16 November 2022

Gillian Gout
Director Strategic Policy & Energy Systems Innovation
Australian Energy Regulator

Submitted online

NSW DNSP response to: Reliability and Emergency Reserve Trader (RERT) via voltage management – Ring-fencing class waiver, AER Initiation Notice

Dear Ms Gout,

Ausgrid, Endeavour Energy and Essential Energy (NSW distribution network service providers (**DNSPs**)) welcome the opportunity to provide a submission on the Australian Energy Regulator (**AER**) Initiation Notice, ring-fencing class waiver for RERT via voltage management. This notice follows a request from Australian Energy Market Operator (**AEMO**) for a long-term class waiver for DNSPs to be included in RERT urgently to increase reserves for the 2022-23 summer and for subsequent years.

NSW DNSPs strongly support the AER granting a class waiver for a five-year period in accordance with the conditions set out in the initiation notice. This includes reporting customer impacts and complaints that may arise as a result of a DNSP's participation in RERT noting flexibility may be required as customer compliant management systems vary between networks.

Our participation is both necessary and beneficial to customers given AEMO continues to forecast reliability gaps for all mainland regions from 2022-23 to 2031-32. The recent energy market crisis that occurred in June 2022, culminating in the suspension of the wholesale electricity spot market, highlights the need for additional sources of support.

DNSPs are well placed to provide reserve reduction services through dynamic voltage management as evidenced by the Australian Renewable Energy Agency (**ARENA**) Demand Response RERT Trial and the participation of some DNSPs, such as Endeavour Energy, to date. Our participation would:

- Support system reliability at times of critical need due to energy market failure;
- Utilise existing assets which were installed to, and currently provide, standard control services;
- Require no incremental investment and immaterial facilitation works;
- Not materially prejudice the use of assets for standard control services (i.e. not adversely impact the service customers receive);
- Provide a positive incentive and focus on innovative voltage management and actioning enhanced voltage control, particularly as the variability and swing in power flows increase in increasing Customer Energy Resource (**CER**) environments. Dynamic voltage management has many benefits for customers beyond RERT participation and is a key Distribution System Operator (**DSO**) capability. Benefits of innovative voltage management could include:
    - Increased CER hosting capacity; and
    - Lower cost solutions to address network constraints - reducing Augex; and
- Not adversely impact the competitive market for RERT services as:
    - Only a distributor has the authority and capability to operate a distribution network in a manner to control voltage; and
    - AEMO is the only purchaser of this service and understands the role of all market participants.
    - Support services are removed by AEMO once the competitive energy market again functions at supply demand equilibrium.

On the latter, we consider DNSP participation in RERT will enhance competitive outcomes and the market for these services which should in turn reduce the cost and/or improve the quality of these services, the benefits of which flow directly to consumers. We also note that where revenue related to RERT services contributes to a material level of shared asset revenue, customers will benefit from revenue sharing in accordance with the AER's Shared Asset Guideline.

In **Appendix A**, we provide additional background on these services, how we consider they should be classified and address concerns raised by stakeholders during the 9 November 2022 feedback session.

We consider RERT services should form part of our proposed system support services identified in our Framework and Approach determinations for 2024-29 regulatory control period. The AER identified that these services may be included in our service classification via triggering the material change in circumstance provision at the draft of final determination stages. This will be needed in the next period given the rapid rate of transition in the NEM.

Ultimately, we consider there is minimal risk of harm to competitive markets as they are unable to provide these unique services to the market to support AEMO during system security events.

We welcome the opportunity to discuss any aspect of this submission with you.

Please contact for:

- Ausgrid: Naomi Wynn at [redacted]
- Endeavour Energy: Albert Pors at [redacted] and
- Essential Energy: Adam Young at [redacted].

