AGL Energy Limited
T 02 9921 2999
F 02 9921 2552
agl.com.au
ABN: 74 115 061 375

Level 24, 200 George St
Sydney NSW 2000
Locked Bag 1837
St Leonards NSW 2065

Dr Stuart Johnston

General Manager, Network Transformation

Energy Networks Australia

Submitted by email to: info@energynetworks.com.au

---

10 August 2018

Dear Stuart

AEMO ENA Open Energy Networks Consultation

AGL Energy (**AGL**) welcomes the opportunity to respond to the Australian Energy Market Operator (**AEMO**) and Energy Networks Australia's (**ENA**) Open Energy Networks consultation on *how best to transition to a two-way grid that allows better integration of Distributed Energy Resources for the benefit of all consumers* (**Open Networks Paper**).

AGL is one of Australia's leading integrated energy companies and the largest ASX listed owner, operator and developer of renewable generation. Our diverse power generation portfolio includes base, peaking and intermediate generation plants, spread across traditional thermal generation as well as renewable sources. AGL is also a significant retailer of energy, providing energy solutions to around 3.5 million customers across Australia.

AGL is continually innovating our suite of distributed energy services and solutions for customers of all sizes. These behind-the-meter energy solutions involve new and emerging technologies such as energy storage, electric vehicles, solar PV systems, digital meters, and home energy management services delivered through digital applications.

The energy sector is principally responsible for delivering an essential service to customers. However, as Australia's energy markets continue to evolve, customers are playing an increasingly active role, driving a shift away from the traditional linear supply chain towards a more decentralised and bi-directional market.

In AGL's view, the electricity grid of the future will be a gateway to multiple competitive platforms that enable a range of markets for customers. AGL considers that the energy market transformation presents an important opportunity to empower customers to more fully participate in the broader energy market. At the same time, these developments are presenting new challenges for the safe and reliable management of distribution networks. Distribution networks were originally designed for one-way flows and expenditure may be required to accommodate the increasingly bi-directional nature of energy flows.

While the market is in its embryonic stage, AGL welcomes the ENA's intention to develop test use cases for the market's consideration. However, we would urge caution on designing any prescriptive market model at this point in time given the early stage of development.

AGL Energy Limited
T 02 9921 2999
F 02 9921 2552
agl.com.au
ABN: 74 115 061 375

Level 24, 200 George St
Sydney NSW 2000
Locked Bag 1837
St Leonards NSW 2065

In our view, each of the models presented in the Open Networks Paper preference different interactions between market participants. Given that the markets' understanding of orchestrated business models for aggregation, such as that of Virtual Power Plants (**VPPs**) and peer-to-peer trading, it is difficult to predict which market model is optimal.

We acknowledge that the increased uptake of DER assets across the NEM will have ongoing implications for the management of local distribution networks and at the system-wide level. Nevertheless, AGL considers that there is substantial scope for distribution network businesses to manage these issues.

An important example of this is the management of voltage levels. We would welcome the opportunity to engage further with the ENA and AEMO to develop an appropriate action plan on how this issue could be proactively managed in the short to medium term.

Should you have any questions in relation to this submission, please contact Kurt Winter on 03 8633 7204 or KWinter@agl.com.au.

Yours sincerely

Con Hristodoulidis

Senior Regulatory Strategy Manager

AGL Energy Limited
T 02 9921 2999
F 02 9921 2552
agl.com.au
ABN: 74 115 061 375

Level 24, 200 George St
Sydney NSW 2000
Locked Bag 1837
St Leonards NSW 2065

ATTACHMENT

1. Pathways for DER to provide value

AGL generally agrees with the sources of value associated with distributed energy resources (**DER**), as articulated in the Open Networks Paper.

In our view, for the majority of the time, customer-owned DER installed behind-the-meter is likely to be employed directly for meeting the consumption needs of the customer. This encompasses the primary sources of value from passive DER in terms of self-consumption and passive exports.

Active DER also presents opportunities for customers to realise additional sources of value through:

a) participation in in the National Electricity Market (**NEM**) with the assistance of an aggregator/ retailer to provide energy, Frequency Control Ancillary Services (**FCAS**) and any other services;

b) bilateral agreements outside of the NEM, again with the assistance of an aggregator/ retailer to sell DER services outside of the market, including network support, services to AEMO and peer-to-peer energy trading.

AGL has been embracing innovative business models and services focused on DER asset solutions that are based on optimising value streams. In our view, orchestrating customers' DER assets will enable customers to realise the full benefit of those assets while also benefiting the broader electricity system. By modifying the overall volume and shape of demand, DER can be deployed and operated to avoid or delay more expensive augmentations to the network and/ or peak pricing events in the wholesale market. Further, smart inverters and local sensing devices can enable the provision of voltage and frequency services back to the distribution network and is an associated benefit of DER.

