO discuss the issues and potential solutions to address them.</p> <p>Similarly AESO should discuss potential reliability and/or FEOC issues associated with managing state of charge in order to provide reliability services in anticipation of potential system problems while simultaneously participating energy and AS markets.</p>
2.	Are there additional options to energy storage market participation within the current market structure that AESO did not identify?	

3.	Do you agree with the evaluation of options?	
4.	Is full range market participation an important priority for energy storage right now; or is half-range providing required market access? Should full range market participation be deferred for investigation and implementation at a future date?	
5.	<p>Should Variable Energy Resources and Storage hybrids be permitted to participate?</p> <p>a. If no please explain why not</p> <p>b. If yes please provide a rationale as to why and how the dispatch variability issue should be addressed?</p>	
6.	<p>How should storage and potentially other demand side resources be required to participate in the energy market?</p> <p>a. Must submit full range</p> <p>b. May submit full range</p> <p>c. Only submit discharge capability</p> <p>Please provide a rationale for your choice.</p>	
7.	In regard to the full range market participation options, how do you feel the chosen option should land when trading off technology agnostic treatment and complexity against participation flexibility?	
8.	Do you have any comments on defining the state of charge? Is there anything the AESO has not considered? Please explain.	

9.	Do you have any comments on the commissioning requirements for storage? Is there anything the AESO has not considered? Please explain.	
10.	Do you have any concerns or suggestions on the energy storage market participation engagement process and timeline?	
11.	Do you have any other suggestions or comments you would like to share with the AESO related to the Long-term Energy Storage Market Participation Options Paper or the engagement activities?	

Thank you for your input. Please email your comments to: [energystorage@aeso.ca](mailto:energystorage@aeso.ca).

# Stakeholder Comment Matrix – Oct. 1, 2020

## Request for Feedback on Long-term Energy Storage Market Participation Options Paper



<p><b>Period of Comment:</b> Oct. 1, 2020 through Oct. 30, 2020</p> <p><b>Comments From:</b> Canadian Renewable Energy Association</p> <p><b>Date:</b> October 30, 2020</p>	<p><b>Contact:</b></p> <p><b>Phone:</b></p> <p><b>Email:</b></p>
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**The AESO is seeking comments from Stakeholders with regard to the following matters:**

	Questions	Stakeholder Comments
1.	Are there additional issues to energy storage market participation within the current ISO rules that AESO did not identify?	
2.	Are there additional options to energy storage market participation within the current market structure that AESO did not identify?	<p>Energy storage will play an integral role in maintaining and enhancing reliability and affordability for ratepayers as Alberta transitions to a more flexible and less carbon-intensive electricity system. However, the growth of energy storage going forward will depend on the ability of operators to manage the full range of charge for their facility while only bidding into the market when they chose to do so on an economic basis, rather as directed by the system operator.</p> <p>As proposed in the long-term options document, the “half range” and “full range” options do not represent the full range of potential participation frameworks for storage facilities operating in the Alberta market. Rather, they are the two extreme options, which bookend a number of possible implementations.</p> <p>In the case of the half range option, the facility may only offer half of its full charging capacity to the market, but is free to charge based on when it is financially optimal to do so. However, at the other bookend, the full range option, the battery may operate within the full range of its charge at all times, but has a “must bid” requirement for</p>

		<p>charge, meaning that it must always state the pull price at which the facility will operate as a sink asset. This “must bid” requirement gives the operator little control over how it may charge.</p> <p>Going forward, the electricity system would be best served by enabling full-range participation of energy storage implemented on a “may bid” basis, rather than the proposed “must bid” basis.</p> <p>Should the AESO desire to prescribe demand response behaviour in order to provide reliability services, this should be done through the procurement of operating reserves, ancillary services or through other contracts for these products. Storage facilities should be provided with the greatest amount of flexibility to pursue revenue in the energy-only market according to FEOC principals.</p>
3.	Do you agree with the evaluation of options?	<p>Overall, the evaluation of options was helpful in regard to understanding the AESO’s point of view on the challenges and opportunities relating to the deployment of storage in Alberta’s energy markets. As provided, the in-text evaluation of each position was helpful for internal conversations. However, the options discussed did not provide a sufficient range of alternative approaches for consideration prior to making any final decision. It is recommended that the results of this stakeholder matrix lead to further discussion, prior to drafting the market rules, rather than leading directly to the draft rules.</p>
4.	Is full range market participation an important priority for energy storage right now; or is half-range providing required market access? Should full range market participation be deferred for investigation and implementation at a future date?	<p>The AESO should implement the full-range market participation of energy storage, while maintaining the option to participate on a half range basis.</p> <p>Again, we emphasize that any full-range participation must be implemented on a “may bid” basis, rather than the proposed “must bid” basis. This permits further flexibility and price sensitivity.</p> <p>Should the AESO require certain behaviors in order to maintain grid stability, they should be procured through the operating reserves market, the ancillary services market, or other longer-term service procurements.</p>
5.	<p>Should Variable Energy Resources and Storage hybrids be permitted to participate?</p> <p>a. If no please explain why not</p>	<p><b><i>Yes, Variable Energy Resources and Storage hybrids should be permitted to participate.</i></b></p> <p>We strongly disagree with the AESO suggestion that they may consider not permitting Variable Energy Resources and Storage hybrids from being able to participate. We note that the AESO had only recently provided clarity on “hybrid” configurations and how these assets can participate in the market. We see no justification for the AESO</p>

	<p>b. If yes please provide a rationale as to why and how the dispatch variability issue should be addressed?</p>	<p>changing its course or view on the acceptability of hybrid assets when it directed specific metering infrastructure to enable these assets to participate in the market.</p> <p>The co-location of an energy storage resource alongside a VER does not increase the variability of the latter. While the energy storage asset can consume generation produced by the variable resource, which varies the amount of generation that is sent to the grid, the AESO does have some visibility what the energy storage asset is doing behind-the-fence.</p> <p>In fact, the market participant must schedule charging that would be greater than the allowable dispatch variance of the variable resource by pricing those megawatts out of merit. In this respect, the system controller is made aware from offers from the variable resource when it is going to use the generation to charge the energy storage asset, as those megawatts would be priced out of merit. Any charging that is within the allowable dispatch variance is too low to provide meaningful information to the system controller (and is visible to them in any event by the SCADA information on the energy storage asset).</p>
<p>6.</p>	<p>How should storage and potentially other demand side resources be required to participate in the energy market?</p> <p>a. Must submit full range</p> <p>b. May submit full range</p> <p>c. Only submit discharge capability</p> <p>Please provide a rationale for your choice.</p>	<p>Storage resources should be provided the option to submit their full range in the energy market. To obtain sufficient revenues, storage facilities may engage in a variety of behaviours, including the time shifting of generation or market arbitrage.</p> <p>This variety of behaviours require that facility operators have sufficient flexibility to determine when they should be consuming from the grid and to sort out the pricing signals that provided them the incentives to do. While some operators may decide to offer their full range when appropriate, there may also be times when they determine that it is optimal to consume from the grid without scheduling ahead of time.</p> <p><i>Section 203.1: Offers and Bids for Energy</i> does not impose a requirement on load resources today to bid into the market. Rather, the rule permits a load resources the option to bid to purchase electricity at a bid price determined by the market participant. While it is clear that a storage resource is not a load, per se, because the facility is not an end user of the electricity, any energy market participant that consumes from the grid should be granted the same optionality. Thus, if load resources <i>may</i> bid to purchase electricity without a requirement to do so, storage should receive the same treatment.</p>
<p>7.</p>	<p>In regard to the full range market participation options, how do you feel the chosen option should land when trading off</p>	<p>Full range market participation should be enabled but it should be voluntary not mandatory.</p>

	technology agnostic treatment and complexity against participation flexibility?	
8.	Do you have any comments on defining the state of charge? Is there anything the AESO has not considered? Please explain.	State of Charge should be based on MWs available for the delivery/settlement interval not MWhs of stored capacity. Different storage technologies may have different operational requirements relating to the state of charge and the MWs available approach better reflects a range of technological capabilities.
9.	Do you have any comments on the commissioning requirements for storage? Is there anything the AESO has not considered? Please explain.	
10.	Do you have any concerns or suggestions on the energy storage market participation engagement process and timeline?	No concerns at this time.
11.	Do you have any other suggestions or comments you would like to share with the AESO related to the Long-term Energy Storage Market Participation Options Paper or the engagement activities?	<p>The treatment of energy storage under the Bulk and Regional Tariff is of utmost importance to the deployment of these technologies in Alberta. However, it is our concern that there is not sufficient alignment between these two processes and steps should be taken to ensure that learnings from one are considered in the other.</p> <p>It is our observation that the design of the two separate processes may preclude any information gathered from the Energy Storage Roadmap being integrated into the Bulk and Regional Tariff Design Stakeholder Engagement process. This misalignment may lead to redundancy and red tape in the overall process, as it means that the same issues may be brought up in both sessions. This is not an efficient use of time for the stakeholders attending both sessions.</p> <p>We request that more time be provided to future discussions of energy storage during this consultation process. There is considerable further discussion required specifically regarding energy storage, and we recommend that the energy storage engagement be given more priority in future discussions of the Bulk and Regional Tariff.</p> <p>Given the accelerating pace with which storage solutions are being put forward in the Alberta market, we recognize the importance of resolving important questions in terms of the tariff structure with the 2021 filing. However, this current stakeholder</p>

	<p>engagement does not allow for sufficient focus on these issues, nor does it allow for meaningful integration of the ESILF outcomes.</p> <p>We propose the following adjustments be introduced to this process to provide sufficient time for discussion:</p> <ul style="list-style-type: none"><li>- The storage tariff design proposal be brought forward to the AUC for approval along with the Phases being filed on June 30, 2021;</li><li>- The energy storage tariff treatment consultation timeline be modified to allow for discussion outcomes from the Energy Storage Roadmap and ESILF engagement to be brought forward into the tariff design discussion; and</li></ul> <p>At least two additional dedicated half-day sessions be set aside for energy storage discussion.</p>
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# Stakeholder Comment Matrix – Oct. 1, 2020

