

Q&A – MASS Consultation Stakeholder Forum

MEETING: MASS Consultation Stakeholder Forum #1
 DATE: Thursday, 4 February 2021
 TIME: 10:30am – 12:30pm
 LOCATION: Microsoft Teams
 MEETING #: 1

QUESTIONS RAISED IN THE FORUM WITH RESPONSES AS FOLLOWS:

Q#	Stakeholder	Question	AEMO Response
1	Reposit Power	Is AEMO the proponent of Option 2 change? Has AEMO written a NEO-based supporting argument for Option 2? How does Option 2 promote the achievement of the NEO?	<p>AEMO is not proposing one option over the other at this stage in the consultation.</p> <p>As per the Issues paper, AEMO has set out:</p> <ul style="list-style-type: none"> • Option 1: To leave the measurement requirements in the current MASS unchanged. • Option 2: To embed the measurement requirements that were tested in the VPP Demonstrations in the ongoing MASS. <p>AEMO will also consider any alternative options put forward by stakeholders, if sufficient supporting evidence is provided as to benefits, costs and operability.</p> <p>In assessing alternative options or variations, AEMO will consider:</p> <ul style="list-style-type: none"> • Potential to benefit consumers • Impact to power system security • Whether the FCAS compliance can be verified. <p>Section 2.4 of the Issues Paper details the principles to guide AEMO’s assessment of the options.</p>

2	Empower Energy	Of the two options presented, why are options demonstrated outside of the VPP trial not considered in this consultation paper?	<p>All options that were demonstrated in line with the MASS and the trial specification are considered as part of this consultation.</p> <p>The measurement requirements under Option 2 were trialled during the VPP Demonstrations and the conditions linked to Option 2 have been devised based on the learnings from the demonstrations. These measurement requirements have been proven in terms of AEMO's ability to adequately verify compliance in the events throughout the trial.</p> <p>Proposals for alternative measurement options will be considered through the formal submission process, however they need to include evidence-based justification, demonstrating that the provision of FCAS from DER can be reliably verified to identify non-compliances and whether FCAS has been genuinely delivered throughout the relevant time period.</p>
3	Enel X	Will the third knowledge sharing report be published before MASS submissions close?	The third knowledge sharing report ¹ was published on 9 February 2021, prior to the close of submissions.
4	Energy Networks Australia	Won't the requirement for very high time resolution data (50 ms), plus other requirements, in Option 2, make it prohibitively expensive for DER to deliver FCAS (particularly the aggregation of residential providers)? This would exclude residential-scale aggregation from participating in providing FCAS services, which seems contrary to the general attempts to integrate DER.	<p>For clarity, Option 1 is to retain the high-speed² metering capability in the current MASS and Option 2 uses the 1 second metering requirements currently being trialled as part of the VPP Demonstrations.</p> <p>As noted in the forum, there are different views regarding the implementation cost. AEMO will use any information provided through the formal submission process to help determine whether the cost of high-speed metering capability is an unnecessary barrier to entry for the six-second FCAS markets.</p>
5	Solar Analytics	For option 2, could you explain more about the interaction between the 50ms meter requirement (one per 5MW) and the 1s reporting required for each site? e.g. is each individual site meant to be internally sampled and controlled at 50ms resolution such that the response matches that	If the aggregated FCAS response is lower than the minimum required response from a VPP, the FCAS delivery from the site with the high-speed meter would be compared with the expected response for a single system. AEMO would then verify whether the proportional response was in line with the droop curve of the controllable device or if frequency went below the assigned trigger setting of the switching controller. To provide further clarification, the requirements refer to the measurement intervals only.

