Victorian System Strength PADR Q&A

Questions & Responses

AEMO Victorian Planning (AVP) is undertaking this Regulatory Investment Test for Transmission (RIT-T) to consider options that enable AVP to meet system strength standards. AVP has prepared this factsheet to provide information on the Project Assessment Draft Report (PADR).

While AVP has taken all reasonable care in the preparation of this document, the information should not be construed as advice.

Questions & Responses

Questions	Response
Options portfolios	
Can AVP consider opportunities to accelerate low regret investments?	AVP assessed bringing forward two new synchronous condensers, under Option Portfolio 4, which was found to not provide higher net benefits than the proposed preferred option, Option Portfolio 3. AVP is open to opportunities that might support the timely delivery of services to meet its requirements, and this will be considered through the procurement that will determine the combination of investments that deliver the best outcome for Victorian consumers.
Can synchronous generation/condenser retrofits be considered for system strength services?	All options, including converting existing synchronous generators and condensers to be able to operate in synchronous condenser mode, were considered. What is now more important is the procurement being open to all options to ensure the combination of investments delivers the best outcome for Victorian consumers.
If a grid-forming (GFM) BESS proposal does not meet the criteria to be classified as 'anticipated' or 'committed' but has land secured, a planning permit underway, a detailed enquiry response	Although it is predominately projects that have been determined as ‘anticipated’ or ‘committed’ that have formed part of the PADR proposed preferred option, due to their cost treatment under the RIT-T, the procurement process will be open to all

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obtained, and is about to start a connection application, would it be of interest for a future system strength tender?	options to ensure the combination of investments delivers the best outcome for Victorian consumers.
Can AVP share the outcomes of the option which investigated procuring existing services only? Why were these details not included in the PADR?	The PADR inputs and assumptions are drawn from the 2024 Integrated System Plan and associated 2023 Inputs and Assumptions Report and based on the *Step Change* scenario. As synchronous generators retire or are withdrawn from the market under that *Step Change* scenario, there comes a time when there are insufficient synchronous machines remaining to meet the system strength requirements. This can be seen in the PADR Net Present Value Model Results workbook, where from financial year 2033, involuntary load shedding is forecast due to the inability of the existing synchronous machines to meet the minimum fault level requirements.
How will AVP assess the contribution of a grid-forming BESS to meet the efficient system strength level, and will AVP consider different assumption, particularly if a GFM BESS can oversize to provide more capacity?	In the PADR studies AVP assumed that, if contracted for system strength services, a 250 MVA grid-forming BESS can provide system strength sufficient to support 500 MW of grid-following BESS, which is the equivalent of a 900 MVA change in available fault level. AVP considers this assumption to be appropriate for the PADR and PACR because it is based on a conservative review of existing research comparing synchronous condenser and grid-forming BESS contribution to a stable voltage waveform. In practice, however, differing contributions, justified through any future procurement processes may be considered.
Option Portfolio 3	
How does dispatch in the Reference Case compare with Figure 31 in AEMO's 2024 System Strength Report?	Figure 31 of AEMO's 2024 System Strength Report presents duration curves of the number of synchronous units projected to be online under the *Step Change* scenario in Victoria. AVP has compared these curves with the synchronous unit dispatch modelling results for modelled years 2026, 2027 and 2028. The synchronous unit duration curves of the two modelling pieces look very similar, with PADR modelling showing marginally

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	(typically zero to one unit) less synchronous unit dispatch overall. These marginal differences are driven by the differences in modelling assumptions where the 2024 System Strength Report utilised the bidding behaviour model for realistic bidding, but did not enforce operational unit commitment requirements, whereas the PADR applied synchronous unit commitment in line with the 2023 Inputs, Assumptions and Scenarios Report, but did not otherwise apply realistic bidding or utilise the bidding behaviour model.
Option costs	
In Table 6 of the PADR, there is no cost to contract GFM BESS in capital cost estimates for all options. Are these costs considered operating and maintenance expenditure and not included in the table?	AVP has not included a capital or operating and maintenance cost for these components in the analysis because these projects, and therefore their costs were included in the base case and are assumed to be sunk costs in the option cases. Whilst there may in fact be a contract cost for any procured services, these are considered a wealth transfer and that therefore do not impact the RIT-T assessment. No upgrade cost was assumed because AVP treated all new BESS as being GFM, based on recent connection enquiries and application information from AEMO's Victorian Connections team.
Can AVP provide any information on capital cost and lead times for synchronous condensers?	All synchronous condenser cost estimates have been sourced from the AEMO Transmission Cost Database (version number 4-0) and escalated to be in 2023-24 dollars, and include connection costs. AVP estimates build periods to be three years for synchronous condensers and two years for BESS, sourced from the 2023 Inputs, Assumptions and Scenarios Report, starting after a future procurement process contract award is complete.
Will AVP provide an update on new plant or asset build period lead time and cost estimates before publishing the RIT-T Project Assessment Conclusions Report?	AVP will monitor the release of public information that may be considered material to warrant revisiting the estimated build period time and cost estimates of new plant or assets identified in the PADR. However, given the robustness of the proposed preferred option, as demonstrated in the PADR, AVP considers

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	that being guided by the procurement process is more appropriate than updating assumptions ahead of the PACR publication.
Market modelling topology	
Does AVP think the proposed solution will be able to host 100% instantaneous IBR generation scenarios, or is there always a MW contribution from the thermal generation fleet (from within Victoria)?	The PADR inputs and assumptions are sourced from the 2024 Integrated System Plan and 2023 Inputs, Assumptions and Scenarios Report. These publications model scenarios where all coal generators are withdrawn from the Victorian system, and AVP has factored these assumptions in the assessment period in developing the PADR. Additionally, there is also a significant number of modelling intervals in last three years of the assessment period, when all Victorian coal has withdrawn, where there is also no gas generators operating, and so it is conceivable that the proposed preferred option portfolio would be able to host 100% instantaneous IBR.
Procurement	
What are the upcoming needs to address system strength issues in Victoria?	The preferred option portfolio in the PADR includes a total of five new 250 MVA synchronous condensers (or plant able to operate as a synchronous condenser), in addition to contracting one existing synchronous condenser and converting some existing synchronous generators to be able to operate in synchronous condenser mode. However, it is important to note that the procurement process will be open to all options to ensure the combination of investments delivers the best outcome for Victorian consumers.
What does AVP mean by spare (uncontracted) capacity under a phase 1 tender?	Initial procurement is planned to be a closed tender only to proponents of existing synchronous generators and existing synchronous condensers with spare (uncontracted) capacity. An existing synchronous condenser may have space capacity if it is not currently contracted to provide system strength, it is oversized relative to any system strength remediation requirement it provides for an associated inverter-based resource (IBR) connection or if it could be contracted during

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	hours where any IBR connection it is required to support is out of service. For example, AVP may be willing to contract a synchronous condenser, that exists to meet a solar farm's system strength remediation requirements, to stay online overnight when the solar farm is not operating.
Is coal eligible under proposed stage 1 tender?	Yes, proponents of existing synchronous generators and existing synchronous condensers with spare (uncontracted) capacity, regardless of fuel type, will be invited to participate in the Stage 1 closed procurement process.
What is the market sounding process likely to require?	AVP anticipates the details of a Phase 2 tender (for system strength services from new or converted assets) market sounding activity will be released in late-July 2025. AVP notes this timing may be subject to change.

Where can I find more information?

See AEMO's website for the Victorian System Strength requirement Regulatory Investment Test for Transmission (RIT-T). For any submission to the PADR or further enquiries, please contact AEMO via AVP RIT-T@aemo.com.au.