AGL's virtual power plant (**AGL's VPP**), co-funded with the Australian Renewable Energy Agency (**ARENA**), seeks to demonstrate the value that grid-connected batteries can create for a range of stakeholders when managed as part of a coordinated virtual power plant. Once complete, AGL's VPP will include 1,000 smart, connected batteries installed behind-the-meter, with a combined nameplate output of 5 MW and an energy storage capacity of around 12 MWh. The project seeks to enable the 'stacking' of multiple value pools and demonstrate at a commercial scale the value that distributed energy technologies (solar and batteries in particular) can provide. Importantly, all grid users stand to benefit from such an arrangement through the increased use of renewables reduced spending on network infrastructure with the transition towards localised generation and improved grid stability.

AGL's VPP was featured in the final Finkel Blueprint as a case study for the effective orchestration of solar and storage to provide multiple services in Australia's evolving energy system. We also presented AGL's VPP to the Commonwealth Standing Committee on the Environment and Energy in the context of its Inquiry into modernising Australia's electricity grid.

AGL has also engaged in a range of other innovative initiatives that draw upon customers' DER assets and rely on the various value streams to support customer consumption motivations and behaviour, including:

AGL Energy Limited
T 02 9921 2999
F 02 9921 2552
agl.com.au
ABN: 74 115 061 375

Level 24, 200 George St
Sydney NSW 2000
Locked Bag 1837
St Leonards NSW 2065

- *Peer to peer trading technology:* AGL has been actively supporting the development of peer to peer (**P2P**) trading. In 2017, in collaboration with IBM Australia and DER advisors Marchment Hill Consulting as well as ARENA, AGL funded a desktop trial to investigate how blockchain distributed ledger technology could enable households with a mix of solar panels, batteries and 'smart' air conditioning to trade or share excess electricity they generate. AGL also launched a trial in South Australia enabling our customers to share energy for financial and - for the first time - social gain. Via a prototype app, it empowers customers to partner with their peers to make efficient use of their solar and batteries and manage their household energy.
- *Solar Command*: AGL developed Solar Command in FY15 to enable monitoring of production from customers' systems. This subscription service can identify potential performance problems and help optimise solar energy generation, savings and energy use. In FY16, this monitoring was made accessible via the AGL Energy App, allowing our customers even greater insight into their energy usage. AGL Solar Command Check was also launched in FY17 (and made available to customer from mid-July 2017). This is a free service, that will enable customers with Active Stream digital meters to receive regular health check status updates giving guidance on the working efficiency of their solar systems.
- *Electric Vehicles*: AGL is invested in the development of the Australian EV market through our Electric Car Plan, which allows customers to charge their electric car, whenever they like and as often as they like for $1 per day. As part of our Electric Car Plan, we also offset emissions associated with our customers' EVs at home through our Future Forests Program. AGL is currently trialling remote EV charging management during peak events for a number of privately owned EVs in New South Wales through our Managed for You program.[1] Our Managed for You program is part of a nationwide initiative administered by ARENA and AEMO to deliver a three-year demand response pilot project. The NSW Government has provided additional funding to the initiative for projects that are based in NSW, such as AGL's EV trial. Demand Response contributes to the stability for the electricity system by reducing discretionary energy use at times when demand spikes, such as during summer heatwaves. Notably, the technical solution for AGL's EV trial has been developed by Australian start-up business Chargefox.[2]

2. Maximising passive DER potential

We consider that further analysis is needed to understand the opportunities and potential challenges associated with the increased uptake of DER assets on the management of local distribution networks and at the system-wide level. We also consider that there is substantial scope for distribution network businesses to manage voltage issues.

We note that the Open Networks Paper references SA Power Networks' Salisbury Battery Trial (**Salisbury Trial**) to depict some of the challenges that DER presents to the local network and at the system-wide level. In our view, the Salisbury Trial is not truly representative of how a virtual power plant model would function in a dynamic market. Energy storage systems would not be limited to

[1] See further AGL's Managed for You program at https://aglsolar.com.au/managedforyou-ev/. For further information about the national initiative see Dan Silkstone, 'Keeping the lights on in NSW, one smart meter at a time' (16 October 2017), Available at https://arena.gov.au/blog/demand-response-agl/.

[2] https://chargefox.com/.