## Request for Feedback on Long-term Energy Storage Market Participation Options Paper



<b>Period of Comment:</b> Oct. 1, 2020 through October 30 <sup>th</sup> , 2020 <b>Comments From:</b> Capital Power Corporation <b>Date:</b> 2020/10/30	<b>Contact:</b> <b>Phone:</b> <b>Email:</b>
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**The AESO is seeking comments from Stakeholders with regard to the following matters:**

	Questions	Stakeholder Comments
1.	Are there additional issues to energy storage market participation within the current ISO rules that AESO did not identify?	Capital Power appreciates the opportunity to provide comments on the AESO's <i>Long-Term Energy Storage Market Participation Options Paper</i> . Capital Power provides the following comments for consideration.
2.	Are there additional options to energy storage market participation within the current market structure that AESO did not identify?	Capital Power has no additional comments at this time.
3.	Do you agree with the evaluation of options?	Capital Power appreciates the AESO's efforts to evaluate the market participation options using a simple one to five assessment scale. However, Capital Power submits that the AESO is prematurely evaluating these options and against a scale that is subjective. <b>Capital Power requests that the AESO provide more detail as to how the options were evaluated and ranked on the assessment scale.</b>
4.	Is full range market participation an important priority for energy storage right now; or is half-range providing required market access? Should full range market participation be deferred for investigation and implementation at a future date?	<b>While Capital Power has no comment on the priority level of full-range or half-range market participation for energy storage, Capital Power does support a thorough investigation into full-range market participation.</b>

<p>5.</p>	<p>Should Variable Energy Resources and Storage hybrids be permitted to participate?</p> <p>a. If no please explain why not</p> <p>b. If yes please provide a rationale as to why and how the dispatch variability issue should be addressed?</p>	<p>Capital Power recognizes that the treatment of energy storage resources is an open consultation and continually evolving, but the AESO very recently included hybrid site configurations as a permissible asset configuration in <i>Information Document, Energy Storage Guide, ID #2020-013</i>. The AESO is now questioning whether hybrid assets should be permitted. This is not conducive to an efficient market and it erodes the market and regulatory certainty that currently exists. Capital Power submits that the AESO must consider the impact that removing hybrid assets will have on market participants when investigating the dispatch variability issue.</p> <p><b>Capital Power continues to support the AESO’s consideration of requirements for hybrid facilities. The treatment of a storage facility in market rules should allow participants the ability to configure the site in a manner that best suits the circumstances of the facility, including the option to operate as a hybrid.</b> Further, requiring the energy storage and variable energy resource to be considered separate assets creates administrative and compliance burdens on market participants.</p> <p>At this time, Capital Power supports the AESO’s Hybrid Mechanism 1 – Variable block volume option. However, Capital Power submits that it may be too soon to wholly evaluate the mechanisms provided by the AESO. As noted in the Market Options Paper, if hybrid participation continues, the AESO will have to develop:</p> <ol style="list-style-type: none"> <li>1. Clear and obtainable dispatch compliance rules;</li> <li>2. Classifications for hybrid assets to ensure transparency; and</li> <li>3. Develop appropriate power ramp management and forecasting rules.</li> </ol> <p>Capital Power recommends that because the issues with dispatch variability are closely connected to other issues, including power ramp management, a more holistic evaluation of hybrid participation methodologies for improved dispatch should be considered.</p>
<p>4.</p>	<p>How should storage and potentially other demand side resources be required to participate in the energy market?</p> <p>a. Must submit full range</p> <p>b. May submit full range</p> <p>c. Only submit discharge capability</p>	<p>Capital Power has no comments at this time.</p>

	Please provide a rationale for your choice.	
5.	In regard to the full range market participation options, how do you feel the chosen option should land when trading off technology agnostic treatment and complexity against participation flexibility?	<p><b>Capital Power submits that while the trade-off between technology agnostic treatment, complexity and participation flexibility is important, maintaining a level-playing field remains a foundational principle for Alberta’s market.</b> Any assets participating in either the energy or ancillary services markets should be held to the same standard, regardless of technology. Existing market participants and technologies are held to certain dispatch standards, and in order to maintain a FEOC market, full-range market participation options must be evaluated against these same standards.</p>
6.	Do you have any comments on defining the state of charge? Is there anything the AESO has not considered? Please explain.	<p>Capital Power does not have any comments on defining the state of charge at this time, but reiterates comments made in previous submissions that <b>state of charge information should be provided to all market participants in aggregate form to support efficiency and price formation.</b></p>
7.	Do you have any comments on the commissioning requirements for storage? Is there anything the AESO has not considered? Please explain.	<p><b>Capital Power recommends that because commissioning requirements will need to be revised based on whether full-range or half-range participation is chosen, this issue should not be addressed until after that decision is made.</b> However, any changes made to commissioning requirements should be limited to the energy storage resource, with no impact to any other on-site generation.</p>
8.	Do you have any concerns or suggestions on the energy storage market participation engagement process and timeline?	<p>Capital Power reiterates comments made on April 21, 2020 in the Stakeholder Comment Matrix for the 2020 Plan for Energy Storage Roadmap Integration Activities; consultations and timelines should allow stakeholders a reasonable opportunity to comment and where possible, there should be coordination among AESO consultations. <b>Integrating energy storage into the existing market framework in Alberta is a complex and high-priority initiative and requires a proportionate amount of resources to inform decisions regarding its treatment.</b></p>
9.	Do you have any other suggestions or comments you would like to share with the AESO related to the Long-term Energy Storage Market Participation Options Paper or the engagement activities?	<p>Capital Power has no additional comments at this time.</p>

Thank you for your input. Please email your comments to: [energystorage@aeso.ca](mailto:energystorage@aeso.ca).

# Stakeholder Comment Matrix – Oct. 1, 2020

Request for Feedback on *Long-term Energy Storage Market Participation Options Paper*



<b>Period of Comment:</b> Oct. 1, 2020 through Oct. 30, 2020 <b>Comments From:</b> Direct Energy <b>Date:</b> 2020/10/30	<b>Contact:</b> <b>Phone:</b> <b>Email:</b>
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Instructions:

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2. Please respond to the questions below and provide your specific comments.
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**The AESO is seeking comments from Stakeholders with regard to the following matters:**

	Questions	Stakeholder Comments
1.	Are there additional issues to energy storage market participation within the current ISO rules that AESO did not identify?	Direct Energy (DE) requests that the AESO clarify resource specific issues pertaining to batteries. DE believes that carbon tax should be considered based on the commodity consumed in the charging of batteries (i.e. coal is not “washed clean” by charging that occurs during predominantly coal powered hours). The desired outcome for DE is a level playing field which is mindful of the FEOC principles. DE would like to see a link to the FFR pilot project
2.	Are there additional options to energy storage market participation within the current market structure that AESO did not identify?	No.
3.	Do you agree with the evaluation of options?	Yes.
4.	Is full range market participation an important priority for energy storage right now; or is half-range providing required market	Full range market participation is important with transparency and clarity for all market participants. Once again, carbon intensity should be considered during charging for storage.

	access? Should full range market participation be deferred for investigation and implementation at a future date?	
5.	<p>Should Variable Energy Resources and Storage hybrids be permitted to participate?</p> <p>a. If no please explain why not</p> <p>b. If yes please provide a rationale as to why and how the dispatch variability issue should be addressed?</p>	As long as rules are clear and applicable to all participants and all assets. Whether assets can be considered both a sink and a source or whether multiple asset ID (one as a sink and one as a source) will need to be created, or the creation of “virtual asset IDs” should be considered by the AESO. These are technical issues that should be considered in order to ensure rules are followed and enforceable, proper reporting can be performed, and bids and offers are distinguishable. Further, batteries behind load should be considered.
6.	<p>How should storage and potentially other demand side resources be required to participate in the energy market?</p> <p>a. Must submit full range</p> <p>b. May submit full range</p> <p>c. Only submit discharge capability</p> <p>Please provide a rationale for your choice.</p>	Resources should be required to submit full range.
7.	In regard to the full range market participation options, how do you feel the chosen option should land when trading off technology agnostic treatment and complexity against participation flexibility?	Technology agnostic should be the goal.
8.	Do you have any comments on defining the state of charge? Is there anything the AESO has not considered? Please explain.	Up to date “state of charge” information should be available to all market participants and included in the dispatchable resource information.
9.	Do you have any comments on the commissioning requirements for storage? Is there anything the AESO has not considered? Please explain.	As previously stated, the carbon intensity of the battery charging should be considered.

10.	Do you have any concerns or suggestions on the energy storage market participation engagement process and timeline?	No.
11.	Do you have any other suggestions or comments you would like to share with the AESO related to the Long-term Energy Storage Market Participation Options Paper or the engagement activities?	The goal for DE is to continue to enhance the FEOC principles of the Alberta electricity market. In the view of DE, “out of market” payments lead to poor market outcomes and should be completely avoided.

Thank you for your input. Please email your comments to: [energystorage@aeso.ca](mailto:energystorage@aeso.ca).