Yours sincerely,

[redacted]

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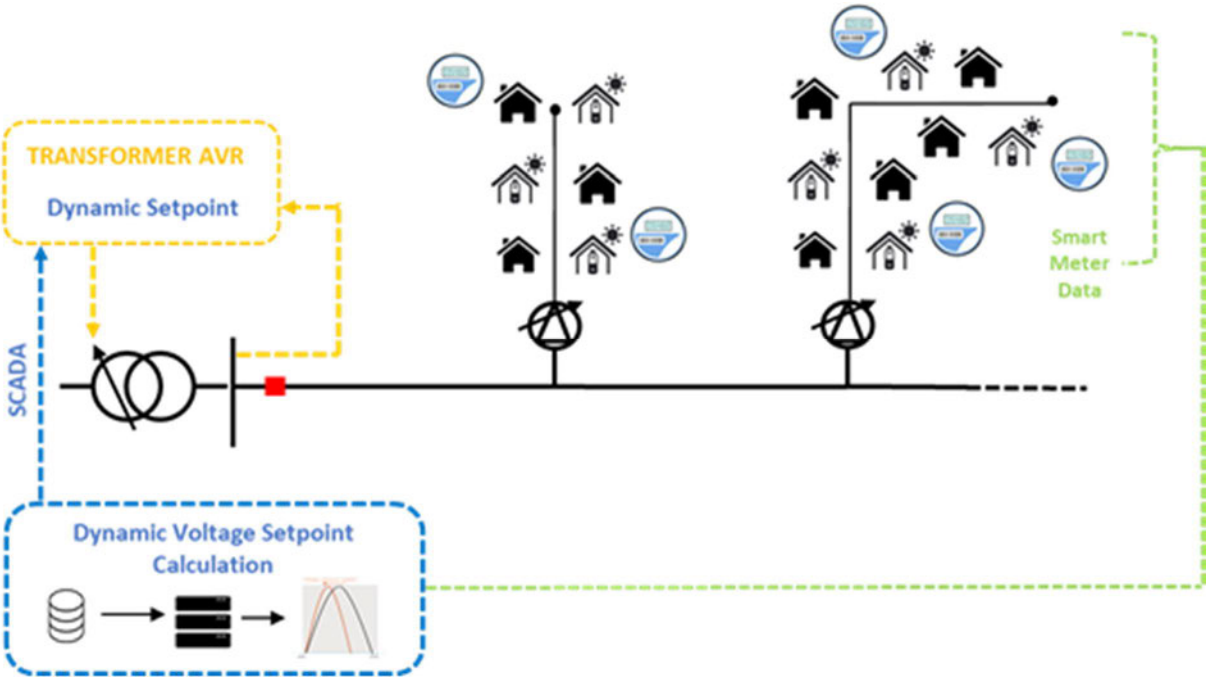
Appendix A: Detailed response to initiation notice

1. What are RERT services?

RERT services are an intervention mechanism under the NER that allows AEMO to contract for emergency reserves, such as generation and demand response, that are not otherwise available in the market. RERT services essentially act as a safety net and last resort mechanism for addressing critical shortfalls in reserves. This service has become increasingly important in recent years with increasing reliability risk due to a combination of extreme weather conditions and higher outage rates from ageing generation assets.

By way of example, a voltage reduction scheme at the zone substation level is one way in which DNSPs could provide RERT services.

Figure 1. Conceptual dynamic voltage reduction scheme



Under such a scheme, when activated under RERT by AEMO, the DNSP would adjust down the setpoint voltage across a number of substations by a set percentage. Doing so would require remote terminal units (**RTUs**) which can be used to remotely adjust voltage settings through a SCADA system.

Generally, DNSPs' substations are already equipped with RTUs, meaning no additional assets/hardware are required to provide RERT services. Investment in SCADA systems and RTUs is driven by several network benefits including:

- Advanced network voltage management:
    - Solar hosting: by better optimising voltage profiles, low cost improvements to hosting capacity can be made to cater for increasing amounts of distributed solar PV/CER systems. This is a form of closed loop voltage control scheme, using available smart meter data feedback.
    - Improve voltage compliance to AS61000.3.100 limits.
- Improving asset performance visibility within the substation.

For DNSPs with these assets, facilitating RERT services will be immaterial as their participation will be largely automated through simple scripts, requiring minimal intervention by staff. The provision of measurement data to AEMO to verify their response following a RERT activation would also require minimal effort.