¹ Available: <https://aemo.com.au/-/media/files/initiatives/der/2021/vpp-demonstrations-knowledge-sharing-report-3.pdf?la=en>

² High-speed data refers to measurements made at 50 ms or less as per clause 3.6(a)(iii) of the MASS

		expected based on the 50ms freq measurements?	
6	Social Energy	In order to work out the implementation cost, can we get clarification on this point: Page 13: If the one unit per 5MW needs to have a measurement at the GRID, the BATTERY and the PV inverter (that's 3 meters), does EACH of these need to be 50ms? That's a huge amount of data (more than can run through a single RS485 connection). This would also mean that the "test" case is using completely different measuring hardware to the general VPP fleet.	<p>The ability to capture high-speed data of frequency, grid flow, battery power and PV inverter output by a single meter has been demonstrated by a participant in the trial.</p> <p>The requirement for high-speed data in the trial was for frequency only per region, and AEMO considers that this is not sufficient in terms of the ability to adequately verify FCAS compliance and identify remedial action.</p> <p>One of the learnings from the trial is that following the identification of an under-delivery of ancillary services from the aggregate using 1 second measurements, high-speed data for grid flow, battery power and PV inverter output provides AEMO with necessary information to analyse the extent of the FCAS non-compliance and likely rectification requirements. As a result, AEMO has included the grid flow, battery power and PV inverter output in the Option 2 proposal, and is seeking industry feedback on the overall approach.</p>
7	Energy Networks Australia	What is wrong with the status quo? If VPPs are currently successfully delivering FCAS, so why is any change required? Has the need for change been demonstrated?	<p>The status quo is one of the options (Option 1) being consulted on.</p> <p>VPPs can participate in the fast FCAS markets³ under the current MASS framework, and AEMO notes that current registered aggregated ancillary service providers with residential battery systems use a single technology provider. However, a number of additional providers have successfully demonstrated capability to provide 6-second FCAS using the Option 2 measurement requirements as set out in the VPP Demonstrations FCAS specification.</p> <p>Since considerable time has passed since the development of the measurement requirements for the VPP Demonstrations (June 2019), AEMO is revisiting the question of whether the existing MASS measurement requirements still represent a material barrier to FCAS participation from DER, as part of the current consultation.</p>

³ Fast Raise and Fast Lower contingency services as defined under Section 3.2 of the MASS

8	Reposit Power	<p>How is the 5 MW high-speed meter effective at confirming the response of the aggregate system? Does it need to be at a NMI that has a responding unit? Are the conditions and response at the 5MW meter's site considered to be the same conditions across every unit in the aggregate system? What is the justification for making that assumption?</p>	<p>As detailed above in response to Question 6, one of the learnings from the VPP Demonstrations is that following the identification of an under-delivery of FCAS from the aggregate using 1 second measurements, high-speed data for grid flow, battery power and PV inverter output provides AEMO with necessary information to analyse the extent of the non-compliance. The importance of the high-speed meter for every aggregated capacity of 5 MW is further explained in Section 2.3.2 of the Issues Paper.</p> <p>Under this proposal, the conditions and response at the high-speed meter site are required to be the same across all units of a particular technology in the aggregate system, and each type of controllable device requires a high-speed meter.</p> <p>A VPP cannot have a combination of systems that are switched and proportional for the same service under one DUID, as the requirement for initiating an FCAS response and the amount of FCAS delivered at the same frequency is significantly different depending on the type of FCAS controller. The same droop setting is assigned to the proportional FCAS controllers as well.</p> <p>A frequency injection test is completed for different types of controllable devices to confirm their individual response. It is assumed that similar types of controllable devices within the same VPP will respond similarly (droop response for proportional controller and initiation time for switching controller). A frequency injection test is completed on different types of controllable devices and a VPP wide test is also required under Option 2 to confirm whether the aggregated FCAS response is in line with the agreed settings for the FCAS controller.</p>
9	Reposit Power	<p>There are changes outlined to the measurement resolution only - are we to assume that any other measurement specification will be unchanged and out of scope for this review. E.g. resolution and accuracy.</p>	<p>The allowable error in the measurements of power and frequency, and the accuracy specified in the MASS remain unchanged under Option 2.</p> <p>Submissions can propose changes to resolution and accuracy for consideration and further consultation, but should include evidence-based justification for the proposal and information on costs, benefits and operability.</p>

