

# Energy Storage ISO Rule Amendments

## AESO Written Responses to Comments on Version 2.0 Definitions



Stakeholder comments	AESO Reply
<b>"allowable dispatch variance"</b>	
<p><b><u>Capital Power Corporation</u></b></p> <p>1. Capital Power supports the “technology-agnostic ADV” definition, however makes one observation and requests the following clarifications:</p> <ul style="list-style-type: none"><li>- Observation: the “technology-specific ADV” definition is not truly technology agnostic, as the definition of “non-controllable” is based on technology types. That said, Capital Power is unable to offer any suggestions to make the proposed definition <i>more</i> technology agnostic, as this may create unintended consequences for hydro, geothermal and other resources.</li><li>- Recommendation 1: remove the “or” and the second “(v)” defining ADV when the asset is dispatched outside the VER block should be labelled as “(vi)” for clarity sake when rules are quoted.</li><li>- Recommendation 2: Proposed requirements for “non-controllable” may create confusion. The AESO notes in its description that “if a source asset is non- controllable, by definition, the dispatch compliance is based on meteorological conditions”. However this is not clear in the proposed requirements for non- controllable assets under the ADV definition.</li></ul> <p><b><u>ENMAX Corporation</u></b></p> <p>2. There are two section (v)’s here.</p> <p>In the second section (v), the phrase “plus or minus [5 or 10]</p>	<p>1. The AESO agrees with Capital Power’s first recommendation.</p> <p>Regarding the second recommendation, meteorological conditions are considered in determining the “potential real power capability” of the source asset, which is measured in accordance with Section 503.16 via SCADA. Further, the definition of “non-controllable” references “solar and wind conditions”. An information document will be created to support the ADV definition.</p> <p>2. The AESO has corrected the numbering in the ADV definition. Subsection (vi) has also been revised to clarify that ADV is plus or minus [5 or 10] MW from the dispatch quantity.</p>

MW" is used, but the value against which it is measured is not stated.

**"automatic generation control"**

**ENMAX Corporation**

3. We suggest the following modification (delete the strikethrough text and add the underlined text):

"automatic generation control means the process of adjusting resources that produce or consume electrical energy in a balancing authority area, in response to a control signal from a central location, to maintain the balancing authority's frequency or interchange schedule plus or minus frequency bias; and may also or to accommodate automatic inadvertent payback and time error correction."

NOTE: the equipment would be an "automatic generation control device" or an "automatic generation controller."

**TransAlta Corporation**

4. Please clarify automatic generation control applies to loads (other than energy storage resources) that consume electrical energy.

- 3. The AESO agrees with ENMAX's recommendation to define AGC as a process versus equipment. The AESO has included new levels in the definition for better readability.
- 4. Load is considered a resource and is captured by the definition. However, not all resources (e.g., generating units, aggregated facilities, energy storage resources, load facilities) are able to perform automatic generation control.

**"automatic voltage regulator"**

**ENMAX Corporation**

5. We suggest an addition: "... that adjusts and continuously maintains the voltage level at the point of interconnection of

5. The AESO does not agree with ENMAX's recommendation as it is possible for the point of connection and the point of control to be two separate points.

"black start capability"	
<p><b><u>TransAlta Corporation</u></b></p> <p>6. Please clarify the intent of replacing “AIES” with “interconnected electric system”. Is the AESO implying that resources outside AIES but interconnected to AIES can supply blackstart capability (e.g., resources in other jurisdictions)?</p>	<p>6. “Interconnected electric system” is the AIES; however, the former is the proper defined term used in the CADG and legislation.</p>
“bulk transmission line”	
<p><b><u>ENMAX Corporation</u></b></p> <p>7. Is the use of “<u>bulk</u> transmission line” intended to distinguish bulk facilities from regional or local facilities? If so, the definition is circular because it uses the undefined term “bulk.” We suggest the following change: “transmission circuits composed of the conductors <del>that form the minimum set</del> required to <del>se</del> transmit electric energy.” The reason is that either: (i) transmission circuits can contain <i>more</i> than the minimum set of conductors, in which case such circuits would fall outside the definition; or (ii) the minimum set is, by definition, whatever the line contains, in which case reference to the minimum set is redundant.</p>	<p>7. The AESO will consider ENMAX’s comments as part of the upcoming engagement on bulk transmission line technical requirements (see the AESO’s <a href="#">March 10, 2023 letter</a>)</p>
“electric distribution system”	
<p><b><u>AltaLink Management</u></b></p> <p>8. Refer to the comments below about the AESO’s definition of “transmission facility”.</p>	<p>8. See AESO Reply #9.</p>
“energy storage resource”	
<p><b><u>AltaLink Management</u></b></p> <p>9. Energy Storage Resource is a defined term in the <i>Electricity Statutes Amendment Act (ESAA)</i>. The AESO uses the same term; however, it applies a different definition. AltaLink understands the AESO’s rationale for this alternate definition of</p>	<p>9. The AESO confirms that the definition of “energy storage resource” within the ISO rules is intended to apply only to energy storage resources that participate in the electricity markets and not to energy storage owned by a DFO or TFO.</p>