2. How should they be classified?

To date, DNSP participation is contingent on this being either a classified service DNSPs are permitted to supply or via a ring-fencing waiver[1]. We note the NSW 2019-24 service classification includes a 'Distribution asset rental' service which relates to the[2]:

> *Rental of distribution assets to third parties (e.g. office space rental, pole and duct rental for hanging telecommunication wires etc.).*

In our view, the provision of RERT services constitutes a rental of distribution assets (in this case SCADA and RTUs) to a third party (AEMO). However, the AER has previously formed the view that RERT services do not form part of this rental service. Instead, the AER considered RERT was a distinct and separate service and one that it would not classify in its final Service Classification Guideline (**SCG**). The AER considered a case-by-case assessment via a ring-fencing waiver process would be more prudent to ensure that[3]:

- The shared use of network assets to provide RERT services does not:
  - Incentivise over investment in control systems;
  - Materially prejudice the use of assets for standard control services; and
  - Adversely impact the development of competition in the RERT market.
- The AER's Shared Asset Guideline (**SAG**) is:
  - Used to encourage the use of underutilised assets for the benefit of customers; and
  - Not used in a forward looking manner and/or conflated as a way of correctly allocating incremental costs.

We appreciate these concerns and the value of initially assessing these services on a case-by-case basis to better understand their nature. However, since the SCG was finalised in 2018 we consider:

- There is an improved understanding of how DNSPs can participate in RERT utilising existing assets with minimal incremental cost and effort without adversely impacting customers;
- There is a growing and urgent need for RERT as noted by AEMO; and
- The energy landscape has evolved significantly in the last few years as led by the Energy Security Board (**ESB**) Post-2025 Market Design reforms.

In light of these changes since 2018, the NSW DNSPs proposed the 2024-29 service classification be updated to accord with the ESB's expectation[4] that DNSPs will work more closely with transmission network service providers and AEMO to ensure that minimum system security is maintained in a high CER system.

Specifically, the NSW DNSPs proposed a new service group called 'system support services' to capture activities like utilising dynamic network operating envelopes to signal system events or, in the medium term, direct load and/or generation shedding. It could also include services that facilitate local market support arrangements that have the potential to unlock significant benefits for the local communities which share the electricity grid.

Whilst the AER acknowledged the growing importance of DNSPs in supporting system security and strength they decided against classifying system support services as a direct control service. This is because the development of the market for these service remains in its infancy and that further clarification regarding the scope and contestability of such services is likely to be provided through a

[1] Noting this may also take the form of confirmation that the provision of RERT services would form an immaterial breach of the ring-fencing guideline that does not require a ring-fencing waiver.
[2] AER, Final decision – Endeavour Energy distribution determination 2019-24 - Attachment 12: Classification of services, April 2019 , p. 17.
[3] AER, Explanatory Statement – Final electricity distribution service classification guideline, September 2018, p. 24
[4] ESB, Post-2025 Market Design Final advice to Energy Ministers - Part B, 27 July 2021, p.70

range of ongoing policy reforms[5]. It therefore remains unclear the extent to which these services are simply inputs to, or already set out within, common distribution services compared to separable, billable services.

As such, classifying this service remains an available option for the NSW, ACT, NT and TAS DNSPs for the 2024-29 period with an intervening waiver for the remainder of the current regulatory period. We consider this option is preferable and recommend it is considered further as part of the 2024-29 determination process and as the ongoing reforms referred to above are finalised.

3. Why should a class ring-fencing waiver be granted?

If the view remains that DNSP-provided RERT services are and will remain unclassified there would be ring-fencing implications, particularly with respect to office and staff sharing and branding. We note that the ring-fencing guideline provides exceptions to office and staff sharing restrictions for staff that do not have an opportunity to use electricity information to engage in discriminatory conduct in performing their roles. In our view, this exception would apply to DNSPs circumstances with respect to RERT via voltage management (if required).

This is because only a DNSP has the authority to manage distribution network voltages and for security reasons, only the control centre staff of a DNSP are authorised to perform this function. For that reason they would need to be shared in order to provide RERT services, however, they do not have any opportunity to share the knowledge and information they have to other parties in a manner that would unfairly or materially impact competition. That is because other parties are incapable of offering the same service to AEMO and instead provide RERT services through alternate means (e.g. demand reduction or generation).

