DER MASS Review Response

We are responding to the DER MASS review component only, in particular section 2.5 (screenshot below).

2.5 Consultation questions for DER participation

AEMO encourages stakeholders to submit their perspectives by answering the questions below. All views will be considered and AEMO will explain its positions on various matters transparently throughout this consultation.

1. Which option for the ongoing measurement requirements for DER described in Section 2.3 do you want AEMO to implement and why? Should any other options be considered?
2. Which option do you think is more consistent with the NEO, and why?
3. Should AEMO consider any principles other than those described in Section 2.4 to guide its assessment?
4. What is the difference in implementation costs, such as updating the communication links or installing additional equipment, for capturing data at a resolution of either 50 ms or 1 second for every NMI for different VPP facility types? Do you consider the cost difference to be prohibitive for participating in the Contingency FCAS markets? Please provide examples or analysis if possible.
5. Do you think that either of the options presented will result in more or less competition in the Contingency FCAS markets?
6. Are there any technical risks that you envisage if the Option 2 measurement requirements are allowed? How material do you consider those risks and how could they be efficiently mitigated?
7. Does the sampling rate of one second rather than 50 ms for Fast Contingency FCAS under Option 2 and the determination of the FCAS delivery at the inverter/controllable device level create market distortion or negatively impact the FCAS markets?
8. If Option 2 was adopted, should the changes to the measurement requirements of the MASS be limited to small-scale DER (under 1 MW per NMI), or should a different threshold apply, such as 5 MW? For example, what do you see as the risks and benefits of expanding these measurement requirements to other FCAS providers and in what circumstances might that be appropriate?

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Responses to each question:

1. **Which option for the ongoing measurement requirements for DER described in Section 2.3 do you want AEMO to implement and why? Should any other options be considered?**

Option 2 is a far superior option for VPP operation. From our experience, residential battery inverter tends to have >2s raising time (10% to 90% Pmax), partially because of AS4777 requirement, and partially because of technical limitation. Even if the meter is able collect 50ms interval data, the inverter's response speed is limited. Secondly, inverters are distributed in a big geographical area where frequency over the battery fleet will be quite different, based on each site. Additionally, a 1 second interval is similar to implementing an "inertia" into the fleet, which may be actually helpful as it will filter out some local frequency disturbances during the frequency event. Finally, 50ms interval data will become an unnecessary burden for communication network too as it requires 20x larger spaces to store and process all the data, in what is already a large data set. This limitation will not be noticed much at the current scale of VPP, but as we move into 100's of megawatts, this will require significant investment by VPP providers to handle all that data, and respond to the insights the data provides quickly. In traditional MASS setups it would not be an issue as 100MW can be supported by 1 site. However, 100MW requires 20000 sites when it comes to a residential VPP, and data transfer – or more specifically, the lag created by having thousands of sites pulling data and pushing commands in unison – is one of the biggest software development challenges of operating VPPs at scale.

Would be keen to have further discussion and check the necessity of have 1 fast meter for every 5MW VPP capacity per region. First it could be hard to define 1 region. If it's one state, frequency can vary a lot from site to site. I'm doubtful about the accuracy of using the fast meter as a baseline to evaluate the frequency detection across a range of sites. Secondly it conflicts with the "Same Type of FCAS controller" requirement as the FCAS controller normally is the inverter, which is the measurement equipment. It then requires a new model of inverter to be tested and certified by AEMO. Finally, it's not practical for commercial solar + battery sites either. It'll effectively incentivize the FCAS providers to split the fleet into small groups that are less than 5MW each. It brings no benefit to grid safety and stability at all but purely increases the admin workload for AEMO and the service providers.

2. **Which option do you think is more consistent with the NEO, and why?**

Option 2, as stated in Q1.

3. **Should AEMO consider any principles other than those described in Section 2.4 to guide its assessment?**

Safety of Battery Technology should be carefully considered too. Unlike most MASS participants who normally has its own sites and secured by fences, Most VPP providers are using Lithium batteries that sit in residential homes. Plus, FCAS normally requires maximum power charge & discharge where it could incur faults or even fires if the battery material is unstable. Any safety risks to homeowners could be detrimental to the VPP FCAS program.

Critically important is Server Location and Data Security: as the data of power usage are sensitive and data transmission to AEMO should be secured and reliable, it may need to consider requiring the participants' data server to be located in Australia and the data transmission should be limited within

Australia. More specifically, the data flow from the inverter, to VPP provider, and to AEMO should all be done within Australia – without any data being sent overseas.

4. **What is the difference in implementation costs, such as updating the communication links or installing additional equipment, for capturing data at a resolution of either 50 ms or 1 second for every NMI for different VPP facility types? Do you consider the cost difference to be prohibitive for participating in the Contingency FCAS markets? Please provide examples or analysis if possible.**

Currently, our VPP is capturing data in 1 second intervals. Keeping the data requirement at this level will be no issue and we can continue to offer our current VPP products to the market.

However, moving to 50ms would require two main things:

- Upgrade to our software infrastructure
  - Initial development cost (estimated at an additional $85,000)
  - Ongoing software maintenance (estimated at an additional $135,000 per year)
  - Additional data and server costs (estimated at an additional $27,000 per year)
- Ability to collect that data on-site
  - We aren't product manufacturers so we don't know the exact cost here. However, it's fair to say that this will add significant development cost which will make the batteries more expensive to the end user – potentially outweighing the benefits of joining a VPP.

5. **Do you think that either of the options presented will result in more or less competition in the Contingency FCAS markets?**

Option 1 will significantly lower competition in the market because:

- Few **manufacturers** will be able to deliver 50ms data response from the product side. Those that will, will be charging a premium for their products which prevents customers from adopting them in the first place.
- With 50ms data requirement, **VPP operators** will be required to invest more heavily in data management and software infrastructure which will essentially require heavy investment to get underway. This would limit the VPP operators to the large well-funded companies, and prevent the smaller, more start-up style companies from participating and innovating.

6. **Are there any technical risks that you envisage if the Option 2 measurement requirements are allowed? How material do you consider those risks and how could they be efficiently mitigated?**

We do not see any risk with Option 2.

7. **Does the sampling rate of one second rather than 50 ms for Fast Contingency FCAS under Option 2 and the determination of the FCAS delivery at the inverter/controllable device level create market distortion or negatively impact the FCAS markets?**

No inverter level sampling (aka Option 2) would be the best option because it helps to tell how much power inverter and battery output. It would also be the simplest plugin method on the current load forecasting modules that AEMO has.

8. **If Option 2 was adopted, should the changes to the measurement requirements of the MASS be limited to small-scale DER (under 1 MW per NMI), or should a different threshold apply, such as 5 MW? For example, what do you see as the risks and benefits of expanding these measurement requirements to other FCAS providers and in what circumstances might that be appropriate?**

For most of the new house and land development sites, it's around 400 homes. If they are doing an embedded network, each home with 5kW inverter + battery, it would still all fall under one NMI and the total size would be higher than 1mW. Using a 5mW capacity will be better if AEMO wants to accommodate embedded networks to provide FCAS services going forward.

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