“energy storage resource” to be because the proposed storage rule is meant to apply only to energy storage resources that participate in the electricity markets and not to energy storage resources owned by a DFO or TFO as allowed under the *ESAA*.

Although AltaLink understands and agrees with the need to create a market energy storage resource definition, it disagrees with the definition proposed. First, applying a different definition to the exact term already defined in the legislation causes confusion and potentially disputes. Second, it is unclear to AltaLink whether the additional reference to “approved by the Commission pursuant to section 13.01 of the HEEA” would be enough to differentiate market energy storage resources from those owned by TFOs and DFOs. For example, at this point, it seems likely that the Commission could approve a TFO’s storage facility under section 13.01 as well as under section 14 and 15 of HEEA. Section 13.01(b) states that the Commission may make rules with respect to the procedures and processes applicable to locating, building, constructing and operating an energy storage facility. The definition energy storage facility in the *ESAA* is broad enough to cover market as well as DFO and TFO storage. AltaLink would expect that any TFO building a storage facility would need to consider, and follow where applicable, the Commission’s rules on storage facilities.

AltaLink suggests that the AESO create a specific definition for “market energy storage resource” that excludes energy storage resources owned by a TFO or DFO as allowed under the *ESAA* and the *Electric Utilities Act (EUA)* as opposed to using a definition already used in legislation.

**ENMAX Corporation**

10. The AESO has deleted the definition of “energy storage facility” but then refers to it, in bold, in its definition of “energy storage resource.”

Based on the AESO’s review of the *ESAA* and the interaction of the legislative definitions: (i) TFO-owned storage will be approved as a “transmission facility” under subsections 14 and 15 of the amended HEEA; and (ii) DFO-owned storage will be approved as part of an “electric distribution system” pursuant to subsection 25.1 of the amended HEEA. Therefore, the AESO is proposing to treat energy storage owned by TFOs and DFOs under these respective definitions for the purposes of the ISO rules. For this reason, the AESO considers that a specific definition for “market energy storage resource” is not necessary to distinguish wire-owned energy storage from energy storage that participates in the electricity markets.

The AESO has revised the definition of “energy storage resource” to refer to resources owned by pool participants, instead of the former reference to the *Hydro and Electric Energy Act*. References to “energy storage approved by the Commission” have been added back into the definitions of “transmission facility” and “electric distribution system”.

10. The reference to energy storage facility has been removed from the “energy storage resource” definition

<b>"generating asset steady state"</b>	
<p><b><u>ENMAX Corporation</u></b></p> <p>11. Assume an asset with a <math>\pm 5</math> MW ADV is redispatched from 100 MW to 150 MW at 13:04:00. At 13:09:50 its output reaches 145.1 MW, which is within the ADV band. At 13:10:10 its output falls to 144.9 MW, which is outside the band. At 13:10:30, it reaches 145.0 MW, and it remains within the ADV band till the next dispatch. In which 10-minute clock period is the asset deemed to have reached the generating asset steady state? See also the definition of "ramping."</p> <p><b><u>TransAlta Corporation</u></b></p> <p>12. The reference to "energy production" is overly broad and could be interpreted to apply to thermal or other forms of energy. TransAlta recommends that "energy production" be replaced by "electricity production".</p>	<p>11. In the example provided, generating asset steady state would be in the 10-minute clock period from 13:10 – 13:19.</p> <p>12. The AESO agrees with TransAlta's recommendation and has replaced "energy" with "electricity" in the definition.</p>
<b>"gross real power"</b>	
<p><b><u>Capital Power Corporation</u></b></p> <p>13. Capital Power recommends that the definition should explicitly state where gross real power would be measured for ES resources.</p> <p>Capital Power offers two suggestions to further clarify that the gross real power from an aggregated facility, which includes an energy storage resource, will be considered as the combined gross real power output from both the generating unit(s) and the energy storage resource(s):</p> <ul style="list-style-type: none"> <li>- Suggestion 1: Should "and/or" replace the first "or"?</li> <li>- Suggestion 2: Should the order of the roman numerals, such that "the real power measurement at the generator terminal" appear as first?</li> </ul>	<p>13. The AESO has revisited the definition and revised part (b) to clarify that gross real power for synchronous technologies (e.g., generating unit and energy storage resources) is measured at the stator winding terminals of the resource.</p> <p>Regarding Capital power's first suggestion, "or" is inclusive of "and" from a drafting perspective.</p> <p>The AESO agrees with Capital Power's suggestion 2 and has corrected the numerals in the definition.</p>