# Stakeholder Comment Matrix – Oct. 1, 2020

## Request for Feedback on Long-term Energy Storage Market Participation Options Paper



<b>Period of Comment:</b> Oct. 1, 2020 through Oct. 30, 2020 <b>Comments From:</b> Energy Storage Canada <b>Date:</b> 2020/10/30	<b>Contact:</b> <b>Phone:</b> <b>Email:</b>
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**The AESO is seeking comments from Stakeholders with regard to the following matters:**

	Questions	Stakeholder Comments
1.	Are there additional issues to energy storage market participation within the current ISO rules that AESO did not identify?	<p>Energy storage resources are expected in the future to participate in the energy market and to offer services to grid operators of transmission &amp; distribution networks. The roles and responsibilities in managing multiple service offerings between market participation and grid operators have not been discussed. In particular, third party owned energy storage resources with service agreements for regulated activities with grid operators that are also participating in the energy market has not been discussed. At a high-level, the AESO should explore how energy storage resources would operate under normal operating conditions and under abnormal/contingency events. For example, a generator participating in the energy market is not responsible for energy delivery if a transmission outage occurs that physically restricts the generator from delivering the energy. Would the same exemption apply for energy storage resources that are used to help maintain grid stability during outage events?</p> <p>As part of the Capacity Market development, the AESO explored co-optimization between energy and ancillary service markets (<a href="https://www.aeso.ca/assets/Uploads/1.2-Further-analysis-Cooptimized-markets.pdf">https://www.aeso.ca/assets/Uploads/1.2-Further-analysis-Cooptimized-markets.pdf</a>). Energy storage resources can quickly adjust operation to provide services most valued at a given moment. Co-optimization may be an option to explore to support value stacking for energy storage resources.</p>

2.	Are there additional options to energy storage market participation within the current market structure that AESO did not identify?	ESC believes the AESO has identified the primary options available for energy storage market participation. ESC believes there may be sub-categories for the options presented by the AESO and may be worth exploring further when more details and analysis is presented.
3.	Do you agree with the evaluation of options?	At this time, ESC requires further information on the options and evaluation method to provide an opinion.
4.	Is full range market participation an important priority for energy storage right now; or is half-range providing required market access? Should full range market participation be deferred for investigation and implementation at a future date?	Alberta, as with other markets, is expected to increase the share of variable renewable energy resources in the supply mix over the next decade. As the name implies, variable renewable energy resources output is more sporadic and will require more balancing resources. This is a role that energy storage resources are well suited for. ESC notes that the benefits of full range participation primarily focus on the AESO as market operator allowing it to maximize the ability of energy storage to offer services to support volatility in energy market supply-demand balance, a service the AESO does not fund directly.
5.	<p>Should Variable Energy Resources and Storage hybrids be permitted to participate?</p> <p>a. If no please explain why not</p> <p>b. If yes please provide a rationale as to why and how the dispatch variability issue should be addressed?</p>	<p>There are benefits and drawbacks to hybrid model participation including consideration for metering design and storage operation plans. When considering hybrids, the AESO should focus on flexibility and potentially applying ad-hoc solutions as storage technologies and applications evolve.</p> <p>ESC notes that ISO tariff design influences decisions on hybrids and must be considered concurrently. For example, a main consideration for hybrids is the ability to avoid DTS charges. Exploring hybrid participation models should be included in the AESO's bulk and regional tariff design consultations.</p>
6.	<p>How should storage and potentially other demand side resources be required to participate in the energy market?</p> <p>a. Must submit full range</p> <p>b. May submit full range</p> <p>c. Only submit discharge capability</p>	<p>ESC supports a may submit full range with adjustments allowed for acceptable reasons</p> <p>The AESO recently concluded a consultation on sub-hourly settlement and determined that no major market changes were needed at this time. As part of the consultation, the AESO explored Payments for Load on the Margin (PLM) and concluded that the true-up to bid option may warrant further investigation as there are benefits to the market. The benefits of PLM would be similar for energy storage</p>

	Please provide a rationale for your choice.	resources and ESC recommends exploring these benefits as part of a full range participation model.
7.	In regard to the full range market participation options, how do you feel the chosen option should land when trading off technology agnostic treatment and complexity against participation flexibility?	Participation in the Alberta electricity market requires participants to adhere to responsibilities and obligations as established in the ISO rules and associated regulation. Complexity should not be a major barrier since it is expected market participants should be sophisticated enough to manage the participation requirements.
8.	Do you have any comments on defining the state of charge? Is there anything the AESO has not considered? Please explain.	<p>State of charge definition and monitoring may be different for different energy storage technologies. How state of charge is defined and used will influence ESC's decision making and implementation.</p> <p>ESC does recognize the need to monitor state of charge in some way to ensure fair competition and avoid potential market power manipulation through ill-conceived scheduling of outages. In short, ESC believes that state of charge definition and application should be viewed through market participation obligations and not as a real-time operation priority.</p>
9.	Do you have any comments on the commissioning requirements for storage? Is there anything the AESO has not considered? Please explain.	ESC believes the AESO has adequately covered the commissioning requirements for storage
10.	Do you have any concerns or suggestions on the energy storage market participation engagement process and timeline?	ESC commends the AESO on the energy storage market participation engagement process and believes the timelines are prudent.
11.	Do you have any other suggestions or comments you would like to share with the AESO related to the Long-term Energy Storage Market Participation Options Paper or the engagement activities?	No further comments or suggestions

Thank you for your input. Please email your comments to: [energystorage@aeso.ca](mailto:energystorage@aeso.ca).

# Stakeholder Comment Matrix – Oct. 1, 2020

Request for Feedback on *Long-term Energy Storage Market Participation Options Paper*



<b>Period of Comment:</b> Oct. 1, 2020 through Oct. 30, 2020 <b>Comments From:</b> ENMAX Corporation <b>Date:</b> 2020/11/23	<b>Contact:</b> <b>Phone:</b> <b>Email:</b>
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**The AESO is seeking comments from Stakeholders with regard to the following matters:**

	Questions	Stakeholder Comments
1.	Are there additional issues to energy storage market participation within the current ISO rules that AESO did not identify?	<p>While ENMAX is interested in the development of storage rules and remains an active investor in this technology, there are a number of legislative, market design and operational considerations that must be addressed before ENMAX is able to comment further on the specifics of energy storage market participation in Alberta. For instance:</p> <ul style="list-style-type: none"> <li>- The AUC’s Distribution System Inquiry recently concluded with a final report expected to be issued by the Commission by the end of the year. As the AESO is aware, energy storage was a main topic of discussion throughout the inquiry and in order to avoid duplication of work, the AUC’s report should be referenced to help guide and inform the AESO’s roadmap.</li> <li>- Clear policy direction from the Government is still required on the topic of self-supply and export, and the outcome will likely impact the rules for energy storage resources and the timelines for implementing certain activities in the AESO’s roadmap.</li> </ul> <p>ENMAX remains open to new opportunities where there is minimal disruption to the current framework (e.g., supportive of new products like fast frequency response). While ENMAX is not supportive of changes to the existing market design at this time, we encourage the AESO to continue imbedding flexibility throughout new and</p>

		existing ISO rules and technical requirements, where practical, in recognition of the evolving nature of storage technologies and the regulatory framework.
2.	Are there additional options to energy storage market participation within the current market structure that AESO did not identify?	In ENMAX's view there are some other options. Before exploring them, however, a number of interrelated topics still require further consideration or policy direction from the Government of Alberta. This complexity of interrelated issues was eluded to in the AESO's own documentation.
3.	Do you agree with the evaluation of options?	The options paper is a good starting point for industry to consider the long-term market participation of energy storage in Alberta. However, at this time, ENMAX neither agrees nor disagrees with the evaluations of the options for the reasons mentioned above.
4.	Is full range market participation an important priority for energy storage right now; or is half-range providing required market access? Should full range market participation be deferred for investigation and implementation at a future date?	<p>Given a number of important elements that require further consideration and/or policy direction, ENMAX is unable to comment in depth on the half-range and full-range options.</p> <p>While half-range may be a good first step, ENMAX is not supportive of expensive market design change discussions and AESO system changes. The market design should remain stable for the near term.</p> <p>Some ISO Rules may need to be adapted for Energy Storage but in general the approach to ISO rules and market design should remain technology agnostic (not just across storage technologies but across generation asset types that adhere to market rules) in order to preserve fairness and a level playing field in the Alberta market.</p>
5.	<p>Should Variable Energy Resources and Storage hybrids be permitted to participate?</p> <p>a. If no please explain why not</p> <p>b. If yes please provide a rationale as to why and how the dispatch variability issue should be addressed?</p>	<p>VERs and storage hybrids should be permitted to participate in the market subject to meeting both the relevant technical requirements and all legislative requirements—in particular those related to a fair, efficient, and openly competitive market. No market advantage can be conveyed to certain market participants through simpler participation requirements, less stringent ADVs, "easier" AORs, or any other failure to be technology agnostic. Should it be found that certain rules have to be "relaxed" to permit VERs and/or hybrids to participate, those relaxations must be applicable to other sources and sinks as well.</p>
6.	How should storage and potentially other demand side resources be required to participate in the energy market?	ENMAX is not able to choose one of these options over another at this time but would encourage the AESO to remain technology agnostic in order to preserve fairness and a level playing field in the Alberta market.