10	Reposit Power	If the assumption underpinning option 2 is that high speed metering for DER is cost prohibitive, how has AEMO tested that assumption to either prove or disprove that assumption?	<p>Through the VPP Demonstrations, AEMO tested alternative measurement requirements with a view to lowering the barrier to entry for DER participants while at the same time testing whether alternative measurement requirements could be effectively used to verify FCAS compliance.</p> <p>As part of this consultation process and noting the considerable time that has passed since the development of the VPP Demonstrations requirements, AEMO has requested feedback on whether high-speed metering capability and cost now represents a material barrier to DER participation in the fast FCAS markets.</p>
11	Energy Networks Australia	Consumers, via the ESB P2025 process, are already possibly going to be required to invest in multiple NMI standard meters to provide services. Are we asking them to invest in further monitoring? And while cost is a barrier to participation, COMPLEXITY is also a barrier.	<p>As detailed in response to Question 1, AEMO is not proposing one option over the other, and is currently consulting with the industry to determine which option should be implemented.</p> <p>Minimising cost to consumers and managing power system security are AEMO's highest priorities.</p> <p>To clarify: Option 1 maintains the status quo, which means that only consumers with high-speed (50ms) meters at every inverter get the benefits of FCAS market participation. Option 2 uses the 1s metering requirements currently being trialled as part of the VPP Demonstrations, with a high-speed meter required for every 5 MW of aggregated ancillary service capacity per region.</p> <p>AEMO acknowledges that complexity can also be a barrier to entry and understands that there are different levels of complexity depending on the measurement requirements, type of FCAS controller and the controllable device itself. AEMO will consider stakeholder feedback on to what extent simplifying the requirement can reduce the barriers to participation while ensuring power system security is not jeopardised and compliance can be effectively verified.</p>
12	Yates Electrical	What happens when particular tech providers also don't provide access to control their API for FCAS?	<p>This issue is outside of the remit of the MASS.</p> <p>However, AEMO raised this matter in the rule change proposal for DER Minimum Technical Standards: 'For the system and markets of the future to operate efficiently, this minimum level of control functionality in platforms and devices must be consistent from the DER to the</p>

			<p>DNSP and AEMO, and ultimately once markets mature, to and from the VPP and DER aggregators. Unless the millions of devices respond in a consistent manner, and critically are tested to deliver this response, then the operation of this fleet is not secure, and customers may be locked into control platforms and providers without the ability to easily churn and take advantage of market competition.⁴</p> <p>The AEMC draft determination can be found here.⁵</p>
13	Energy Networks Australia	<p>What is the benefit of <1 sec data to AEMO? To customers? Versus the cost of meeting Option 2 requirements? Has AEMO undertaken a CBA?</p>	<p>Option 1 will allow AEMO to verify the delivery of the fast contingency services with a greater degree of accuracy, especially during complex events. It also allows for easier diagnosis of where an FCAS delivery issue or other system issue may exist. AEMO always prefers higher resolution data, since it simply provides a more complete picture of system performance. However, we recognise there is a need to consider a balance against the potential participation barriers associated with this requirement. AEMO also notes that potential fast frequency response services are likely to require data resolution faster than 1 second.</p> <p>Option 2 in the issues paper uses data with a resolution of <i>less than or equal to</i> 1 second which is generally captured by the inverter itself. The VPP Demonstrations allowed FCAS providers to measure at 1 second intervals on a limited basis as, at the time of developing the trial specification, high-speed metering was regarded as a material barrier. Since the VPP Demonstrations launched in July 2019, AEMO has been able to verify the delivery of the fast contingency services using data with a resolution of 1 second. The VPP Demonstrations knowledge sharing reports also explain how AEMO was able to identify FCAS under-delivery following power system incidents.</p> <p>AEMO did not complete a CBA as part of the VPP Demonstrations, as the focus was to establish whether VPPs could respond to a frequency disturbance and whether AEMO could effectively verify the FCAS delivery under alternative measurement requirements.</p> <p>Question 4 in the Issues paper asks whether there is any cost benefit if less stringent requirements are specified. AEMO is requesting the industry to provide detailed</p>

