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Matthew Hyde

Stream Lead, DER Standards
Australian Energy Market Operator

Submitted via email to DERProgram@aemo.com.au

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Dear Matthew

Initial Distributed Energy Resources Minimum Technical Standards – for Consultation, Issues Paper, August 2020

AGL Energy (**AGL**) welcomes the opportunity to respond to the Australian Energy Market Operator's (**AEMO**) Issues Paper on the setting of initial distributed energy resources (**DER**) minimum technical standards.

AGL is a market leader in trials and projects that draw upon customers' DER. Our current DER product and service offerings include our Virtual Power Plant¹, our retail offer for electric vehicle owners² and our electric vehicle subscription service.³ AGL has been involved in the development of a range of technical standards applicable to DER and currently represents the Australian Energy Council (**AEC**) membership on a range of relevant Standards Australia Committees, including:

- EL-42 (Renewable Energy Power Supply Systems and Equipment);
- EL-54 (Remote demand management of electrical products); and
- EL-64 (Decentralised electrical energy and grid integration of renewable energy system).

We are also engaged in a range of industry forums that are focused on the development of appropriate technical standards and protocols to support DER integration, including the Distributed Energy Integration Program and API Technical Working Group. Our feedback on the Issues Paper is based on our experience with DER products and services and ongoing involvement in technical standards development.

Getting the sequencing of technical standards arrangements right

The bi-directional nature of energy flows presents a new set of technical requirements that need to be considered in managing system security and reliability whilst also balancing the customer investment, value and participation of DERs. We also believe that promoting interoperability through technical standards will be a key enabler for the effective use and optimisation of DER.

AGL believes the setting of technical standards arrangements should be carefully sequenced to ensure a fit-for-purpose decision-making process informs the development of any new technical standards as follows:

1. The AEMC consider the Energy Security Board's (**ESB**) proposed governance arrangements for DER technical standards that will inform the role AEMO and other market participants have with

¹ For further information regarding AGL's Virtual Power Plant, currently available to customers in New South Wales, Queensland, South Australia and Victoria please refer to https://www.agl.com.au/solar-renewables/solar-energy/bring-your-own-battery?cide=semr&gclid=EAlaIqobChMlicjKmkUP5wIVyjUrCh2eXwvVEAAYASAAEgLRPD_BwE&gclsrc=aw.ds.

² See further, AGL EV Plan, available at <https://www.agl.com.au/electric-vehicles>.

³ See further, AGL Electric Vehicle Subscription, available at <https://www.agl.com.au/get-connected/electric-vehicles/ev-subscription>.



respect to technical standards development. We note that the ESB has now lodged its formal rule change request to effect these changes.

2. The AEMC consider AEMO's proposal to establish minimum technical standards, having regard to any governance reforms. We note that publication of the AEMC's draft rule change determination has been deferred to December and a final Decision is not expected until February 2021.
3. AEMO then consult on how they intend to apply any new arrangements, including the content of any minimum DER technical standards.

Given the need to accommodate this sequencing, we would recommend AEMO defer its consultation until such time as these preceding reforms are concluded.

AGL supports AEMO's role in contributing towards the development of appropriate technical standards for DER with insights on system security and market operations.⁴ If AEMO is given the power to set minimum technical standards for DER we recommend that a broader set of capabilities with respect to safety, economic efficiency, innovation and customer impact are necessary to ensure a comprehensive decision-making process.

Setting technical standards and customer value

Should AEMO proceed with completing its consultation prior to the completion of the ESB and AEMC consultations, we recommend that in setting DER minimum technical standards AEMO adopt an open, transparent and fulsome review that includes an assessment of:

- Technical system security;
- Consumer impact of any proposed technical standards; and
- Cost implications of various elements of standards, including those relating to uniform power quality response modes and interoperability.

This assessment should be reviewed and approved by an appropriate independent modelling expert. In particular, we would not support AEMO's proposed position to adopt the revised 4777.2 without conducting this assessment.

We elaborate on the specific elements of the proposed initial DER minimum technical standards in the **Attachment**.

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

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Elizabeth Molyneux'.

Elizabeth Molyneux

GM, Policy and Markets Regulation

⁴ See further AGL submission in response to AEMC Consultation Paper on technical standards for distributed energy resources (23 July 2020), Available at <https://thehub.agl.com.au/articles/2020/07/submission-in-response-to-der-standards-rule-change>.

ATTACHMENT

1. Inverter undervoltage disturbance ride-through

AGL supports the establishment of low voltage ride-through requirements for smart inverters. We note the analysis presented by AEMO on the risks associated with inverter disconnections in South Australia during disturbances which resulted in brief low voltage excursions.

We recommend a commencement date of no sooner than 1 July 2021. We note AEMO's intention to establish a compliance test that specifically determines whether an inverter can meet the existing defined voltage ride-through provisions in AS/NZS 4777.2:2015. Industry should be provided with sufficient time to adopt the test into their processes, enable compliance and mitigate any impact to consumers who have already contracted for the installation on new solar generation.

2. Inverter capabilities and power system security

We note AEMO's recommendation to:

- Set AS/NZS 4777.2 in its entirety as an Initial DER Standard; and
- Consider incorporating additional capabilities that form part of the AS/NZS 4777.2 revision recommendation from AEMO in 2019 for future iterations of the initial DER standard once the current Standards Australia review process is complete.