	<p>a. Must submit full range</p> <p>b. May submit full range</p> <p>c. Only submit discharge capability</p> <p>Please provide a rationale for your choice.</p>	
7.	<p>In regard to the full range market participation options, how do you feel the chosen option should land when trading off technology agnostic treatment and complexity against participation flexibility?</p>	<p>ENMAX agrees that “technology agnostic” is fundamental to a market-based approach. The preservation of a fair, efficient, and openly competitive market in which no participant receives unearned advantages is a legislative requirement. The need to comply with legislation, which in this context requires the rules to support a FEOC market and be technology agnostic, trumps both simplicity and flexibility. Flexibility is the next most important—provided it does not conflict with FEOC requirements—because it maximizes market participation. Participants in Alberta’s competitive electricity market ought to be capable of understanding and complying with rules that are complex, but this complexity must be out of a technical necessity.</p>
8.	<p>Do you have any comments on defining the state of charge? Is there anything the AESO has not considered? Please explain.</p>	<p>State of charge is simply the amount of “fuel” that is available to a battery energy storage system. All plants must manage its fuel and comply with ISO rules by declaring its capabilities through the Energy Trading System, operators of battery storage facilities ought to be able to do the same. Control of the asset’s state of charge should reside with the market participant /asset owner just like any other generator. Of course this control may be transferred to the AESO under a contract for services of the storage assets similar to an OR product.</p>
9.	<p>Do you have any comments on the commissioning requirements for storage? Is there anything the AESO has not considered? Please explain.</p>	<p>As the AESO notes, the commissioning rules will depend on the participation option ultimately chosen for energy storage. ENMAX is not yet able to comment on the commissioning approach but it should not differ that much from any other generator in verifying its range of technical capabilities.</p>
10.	<p>Do you have any concerns or suggestions on the energy storage market participation engagement process and timeline?</p>	<p>ENMAX appreciates the AESO’s engagement efforts to date and looks forward to future consultations on this subject.</p>
11.	<p>Do you have any other suggestions or comments you would like to share with the AESO related to the Long-term Energy Storage</p>	<p>The AESO states under the dispatchability objective and under the design principles that “The design should give the system controller the ability to monitor and control energy storage facilities in support of power delivery and balancing across the AIES.” ENMAX is concerned with the “control” aspect of this statement. In our view,</p>

<p>Market Participation Options Paper or the engagement activities?</p>	<p>once the AESO has established the necessary market rules and technical standards, it is up to each market participant to control its own facility and to comply with those rules and standards. The AESO may wish to expand on what they mean by “control”. Does the AESO consider that a facility’s state of charge should be managed by the ISO as this would not be in keeping with the market-based approach we understand as the objective? Or is the AESO contemplating buying contracts for asset control?</p> <p>The AESO may be confusing the role of an energy market participant with an energy storage asset with that of a non-wire solution that could potentially be thought of purely as a part of the grid. If it were on the Transmission system, the AESO may have some need to control it but not if it were part of the distribution system. From our understanding, the AESO is not being clear in this distinction.</p> <p>Any AESO developed DER and storage rules should not infringe on the DFO’s ability and obligation to continue managing their respective systems.</p>
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Thank you for your input. Please email your comments to: [energystorage@aeso.ca](mailto:energystorage@aeso.ca).

# Stakeholder Comment Matrix – Oct. 1, 2020

## Request for Feedback on Long-term Energy Storage Market Participation Options Paper



<p><b>Period of Comment:</b> Oct. 1, 2020 through Oct. 30, 2020</p> <p><b>Comments From:</b> Greengate Power Corporation</p> <p><b>Date:</b> 2020/10/30</p>	<p><b>Contact:</b></p> <p><b>Phone:</b></p> <p><b>Email:</b></p>
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Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed matrix per organization.**
4. Email your completed comment matrix to [energystorage@aeso.ca](mailto:energystorage@aeso.ca) by **Oct. 30, 2020**.

**The AESO is seeking comments from Stakeholders with regard to the following matters:**

	Questions	Stakeholder Comments
1.	Are there additional issues to energy storage market participation within the current ISO rules that AESO did not identify?	The AESO's longer term market participation document outlines potential changes to the treatment of storage that could make storage Market Participants offer on a distinct and different basis than other DTS load customers. This modification on the load or charging treatment of storage should not be contemplated unless the AESO implements a revised storage tariff. Storage should not be treated differently from other loads unless it is offered a tariff more in line with other Market Participants such as exporters and importers. Any distinction on the load treatment of storage should not be contemplated until a storage tariff is approved and implemented.
2.	Are there additional options to energy storage market participation within the current market structure that AESO did not identify?	
3.	Do you agree with the evaluation of options?	<i>The AESO's evaluation of the options is a reasonable approach. However the design principles are overlapping and complex and it is difficult to determine how the AESO will combine the assessment of each principle into its recommendation. Scoring the principles is very subjective and it seems like each alternative scored is close to the other alternatives. Some other higher level principles may be helpful such as: Fairness, minimize changes to existing rules, maximize value to consumers</i>

		<p><i>from storage participation. The visibility of the system operator needs to be a key factor however, the AESO's system operators have shown in managing dual use sites, that it can operate the grid even if net to grid output is reasonably opaque. More stringent rules for energy storage as compared to dual use sites should not be considered.</i></p>
4.	<p>Is full range market participation an important priority for energy storage right now; or is half-range providing required market access? Should full range market participation be deferred for investigation and implementation at a future date?</p>	<p><i>The full range advantages outlined by the AESO seem to all provide the benefit to the AESO while the disadvantages impact Market Participants. The half range works within existing rules. Greengate advocates that the full range should only be an option for Market Participants, not a requirement.</i></p>
5.	<p>Should Variable Energy Resources and Storage hybrids be permitted to participate?</p> <p>a. If no please explain why not</p> <p>b. If yes please provide a rationale as to why and how the dispatch variability issue should be addressed?</p>	<p><i>Sites have already energized that are storage hybrids, therefore they should be allowed. The variability issue seems most concerning when a variable resource offers non-zero dollar offers. However, this currently does not occur. Therefore, this is currently not an issue. It seems reasonable that the AESO system controllers should have visibility on the state of charge for these type of assets. The AESO should also have the ability to review a site's past performance and determine if the Market Participant is withholding energy or simply charging their storage asset. Real time verification of following a dispatch may not be required, especially when so few storage assets are on the system. While it is helpful to have a vision of the future and rules that will last for decades to come perhaps it is best to design rules that will fit in the next several years and can be adjusted at a later date as the market unfolds.</i></p>
6.	<p>How should storage and potentially other demand side resources be required to participate in the energy market?</p> <p>a. Must submit full range</p> <p>b. May submit full range</p> <p>c. Only submit discharge capability</p> <p>Please provide a rationale for your choice.</p>	<p><i>Storage assets should submit discharge capability and only submit for a full range if desired by a Market Participant. The discharge capability will give the AESO's system controller required information to enable dispatch and market participation.</i></p>
7.	<p>In regard to the full range market participation options, how do you feel the chosen option should land when trading off</p>	<p><i>Generally Greengate supports the AESO allowing market participants to have full range market participation as an option. Generally the scoring of the alternatives in table 6 seems slanted in favor of the options that are best for the system controller</i></p>

	technology agnostic treatment and complexity against participation flexibility?	<i>and less so for the market participant. Further consultation is required to fully unpack each option for evaluation.</i>
8.	Do you have any comments on defining the state of charge? Is there anything the AESO has not considered? Please explain.	<i>It seems reasonable, if not a burden on Market Participants, to allow the AESO to have visibility on the state of charge.</i>
9.	Do you have any comments on the commissioning requirements for storage? Is there anything the AESO has not considered? Please explain.	<i>The rule change proposed to allow the Market Participant to have two offer blocks should allow the assets to be commissioned in a reasonable fashion.</i>
10.	Do you have any concerns or suggestions on the energy storage market participation engagement process and timeline?	<i>Given the complexity of the issues, it would likely be beneficial to stakeholders if the AESO held smaller group sessions to allow more two way dialogue. This will enable some debate to occur that would not be possible in the larger consultation sessions and an improved understanding of each option.</i>
11.	Do you have any other suggestions or comments you would like to share with the AESO related to the Long-term Energy Storage Market Participation Options Paper or the engagement activities?	<i>Greengate advocates for a recognition on how connected the AESO storage tariff is with market rules and time significant changes appropriately. Greengate continues to advocate for a reasonable storage tariff.</i>

Thank you for your input. Please email your comments to: [energystorage@aeso.ca](mailto:energystorage@aeso.ca).

# Stakeholder Comment Matrix – Oct. 1, 2020

## Request for Feedback on Long-term Energy Storage Market Participation Options Paper



<b>Period of Comment:</b> Oct. 1, 2020 through Oct. 30, 2020 <b>Comments From:</b> TransCanada Energy Ltd. (TCE) <b>Date:</b> [2020/10/30]	<b>Contact:</b> <b>Phone:</b> <b>Email:</b>
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Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed matrix per organization.**
4. Email your completed comment matrix to [energystorage@aeso.ca](mailto:energystorage@aeso.ca) by **Oct. 30, 2020**.

**The AESO is seeking comments from Stakeholders with regard to the following matters:**

	Questions	Stakeholder Comments
1.	Are there additional issues to energy storage market participation within the current ISO rules that AESO did not identify?	Although not as urgent as those issues raised in its Options Paper, the AESO has yet to address the participation of energy storage as a transmission asset.
2.	Are there additional options to energy storage market participation within the current market structure that AESO did not identify?	Please see the response to #1 above.
3.	Do you agree with the evaluation of options?	There are certain evaluations that TCE does not agree with. Please see responses below for more detail.
4.	Is full range market participation an important priority for energy storage right now; or is half-range providing required market access? Should full range market participation be deferred for investigation and implementation at a future date?	While full-range participation is important for the ancillary services market, TCE sees no immediate need for full-range participation in the energy market. As per TCE's comments below, half-range participation is the preferred form of participation for the energy market. If full-range participation for the energy market remains an option, its consideration should be deferred to a future date.