<p><b><u>ENMAX Corporation</u></b></p> <p>14. It appears that the locations of the numbers are incorrect. We assume this definition should read:  “gross real power” means: (i) for an aggregated facility, the sum of real power delivered at the collector bus; (ii) for a generating unit, the real power measurement at the generator terminal; or (iii) for an energy storage resource, the real power measurement at the low voltage side of the transmission system step-up transformer.</p>	<p>14. The AESO agrees with ENMAX’s observation and has corrected the numbering.</p>
<p><b>“in merit”</b></p>	
<p><b><u>ENMAX Corporation</u></b></p> <p>15. We suggest using “in a bid” instead of “for a bid” to maintain consistency with “in an offer.” Also, “(iii)” should not be struck.</p>	<p>15. The AESO agrees with ENMAX’s suggested revisions.</p>
<p><b>“incremental generation costs”</b></p>	
<p><b><u>ENMAX Corporation</u></b></p> <p>16. The wording “in the form of verified damages or liquidated claims dollar amounts or claimed by third parties” is confusing.</p>	<p>16. The AESO will evaluate improvements to part (v)(d) of this definition at a later date.</p>
<p><b>“maximum authorized real power”</b></p>	
<p><b><u>Enfinite</u></b></p> <p>17. The definition for energy storage resource needs to be updated as there is typically no stator windings associated. Enfinite recommends using the same definition from the aggregated facility with the measurement at the collector buses.</p>	<p>17. The AESO has revisited the definition and revised part (ii) to clarify that maximum authorized real power for synchronous technologies (e.g., generating unit and energy storage resources) is determined at the stator winding terminals of the resource.</p>

<p><b><u>ENMAX Corporation</u></b></p> <p>18. There are two (ii)'s. The first appears to have been struck in error, while the second should be (iii) and must be corrected, since not all energy storage resources have stator windings.</p>	<p>18. Please see AESO Reply #17.</p>
<p><b>“non-controllable”</b></p>	
<p><b><u>AltaLink Management</u></b></p> <p>19. As all forms of energy supply and/or consumption can be curtailed, AltaLink suggests the AESO reconsider the definition of “non-controllable” pool asset to be those assets which are not able to “increase energy production or consumption” and remove the reference to “decrease energy production or consumption” from the definition.</p>	<p>19. The AESO agrees with AltaLink’s recommendation to remove “decrease energy production or consumption” and has revised the definition accordingly.</p>
<p><b>“partially controllable”</b></p>	
<p><b><u>ENMAX Corporation</u></b></p> <p>20. Add an “s” to the first “resource.”</p>	<p>20. The AESO agrees with ENMAX’s editorial change and has revised the definition accordingly.</p>
<p><b>“transmission facility”</b></p>	
<p><b><u>ENMAX Corporation</u></b></p> <p>21. The definition refers to the high voltage terminal of the generation transformer. The definition should be modified to include the step-up transformers for generating units, aggregated facilities, and energy storage resources, and to exclude generating units, aggregated facilities, and energy storage resources. This will provide consistency with the definition of “point of connection.”</p>	<p>21. The definition of transmission facility aligns with the legislative definition in the <i>Electric Utilities Act</i>.</p>

