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Tim Jordan
Commissioner
Australian Energy Market Commission
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Dear Mr Jordan

Ausgrid response re Review of System Restart Standard

Ausgrid welcomes the opportunity to respond to the Australian Energy Market Commission's (**AEMC**) *Issues Paper on Review of the System Restart Standard* (**Issues Paper**).

Ausgrid operates a shared electricity network that powers the homes and businesses of more than 4 million Australians living and working in an area that covers over 22,000 square kilometres from the Sydney CBD to the Upper Hunter.

The National Electricity Market (**NEM**) is experiencing an unprecedented transformation. Inverter based resources (**IBR**) are approaching half of installed generation capacity with rooftop solar, at 20GW, the single largest component of the total generation mix.[1] The System Restart Standard (**Standard**) must be responsive to these changes. In particular, the large synchronous generation units that could be traditionally called upon to restore the grid no longer dominate the system, leading to a limited pool of System Restoration Ancillary Service (**SRAS**) providers in some NEM regions combined with limited incentives for the development of new restart plant.[2]

Our submission makes the following key points:

- New commercial incentives are needed to meet current and emerging SRAS shortfalls;
- Any emergency backstop capabilities Ausgrid implements in the near term are unlikely to include advanced system restoration support, due to the current regulatory framework;
- Distribution networks can play an enhanced role in supporting restoration services by leveraging existing assets and efficiently expanding the scope of planned investments; and
- Our sub-transmission network and role as preferred network operator of the Hunter Central Coast Renewable Energy Zone (**HCC REZ**) puts Ausgrid in a unique position to offer system restoration support.

Our detailed submission is outlined in Appendix A. If you wish to discuss this submission contact Shannon Moffitt, Regulatory Strategy Manager, on 0468 616 512 or shannon.moffitt@ausgrid.com.au.

Regards,

Junayd Hollis
Group Executive, Customer, Assets and Digital

[1] AER, State of the Energy Market, 2024, p.36
[2] AEMO, General Power System Risk Review, 2024, p. 124.

Appendix A

Question 1 Appropriateness of the current roles and responsibilities for system restart

Question 1.1: Are stakeholders aware of any issues related to the roles and responsibilities within the current system restart regulatory framework that may impact system restart outcomes over the short to long term? If so, please elaborate.

Please refer to our response to questions 4 and 5 below where we provide feedback on managing risks to system restart due to changes occurring at the distribution level.

Question 1.2 What if any, are the potential changes to the current restart frameworks that could improve restart preparedness?

Our views are predominately set out in responses to questions 4 and 5.

Question 2 System restart capability from Renewable Energy Zones

Question 2.1: What opportunities are there for the design and specification of generation and network infrastructure in each REZ help to support future system restart?

Ausgrid has been appointed the preferred network operator for the HCC REZ. This project involves enhancing our existing high voltage network (132kV) to enable 1GW of additional renewable generation transfer capacity. There could potentially be scope for the HCC REZ to support future system restart procedures. However, local black start protocols are currently excluded from the project's technical specifications.

Ausgrid and the Australian Energy Market Operator (**AEMO**) could collaborate on implementing system restart capabilities at the HCC REZ in the future. The Eastern Hub of the HCC REZ does include space for up to four 45MVAr synchronous condensers. Adding synchronous condensers could play a crucial role in restarting the system by providing vital reactive power support that helps stabilise voltage levels during the initial stages of grid restoration following a blackout, effectively acting as a 'voltage booster' to facilitate the smooth reconnection of generation and load. Additionally, synchronous condensers could help in facilitating renewable energy sources connected to the HCC REZ being used as a System Restart source through their contribution to System Strength.

We would be open to exploring the addition of synchronous condensers within the HCC REZ. However, Transgrid is the only System Strength Service Provider in the NSW network. There is no mechanism for Ausgrid as a DNSP or as HCC REZ operator to recover any investment required in this area.

If additional restart services are required in the Hunter Central Coast area in the future, there are long lead times associated with the planning and approval studies that would have to be undertaken under Chapter 5A of the National Electricity Rules (**NER**). These lead times, which can run for up to 3 years, illustrate how aspects of the current regulatory framework may not strike the right balance between prudent approval processes and the timely investment needed to keep pace with the energy transition.

Question 2.2 How might the projected REZ developments impact future system restart pathways?

We anticipate that system restart plans will need to be updated once the HCC REZ is commissioned to reflect updated load blocks and changed network topology. As outlined in response to question 2.1 above, the current technical capabilities of the HCC REZ do not include black start protocols so we expect all REZ resources would be directed 'off' as part of a restart. We do not expect that the project would negatively impact existing restoration pathways; however, to contribute to the system restoration process additional investment would have to be made, coupled with a streamlined planning approval and cost recovery process.