<p>5.</p>	<p>Should Variable Energy Resources and Storage hybrids be permitted to participate?</p> <p>a. If no please explain why not</p> <p>b. If yes please provide a rationale as to why and how the dispatch variability issue should be addressed?</p>	<p>TCE anticipates that in many cases the primary motive to establish a hybrid asset would be to avoid unnecessary administrative charges (e.g., DTS charges and pool trading charges) when charging the battery from the variable energy resource. If these charges did not apply in this circumstance, there may be far fewer requests for the creation of hybrid assets, which may assuage the AESO’s dispatch tolerance concerns. Of course, care would need to be taken to ensure the carbon credits from the variable energy resource are maintained.</p>
<p>6.</p>	<p>How should storage and potentially other demand side resources be required to participate in the energy market?</p> <p>a. Must submit full range</p> <p>b. May submit full range</p> <p>c. Only submit discharge capability</p> <p>Please provide a rationale for your choice.</p>	<p>At this point in time, TCE sees no need for full-range participation in the energy market. If parties demonstrate a reasonable need for full-range participation, TCE does not object facilitating this need at some future date.</p> <p>However, TCE would object to a “must submit full range” requirement as this would significantly and unnecessarily limit the flexibility of a storage asset during its charging phase. Because bids and offers must be submitted 2 hours prior to the start of the hour, full-range participation would not permit an energy storage asset to optimize its charging phase since it could not respond to changing conditions in the 2- to 3-hour period up until the end of the hour. This would increase costs and pool prices. A requirement for full-range participation also raises fairness issues as it contrasts to the AESO’s treatment of other price-sensitive loads.</p> <p>With respect to evaluations, TCE questions the AESO’s evaluation for the design principles “maximizes participation” and “dispatch-ability”. TCE submits that under half-range participation, the charging phase of an energy storage asset is still participating in the energy market, although passively as a price-taker rather than as an active participant. Moreover, by limiting the ability of an asset to optimize its charging phase, full-range participation may act as a barrier to entry, thereby limiting participation.</p> <p>TCE understands the AESO’s dispatch concerns with half-range participation. However, TCE submits that like other price-sensitive loads, the AESO should be able to reasonably predict at what pool price assets will be drawing energy from the system. Moreover, for those energy storage assets directly connected to the transmission system, the AESO should know their charging levels when issuing a dispatch in the energy market.</p>

7.	In regard to the full range market participation options, how do you feel the chosen option should land when trading off technology agnostic treatment and complexity against participation flexibility?	As stated above, TCE submits that the preferred option is half-range participation. To the extent that full-range participation is implemented, TCE recommends the linked assets approach for the primary reason that it minimizes complexity.
8.	Do you have any comments on defining the state of charge? Is there anything the AESO has not considered? Please explain.	TCE agrees that “state of charge” needs to be defined and that the definition will need to reflect Alberta’s unique market structure. TCE will be able to provide more comments once the AESO proposes a specific definition.
9.	Do you have any comments on the commissioning requirements for storage? Is there anything the AESO has not considered? Please explain.	TCE has no comments at this time.
10.	Do you have any concerns or suggestions on the energy storage market participation engagement process and timeline?	TCE notes the implicit interconnections between this stakeholder process and the bulk and regional tariff stakeholder process. To the extent that the AESO has not already done so, TCE strongly encourages the AESO to establish an internal cross-functional team that ensures the two processes work in tandem with each other so that comments and issues raised in one process are considered in the other.
11.	Do you have any other suggestions or comments you would like to share with the AESO related to the Long-term Energy Storage Market Participation Options Paper or the engagement activities?	No comment.

Thank you for your input. Please email your comments to: [energystorage@aeso.ca](mailto:energystorage@aeso.ca).

# Stakeholder Comment Matrix – Oct. 1, 2020

## Request for Feedback on Long-term Energy Storage Market Participation Options Paper



<b>Period of Comment:</b> Oct. 1, 2020 through Oct. 30, 2020 <b>Comments From:</b> TransAlta Corporation <b>Date:</b> 2020/10/30	<b>Contact:</b> <b>Phone:</b> <b>Email:</b>
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Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed matrix per organization.**
4. Email your completed comment matrix to [energystorage@aeso.ca](mailto:energystorage@aeso.ca) by **Oct. 30, 2020**.

**The AESO is seeking comments from Stakeholders with regard to the following matters:**

	Questions	Stakeholder Comments
1.	Are there additional issues to energy storage market participation within the current ISO rules that AESO did not identify?	No comment at this time.
2.	Are there additional options to energy storage market participation within the current market structure that AESO did not identify?	<p><b>Full range participation should be voluntary and should combined the existing “may bid” framework with implementation of “half-range”.</b></p> <p>The AESO’s paper identifies what we may could be called the bookends of possible solutions. It does not identify all of the options between those bookends, which we believe should be considered for the option that is ultimately selected.</p> <p>For example, the AESO identifies full range options including a “B-Offer” option, which places a mandatory must bid requirement. We note that full range could be accommodated with the existing “may bid” option combined with the half-range option. We view this option as superior to the options that the AESO has identified in its paper.</p>
3.	Do you agree with the evaluation of options?	<p><b>It’s too early to evaluate the options; we should scope the problems, brainstorm and identify possible solutions and then assess them.</b></p> <p>No, we are not sure that the design principles that the AESO is evaluating options against is the right set of decision-making criteria. Even if this is the AESO’s decision-</p>

		<p>making criteria, we are concerned with assigning each “design principle” or criteria with an equivalently weighted. Additionally, we are concerned about the AESO’s subjective assessments using a 5-point scale as it creates an impression that a higher level of objectivity was applied to rate each option and when those rating are combined or used to assign an overall rating it can lead to misleading conclusions about the ranking of the alternatives.</p> <p>For example, a one-point difference in “dispatch-ability” is not necessarily the same as a one-point difference in “Minimize Complexity”. The “No grandfathering required” criterion does not lend itself to a 5-point scale at all as it only appears to have two responses (yes or no).</p> <p>While we appreciate that the AESO’s desire to advance to the evaluation phase expeditiously, we caution against doing so at this stage. While we do agree with noting the drawbacks and benefits of each identified option, we recommend that evaluation proceed after all of the alternatives raised by stakeholders are also included.</p>
4.	<p>Is full range market participation an important priority for energy storage right now; or is half-range providing required market access? Should full range market participation be deferred for investigation and implementation at a future date?</p>	<p><b><i>The AESO should continue to move forward with implementation that enables the full range market participation of energy storage.</i></b></p> <p>The Information Documents and existing ISO Rules have provided the clarity to allow energy storage to participate on a “half-range” basis.</p> <p>We understood the purpose of the Long-Term activities (in the one to two-year horizon) on the Energy Storage Roadmap was to formalize the ISO Rules to permit energy storage to be fully enable the integration of energy storage technology. We expected this forum to be the investigation and development of implementation of full range participation in the energy and ancillary services markets. For example, the exploration of energy storage to manage wind generation ramping (e.g. the load range of energy storage is an alternative to ramping down intermittent resources).</p> <p>We are also interested in exploring the use of Payment to Loads on Margin (part of the sub-hourly settlement market initiative), which requires the enablement of full range market participation. Energy storage is more likely than most other loads to bid into the market as these resources may be even more price sensitive to energy price – unlike other loads, whose economics of power consumption are tied to the economics of producing goods or providing services, the economics of charging decisions are entirely tied to the provision of source capacity and electricity.</p>

<p>5.</p>	<p>Should Variable Energy Resources and Storage hybrids be permitted to participate?</p> <p>a. If no please explain why not</p> <p>b. If yes please provide a rationale as to why and how the dispatch variability issue should be addressed?</p>	<p><b>Yes, Variable Energy Resources and Storage hybrids should be permitted to participate.</b></p> <p>We strongly disagree with the AESO suggestion that they may consider not permitting Variable Energy Resources and Storage hybrids from being able to participate. We note that the AESO had only recently provided clarity on “hybrid” configurations and how these assets can participate in the market. We are highly concerned having invested millions into a hybrid asset that just entered service a little over a month ago that the AESO is now creating new regulatory risk and uncertainty. We were directly impacted by the changes in the metering configuration for hybrid assets that the AESO decided upon with additional infrastructure that had to be procured in a matter of months during a pandemic. We see no justification for the AESO changing its course or view on the acceptability of hybrid assets when it directed specific metering infrastructure to enable these assets to participate in the market.</p> <p>The existence of an energy storage resource behind-the-fence of an intermittent resource does not increase the system demand variability (it may actual help reduce it). The only difference is that the energy storage asset can consume generation produced by the intermittent resource, which varies the amount of generation that is sent to the grid (and may reduce high levels of intermittent generation in the system when it isn’t needed). The AESO has full visibility of what the energy storage asset is doing behind-the-fence.</p> <p>In fact, the market participant must schedule charging that would be greater than the allowable dispatch variance of the intermittent resource by pricing those megawatts out of merit. In this respect, the system controller is made aware from offers from the intermittent resource when it is going to use the generation to charge the energy storage asset (those megawatts would be priced out of merit). Any charging that is within the allowable dispatch variance is too low to provide meaningful information to the system controller (and is visible to them in any event by the Supervisory Control and Data Acquisition (SCADA) data from the energy storage asset).</p>
<p>6.</p>	<p>How should storage and potentially other demand side resources be required to participate in the energy market?</p> <p>a. Must submit full range</p> <p>b. May submit full range</p> <p>c. Only submit discharge capability</p>	<p><b>No change should be made to the manner in which demand side resources are required to participate in the energy market today due to storage.</b></p> <p><i>Section 203.1: Offers and Bids for Energy</i> does not impose a requirement on load resources today to bid into the market. Rather, the rule permits a load resources the option to bid to purchase electricity at a bid price determined by the market participant. We are not aware of the active use of the option to bid by load customers currently or historically as such we expect that imposition of such a requirement on loads would be onerous and burdensome on those market participants. We see no justification for</p>