⁴ AEMO rule change request available:

https://www.aemc.gov.au/sites/default/files/202005/ERC0301%20RRC0037%20Rule%20change%20request%20pending_.pdf

⁵ <https://www.aemc.gov.au/rule-changes/technical-standards-distributed-energy-resources>

			information in submissions about the costs or benefits of both options (or a viable alternative proposal).
14	Social Energy	<p>Page 12: “Frequency injection test on every different TYPE of controllable device.” Define a TYPE – is the Inverter a TYPE, or is each different MODEL of inverter a TYPE. Or is a Hybrid inverter different from a non-hybrid? 1-phase different to 3-phase?</p>	<p>The type of controllable device refers to the different technology types and model of inverter.</p> <p>A hybrid inverter is considered a different type of controllable device than a non-hybrid one.</p> <p>A single-phase inverter would also be considered a different type of controllable device than a 3-phase inverter.</p>
15	Reposit Power	<p>MASS v6 outlines the principles of FCAS to be “...services that are essential to the management of power system security ... Contingency Services, which are enabled to ensure the power system can arrest and recover”.</p> <p>In the issues paper you have indicated that in some scenarios “the change in active power from the controllable device could be in line with the quantity of ancillary services ... however the power flow from or to the grid could show that the VPP under-delivered”</p> <p>As such you propose moving the measurement location.</p> <p>Are you concerned that the FCAS principles vs the issue AEMO has outlined and proposed solution appear to be at odds in terms of delivery to the power system? An efficient NEM would be one that delivers the appropriate outcomes to the power system and not “under-delivered”.</p>	<p>The MASS aims to ensure that the data used to verify the delivery of FCAS is an accurate representation of the quantity of service provided by the enabled device.</p> <p>Section 2.1.2 of the issues paper details the FCAS measurement location in the VPP Demonstrations, and refers to a scenario where, “the change in active power from the controllable device could be in line with the quantity of ancillary services enabled for the aggregated ancillary service facility, however the power flow from or to the grid could show that the VPP under-delivered”. This scenario illustrates how the current measurement requirement could misrepresent the FCAS delivered by the controllable device, because it cannot distinguish it from an independent response of load or PV at the NMI, which are not enabled to provide FCAS.</p> <p>AEMO agrees that an efficient NEM is one that delivers the appropriate outcomes to the power system. It is equally important that an FCAS provider’s delivery and compliance are determined on the basis of the droop setting or frequency trigger setting, in this case FCAS from the controllable device. However, AEMO notes Reposit Power’s point regarding the FCAS delivery to the power system and will consider this issue further through the formal submissions.</p>
16	Social Energy	<p>How will the MASS interact with AS4777.2:2020? The new AS4777 mandates a priority of responses and forces some grid support from every inverter. Will an FCAS</p>	<p>When delivering FCAS, the droop setting or the response from switching controllers is more aggressive than the requirement under AS/NZS 4777.2:2020. When enabled in the FCAS market, the participant must ensure that they will meet their FCAS requirements following a frequency disturbance.</p>