Question 2.3 Do the projected and committed REZ developments require the consideration of any changes or amendments to the system restart frameworks or the system restart standard? If so, please describe any such potential changes.

Our proposed changes to the system restart framework focus on the commercial and cost recovery aspects for new investments. We elaborate on our views in response to question 6 below.

Question 2.4 How should this information be communicated to the market and/or system planners, and how far in advance would this information be required in order to be actionable?

Ausgrid welcomes the AEMC's consultation on how information should be communicated to the market and system planners in a timely manner. We intend to engage more fully with this question when there is a firmer view on the likely changes to the Standard.

Question 3 Transmission network changes and system restart

Question 3.1: Given current projected network changes set out in AEMO's ISP planning scenarios, what considerations would need to be given to maintain and strengthen restart capability in the future power system?

The HCC REZ is an actionable project in the 2024 Integrated System Plan (**ISP**) which we expect to reach 'committed' status in the coming months. System strength issues within the REZ will be managed through the system strength impact assessment guidelines (**SSIAG**). Generator proponents can elect to self-remediate or pay the system strength charge, where the materiality threshold is exceeded.

The Eastern Hub of the HCC REZ, as noted in our response to question 2 above, includes space for up to four 45MVAr synchronous condensers. There is no regulatory pathway to recover the costs associated with this investment under the Electricity Infrastructure Investment Act (**EII Act**) given that these assets were excluded from the functional specification of the project. There is also no clear mechanism for recovering the costs under the NER as part of an Australian Energy Regulator (**AER**) or AEMO process. We would welcome the AEMC reviewing the current regulatory framework with a view to adding more flexibility to the planning approval and cost recovery processes associated with electricity distributors providing system strength.

Question 3.2: Are the current electrical sub-network boundaries appropriate for the future power system with respect to REZ's and new interconnections? If not, how might they change?

The current sub-network boundaries, which are largely aligned to NEM regions, are too broad to understand the complex interdependencies between different elements of the power system. For example, the current boundaries do not reflect how 20GW of rooftop solar embedded with distribution networks impacts transmission, REZs and interconnectors. For Ausgrid, these interdependencies are increasing as rooftop solar (about 270,000 or 15% of customers) are forecast to rise to 430,000 customers by 2029, and then reaches 550,000 customers (double today's level) by 2034. We recommend that a higher degree of geographic and functional granularity is added to the sub-network

boundaries to incorporate the expanding role of distribution networks and the generating capacity within them.

Question 3.3: In the context of the projected changes in the electricity system over the coming decade, are the guidelines in the standard for electrical sub-network boundaries fit for purpose? If not, what adjustment or additions could be made to future proof them?

We note there is currently an element of procedural complexity in changing electricity sub-network boundaries and setting the associated standards. To address this, there may be merit to exploring whether the processes for updated sub-network boundaries can be simplified and streamlined by embedding a level of flexibility in anticipation of future power system changes.

Question 3.4: What are stakeholders' views on the current process for defining electrical sub-networks and the associated restoration requirements? Do stakeholders consider that any changes could be made to the current frameworks and/or the standard to enable the process of changing electrical sub-network boundaries to be more flexible? Is so, please describe these.

We would support the AEMC exploring ways of adding more flexibility as outlined in our response to question 3.3 above. Efforts to add this element to the process for defining electrical sub-networks and associated restoration requirements should be accompanied by robust stakeholder engagement. The AEMC should carefully balance flexibility with offering investment certainty.

Question 4 Managing risks to system restart from changes occurring at the distribution level of the power system

Question 4.1: Do stakeholders consider there likely to be any required changes to the system restart frameworks, including the Standard, as a consequence of changing operational patterns driven by CER such as roof-top PV and batteries? If so please describe.

We recognise that, without a rethink of existing processes, the current levels of rooftop solar embedded within distribution networks could potentially cause barriers to a system restart. Rooftop solar, while it unlocks significant benefits for customers in normal operating conditions, can stop the grid from reaching the sufficiently stable state needed for system restoration.

The Issues Paper notes that AEMO is working with electricity distributors to implement emergency backstop controls that would provide the ability to curtail all new rooftop solar installations if required as a last resort to maintain power system security. It further notes that such controls, by stabilising demand, could provide the necessary operating conditions required for system restoration.

