

# MASS Consultation – AEMO/DNSP Forum – DER Review

AEMO held a meeting with DNSPs following the publication of the Draft Determination and commencement of the second stage of consultation to gain feedback on the power system security risks identified.

## 1. Attendees:

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### Company

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AEMO

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SAPN

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Essential Energy

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ENA

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Citipower/PowerCor

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Energy Queensland

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## 2. Meeting Minutes

### 2.1.1.1.1.1 Note - For the purpose of this document:

- AEMO comments have been noted in black.
- DNSP and ENA comments in red.

### 1.1 Agenda

The meeting was requested by AEMO to obtain feedback and input from DNSPs regarding the power system security risks due to DER inverter behaviour, and the potential actions to address them.

AEMO presented the risks highlighted in the draft determination and discussed how to best engage with DNSPs to ensure that aggregated DER participation maintains a secure and reliable power system, particularly when DER inverters are enabled to deliver contingency FCAS during network disturbances.

All parties agreed that the meeting be recorded for the purpose of minutes only.

### 1.2 Items for discussion or Noting

AEMO is working with VPP providers on FCAS participation in a trial and AEMO would like to discuss some of the issues identified throughout and subsequent to the trial as part of the consultation process with the DNSPs.

There are a number of risks to power system security concerning AEMO and the purpose of the meeting was to seek input from DNSPs and understand any potential local distribution network concerns as a result of unexpected DER inverter behaviour.

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## 1.3 Overview of the draft determination

### 2.1.2. Measurement sampling rate for fast FCAS

AEMO Position:

- No changes to the data sampling rate requirement for fast FCAS providers ( $\leq 50\text{ms}$  resolution)

AEMO's assessment:

- Errors of up to 20% are introduced in the FCAS assessment process with measurements captured at slower sampling rate, resulting in the potential for under-delivery going unnoticed. For 100ms measurements, the error rate has been calculated as 3%.
- Integrity of fast FCAS would be compromised if FCAS providers were participating in the same market under different measurement arrangements. It would impact AEMO's ability to determine the needs of the power system to meet security responsibilities and the amount of FCAS to be procured.
- Power system security concerns with DER inverter behaviour (discussed further below) have been highlighted in the draft determination. AEMO has listed a number of risks and potential actions requiring a coordinated approach across the industry, particularly with DNSPs and aggregators.

### 2.1.3. Location of FCAS Measurement point

AEMO Position:

- No changes to the FCAS measurement point (net flow)

AEMO's assessment:

- Concerns with gaming and poor orchestration of DER if measurements are taken at the asset level. One example shared through the formal submission is when a residential battery system is negating the FCAS response from a controllable load such as a hot water system.
- Insufficient supporting evidence that changing the measurement point from the connection point (net flow) to the asset level would benefit the power system.

## 1.4 Discussions on DER inverter behaviour

Our initial view of key risks and potential actions associated with DER inverter behaviour have been collated in the draft determination. AEMO's view is that the risks associated with DER operating at a much larger scale must be considered. There are few issues today with small trials that may not be material, however we need to think more about the aggregation issues for the future. There are important coordination questions between AEMO, aggregators and DNSPs that need to be thought through to extract the full benefits of aggregated participation.

AEMO is seeking feedback on the materiality of the risk, experience with these issues and challenges to date, views on potential actions and advice on other risks which have not been identified.

### 2.1.3.1.1 Risks and potential actions

The updated AS/NZS 4777.2:2020 is intended to address some issues suspected to be influencing DER inverter disconnection

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rates, including better measurement and sampling, immunity to a broader range of plausible disturbances, and grid support capability. However, the behaviour of legacy inverters is a significant concern, as well as compliance of assets tested and certified to the updated requirements.

Inverters have certain functions and configuration such as volt-var response. A potential action is to reach agreement with the industry on the control hierarchy for participating inverters in the FCAS markets. The AS/NZS 4777.2:2020 has a section on specifying service prioritisation but what is lacking is an industry agreement on how the controls hierarchy could be set. Distribution networks have requirements such as export limits and volt-var settings, but a method to prioritise and manage local limits for aggregators is also required.

AEMO is in discussion with the CEC on ways to improve compliance. While CEC provided a submission to the MASS consultation, it did not include their views on inverter disconnection.

SAPN outlined that there is a high level of non-compliance across inverters which SAPN has been in discussion with the CEC on, but no way forward has been defined yet. There is a process to put penalties on installers and SAPN is working with the CEC on the legalities. In terms of compliance, SAPN is struggling as the issues persist. The number of new connections is increasing and there is a voltage management strategy and different initiatives planned. In terms of control hierarchy and the VPP integration trial, there are 9 different VPPs in SA, but only one major VPP is in discussion with SAPN on control hierarchy. SAPN is providing piecemeal exemptions in terms of FCAS provision. However, SAPN noted that it is very important to ensure that inverters are prioritising voltage support first, as per AS4777, and then play in the energy market and provide services such as FCAS.

AEMO requested SAPN to elaborate on the exemption.

SAPN stated that the latest exemption granted was for one VPP intending to participate in FCAS. Rather than limiting the amount of FCAS delivered by constraining the site export, SAPN is regularly having discussion with them to explore alternative options. They need to provide further monitoring and high-speed data to support further analysis and ensure there is no material degradation in the quality of supply to other network users in the area.

AEMO sought to confirm whether the exemption is reviewed often or remains in place throughout the trial.

SAPN clarified that the remains in place as part of a trial, and SAPN continues to monitor the low voltage network during the trial.

