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Andrew Swanson
Senior Advisor
Australian Energy Market Commission

Dear Andrew

Review into consumer energy resources (CER) technical standards – Submission to consultation paper

AusNet welcomes the opportunity to provide this submission to the Australian Energy Market Commissions' (AEMC) consultation paper on the review into consumer energy resources (CER)¹ technical standards, with a focus on Australian Standard (AS) 4777.2:2020.

We support the review of the compliance and enforcement of AS 4777.2:2020 across the National Electricity Market (NEM). Approximately 30-50% of new connections are non-compliant with the AS 4777.2:2020 settings and/or with distributors' export limit requirements.² This level of non-compliance is generating growing risk on the safety and security of energy supply, given the large collective size of CER across the NEM and anticipated strong growth in new connections in the future.

While CER are connected to the distribution network, it is important to highlight inverter non-compliance has a cascading effect on system security in the electricity market and our ability to undertake scheduled maintenance on our transmission network. Incorrect protection settings increase the risk of system security disturbances when CER is generating a lot of energy, making it difficult to turn off parts of the transmission network for planned works. In assessing whether to proceed with planned outages, the Australian Energy Market Operator (AEMO) takes into account solar forecasts and the potential for disruptions if inverters trip, resulting in a growing number of cancelled planned outages over the years. This can have a substantive impact on the cost of planned outages, as well as impacting the safety and integrity of our network. For example, our planned maintenance work at the Victoria-South Australia interconnector has been delayed for more than 2 years due to CER-related risks, costing approximately \$1 million in cancelled outages and putting increasing pressure on the performance of the interconnector.

Below we expand on the key risks of non-compliance with AS 4777.2:2020, and propose changes to the regulatory framework and future technical standards to improve compliance today and in the future.

Impacts of non-compliance with AS 4777.2:2020

Non-compliance with fault ride-through protection settings

The AS 4777.2:2020 has protection settings that allow inverters to ride-through frequency disturbances, so that these disturbances do not cause mass inverter tripping and surges in demand. Non-compliance with these protection settings has the potential to cause significant disruptions to energy supply, including the following impacts on customers and network planning:

- customer inverters would stop generating during a disturbance, resulting in demand and charges from the network that would not otherwise occur
- in an unexpected significant demand surge in the energy system, AEMO may be required to instruct load shedding across the networks. Because of the interconnected nature of the NEM, demand surges in one jurisdiction may result in load shedding in other jurisdictions

¹ CER is assumed to include inverter connections for small customers behind the meter, not including grid-connected inverters.

² SA Power Networks and CitiPower, Powercor and United Energy data shared through this review and elsewhere, and our own limited analysis.

- there is difficulty in undertaking scheduled maintenance on the transmission network, as per above
- unless non-compliance is addressed, both the transmission and distribution networks will need to plan for higher demand in the future, resulting in more network investment.

With a rapid uptake of renewables in the NEM, the risk of frequency disturbances in the energy system is also rising rapidly, highlighting the urgency of the need to improve compliance with AS 4777.2:2020.

Non-compliance with voltage protection settings and export limits

The AS 4777.2:2020 is designed to operate to the customer's inverter's generation and export potential within the regulated 216-253 volts while providing reactive power and voltage support when voltages are below 220 volts and above 241 volts. The reactive power setting typically has minimal impact on the customers' DER operation but is an important voltage self-regulation that reduces the need for network interventions in voltage control. Where the reactive power support settings are not configured in line with AS 4777.2:2020, network voltages will experience disturbances which may trip inverters in that network area and limit opportunities for new customers to export onto the grid.

Distributors also require inverters to be configured to their network requirements, such as inverter size and static export limits. Non-compliance with these requirements, e.g., where the inverters is exporting more than allowed, puts pressure on network voltages and limits capacity available for exports by other customers.

As the industry transitions to more flexible export management, compliance with AS 4777.2:2020 and network-specific requirements will be paramount for efficient dynamic network capacity allocation, limiting the of risk of undetected exports or non-compliant inverter settings causing disturbances on the network.

Improvement opportunities

Improving visibility of inverter settings

A key gap in the current CER integration framework is the lack of visibility of inverter settings by the distributor. Installers have visibility of the settings at the time of the installation, and the original equipment manufacturer (**OEM**) has remote visibility of the settings if the inverter is connected to the internet. However, there is no regulated process to require installers or CER retailers to provide inverter settings to distributors.

