

## Attachment 1 – Detailed Response

**Question 1.1: The primary focus of these trials is to demonstrate VPP aggregating battery storage systems. Do intending participants envisage incorporating demand response resources into your aggregated portfolios, and should this be incorporated into the VPP Demonstrations?**

We agree that demonstrating the ability of VPPs to aggregate battery storage and deliver aggregated services would be beneficial. This would allow us to gain an understanding of the impacts of aggregated battery control on the market and networks for both battery import and export conditions, and help define the appropriate communication channels needed for both network and market optimisation.

Demand response could be a significant service that VPPs offer, and should therefore be included in this trial. This demand response may provide wholesale or network services, both of which should be tested in this trial.

The trial should also include a diverse range of customers including residential, SME, Commercial and Industrial to understand the information and co-ordination requirements across all participants. This should explore the extent to which the cost, efficiency and technical characteristics of the aggregated system can be optimised to meet a specific market request.

We believe there is a need to incorporate the role of networks in enabling VPPs to provide services – whether for a local or wholesale market – with different coordination models currently being explored through the Open Energy Networks Project.

**Question 2.1: Are these objectives logical and achievable? Should any other objectives be considered for these VPP Demonstrations?**

Identified below are some suggested additions (in blue) to the proposed objectives, to recognise the needs of networks and the VPPs themselves. We have also included an additional objective, which focuses on ensuring that a diversity of customers and energy sources are considered through this trial.

### **Proposed objectives**

1. Allow participants to demonstrate basic control and coordination capability for VPPs providing market services in the NEM relating to both energy and FCAS.
  - a. VPPs operate unscheduled
  - b. Assist AEMO to determine systems and capabilities needed to support VPP market participation, potentially as a scheduled resource
  - c. Assist relevant DNSPs to determine systems and capability needed to support VPP market participation
2. Develop basic systems and capability to provide AEMO and DNSPs with operational visibility of VPPs to understand their impact on network power quality and power system security, and how they interact with the market.

- a. AEMO will establish an API – allow submission of operational forecasts and actual performance data
  - b. Define the operational information required by VPPs to be able to make informed decisions about the bids that they will submit – services, price stacks, etc...
  - c. Inform potential data challenges and opportunities regarding VPP operation
3. Assess current regulatory arrangements affecting participation of VPPs in energy and FCAS markets, and inform new or amended arrangements where appropriate.
    - a. Operate under current regulatory framework
    - b. Draft specification for DER to provide contingency FCAS
    - c. Understand the distribution level need for services (to maintain power quality) and define these services – locational, raise and lower, etc
  4. Develop an approach that does not exclude participants (provides access to all participants), allowing VPPs to include a diversity of customers – residential, SME, commercial, industrial – and energy sources to:
    - a. understand the information and coordination requirements, and challenges across all participants
    - b. determine the suitability of each of the different customer/DER types in providing different services

The VPP trial could also be expanded to enable a deeper focus on defining and demonstrating the role of networks, and the interaction required between networks and AEMO, in coordinating VPPs.

***Question 2.2: How can projects involved in the VPP Demonstrations better capture consumer insights, and improve customer experience and outcomes?***

As indicated earlier, the trial should involve a broad variety of customers to understand the expectations, priorities and behaviours of different customer segments.

Customer insights that could be captured as part of the trial include:

- How the customer responded to requests for demand response.
- Whether the proposed energy cost savings were realised and met customer expectations.
- The effectiveness and clarity of communication channels from the retailer-aggregator-customer perspective.
- What was the customer’s experience when called upon for demand response? Were there any unexpected impacts on the customer?
- How did the customer usage patterns shift to effectively deliver to DR market requirements and performance expectations?
- What value do customers place on electricity? How much do they expect to be paid to provide DR services?
- Were there any reliability or power quality issues experienced from the network whilst participating in the trial?

***Question 2.3: Is AEMO’s high-level approach to the VPP Demonstrations appropriate? What other arrangements could be tested under the VPP Demonstrations framework?***

The VPP Demonstration appears to cover the appropriate issues. Other considerations that could be covered in this trial may include testing and demonstrating:

- The range and extent of optimisation that is able to be achieved for each of the VPPs entering into both the scheduled and non-scheduled market. This should include a diverse range of customers including residential, SME, Commercial and Industrial to understand the information and co-ordination requirements and challenges faced across all participants. The diversity of applicants could also be considered down to the device level, including the control of air conditioners within the VPP to provide DR services.
- The management of generation across a diversity of locations to adapt to changing locational system conditions, and the ability to maintain a stable supply and adequate response with regards to ramp up and ramp down requirements.
- The extent to which the VPP is able to optimise the cost, efficiency and technical characteristics of the aggregated system to meet a specific market request.
- The mechanisms required to manage the synchronised switching of Demand Response across a network. Potentially, this may involve the development of a Load Management Protocol.
- AEMO’s proposed approach to applying marginal loss factors for dispatch and settlement of energy storage systems.
- Different methodologies for baselining customer energy consumption, and assessing whether different methodologies may be required for different types of VPPs. For example, a VPP consisting of residential customers may require a different baselining methodology compared to a VPP consisting of commercial and industrial customers.
- The additional value that can be obtained by including Aggregators in the provision of market services.
- The different services able to be provided by scheduled and non-scheduled VPPs.

As indicated earlier, the trial could also be used to investigate the interaction between network, at both a transmission and distribution level, and market operations to define the role of the network in enabling VPP participation in the market.

***Question 4.1: AEMO would like the aggregated VPP dataset to be refreshed every five minutes to align with its operational forecasting function. Are VPP operators able to provide this data on a 5-minute refresh basis?***

We have the capability to provide aggregated connection-point level data for each VPP on a 5-minute refresh basis through web API. This would be provided post the 5-minute interval.

Consideration should be given to the size (MW) and scheduling capabilities of the VPP when determining the frequency of data uploads, and what is a cost efficient approach for each of the customer segments (residential, SME, C&I).

A central dataset could be utilised for:

- Transmission and distribution system modelling, to build a common understanding of network performance.
- Aggregators and customers to validate the services provided and the value/revenue obtained.

***Question 4.2: Should the values be reported as an average value across the 5-minute interval, or an instantaneous value at the end of the 5-minute interval, or both?***

We believe that an average value is likely to provide a more reflective indication of each customer's usage profile across the entire 5-minute interval.

The provision of an instantaneous value would need to be assessed in terms of the benefits and use of the data, compared with associated cost implications, including how this may change with technology and accuracy.

***Question 4.3: What is the appropriate frequency for VPP operators to submit the device level dataset to AEMO? Is there a material difference in resources required to upload the data on a daily, weekly, or monthly basis?***

We suggest that daily datasets are appropriate and do not create additional resource requirements given the use of APIs.

Having insight down to the device level as AEMO have articulated will be valuable to understand and share learnings with NSP's where it is pertinent to system security, and to facilitate knowledge sharing around the results of the demonstration.

It is, however, our understanding that the VPP operator will be responsible for meeting the performance standards and dispatch targets at the connection point. Operationally, this raises the question of the need for AEMO to have visibility beyond the connection point.

***Question 4.4: Are there any regulatory or other obstacles to participants facilitating the data sharing arrangements contemplated in this section?***

Data sharing arrangements must have regard to privacy requirements and commercial sensitivities. An agreed schedule of data describing access arrangements should be prepared prior to program commencement. Particular care should be taken when considering data that identifies (or can be used to identify) locations. Where the data identifies a residential address there are clear privacy considerations and where the data identifies a commercial consumer the information may prejudice the commercial interests of the aggregator.