	<p>Please provide a rationale for your choice.</p>	<p>changing the rules for load resources due to the participation of energy storage resources.</p> <p><b>No requirement should be imposed on storage to submit bids; it should be voluntary just as it is for load resources.</b></p> <p>Energy storage assets should also be permitted to consume from the grid without scheduling ahead of time just as load customers currently are allowed to do. The energy storage resource is be charged the prevailing pool price on electricity consumed from the grid, which is reasonable and fair.</p> <p>Energy storage assets should be permitted to submit priced bids just like loads. This requirement should not be made mandatory on energy storage assets just as it is not mandatory on load resources. We believe that energy storage assets may be more inclined to bid into the market than loads particularly if the value of doing so is enhanced by the availability of a program such as payment to loads on margin.</p>
<p>7.</p>	<p>In regard to the full range market participation options, how do you feel the chosen option should land when trading off technology agnostic treatment and complexity against participation flexibility?</p>	<p><b>Full range market participation should be enabled but it should be voluntary not mandatory; voluntary load participation is already permitted, enabled by the existing systems, and provides flexibility participation in energy market participation.</b></p> <p>It is important to arrive at a model where full range market participation in possible. Fortunately, we think that option is already available with the existing framework and only has to be enabled for energy storage.</p> <p>As stated in our response to question 3 above, we are not sure that the “design principles” are the relevant criteria for making the decision. We do not see the fact that energy storage has a load and generation range as a level playing field issue or a deviation from the market treatment of all other participating technologies – it is just a recognition that there aren’t other resources that exhibit this characteristic.</p> <p>We disagree with how the AESO evaluates complexity. Complexity as proposed by the AESO is its assessment about what it believes market participants find intuitive. The fact that the AESO ranks this without stakeholder input really calls into question what design principles is truly evaluating. It appears that complexity is really an evaluation of the degree of administrative change such that any alternative that results in a change would be evaluated as more complex than not making a change at all. We find it highly intuitive to enable a resource that can participate in the market as a load to be enabled to do so in a similar manner as other load resources.</p>

<p>8.</p>	<p>Do you have any comments on defining the state of charge? Is there anything the AESO has not considered? Please explain.</p>	<p><b><i>State of Charge should be based on MWs available for the delivery/settlement interval not MWhs of stored capacity.</i></b></p> <p>Our understanding was that the State of Charge (SOC) was a term that the AESO felt needed to apply for the purposes of clarifying the Acceptable Operating Reason (AOR) specific to energy storage technologies for Available Capability (AC) restatements.</p> <p>More specifically, market participants are prohibited from misrepresenting the capability or operational status of a generating facility under the <i>Fair, Efficient and Open Competition Regulation</i> (FEOC Reg). With respect to an energy storage facility, SOC directly affects AC and without AOR that would permit the AC to restated down for SOC an energy storage facility would be out of compliance with FEOC Reg. In terms of this specific purpose, SOC is better reflected in terms of AC or MW derate to the capacity that is available for dispatch in the delivery hour. This is consistent with the FERC Order 841 language of “The State of Charge as a bidding parameter is the level of energy that an electric storage resource is anticipated to have available at the start of the market interval rather than the end”.</p> <ul style="list-style-type: none"> <li>• For example, a 25% SOC on a battery with an MC of 10 MW translates to an AC of 2.5 MW (for all batteries of the same MC irrespective of differences in storage capacity).</li> </ul> <p>We appreciate that this is different than the PJM definition which is measuring the MW-hours stored in the energy storage asset. While we cannot provide the reason for PJM’s different definition, providing the MWhs of stored electricity is not a very clear representation of AC. In fact, the system controller would then have to know the Maximum Capability (MC) of the battery and take the SOC based on MWhs to figure out whether the AC has been stated correctly. Moreover, we can see some potentially confusing interpretations that may arise due to differences in stored capacity.</p> <p>For example:</p> <ul style="list-style-type: none"> <li>• A 4-hour battery with a MC of 10 MW can store 40 MWhs. A 25% SOC (based on MWhs) translates to AC of 10 MW (100% of MC and no AC restatement required).</li> <li>• A 2-hour battery with a MC of 10 MW can store 20 MWhs. A 25% SOC translates to an AC of 5 MW (50% of MC and an AC restatement is required).</li> </ul> <p>As shown in the examples above, using a SOC definition based on MW versus MWh is more straightforward and easier to interpret.</p>
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9.	<p>Do you have any comments on the commissioning requirements for storage? Is there anything the AESO has not considered? Please explain.</p>	<p>We are confused by the AESO's reference to <i>Section 203.6: Available Transfer Capability and Transfer Path Capability</i> and more specifically to subsection 5 that deals with <i>Submissions of Interchange Transaction Bids and Offers by a Pool Participant</i> as the ISO Rule that creates an issue for storage facility commissioning. We do not understand how storage facility commissioning has anything to do with an interchange transaction or the why a storage facility would be making import offers or export bids when it is commissioning.</p> <p>That said, if the AESO interprets its rules as not permitting multiple offer blocks for storage facilities then it does present issues for commissioning testing. The AESO identified the need for at least two offer blocks as a solution. We note that this could also be dealt with if commissioning requirements was identified as an AOR, which would allow the storage asset to restate its AC to the amount that it would delivery in its commissioning testing (and then only one block would be required).</p> <p>We do not see the same issue per se with bid blocks. Energy storage should be able to choose to consume just as load does (which does not require prescheduling through bids). In commissioning testing, maintaining the commissioning schedule is likely the key decision driver rather than price as such the use of bids is just additional administrative burden for the market participant on top of the important activities that must be done to commission a new asset. We view this as providing limited value.</p>
10.	<p>Do you have any concerns or suggestions on the energy storage market participation engagement process and timeline?</p>	<p>No concerns at this time.</p>
11.	<p>Do you have any other suggestions or comments you would like to share with the AESO related to the Long-term Energy Storage Market Participation Options Paper or the engagement activities?</p>	<p><b><i>Energy storage tariff treatment needs to progress,</i></b></p> <p>We are concerned that tariff treatment for energy storage has yet to make any real progress but is a key impediment for the development of stand-alone energy storage. We would like to see this tariff work prioritized even ahead of the Long Term Energy Storage Market Participation Options.</p>

Thank you for your input. Please email your comments to: [energystorage@aeso.ca](mailto:energystorage@aeso.ca).

# Stakeholder Comment Matrix – Oct. 1, 2020

## Request for Feedback on Long-term Energy Storage Market Participation Options Paper



<b>Period of Comment:</b> Oct. 1, 2020 through Oct. 30, 2020 <b>Comments From:</b> Turning Point Generation (TPG) <b>Date:</b> <u>2020/10/30</u>	<b>Contact:</b> <b>Phone:</b> <b>Email:</b>
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Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed matrix per organization.**
4. Email your completed comment matrix to [energystorage@aeso.ca](mailto:energystorage@aeso.ca) by **Oct. 30, 2020**.

**The AESO is seeking comments from Stakeholders with regard to the following matters:**

	Questions	Stakeholder Comments
1.	Are there additional issues to energy storage market participation within the current ISO rules that AESO did not identify?	TPG suggests that the AESO should start engagement on the concept of “Storage as wires” market participation.
2.	Are there additional options to energy storage market participation within the current market structure that AESO did not identify?	See above response.
3.	Do you agree with the evaluation of options?	See following responses.
4.	Is full range market participation an important priority for energy storage right now; or is half-range providing required market access? Should full range market participation be deferred for investigation and implementation at a future date?	TPG believes that full-range participation of storage in the energy market is not a priority at this time. Half-range participation in the energy market coupled with the current full-range in the ancillary services market is the preferred market structure at this time. There may be a need to revisit this position in the future. See next responses for further information on this item.

<p>5.</p>	<p>Should Variable Energy Resources and Storage hybrids be permitted to participate?</p> <p>a. If no please explain why not</p> <p>b. If yes please provide a rationale as to why and how the dispatch variability issue should be addressed?</p>	<p>TPG submits that the main economic driver for VER/energy storage hybrids is primarily to avoid the current unnecessary DTS charges when charging from the grid. This is another example of the interconnectedness of the storage tariff engagement and AESO technical grid operations. For example, if the storage tariff was adjusted to reflect the unique nature of storage (“not a pure generator, nor is it a pure load” – as per AESO) then TPG believes there may be a significant decrease in the amount of VER storage hybrids and thus a reduction in the dispatch variability impacts which cause concern to the AESO.</p>
<p>6.</p>	<p>How should storage and potentially other demand side resources be required to participate in the energy market?</p> <p>a. Must submit full range</p> <p>b. May submit full range</p> <p>c. Only submit discharge capability</p> <p>Please provide a rationale for your choice.</p>	<p>TPG is strongly opposed to the “Must submit full range” option for the energy market at this time. This will further increase barriers for participation and increase costs of storage market participants through limiting the flexibility and responsiveness of the storage operations. TPG acknowledges the AESO’s concerns regarding dispatch variability however we note that there are other possible tools, such as appropriate tariff treatment (see above comment), which would alleviate this concern. As always, fair treatment is paramount and suggests that this concern should be addressed in the context of all price-sensitive loads.</p> <p>TPG believes that half-range participation in the energy market coupled with the current full-range in the ancillary services market is the preferred market structure at this time.</p>
<p>7.</p>	<p>In regard to the full range market participation options, how do you feel the chosen option should land when trading off technology agnostic treatment and complexity against participation flexibility?</p>	<p>Technology agnostic treatment and minimization of complexity should both be emphasized, however TPG does not support the full-range energy market options.</p>
<p>8.</p>	<p>Do you have any comments on defining the state of charge? Is there anything the AESO has not considered? Please explain.</p>	<p>TPG agrees that “state of charge” needs definition. Technology agnostic treatment needs to be addressed when contemplating its definition. Engagement on the definition would benefit from further understanding on how the AESO intends to utilize “state of charge” information.</p>
<p>9.</p>	<p>Do you have any comments on the commissioning requirements for storage? Is there anything the AESO has not considered? Please explain.</p>	<p>No further comments. TPG suggests that AESO has sufficiently considered the commissioning requirements.</p>

10.	Do you have any concerns or suggestions on the energy storage market participation engagement process and timeline?	TPG has a continued concern that this storage market participation process and the Bulk and Regional tariff process need an enhanced level of integration. For example, our earlier comments above identify interrelated issues which may result in a sub-optimal outcome for all stakeholders in each process unless further integration is achieved.
11.	Do you have any other suggestions or comments you would like to share with the AESO related to the Long-term Energy Storage Market Participation Options Paper or the engagement activities?	None at this time.

Thank you for your input. Please email your comments to: [energystorage@aeso.ca](mailto:energystorage@aeso.ca).