With respect to branding, the service would be provided under the DNSPs brand. However, we do not consider this results in a DNSP gaining unfair advantage as AEMO is the sole purchaser of RERT who understands the role of all market participants and is unlikely to tender for RERT services on the basis of brand perceptions rather than the merit of the service being offered.

We also note cost allocation issues would not be an issue in our circumstances given there are no material incremental costs associated with our provision of RERT services. Further, any staff costs associated with operating the network for RERT (which are expected to be immaterial) can be recorded to a specific cost code and deducted from our regulatory accounts and forecasts.

It is for these reasons that if it is unclassified a class ring-fencing waiver should be granted. Although our primary view is that it is, or should be, a direct control service.

4. How will DNSPs providing RERT via voltage management impact customers?

We note the provision of this service involves the use of assets and staff that provide standard control services. This means that in addition to cost allocation and discrimination concerns, it is also necessary to demonstrate that the provision of this service does not adversely impact or prejudice our ability to provide standard control services. Below we respond to more specific questions raised by stakeholders during the 9 November feedback session in regard to this issue.

Will this impact on customer quality of supply and how will DNSPs know?

From a customer perspective, leveraging voltage sensitivity to provide emergency demand reduction should not have any discernible effect on the usability of electrical appliances and equipment.

LV voltage limits are described in AS61000.3.100, where the allowable voltage range is 230V (+10% -6%). This means, for an individual site, voltage should not deviate outside of a range of 216V to 253V for more than 1 per cent of the time. At a network level, less than 1 per cent of the customer base should not fall outside of this range at any point in time.

In providing RERT via voltage management, a DNSP would need to ensure that this standard is not violated. To do so, a statistical spread of smart meter data within each dynamic voltage control area

[5] AER, Framework and Approach for Ausgrid, Endeavour Energy and Essential Energy – Regulatory control period commencing 1 July 2024, July 2022, p. 22

(zone substation) can be used to understand and predict the compliance of LV voltages within each dynamic voltage control supply area.

With respect to large customers with sensitive loads, we note dynamic voltage responses for RERT will occur at the zone substation 11/22kV level (typically the lowest point of dynamic voltage control). Large industrial customers are typically connected to the 33-132kV network and will not observe or experience this dynamic voltage response. They also have their own voltage regulating transformers at their connection point.

Sensitive customers on the LV and 11/22kV network who would experience a voltage reduction have their own obligations to ensure their equipment can operate within the Australian Standards limits. Provided networks do not enact a RERT response outside of these limits, a well-designed installation will not experience equipment malfunction.

Should networks just offer this service on a 24/7 basis as BAU?

Continuously operating at the lowest end of the Australian Standard range 24/7 is not an optimal outcome. Typically, this will result in an increase in network line losses due to an increase in current (from the component of demand which exhibits a constant power behaviour). Furthermore, the MW response benefit though dynamic voltage reduction is not sustained in full beyond a few to several hours due to the thermostatic response of many loads (constant energy behaviour).

There are broader benefits to sustained voltage reduction, particularly where existing voltages are normally operating at or above the upper end of the compliance range. These benefits include CER hosting capacity, reduced energy wastage in many appliances and improved lifetime of appliances (designed for 230V nominal[6]). Most of these benefits are however gained through targeting average customer voltages within the preferred range of AS61000.3.100, particularly in locations where steady state voltages have historically been much higher than this. This is a strong focus of many networks because of increasing CER as well as improving LV visibility.

How do we protect against DNSPs 'gaming' voltages prior to a RERT event?

A RERT response through dynamic voltage reduction will typically leverage a reduction from the preferred range to the lower limit of the AS61000.3.100. There is increasing focus and action by DNSPs to lower steady state average voltages to within the preferred (sub-range) of the Australian Standard.

The risk of DNSPs gaming a RERT response by artificially increasing the voltage prior to RERT dispatch is low given such an action would be obvious to AEMO when validating RERT measurement and response data (which would include both pre and post activation voltages as well as MW measurements). In addition to this, such 'gaming' would limit CER hosting capacity and likely result in customer complaints related CER export curtailment. This is because operating at the upper end of the Australian standard range commences power quality response modes within CER inverters under AS4777 which alerts the customer.