<b>"aggregated facility"</b>	
<p><b><u>Capital Power Corporation</u></b></p> <p>22. Capital Power remains of the view that the AESO should provide more detail in the definition of an aggregated facility to clarify requirements and eligibility for a waiver &amp; variance as an interim solution to accommodate resources greater than 9 MW. This would provide more clarity and certainty for market participants.</p>	<p>22. Given the current size of inverter-based storage technology the 9 MW limit is not a constraint and the need for a waiver and variance around this limit is not required. The 9 MW limit is an important factor in the reliability of the system and the AESO will continue to monitor the appropriateness of this limit as technology advances.</p>
<b>"control centre"</b>	
<p><b><u>Capital Power Corporation</u></b></p> <p>23. Capital Power notes that the concerns we expressed in the last round of feedback have not been addressed in the proposed definition. In our view, the term “operating personnel” should be defined to make it clear that it excludes a dispatching center that simply relays operating instructions (and does not make decisions on operating instructions). The term “reliability tasks” should also be clearly defined in this same regard. This is important to ensure market participants have clarity and certainty around the rules to mitigate compliance risk.</p>	<p>23. The definition of “control centre” is used heavily in the Alberta reliability standards, but is only contained with three ISO rules. For this reason, the AESO prefers to evaluate Capital Power’s recommendations as part of the next stage of work to align the ISO rules and Alberta reliability standards.</p>
<b>"electrical islands"</b>	
<p><b><u>TransAlta Corporation</u></b></p> <p>24. The proposed language replaces “generation” with “energy production” but the term “energy production” is broader than “electricity production” and would include other energy products including oil, gas, and thermal energy. The AESO should consider replacing the term “energy production” with “electricity production”.</p>	<p>24. The AESO agrees with TransAlta’s recommendation and has revised the definition accordingly.</p>



<b>"maximum capability"</b>	
<p><b><u>ENMAX Corporation</u></b></p> <p>25. The definition references the requirement to comply with applicable ISO rules and the terms and conditions of the ISO tariff. Should it also refer to compliance with other government regulations?</p>	<p>25. In the AESO view, the definition of maximum capability does not need to refer to compliance other government regulations at this time.</p>
<b>"operational deviation"</b>	
<p><b><u>TransAlta Corporation</u></b></p> <p>26. TransAlta has no comments with respect to how operational deviations apply to source assets.</p> <p>TransAlta requests the AESO to clarify whether there are operational deviations that apply to sink assets given that the AESO's proposed definition of ramping applies to pool assets including sink assets.</p>	<p>26. "Operational deviation" only applies to offers by source assets. Please see AESO Written Reply #30 regarding the definition of "ramping".</p>
<b>"point of supply"</b>	
<p><b><u>ENMAX Corporation</u></b></p> <p>27. Either: "including a generating unit, aggregated facility, or an electric distribution system" or "including a generating unit, an aggregated facility, or an electric distribution system."</p>	<p>27. The AESO agrees and will remove the "an" in front of "electrical distribution system".</p>

<b>"pool asset"</b>	
<p><b><u>Capital Power</u></b></p> <p>28. Given the multiple overlapping definitions, the AESO may want to consider creating a Venn diagram or something similar that visually depicts the nesting, and/or overlap, of defined resources. This may save time and add clarity in the long-run.</p>	<p>28. The AESO will consider including a Venn diagram in an information document. See also the Long-term Energy Storage Implementation Recommendation paper post on the AESO's website.</p>
<b>"ramping"</b>	
<p><b><u>ENMAX Corporation</u></b></p> <p>29. Please see the question raised in connection with "generating asset steady state."</p> <p><b><u>TransAlta Corporation</u></b></p> <p>30. The proposed definition refers to the allowable dispatch variance for a pool asset; however, there is no definition of how the concept of the allowable dispatch variance is applied to sink assets. TransAlta asks the AESO to clarify how this ramping requirement is applied to sink assets given that the requirement itself has been extends to all pool assets including sink assets.</p>	<p>29. See the AESO's response to comments regarding generating asset steady state.</p> <p>30. The AESO has modified Sections 203.4 and 203.5 to better clarify the requirements for offer and bid dispatch compliance, respectively. As a result, the definition of "ramping" is no longer necessary and the AESO is now proposing to retire the definition from the ISO rules.</p> <p>The AESO notes that dispatch variance has been clarified within Section 203.5 for bids from controllable sink assets.</p>
<b>Other Comments</b>	
<p><b><u>Capital Power</u></b></p> <p>31. Capital Power was supportive of the AESO including a new definition for Fast Frequency Response Service and would like more information about the AESO's plan to accelerate work associated with addressing frequency-related matters now that it is proposing to remove the proposed definition.</p>	<p>31. As highlighted by the Reliability Requirements Roadmap, the AESO is preparing a near-term procurement for Fast Frequency Response service for a service term of 2025, or earlier. The AESO will be evaluating the ISO rules to ensure they support the FFR procurement product and submitting a single application to the AUC for all FFR changes, if required.</p>