# Stakeholder Comment Matrix – Oct. 1, 2020

## Request for Feedback on Long-term Energy Storage Market Participation Options Paper



<b>Period of Comment:</b> Oct. 1, 2020 through Oct. 30, 2020 <b>Comments From:</b> Utilities Consumer Advocate (UCA) <b>Date:</b> 2020/10/30	<b>Contact:</b> <b>Phone:</b> <b>Email:</b>
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Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed matrix per organization.**
4. Email your completed comment matrix to [energystorage@aeso.ca](mailto:energystorage@aeso.ca) by **Oct. 30, 2020**.

**The AESO is seeking comments from Stakeholders with regard to the following matters:**

	Questions	Stakeholder Comments
1.	Are there additional issues to energy storage market participation within the current ISO rules that AESO did not identify?	<p>The UCA agrees and supports the AESO initiative to address the energy storage market participation within the current ISO rules and would like to bring the following considerations to the AESO's attention.</p> <ul style="list-style-type: none"> <li>- The UCA would like a better understanding of the scope of this analysis regarding whether the AESO is considering only the transmission-connected energy storage or distribution-connected energy-storage or both. The UCA recommends that the AESO provide separate analysis at both the distribution and transmission levels as there may be different technical issues and considerations for each level of connection. In this regard, we also recommend that the AESO clearly identifies and considers the market access and participation of behind-the-meter storage at the residential, farm, and small commercial level.</li> <li>- The UCA recommends that the AESO provide a jurisdictional review regarding how ES is treated in other jurisdictions and develop the pros and cons of each option that could be implemented in Alberta.</li> <li>- The AESO may also provide analysis regarding how the ES owns by distribution and transmission owner will be treated in the future. Distribution facility owners (DFOs) and transmission facility owners ("TFOs") could potentially own ES to provide ancillary services for grid reliability purposes and not for selling into the</li> </ul>

		energy market.. However, the UCA recognizes rules are also required for ancillary services in the distribution grid. The UCA recommends that AESO also considers a long-term initiative or coordination activity with DFOs that contemplate ES providing the ancillary service at the distribution system level.
2.	Are there additional options to energy storage market participation within the current market structure that AESO did not identify?	The AESO may investigate the options that other jurisdictions have adopted regarding the ES market participation and provide the pros and cons of those options that could be practical in Alberta.
3.	Do you agree with the evaluation of options?	The AESO may explain and evaluate the reason behind the dispatch variability issue more clearly when the variable energy resources and storage hybrids are permitted to participate and why this is not the case when these assets participate individually.
4.	Is full range market participation an important priority for energy storage right now; or is half-range providing required market access? Should full range market participation be deferred for investigation and implementation at a future date?	On page 5 of the report, it is mentioned that in the DSI, the AESO submitted "DER and Transmission Connected Generation (TCG) should continue to be treated consistently and is moving forward with the assumption that this will continue to be the case in the future". The UCA understands this statement is only related to the discharge period of the ES. It is important that the AESO continue to investigate the full range option in this initiative to clearly understand how the ES should be treated during the charging period, considering that the current bidding rules are designed for pure loads or exports. In this regard, the AESO may also examine how other jurisdictions treat the charging period of ES.
5.	Should Variable Energy Resources and Storage hybrids be permitted to participate?  a. If no please explain why not  b. If yes please provide a rationale as to why and how the dispatch variability issue should be addressed?	No comment.
6.	How should storage and potentially other demand side resources be required to participate in the energy market?  a. Must submit full range	No comment.

	<p>b. May submit full range</p> <p>c. Only submit discharge capability</p> <p>Please provide a rationale for your choice.</p>	
7.	In regard to the full range market participation options, how do you feel the chosen option should land when trading off technology agnostic treatment and complexity against participation flexibility?	No comment.
8.	Do you have any comments on defining the state of charge? Is there anything the AESO has not considered? Please explain.	The AESO needs a clear definition and administration process regarding the ES's state of charge in the ISO rules to ensure that ES participants will not game the state of charge calculation in an effort to manipulate market outcomes.
9.	Do you have any comments on the commissioning requirements for storage? Is there anything the AESO has not considered? Please explain.	No comment.
10.	Do you have any concerns or suggestions on the energy storage market participation engagement process and timeline?	It would be helpful if the AESO shares a summary of the expertise and key learning that the AESO received from the industry learning forum (ESILF) with other stakeholders in this engagement session.
11.	Do you have any other suggestions or comments you would like to share with the AESO related to the Long-term Energy Storage Market Participation Options Paper or the engagement activities?	See question 1.

Thank you for your input. Please email your comments to: [energystorage@aeso.ca](mailto:energystorage@aeso.ca).

## Introduction

The AESO values stakeholders’ feedback as a critical part of the processes we undertake to reach decisions and would like to thank all those who shared their perspectives with us in the Oct. 14, 2020 Long-term Energy Storage Market Participation engagement process.

The AESO has reviewed the responses provided by stakeholders and found the responses centered around four main topics. The topics were identified as follows:

- 1) Further information on hybrid assets
- 2) May bid vs Must bid within the full-range options
- 3) Scope of work for energy storage market participation
- 4) State of charge (SOC)

The AESO has prepared this document to summarize those topics and provide more information to increase clarity on its view of the issues and the relative options.

## 1) Further Information on Hybrid assets

### Hybrid asset vs co-located technologies

Based on the feedback received from numerous stakeholders, there remains some confusion as to the differences between a hybrid asset and a hybrid facility/site. In order to prevent further confusion, the term “co-located technologies” will be used to describe the nature of the actual physical equipment installed on a customer site. Storage co-located with solar or wind will be defined as co-located VER+ES.

Figure 1: Co-located technologies configured as independent assets (based on the ½ range participation model)

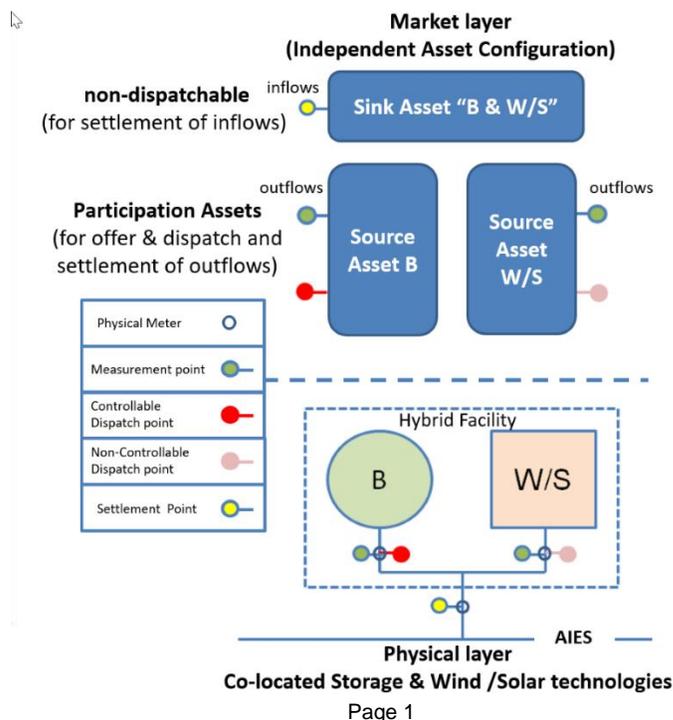
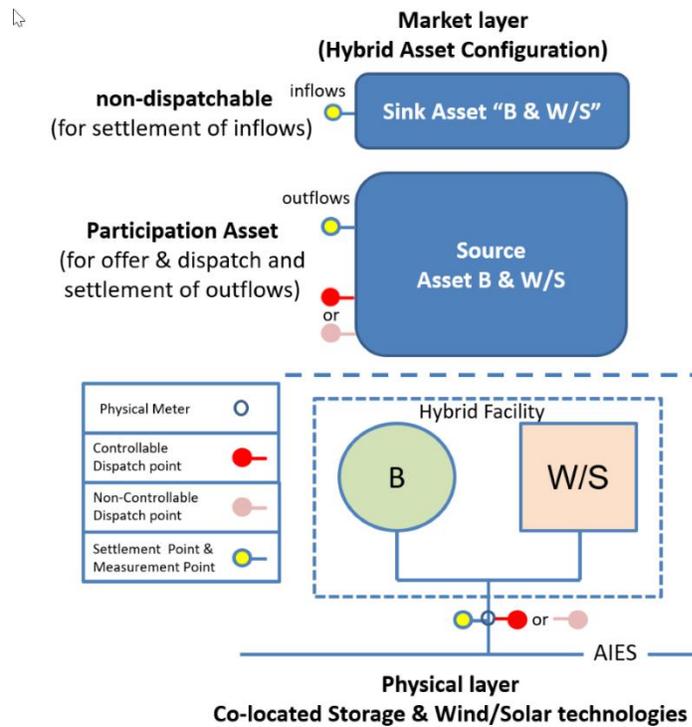


Figure 2 - Co-located technologies configured as hybrid assets (based on the ½ range participation model)



As illustrated in the figures above, co-located technologies are defined as multiple technologies that are located on the same site behind a single point of connection. These co-located technologies may be configured such that each technology is operated as an independent asset in the energy market, as in *Figure 1*. Co-located technologies may also be configured as a single hybrid asset when the pool participant chooses to operate the multiple technologies co-located on the same site as a single entity within the energy market, as shown in *Figure 2*. The choice of market asset configuration (hybrid or independent) depends on what makes the most sense for the operation of the asset. A pool participant should consider the following before choosing the market asset configuration:

- 1) An asset is not considered a hybrid asset if the storage and variable energy resource offers are made independently on a site with co-located technologies.
- 2) Metering determines how Demand Transmission Service (DTS) will be assessed, not the asset configuration. An independent asset configuration for co-located technologies, as shown in figure 1, may require additional metering in order to receive the same DTS treatment as the hybrid asset configuration for the same site.
- 3) The asset configuration decision is made by the Pool Participant provided the configuration is within the boundaries set by ISO rules and standards. Metering and SCADA requirements will differ based on that decision.
- 4) Pool trading charges are not impacted by the asset configuration decision. Trading charges are assessed at the settlement point located at the point of connection (POC), not at the dispatch point.

