



AGL Energy Limited

ABN: 74 115 061 375
Level 24, 200 George St
Sydney NSW 2000
Locked Bag 1837
St Leonards NSW 2065
t: 02 9921 2999
f: 02 9921 2552
agl.com.au

Rupert Doney

Project Leader

Australian Energy Market Commission

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Dear Rupert

Technical standards for distributed energy resources, Draft rule determination, 3 December 2020

AGL Energy (**AGL**) welcomes the opportunity to respond to the Australian Energy Market Commission's (**AEMC**) Draft rule determination for the rule change request submitted by the Australian Energy Market Operator (**AEMO**) on the creation of a subordinate instrument for a minimum technical standard for distributed energy resources (**DER**).

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 Committees¹. 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.

In supporting the advancement of innovation across the energy supply chain, AGL is also an industry partner in the Racefor2030 Collaborative Research Centre². Racefor2030 is co-funded by government and industry to deliver transformative research over the next ten years to lower energy costs and reduce carbon emissions.

Our feedback on the Draft rule determination is based on our operational experience with DER products and services, ongoing involvement in technical standards development and regulatory reform, and the Racefor2030 partnership.

AGL's position

AGL supports the AEMC's draft determination to make a more preferable rule that:

- does not create a subordinate instrument obligating AEMO to establish and maintain DER minimum technical standards; but instead
- creates a definition of DER Technical Standards in the National Electricity Rules (NER) and establishes the AEMC as the responsible body for any necessary updates to those rules.

In determining the defined scope of the DER Technical Standards, we consider the AEMC should carefully review each element against the National Electricity Objective, having regard to:

¹ These include 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).

² See further Race for 2030 Collaborate Research Centre, Available at <https://www.racefor2030.com.au/about/>.



- 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.

We also support further clarity on the compliance pathway and a deferred commencement date to mitigate impact on industry and consumers.

Key recommendations

AGL supports the recommendation:

1. To incorporate Standards Australia's AS 4777.2:2015 and a new Schedule 5A.2 of the NER, which would include AEMO's short duration undervoltage response testing requirements.
2. To mitigate impact to consumers, separate elements of AS 4777.2:2020 be incorporated in the NER as follows:
 - Set relevant voltage ride-through requirements to address system security risks; and
 - Defer incorporation of the power quality response mode requirements for a period of 12 months, at which time the AEMC could undertake a more formal cost benefit analysis, drawing upon authoritative research undertaken in that intervening period.
3. The AEMC clarify how the compliance pathway would interact with state-based regulatory frameworks and whether any further safeguards might be required to mitigate customer impact.
4. A 12-month implementation timeframe be provided.

We elaborate our feedback 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

(signed for electronic transmission)

Con Hristodoulidis

Senior Manager Regulatory Strategy

ATTACHMENT

1. Governance arrangements

AGL supports the AEMC's preferred Draft rule to create a definition of DER Technical Standards that incorporates the existing AS 4777.2 and the short duration undervoltage response testing requirements in the NER, rather than AEMO's proposed Rule to create a subordinate instrument administered by AEMO to create DER Technical Standards. As we outline in our response to the AEMC Consultation Paper³, AEMO has a critical role in contributing towards the development of appropriate technical standards for DER with insights on system security and market operations, however, the AEMC is better placed to make a whole of market decision, including a proper and full assessment of system security and consumer impacts of any proposed DER Technical Standards.

2. Scope and duration of the initial standard

Preferred approach

AGL agrees with the AEMC's conclusion that to maintain consistency with the NEO, any minimum DER standards should be limited to those required to address imminent threats to NEM-wide power system security and that other important DER integration issues, such as interoperability and communication interfaces and cyber security measures, can be addressed in the future. We consider that the Distributed Energy Integration Program is well placed to progress some of these issues through its established Working Groups and Taskforces.

Therefore, we support the AEMC's Draft rule that the scope of the DER Technical Standards should focus on inverter performance and grid responsiveness only and encompass the following elements:

- A new Schedule 5A.2 of the NER, which would incorporate AEMO's short duration undervoltage response testing requirements;
- Standards Australia's AS 4777.2:2015 *Grid connection of energy systems via inverters — inverter requirements* in its entirety by way of reference in the NER.

If Standards Australia releases the updated version of AS 4777.2 (that is, AS 4777.2:2020) before the publication of the final rule determination, AGL supports the immediate adoption of the revised voltage ride-through elements of AS 4777.2:2020. However, we recommend the AEMC defer for 12 months the revised power quality response modes elements as contained in AS 4777.2:2020.

