

AEMO Open Energy Networks Consultation Paper

Section	Consultation Question	Submission
2. Path-ways for DER to provide value	1. Are these sources of value comprehensive and do they represent a suitable set of key use-cases to test potential value release mechanisms?	<ul style="list-style-type: none"> • Customers by being able to store and release energy can benefit by real-time pricing of power. • Active DER could support smart grids that provide regional resilience against power outages.
	2. Are stakeholders willing to share work they have undertaken, and may not yet be in the public domain, which would help to quantify and prioritise these value streams now and into the future?	Yes, I have initiated an open source project to develop an End User's Energy Management System (EMS). The EMS will monitor and manage energy production and usage and support forecasting behind-the-meter. However, it has not reached the point where any data is being collected.
3. Maximising passive DER potential	1. Are there additional key challenges presented by passive DER beyond those identified here?	
	2. Is this an appropriate list of new capabilities and actions required to maximise network hosting potential for passive DER?	Passive DERs should be encouraged as much as possible to become active DERs. Perhaps by incorporating energy management into building codes.
	3. What other actions might need to be taken to maximise passive DER potential?	An essential pre-requisite for a consumer to plan and size a battery installation is being able to monitor usage both overall and time of day. A low-cost open EMS device could support this. Being non-proprietary is essential for connection to inverter and battery equipment and controllable appliances from competing manufacturers.
4. Maximising active DER potential	1. Are these the key challenges presented by active DER?	Rather than a VPP a better model for managing DERs could be an Aggregator model. In this case control of the VPP is not centralised but retained

		<p>in the End User's Energy Management System (EMS). The EMSs would be polled by the Aggregator to predict their production, usage and trading intent based on notional ranges of spot prices. The Aggregator then sets the spot price to balance supply with demand.</p> <p>Most consumers would prefer to retain control of their home network albeit with trading rules set-up to respond to price signals.</p> <p>As a bonus an EMS can provide many other potential benefits by controlling IOT smart devices. These are additional incentives to install such a device and join an aggregation scheme.</p>
	<p>2. Would resolution of the key impediments listed be sufficient to release the additional value available from active DER?</p>	<p>No. The Aggregator model in contrast could largely remove the unpredictability issue by EMSs forecasting 'behind-the-meter'.</p> <p>Aggregation could be controlled at any level to achieve local network load balancing coupled with local connected generation capacity and storage.</p>
	<p>3. What other actions might need to be taken to maximise active DER potential?</p>	<p>Rules are needed to establish various spot markets that prosumers can participate in via their aggregator.</p> <p>An interface would need to be established between AEMO systems and the aggregators to provide network feedback and negotiate trading outcomes.</p>
	<p>4. What are the challenges in managing the new and emerging markets for DER?</p>	<p>The average DER owner could not be expected to actively monitor and participate the various new markets. The 'behind-the-meter' EMS would need to operate with set rule parameters. The initial set-up would probably require the</p>

		<p>assistance a new class of technicians trained by the aggregator.</p> <p>DER Owners would also need to be assured that their privacy and security is not compromised by collection and analysis of their usage data.</p> <p>A way for DER owners to trade peer to peer and in other services through an aggregator outside of a retailer needs to be legislated and facilitated.</p>
	5. At what point is coordination of the Wholesale, FCAS and new markets required?	<p>Coordination is required immediately to enable them to operate outside the incumbent retailers.</p> <p>An initial low level of participation would enable the business model, business rules and systems to develop while limiting the potential impact on the network.</p>
5. Frameworks for DER optimisation within distribution network limits	1. How do aggregators best see themselves interfacing with the market?	<p>The EMS has a web browser user interface that is accessible from the home LAN and remotely over the internet via SSL.</p> <p>The aggregators could communicate with the market operator and the EMS home management systems by API over the internet via VPNs using for example web sockets.</p>
	2. Have the advantages and disadvantages of each model been appropriately described?	Yes.
	3. Are there other reasons why any of these (or alternative) models should be preferred?	<p>The two tier model seem to be better for managing the network as a set of interconnected local sub-networks. The DNSPs could include utility scale battery storage to assist load balancing at a macro level and support islanding of the sub-network.</p> <p>The role of the Aggregator(s) is to orchestrate the DERs and provide predictability of usage</p>

		<p>and supply and to make the market for DERs to trade. Care should be taken to decouple DNSPs and Aggregators so that a monopoly situation does not occur at any level and the integrity of the real time markets is maintained. In each of three models the Aggregator is shown tied to the FRMP. This need not be the case. Consumers could split their custom between one or more FRMPs and a spot market operated through the local DNSP. FRMPs would offer stable tariffs at a higher overall cost, while the spot market would enable prosumers to maximise the return from their investment in generation and storage equipment. The standard usage and feed-in tariffs would provide back stops to the spot market. It should always be cheaper to buy from the spot market and more lucrative to sell to the spot market.</p>
6. Immediate actions to improve DER coordination	1. Are these the right actions for the AEMO and Energy Networks Australia to consider to improve the coordination of DER?	Yes especially the standards for DER monitoring and management.
	2. Are there other immediate actions that could be undertaken to aid the coordination of DER?	Work with governments to remove legislative barriers and promote competition such as ensuring separation of DNSPs and Aggregators.