- 5) If the customer chooses independent connections for the resources on the same site it would not be considered co-located technologies, the resources on this site would be considered stand-alone assets.

Please see the more detailed explanation provided in the [short-term market implementation requirements for energy storage participation](#) paper published on April 9, 2020.

### **Reliability concerns caused by Variable Energy Resource (VER) hybrid assets**

Real-time energy market dispatches are the primary mechanism for the System Controller to maintain supply/demand balance. The System Controller relies on the must offer-must comply and energy delivery requirements within ISO rules for assurance that the volumes dispatched will be the volumes provided or withdrawn. With the introduction of wind and solar resources, the AESO developed a secondary means to maintain the supply/demand balance by requiring all non-controllable variable energy resources to convert meteorological (MET) data into a power forecast which becomes the expected energy delivery from these resources. This data informs the System Controller of the adjustment they will need to make the real-time dispatch. For a hybrid asset the System Controller cannot rely on the VER power forecast alone, as with the addition of the controllable storage resource, there is greater variation in the possible output from the site. The System Controller requires additional information to understand the behavior of the storage resource behind the hybrid asset to anticipate the output from the co-located technologies. The AESO only has full visibility if the storage is an independently dispatched asset and not a single hybrid asset. The AESO proposed two mechanisms in the [Long-term Energy Storage Market Participation Options Paper](#), the Variable Block Volume and Storage Only Participation, to obtain the required information in cases where storage is co-located with non-controllable wind or solar and configured as a single hybrid asset.

Under current ISO rules, co-located VER and storage technologies configured as a hybrid asset would be considered non-controllable from a dispatch perspective. The term non-controllable is not defined in the current ISO rules but is a simple way to indicate that the asset can be dispatched but the dispatched output is non-controllable. As part of the short-term implementation the AESO classified these new “co-located VER and storage technologies configured as a hybrid asset” as “wind and solar aggregated generating facilities”. Wind and solar aggregated generating facilities have large allowable dispatch variances, which consider the potential MW to set the lower end of the dispatch tolerance. The AESO cannot tighten the variances of VER+ES Hybrid assets because the potential MW will not be the minimum dispatch threshold if the underlying storage resource is charging. For example, co-located VER and storage technologies, each 50 MW in size, in a hybrid asset configuration submit a \$0/MWh, 100 MW offer. Because it is considered a non-controllable VER+ES hybrid asset, the allowable dispatch variance for this asset is 100 MW as it is not possible to set a lower threshold on the dispatch because the underlying storage resource could be operating anywhere between +50 and -50 MW allowing the output to be anywhere between 0 MW and 100 MW.

Some parties suggested that the System Controller learn the individual behavior of storage within the hybrid VER+ES asset in order to dispatch them. As a hybrid asset, SCADA may only be available on the net of the 2 resources and not individually, limiting visibility to the storage asset’s individual behavior. To effectively and sustainably enable the increasing numbers of hybrid VER assets, the AESO has identified the need to address this visibility and dispatch concern to maintain reliability. Additionally, other market participants should have the same level of visibility to be able to predict changes in net demand to support efficient market response. Tools like the current supply demand report or historical trading report would not include this information.

## 2) May bid vs. Must bid

Based on stakeholder feedback, the AESO recognizes it did not make it clear within the long-term energy market participation options paper, that the full range participation options are independent of the debate as to whether storage should be required submit its full capability into the energy market or allow for optional participation of the charging capacity. These full range options were intended to be improvements for storage resources recognizing that the underlying resource is not a separate load and generator operated independently, but rather it is an integrated system.

### Current bid requirements

The current ISO rules provide an ability for pool participants to submit an optional bid. It should be noted that there is no managed relationship or submission validation between the source offer and the sink bid in the current ISO rules unlike the full range options presented in the long-term energy market participation options paper. The two market assets (source and sink) are unrelated and independent. Storage participants may use the sink bid rules as they exist today, but the onus would be on the participant to ensure the offer and bid results in an effective dispatch sequence for the underlying resource. The AESO would like to clarify that if a pool participant chooses to bid, they would be required to follow the current participation rules, and the AESO would designate a dispatchable sink asset for some, or all, of its energy consumption. The pool participant would also be required to submit daily bids. The current “may bid” option is not “may submit a bid whenever the customer chooses”, it is a choice to participate in merit order dispatch on a continual basis by reducing consumption based on a System Controller dispatch of the bid and compliance to the instruction.

### AESO concerns with supply-side only participation

The long-term energy storage market participation options paper identifies some issues with supply-side only participation for energy storage. Dispatching a block on the merit order should result in a predictable response based on the size of the dispatched block. With energy storage half range participation, this is not always the case. At certain price levels, dispatching up a block may be partnered with a large demand response. For example, block zero of 20 MW at \$15/MWh is dispatched up by the System Controller. Because the price was below \$15/MWh prior to the dispatch, the storage resource was charging at 30 MW. In order to comply with the dispatch instruction, the storage operator moves the asset from -30 MW to +20 MW resulting in a 50 MW energy delta. Regardless if the System Controller anticipated the delta, the block must be dispatched according to the energy market merit order. The System Controller has now over dispatched because only 20 MW was needed. To rebalance supply and demand, the system controller must dispatch the block off. Should the storage operator resume charging because prices have dropped, it would result in “saw tooth” real-time prices. This outcome is not ideal for system operations, the energy market, or the energy storage operator.

Beyond dispatch variability and reliability considerations, there is a market power driver for full range participation. The must offer/must comply requirement was included as a market design mechanism to prevent physical withholding of dispatchable capacity to uncompetitively steer energy prices. Unlike loads, storage that is part of a portfolio of generation may be able to benefit from physically withholding dispatchable capacity by pricing out of the market and then choosing to charge at high prices to benefit the portfolio of generation. While the MSA can investigate such behavior, full range participation limits the ability for such behavior and prevents the resulting effects of this behavior on other participants.

### Limited flexibility

Stakeholder comments were received that the must submit full range requirement would limit the flexibility while charging. As is the case with the short-term implementation, storage resources in a full range participation model would have an acceptable operating reason (AOR) to restate should the state of charge drop to zero. The participant would restate the offers to discharge to zero but is not permitted to recharge until the system marginal price (SMP) is lower than the price of the lowest offer block. The only difference with full range participation is the SMP would drive the recharge rate because the recharge is based on the participants bids. Under a full range participation model, the AESO expects the full range dispatch would reduce net demand variability while providing clear and stable price signals for bidders to guide their consumption.

## 3) Energy Storage market participation scope of work

### What does participate mean?

As further background, all resources connected to the AES, which includes both transmission and distribution connections, that inject or withdraw power must exchange their energy through the power pool and are settled at pool price. The organizations that own or operate these assets are called pool participants. For a pool participant's asset to actively participate in the market, the asset must be 5 MW in size or greater regardless of their connection voltage. That said, assets less than 5 MW are still settled using the pool price, but do not have participation requirements. The energy market does not distinguish between assets connected at the distribution or transmission system. As such a separate connection-based analysis is not required.

The scope of this effort and the options presented are limited to active energy market participation only.

### Need for finalizing tariff treatment first

The AESO understands that tariff treatment may drive behavior in the energy market as there are both energy and wires price signals to consider. The Energy market participation model is designed so that the pool participant can consider all factors in their energy market submission provided the submission indicates what capacity is physically available and at what price that capacity should be dispatched at.

For the reasons stated above regarding DTS treatment, the AESO believes the participation model for storage can be developed independently from the tariff.

### Storage as a transmission alternative (SATA) and market participation

The work on SATA and market participation are not directly coupled and can be progressed independently. SATA will be addressed within a separate Energy storage roadmap initiative and is not part of the market participation scope of work. The AESO reported in the Oct 14, 2020 update that the AESO is conducting: Review of policy, technical and economic assessments, market impacts, procurement, transmission planning process and associated requirements for regulatory processes related to SATA.

Storage ownership by TFOs and DFOs is out of scope. As stated in the options paper, the AESO's assumption is "storage will be a market asset that may provide non-wires solutions, rather than a regulated asset capable of participating in the energy and AS markets." As such, there would be no regulated activities provided by assets participating in Alberta's deregulated electricity market.

## 4) State of charge (SOC)

The AESO does not see the SOC being used as an indicator of available capacity (AC) as is seen in some FERC jurisdiction markets. FERC jurisdiction markets are not real-time energy-only markets. Commitment decisions in those markets are made by the ISO based on multi-part offers and bids. Alberta's energy market allows resources to make their own commitment decisions. For storage, this means managing state of charge is the responsibility of the asset operator, not the AESO. As such, the AESO does not require state of charge be submitted as part of the offer or bid on a time ahead basis. The AESO does require state of charge as a SCADA data point for real-time operations. The AESO will also use this data to assess the Acceptable Operational Reason (AOR) provided by storage resources as part of our ongoing rule compliance assessments for restatements of the energy market submission.

State of charge will be used in the assessment of dispatch compliance where state of charge at 0% is considered an acceptable operating reason for restatement of the energy offer. State of charge cannot be used as the reason for a restatement if the state of charge is greater than zero. This is explained further in the short-term implementation located here. This is not anticipated to be changed as part of the long-term implementation. Further details on state of charge definition will be provided within the recommendation.

## Next steps

The AESO will be releasing a Long-term energy storage market participation draft recommendation in early 2021. We will be hosting a virtual engagement session in Q1 2021 where stakeholders will have the opportunity to ask clarifying questions on the draft recommendation prior to submitting written comments. In the meantime, if you have additional questions or comments, please email [energystorage@aeso.ca](mailto:energystorage@aeso.ca).