How will the service be accurately measured and validated?

Most DNSPs have, or are, installing high accuracy power quality meters within major substations (zone and transmission substations). This is critical for understanding and managing power quality compliance as well as informing power quality allocations to customers. These meters are of suitable accuracy for measuring and validating RERT responses. Such meters comply to IEC 61000-4-30 Class A specifications. The accuracy and granularity of data captured by these meters exceed that of pattern approved smart meters.

DNSPs can submit to AEMO the high accuracy power quality meter measurement data for each substation (each dynamic voltage control zone) which they elect to offer into the RERT scheme. This will allow AEMO to validate both the voltage response as well as the overall MW reduction correlated to the voltage reduction.

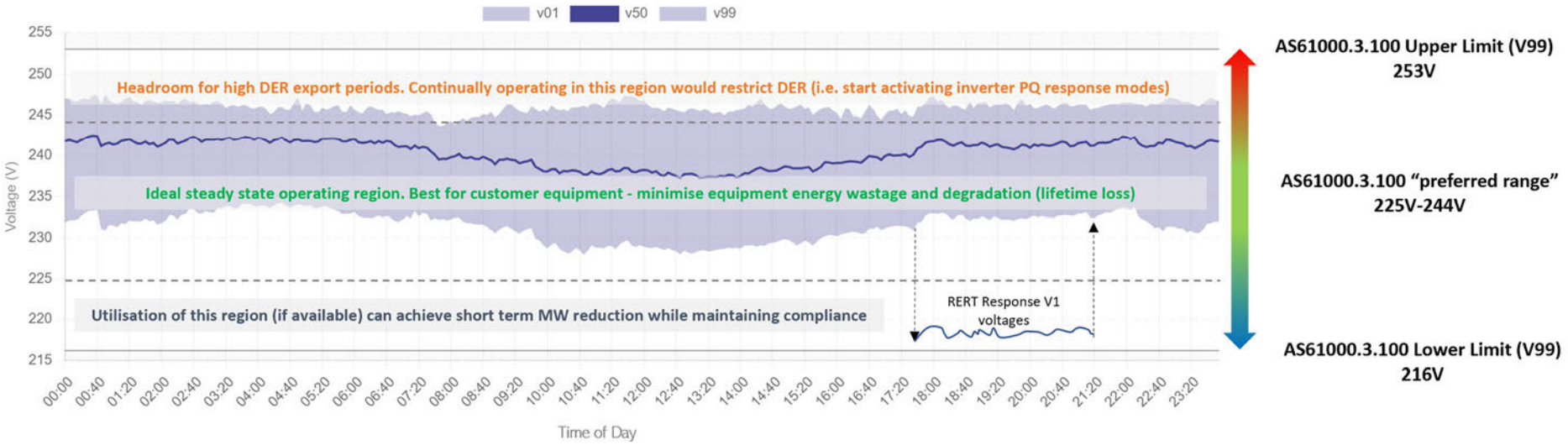
[6] We note that customer appliance sensitivity to undervoltage is reducing as appliances are increasingly manufactured for international markets where statutory limits are 230V +10% -10% (207V to 253V).

Case study: Endeavour Energy

Below is an example of a zone substation within Endeavour Energy's network showing the voltage control bandwidth over a month in relation to AS61000.3.100 limits. The bandwidth shown is derived from statistical sample of smart meters within the supply area. The bandwidth is around the preferred range in AS61000.3.100.

This example shows that for this substation that the spread of customer voltages are close to within the preferred range, which is the optimal zone for most customer equipment including CER to operate efficiently. It is evident that in this example there is room between the 1st percentile voltages (lowest customer voltages) and the V1 (as in the 1st percentile) compliance limit allowing room for a temporary RERT response while still maintaining our supply quality and performance obligations.

In this case activating such a response in a temporary manner (hours) will not affect or be noticeable by equipment designed to meet Australian Standards limits.



Example Zone Substation Voltage Bandwidth across a month (based on smart meter data).

Substations with particularly poor voltage spread can be identified by networks ahead of time through such analysis shown above. Networks would exclude such substations where there is no appropriate room for a reliable RERT response within the obligations of the service quality voltage limits.