AEMO - How does SAPN envisage moving beyond the trial? Will there be connection agreements in place?

SAPN stated that connection agreements may be put in place but SAPN is looking at various options available to ensure that there is no material impact on the local network, especially at distribution transformer/feeder level. The trial is with one VPP, but once there are multiple manufacturers on the same network, some studies might need to put in place to ensure the reliability and quality of supply is not compromised for other network users. SAPN would like to work with AEMO and other DNSPs to find a way forward. Fundamentally from SAPN's perspective, each party will have its own interest. When it comes to DER, SAPN cannot go to the same level of detail required for sites exceeding 5 MW. SAPN considers that quality of supply and reliability of supply to all network users is important, and not just for VPPs. SAPN does not want VPPs to breach local network limits resulting in increased quality of supply complaints or even localised outages due to over-delivery of FCAS causing a local fuse to blow. SAPN's number one priority is for VPPs to satisfy the power quality response modes and maintain network limits. SAPN understands that AEMO's concern is related to lack of visibility and with the MASS setting the requirements, AEMO would be relying on FCAS from VPPs. Without a firm mechanism to understand how much VPPs can deliver and how compliance can be enforced, SAPN considers that system security is at risk and that all of these issues need to be looked at carefully by everyone including the manufacturers.

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SAPN pointed out that unlike FCAS providers connected to the transmission network, for DER there are constraints driven by quality of supply such as voltage, network limits such as thermal constraints on the local lines and transformer ratings to consider. VPPs will not be able to go beyond a certain capacity at times, and there are a lot distributed generating systems that are subject to local export limits. The last thing that SAPN wants is for AEMO to rely on FCAS from DER when most are constrained off due to local limits, and the system ends up with an FCAS shortfall. It is quite a complex problem that the industry needs to solve.

AEMO – One of SAPN's concerns is DER FCAS delivery overloading certain areas of the network and maximum export is capped to manage network limits. How are the export limits determined?

SAPN acknowledged that this matter is still under discussion. The limits depend on the size of the system and whether there are different levels of sophistication. SAPN requires SCADA for systems greater than 200 kW for example. Export limits are based on local area or site-specific constraints.

SAPN outlined that since there are now VPPs that deliver FCAS, a coordinated approach is required with inverter manufacturers and the people working on the bidding algorithm to consider the local limits imposed.

Essential shared SAPN's concerns, particularly on the issue of local limits constraining an FCAS response.

AEMO – It is expected that DER FCAS providers are aware of any export limits and reflect this in their FCAS offers.

SAPN asked if AEMO was considering expanding the NEMDE platform to consider distribution level local constraints?

AEMO confirmed that updates to NEMDE to add this functionality is not being considered at this stage.

SAPN considers it difficult for DNSPs to work out who gets a share of the available network when more than one battery/DER plays in the FCAS markets on a feeder with a limited capacity. Obviously, this is not an issue for transmission network customers as NEMDE will work out the dispatch amount for each customer depending on the best price outcome. Without a dispatch engine, it is not possible to guarantee the dispatch of a particular customer and SAPN has to work on the basis of the worst-case scenario, which results in the network capacity not being fully utilised.

AEMO confirmed that this was an area that AEMO is looking to explore with Ausnet and Mondo in another trial in VIC called Project Edge. The management of network limits needs to be well thought through as well as the implementation phase. AEMO is keen to engage with the whole industry on this matter.

AEMO outlines a risk of large changes in active power from embedded assets in the distribution network as a result of FCAS delivery and noted the importance of ensuring that distribution network limits are appropriately prioritised in the control hierarchy. There are no clearly defined processes nationally in terms of how the hierarchy works. There are also no pathways for aggregators to engage with DNSPs on how the hierarchy should be managed.

SAPN stated that most NSPs will be sharing the same concerns around network constraints and whether participants will limit their offers and asked if there are plans to move to a shared standard across the industry?

ENA responded their desire for the industry to stay on the same page and not have to replicate comms requirements and FCAS participation procedures across the NEM. Some consistency and harmonisation is desired. ENA stated that it is trying to progress this through The Distributed Energy Integration Plan (DEIP) from ARENA. There are 2 workstreams namely the Interoperability steering committee chaired by Lachlan Blackhall at ANU considering the cyber security aspect and communication standard. The Dynamic Operating Envelope working group also under DEIP is mostly customer focused but partly technical as well. The key takeaway is that work is being done, perhaps not as quickly as is required, but it needs to be pushed.

SAPN shared that customers are comparing what others are being allowed to do, without a complete understanding of why prior decisions were made.

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ENA added that the location in the network is an important factor which needs to be well understood.

SAPN is keen to have a common standpoint between AEMO and DNSPs.

AEMO noted that DEIP and other working groups are very important and a range of other trials such as the Evolve project and Project Edge will bring new learnings required for this coordination. Post 2025 reforms and the DER integration maturity plan which will likely come out of this work will need a coordinated approach.

AEMO considers it is quite pressing to have these frameworks in place to manage increased DER participation. A situational awareness of the impacts on DER on the power system is very important as it is not going to take long before material issues arise if these risks are not addressed.

## 3. Next Steps

- Minutes will be shared with DNSPs and published once they have been reviewed.
- AEMO will seek to refine the Final Determination to include the important issues and concerns discussed during this forum.
- Formal Submissions are welcomed.
- AEMO considers that the concerns around the risks identified in the draft determination are shared and the priority for AEMO is to work towards resolving the power system security issues through a coordinated approach with the industry.
- SAPN, Essential and Citipower/Powercor stated their interest in pursuing further discussion in a consultative forum.