AGL supports the AEMC's assessment framework in considering the proposed DER Technical Standards in accordance with the NEO. However, we believe the AEMC need to also consider the following criteria to ensure they conduct a fulsome assessment of the NEO:

- Technical system security;
- Consumer impacts of any proposed technical standards; and

³ See further AGL response to AEMC Technical standards for distributed energy resources, Consultation Paper, June 2020 (23 July 2020), Available at https://thehub.agl.com.au/-/media/thehub/documents-and-submissions/2020/agl-submission_-aemc-technical-standards-for-der-rule-change_consultation-paper_final.pdf?la=en&hash=34CBE329C9F0F7CD775B2C4D1A149E6B.



- Cost implications of various elements of standards, including those relating to uniform power quality response modes.

While the AEMC acknowledges that the proposed DER Technical Standards framework could be costly, it also notes that these possible costs are difficult to specify. It is not apparent in the Draft Determination whether the AEMC has sufficiently considered the potential consumer impacts of the proposed DER Technical Standards, including their impact to value for customer who invest in DER products, such as solar.

To address system security risks, AGL supports the incorporation of Standards Australia's AS 4777.2:2015 and a new Schedule 5A.2 of the NER, which would incorporate AEMO's short duration undervoltage response testing requirements.

However, to mitigate impact to consumers, we would recommend the incorporation of separate elements of AS 4777.2:2020 as follows:

- Set relevant voltage ride-through requirements to address system security risks; and
- Defer incorporation of the power quality response mode requirements for a period of 12 months, at which time the AEMC could undertake a more formal cost benefit analysis, drawing upon authoritative research undertaken in that intervening period.

We appreciate the AEMC's intention to reference Australian Standards in their entirety in the NER in order to prevent divergence between the requirements relevant in the NEM and the industry standard.

However, we believe the separate treatment of different parts of the standard is required to mitigate customer impacts, given the lack of appropriate cost benefit analysis that had been brought to bear in the AS 4777.2:2020 standards development process.

Insights into power quality response modes

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.⁴

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.

⁴ 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/>.



- 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 in wider network and wholesale market services.
- 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.

The AS 4777.2:2020 inverter standard amendment that was recently 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 disincentivise 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 deeper and more informed understanding, analysis should include a broader customer asset base, assessing impact to solar and V/Watt mode in concurrent operation. We anticipate this will reveal a potentially far greater negative customer impact across a more material portion of the fleet.

To this end, we recently partnered with the University of New South Wales alongside SAPN, Solar Analytics and the Australian PV Institute (APVI) in a Fast Track Project through Cooperative Research Centres (CRC) Racefor2030: Curtailment and Network Voltage Analysis Study (CANVAS). Among other things, will assess DER curtailment, impact of different inverter power quality response modes on energy-user's revenues, and fairness of curtailment from the energy-user's perspective. The project has been provisionally approved as the first Fast Track project to be progressed by Racefor2030 and contractual arrangements are currently being finalised.

In the short term, we believe this research will be critical to inform the development of suitable revised power quality response modes set points across the NEM to appropriately minimise curtailment of DER. We anticipate that in the initial 5-month period, the project could deliver unique social-technical insights that would inform that discussion, including improved understanding of real-world curtailment, characterisation and quantification of different curtailment modes and their associated financial and environmental impacts, as well as understanding of energy user experience and perceptions. The research project will also deliver a range of longer-term impacts in informing appropriate strategic balance between utilising inverter voltage management modes and broader network measures.

AGL recommends the AEMC defer the incorporation of the power quality response mode requirements under AS 4777.2:2020 into the DER Technical Standards for a period of 12 months, as the proposed research could underpin a more robust cost benefit analysis in determining appropriate power quality response modes.



Compliance arrangements and implementation

Preferred compliance pathway

AGL supports the AEMC's preferred compliance pathway through network connections agreements over AEMO's proposal for the AER to develop a light-touch monitoring and compliance framework.

Nevertheless, we anticipated some challenges with the AEMC's preferred approach including that:

- It will create additional complexity for industry by duplicating the current compliance framework for technical standards that is largely enforced through state-based legislative technical and safety requirements; and
- Customers and other market participants may be exposed where distribution networks misinterpret their regulatory obligations and include more stringent requirements in their connection agreements.

Accordingly, we would recommend the AEMC clarify how the compliance pathway would interact with state-based regulatory frameworks and whether any further safeguards might be required to mitigate customer impact.

Application

AGL supports that the DER Technical Standards will apply to new connection and replacement inverters and connection alterations (including upgrade, extension, expansion or augmentation).

We recommend a commencement date of 12 months following the Final Rule Determination to enable compliance and mitigate any impact to consumers.