		contract take precedence over AS4777 response requirements?	
17	Social Energy	How can we get to a point where ALL DER devices have a standardised API - so a controller could feasibly control every type of inverter because every inverter would be required to receive the same "message". The costs trying to map and communicate with all of the different types of inverters means that only the larger inverter companies would be used in VPPs. It also means that larger inverter players can easily refuse to allow anyone other than themselves to control their systems.... stifling competition.	Refer to response to Question 12 for more details.
18	Reposit Power	If there is a requirement to provide grid flow under option 2, why not just measure at that point? what is the benefit gained by measuring each individual controllable device behind the connection point?	<p>The grid flow is required for compliance purposes to ensure that the FCAS response from the controllable device is genuinely delivered throughout the relevant time period. This is detailed in Section 2.1.2 of the Issues paper. However, as illustrated in the Issues paper, the grid flow alone may not indicate whether the FCAS provider's enabled device actually delivered the required response.</p> <p>AEMO encourages participants to provide a detailed formal submission with their perspectives and information relating to measuring the delivery of FCAS using the flow from, or to, the grid.</p>

19	Energy Networks Australia	But why does AEMO need 50 ms data? Has the need be demonstrated?	<p>Under the current requirements of the MASS, the measurement of power and frequency must be captured with a data resolution of less than or equal to 50 ms when participating in the fast contingency FCAS markets. Data with a high resolution is required to determine the inertial component of a synchronous generator's response to a change in active power during a frequency disturbance, since the inertial component from an ancillary service facility is excluded when determining whether a generator has delivered its FCAS requirements. High-speed metering is also used to determine whether the active power response from a synchronous generator during the first few seconds of a power system incident was impacted due to a voltage disturbance, which can result in reactive power being prioritised over active power. High resolution data is also highly useful in diagnosing FCAS delivery issues and in general the dynamic behaviour of systems especially during complex events.</p> <p>The FCAS assessments completed during the VPP trial have demonstrated that FCAS compliance for DER can be verified without high-speed data, at least for all events examined in the trial.</p>
20	Social Energy	Net metering ALONE does not work. If I have a battery I will charge it for 1 minute before my contract period so that my response looks larger (I won't need the battery to act by as much) during my contracted period. I could even turn the solar off just prior to my contract period. Similarly, if PV decreases while I'm trying to discharge a battery (a cloud comes over), discharging the battery will have a smaller "net" effect to the grid, so it may look like a VPP is not meeting it's contracted volume.	<p>This point is acknowledged under Section 2.1.2 of the Issues paper and is the reason that option 2 proposes that both the measurements of power from the controllable device and the flow from, or to, the grid must be captured.</p> <p>Refer to responses to Questions 15 and 18 for more detail.</p>

21	Reposit Power	<p>Is the only objective of FCAS metering to reliably detect under-delivery of FCAS? If so, why not apply it to all generation? Section 2.3.2 says it is inappropriate for larger generators to be Option 2 metered because they will have a larger change in MW/Hz. That suggests that FCAS metering is not only to detect under-delivery.</p>	<p>FCAS metering is used to verify FCAS compliance and to detect under-delivery. Every fast contingency FCAS provider must have high-speed metering capability under the current MASS.</p> <p>As detailed above in response to Question 19, data with a high resolution is required to calculate the inertial component of synchronous generators and to determine whether an ancillary service facility had to prioritise reactive power over active power if there was also a voltage disturbance during a power system incident.</p> <p>The inertial component from a facility is excluded when determining the FCAS delivery. As DERs do not inherently provide any inertia, 50 ms data is not required to calculate their inertial component.</p>
22	Grant Stepa (Independent representative)	<p>We can't assume that a site only has one DER device that will be used for FCAS. A site may have multiple DER appliances (Solar, Battery, Smart WH, Pool Pump etc) under HEMs orchestration reliant on connection point metering. In a situation where for instance a battery is NOT coordinated with other Smart HEMs coordinated DER (Smart Water Heater etc) serves no one, as a battery FCAS response may immediately be offset by the HEMs controller. Hence the need for LOCAL interfaces and LOCAL control enablement for all Smart DER on a site. Closed off local interfaces from certain battery providers that require round trips to clouds for control cannot continue under orchestrated DER sites that provide FCAS service from multiple devices on the site. Site Net metering is a must. That's my field experience to date.</p>	<p>A site can have multiple devices that deliver FCAS. Under option 2, a participant can choose to deliver FCAS at the device level. The option to measure at the connection point level is already allowed under the current MASS and will not be superseded even if there is an alternative measurement arrangement for DER.</p> <p>It may be suitable to only allow one FCAS participant per NMI but the issue of interoperability should be addressed in the DER Minimum Technical Standards rule change. AEMO recommended an interoperable approach in the rule change proposal which is now being considered by the AEMC. AEMO encourages stakeholders to engage in that the rule change process so that their perspectives can be considered.</p>