AGL has been actively engaged in contributing towards the development of appropriate technical standards and industry protocols, including through AEC representation in the EL-42 Standards Australia Committee that is considering the amendment to AS4777 and our involvement in the DEIP and API Technical Working Group. AGL also made a formal submission to the Standards Australia public consultation on the AS/NZS 4777.2 revision.

In determining the applicability of the AS/NZS 4777.2 revision for future iterations, we believe AEMO should separate elements of the AS/NZS 4777.2 revision. In order to address system security risks while mitigating impact to customers, we recommend AEMO:

- Set relevant voltage ride-through requirements to address system security risks; and
- Defer incorporation of power quality response mode requirements until a cost benefit analysis completed.

We strongly support AEMO's observation in the Issues Paper that the costs and benefits of standardising specific capability needs to be understood and welcome AEMO's interest in balancing appropriate capability for stable and secure operation of the power system with:

- the delivery of cost-efficient electricity supply for consumers;
- enabling innovation; and
- open market access to deliver value for DER owners.



Through AGL's SA VPP, we have been able to draw upon operational data to develop a range of important insights into the interaction of DER with the low voltage distribution network, including on voltage management.⁵

With a view to understanding whether regulating inverter power quality response modes is the right approach to addressing overvoltage issues, AGL undertook some preliminary analysis of the effect of Volt-VAR on our SA VPP battery fleet in 2019-20. Our analysis revealed the following key insights:

- The voltage reduction impact of the Volt-Var power quality response mode at individual sites was minimal across a range of network types. This finding aligns with reactive power theory and academic literature which indicates that the impact of these modes is highly variable and depends on their location within the LV network, the overall network topology, the conductor materials and characteristics. While there may be a greater impact in aggregate, we are not aware that this has yet been demonstrated at scale or proven through academic literature.
- At the same time, the ability of that asset to provide real power is curtailed. This reduces the value of a customer's investment for self-consumption and limits their ability to transact in the value of that asset.
- Power quality response modes materially impact customer value. Applying the draft updated AS4777.2 Volt-Var set points, our analysis revealed that there is an equity risk in the way uniform power quality response modes impact customers, with some customers experiencing material value losses due to network locational characteristics.

Having regard to this early analysis, we would recommend AEMO's setting of any uniform power quality response modes be informed by a comprehensive cost benefit analysis supported by an independent modelling expert.

We note that AEMO's proposal to Standards Australia to amend the AS4777 inverter standard which is currently open for public consultation did not include analysis of customer impacts associated with proposed power quality response modes or assess its potential impact in light of current grid voltage conditions. Whilst AGL has raised the need for such analysis to inform the Standards Australia process for the AS4777.2 revision, including in our formal submission to the public consultation, to date no such analysis has been undertaken or provided to broader industry for consideration. It is important this analysis is undertaken to ensure power quality response modes not only support voltage management practices and system security but also do not unintentionally impact customer value and therefore potentially dis-incentivise consumer uptake and participation in DERs. Especially as DER plays a key role in broader government climate change and energy market transformation policies.

AGL is actively exploring opportunities with academic institutions to draw upon our SA VPP operational data to expand understanding of the impact power quality response modes on customer value. To obtain a complete picture, analysis should include a broader customer asset base, assessing impact to solar and V/Watt mode in concurrent operation. This would reveal a potentially far greater impact across a more material portion of the fleet.

⁵ For further information regarding AGL's ARENA SA VPP program, including the two milestone reports published to date, please refer to <https://arena.gov.au/projects/agl-virtual-power-plant/>.



3. Interoperability

AGL supports the development of a forward work program regarding DER data, communications and interoperability requirements and standards, given the increasing decentralisation of Australia's energy market system. AGL believes that a common, open technical standards framework will best support the development of a market for DER services to interact with the broader energy market system.

We agree with AEMO that it is not appropriate to establish as such standards at this point in time, given that they are not yet sufficiently well prepared. In considering a forward work program, we believe technical standards and requirements should adhere to the following guiding principles:

- Align with internationally accepted standards, where consistent with Australian energy market structures, to ensure access to an open and competitive market for DER;
- Be technology agnostic and remain future-proofed for future technological developments; and
- Empower consumers with choice to utilise DER assets for their own comfort and to participate in competitive market services which address broader energy system needs through innovative aggregator models such as virtual power plants.

While we note AEMO's interest in drawing upon IEEE 2030.5 as a basis for review and inclusion in future DER technical standards, this standard tends to be applied in jurisdictions where the distribution network and retail functions are vertically integrated. Accordingly, in addition to IEEE 2030.5, we would recommend careful consideration of the technical settings that may be required to support contestability in the provision of DER services to ensure a fit-for-purpose regulatory framework for the Australian market.

AGL would also recommend that industry expertise be formally engaged to develop an appropriate forward work program. Given that the market for DER optimisation and grid-integration is at its early stages of development both in Australia and internationally, knowledge sharing is required to assess where interoperability functionality is required and should be mandated by way of technical standards versus where interoperability can be managed through the competitive market itself. We believe a balance is required to facilitate an open and competitive marketplace and support commercial innovation and consumer choice.

Accordingly, we would encourage AEMO to establish a Technical Working Group to oversee AEMO's forward work program, bringing together relevant industry expertise and drawing upon the experience of the API Technical Working Group as well as established DEIP working groups and taskforces.