AGL Energy Limited
T 02 9921 2999
F 02 9921 2552
agl.com.au
ABN: 74 115 061 375

Level 24, 200 George St
Sydney NSW 2000
Locked Bag 1837
St Leonards NSW 2065

charging only in the lead up to a peak demand event, and there may be opportunities for batteries to engage in overnight charging.

We also note that distribution network businesses have a range current options available to manage the integration of DER assets, including on issues such as voltage. In our recent experience with AGL's VPP, high voltage levels in many parts of the distribution network regularly affected some customers by making their energy storage system (**ESS**) systems inoperable. During voltage excursions, customers' inverters disconnected from the grid, making them unavailable to the VPP. At times when customers were exporting power into the grid, voltage levels increased further. However, our analysis also revealed that grid voltage levels across the grid were generally too high regardless of whether customers were exporting solar. These findings are consistent with the broader industry's current understanding of the issues associated with network voltage, which have been actioned by a range of legislators and distribution network businesses.

In our view, there are a range of options available to network business to manage this issue and thereby enable the smoother integration of DER assets. These include lowering automated voltage settings at the zone substation level for customers experiencing the highest voltages (thousands of customers at a time) and implementing manual tap changes at the local distribution level for approximately hundreds of customers at a time.

We consider that in the short to medium term, distribution network businesses and legislators should be focused on proactively managing voltage. We note that some jurisdictions have implemented changes to statutory voltage limits, enabling distributors to lower average network operating voltage and thereby accommodate greater reverse power flows. We have also observed examples of distribution network businesses proactively reducing voltage in a dynamic fashion, and through discussions with network businesses understand this to be the likely solution implemented into the future. Where distribution networks businesses have limited visibility of voltage levels in their network, we would encourage them to facilitate visibility through appropriate data sharing contractual arrangements with energy service providers engaged in the operation of virtual power plants.

3. Maximising active DER potential

Consistent with our observations above in the context of passive DER potential, in the short to medium term we consider that there is substantial scope for distribution network businesses to manage voltage levels to maximise active DER potential.

In our experience with AGL's VPP, high operating voltage levels across the grid leave a very narrow headspace for any anticipated increases in voltages. This continues to expose our customers who are seeking to access wholesale value.

We also consider that the connections framework for DER continues to present barriers to customers seeking to more actively engage in the energy market transformation. Based on our advice to the Australian Energy Market Commission (**AEMC**) in the context of its Distribution Market Model consultation, customers expect to be able to easily connect new distributed technologies behind-the-meter. However, there are different application processes and technical criteria applying across different distribution zones. These cumbersome and lengthy application processes create a barrier to the easy connection of new distributed technologies.

AGL Energy Limited
T 02 9921 2999
F 02 9921 2552
agl.com.au
ABN: 74 115 061 375

Level 24, 200 George St
Sydney NSW 2000
Locked Bag 1837
St Leonards NSW 2065

AGL supports a nationally consistent connections framework. However, we remain concerned that the National Connection Guidelines – Framework and Principles (**ENA Framework**) could lead to poor outcomes for customers due to the likelihood to establishing low common denominator requirements.

AGL considers that all technical network connection requirements should ensure optimal customer outcomes, taking into account customers' changing preferences and expectations. Therefore, our priority is that network businesses provide transparent information to the market about all applicable network requirements and constraints so that customers can make properly informed decisions that best suit their individual preferences and needs.

The ENA Framework risks further entrenching networks businesses' current approach to grid connections without necessarily delivering any further benefit to consumers. To ensure the continued advancement of the energy market transformation into the future, we consider that the application process should be substantially streamlined across the NEM particularly at the distribution level. This may entail a more limited role for network businesses (including in any application processes) as customers are empowered to individually manage their own energy system requirements.

More broadly, on the question regarding the point in time at which coordination of the wholesale, FCAS and new markets for DER is required, we do not consider that the market is currently in a position to prescribe the most optimal design. While we welcome the ENA's intention to develop test use cases for the market's consideration, we would urge a high degree of caution on designing any prescriptive market model at this point in time. As far as possible, we would encourage a test and learn approach to the future design of the distribution market, that places the customer at the centre of any design considerations. In our view, a customer-centric approach is critical to enabling customers to realise the value of their own DER assets and unlocking the value of those assets for the benefit of the broader electricity system in terms of wholesale market participation and network support services.

4. Frameworks for DER optimisation within distribution network limits

As noted above, while we welcome the ENA's intention to develop test use cases for the market's consideration, we would urge caution on designing any prescriptive market model at this point in time. In our view, each of the models presented in the Open Networks Paper preference different interactions between market participants. Given that the markets' understanding of orchestrated business models such that the VPP is still in an early phase, it is difficult to predict which is the most optimal market model.