23	Social Energy	The hardware issue with 50ms readings is the comms. If the 50ms readings need to come from multiple meters, RS485 channels cannot handle the data volume. Making a 50ms meter (power or frequency) is easy and not expensive. Even at that accuracy for the frequency meter - no problem. Getting a reading from MANY devices is a problem, particularly if the data needs to be processed by a central controller for the house/site.	AEMO would like to understand through the formal submission process whether the comms can be upgraded and the cost to do so, in order to sample high-speed data from every site and provide this data for AEMO to verify FCAS compliance after a power system incident
24	Tesla	One other risk to flag re installing a high speed meter per 5MW is that they will likely be installed on customer properties. If a customer churns from their retailer, or opts-out of a VPP program, then that investment is likely to be lost.	If the meter is installed at a site that is no longer under the retailer's control for FCAS purposes, the FCAS provider would need to relocate the meter to meet the requirements under Option 2.
25	Reposit Power	DER doesn't do inertia response today. But it absolutely will in the future.	Potential future services such as synthetic inertia and FFR are likely to require measurements with a resolution much higher than 1 second. While this is out of scope for this consultation, it would seem prudent for FCAS providers to consider the future outlook for frequency response services in their decision making. Please notes that the MASS defines <i>minimum</i> requirements, and providers are free to implement solutions that exceed those requirements.
26	ERM Power	Will the 50 ms recorder only be required if the VPP or DER wants to supply fast services. Can the slow and delayed services be supplied with 1 sec metering. Does this not then allow potential service providers to choose what services they will register for?	Yes, the measurements of power and frequency with a data resolution of 1 second meet the sampling rate requirements of the current MASS for the slow and delayed services. AEMO notes that the allowable error and resolution of the measurements differ between the fast and slow/delayed services.

27	SwitchDin	How would the frequency injection test apply to switching devices that are aggregated in a controlled manner to provide a proportional response?	<p>The frequency signal in the test for a proportional controller or switching controller is the same. The MASS FCAS verification tool has the option to select whether the FCAS controller is proportional or switched.</p> <p>If the response from an individual device is switched but the overall VPP response is proportional, the minimum required proportional response will be compared with the actual response of the aggregate during the VPP-wide test.</p>
28	Evergen	A useful benchmark for how much additional cost that can be accommodated per site in a VPP is the income generated per site from participation in FCAS, given that per site participation is also limited by the end user making use of their battery for non-FCAS purposes. We are talking tens/hundreds of dollars per site per year, not thousands, and that is dependent on having sites ready to go during high price periods, which might not always be the case.	<p>AEMO encourages participants to provide a detailed formal submission with their perspectives and information relating to the cost of high-speed metering and whether or not it poses a barrier to participation in the FCAS markets.</p> <p>When specifying the cost of the high-speed meter, it is important to clarify whether this cost includes the development, purchase, installation and maintenance of the meter. As mentioned under Section 4 of the Issues paper, please identify any parts of your submission that you wish to remain confidential, and explain why. AEMO may still publish that information if it does not consider it to be confidential, but will consult with you before doing so</p>
29	Reposit Power	Presumably the "one high-speed meter per 5 MW" approaches a verification step - could we get clarity on how this is intended to be used?	Refer to response to Question 8