While in Victoria we are able to use smart meter data to analyse abnormalities at the connection point, smart meter analytics only provide indication of potential non-compliances that would require confirmation through a site vision or information from the OEM. Smart meter analytics also cannot proactively identify the frequency disturbance ride-through protection settings that are critical to system security. Hence, smart meter analytics can assist in identification of the extent of non-compliance, but cannot be relied upon for full visibility.

As an alternative, we are considering changes to our connection process to introduce mandatory sharing of inverter settings data at the time of connection, including options to automatically identify non-compliance before completing the connection and on an on-going basis. While this is not a regulated obligation for distributors, the urgency of the risk to system security necessitates these changes. However, these types of investments take a while to implement and can be costly. We are not funded for these investments, or changes to our processes, under the regulatory framework—the AEMC review should assess how the cost of these investment should be recovered by distributors, including potentially recovering the costs from non-compliant installers and CER retailers rather than from our customers.

In the longer term, visibility of inverter settings will be necessary on an on-going basis and in near real time. While distributors would not access inverter settings at all times, it is important they are able to access settings data quickly whenever needed, whether to implement a solution that is reliant on compliance with the technical standards or identify a potential non-compliance if there is evidence of abnormalities. This functionality will become increasingly important as distributor transition to the role of the distribution system operator (**DSO**) and low voltage network management becomes more dynamic and in real time.

One avenue for increased ongoing visibility is through changes to the Common Smart Inverter Profile Australia (**CSIP-Aus**) (the standard may become mandated in inverters from 1 July 2024³). The current version of CSIP-Aus has the capability to share data on the size and export limit of the inverter, which assists in flexible export management. Future versions of the CSIP-Aus should consider sharing data on inverter settings, to provide

³ Energy Security Board, Interoperability Policy for Consultation, October 2022.

distributors visibility of all factors impacting the performance of the inverter when interacting with the network. Appropriate privacy and cyber security protections would need to be developed.

Introducing softer enforcement measures for distributors

From 1 March 2022, Victorian distributors are able to remotely adjust inverter settings through OEMs on the customer's behalf if the inverter is non-compliant with the technical and safety requirements of the network (which includes AS 4777.2:2020 requirements). We plan to use this measure to rectify non-compliances where possible, once we obtain better visibility of inverter settings on our network.

However, this approach would only apply to customers connected after 1 March 2022, with approximately 150,000 customers that have connected their CER since 2015 when AS 4777.2 was first introduced. For customers connected prior to 1 March 2022, our only enforcement option is the disconnection of their CER or disconnection of supply, which we do not consider to be a proportionate enforcement measure, particularly as most customers have no visibility of their inverter settings.

Instead, there may be merit in introducing new rules that allow distributors softer enforcement measures, like the remote inverter settings adjustment through OEMs, for all customers with AS 4777.2, regardless of which version or when they connected to the network. Other potential softer enforcement measures include:

- at the time of installation:
 - delay in the meter reconfiguration until evidence of compliant inverter settings is provided⁴
 - delay in transferring the customers on preferable network tariffs until evidence of compliant inverter settings is provided
- on-going compliance:
 - using flexible exports to limit customer's exports to zero until inverter settings are rectified.

We propose to work with the industry, government and customer representatives to discuss these options and understand preference around introducing new enforcement measures for legacy and new customers.

Increasing CER retailer/installer accountability of technical standards compliance

Because of the lack of visibility of inverter settings by the customer, and the general lack of visibility and understanding of customers' obligations under the Model Standing Offer (**MSO**), we do not consider the customer should be held liable or responsible for AS 4777.2:2020 compliance.

The responsibility for compliance, and the liability for enforcement measures for non-compliance (such as loss of export income by the customer), should be with the CER installer/retailer. This may require changes to commercial arrangements between the customer and CER retailer/installer to formally recognise the responsibility and liability of inverter compliance. An alternative is a warranty arrangement, where the warranty is specific to inverter compliance with technical standards and network requirements.

Increased information sharing between the retailer/installer and the customer may also incentivise better compliance outcomes. For example, CER retailers/installers could be required to provide customers with inverter commissioning sheets and certificates of compliance (e.g., by the OEM) following an installation. This would increase customer awareness of the need for compliance with technical standards and network requirements, while increasing reputational incentives for retailers/installers to meet compliance.

Please do not hesitate to contact me on sonja.lekovic@ausnetservices.com.au about the submission.

Sincerely,



Sonja Lekovic
Regulatory Policy Manager
AusNet Services

⁴ Requires amendments to NER clause 7.8.2(a)(7) to make the obligation conditional on the inverter complying with relevant Australian Standards and network requirements.