Ausgrid does not currently have emergency backstop capabilities to reduce rooftop solar generation but is working with AEMO, the NSW Government and others on the implementation of these controls and other methods of increasing demand to manage system security, with a target date of Spring 2025. These capabilities will most likely reflect the 'base level' controls needed to meet minimum requirements set out in planned changes to our Licence Conditions. In past regulatory processes this has forced the Australian Energy Regulator (**AER**) to reject funding for 'optimisation' functions over and above base level controls associated with regulatory backstop capabilities.[3] This is even though the AER has agreed that the optimised controls would provide benefits and efficiencies for customers.[4]

We encourage the AEMC to consider these constraints under the current regulatory framework. The Issues Paper flags that emergency backstop capabilities could be used to co-ordinate and manage rooftop solar after a major disruptive event through islanded operation of parts of a distribution

[3] AER, Ausnet Services emergency backstop mechanism cost pass through, August 2024, p.10
[4] AER, AusNet Services emergency backstop mechanism cost pass through, August 2024, p.10

network. It then goes on to acknowledge that this 'would require a dynamic balance between local generation and demand within the power island combined with assets that could provide frequency control'. These capabilities go beyond the current scope of the minimum backstop capabilities and are unlikely to gain funding approval from the AER without further regulatory reform.

Question 5 Opportunities for improved restart preparedness from changes in the distribution system

Question 5.1: Do changes in the distribution level of the power system present any opportunities for improved system restart preparedness over the short, medium and long term?

We encourage the AEMC to identify opportunities for undertaking pilots in partnership with network operators as well as other regulators and market participants. These pilots could be implemented in the short term to test new opportunities for improved system restart preparedness that consider changes in the distribution system. The learnings from these trials (whose focus does not necessarily have to be system restoration) could then be used to provide empirical evidence that support larger scale changes over the medium to long-term

Question 5.2: Is it conceivable that distribution system power islands could play a role in future power system restoration following major supply disruptions? What are the technical challenges that would need to be overcome to realise such a potential?

Pilots and innovative trials at the edge of the grid will be critical to enabling new models, like distribution system power islands, to play a future role in system restoration.

At Ausgrid, we have been working on a new concept called "Distributed Energy Zone" (**DEZ**) in collaboration with potential partners. The DEZ is geared towards deploying more rooftop solar and batteries with funding support from Ausgrid, working with retailers and aggregators to orchestrate those assets to deliver maximum value to customers, and allowing all customers to participate in the benefits of distributed energy. The new concept requires the backing of the regulatory sandbox arrangements, with staff level engagement with the AER underway.

The DEZ model, by providing more co-ordination and management of rooftop solar and batteries, could potentially establish islanded parts of distribution networks that could be used to support system restoration. While this is currently not an express aim of the DEZ model, we expect that that it would unlock learnings that the AEMC could leverage when refining its System Restoration Standard at a future point in time.

Question 5.3: Are stakeholders aware of any impediments to unlocking the benefits of improved resilience in relation to how distribution system respond to major supply disruptions and contribute to system restoration?

We would welcome the AEMC reviewing the current regulatory framework for system strength. The main impediment is that there is currently no clear cost recovery mechanism for electricity distributors providing these services, as noted in our response to question 3 above in relation to HCC REZ project. Clearer regulatory and commercial pathways for these investments, subject to appropriate cost benefit tests, would improve resilience for the medium and lower voltage ends of the grid.

Question 5.4: Do stakeholders consider that the current system restart frameworks and standard are helpful, neutral or detrimental to realising the potential of distribution systems for improved system restart outcomes?

Our assessment of the current restart frameworks and standard is 'neutral' in terms of realising the potential for distribution systems to improve system restart outcomes. In the absence of changes to

the standard, this could shift to 'detrimental' in the near term. Though the current framework may be appropriate for a system dominated by centralised generation connected at the transmission end of the grid, the largest single component of today's NEM is rooftop solar (20GW) embedded within distribution networks. We accordingly welcome the AEMC's review into ways the current frameworks and restart standard can take a more active approach to realising the potential of distribution networks in an IBR dominated system. These reforms need to be accompanied by appropriate planning approval and costs recovery mechanisms.

Question 6 Understanding how the Standard could evolve to support a transitioning system

Question 6.1: What information would providers seek when deciding to invest and maintain SRAS capability, under the current arrangements? How might this change as the system transitions?

The Issues Paper notes that the AEMC is unaware of any reporting that is readily available on when SRAS sources are required to be made available, or gaps in future SRAS capability. Ausgrid encourages the AEMC to pursue information sharing arrangements between NEM market bodies, electricity networks, and potential SRAS providers which provides:

- a common understanding of current or emerging SRAS shortfalls;
- clear information on the commercial arrangements for meeting an SRAS shortall; and
- opportunities that distribution networks or others may have to efficiently leverage existing assets or planned investments to provide SRAS at the lowest cost.

We would also support the AEMC investigating information sharing arrangements that avoid misunderstandings about the capabilities that networks or others can offer. The Issues Paper, for example, appears to suggest that the implementation of emergency backstop capabilities will allow electricity distributors to provide advanced system restoration support. This is unlikely to be the case for Ausgrid. We do not currently have emergency backstop capabilities to reduce rooftop solar generation and, when we do implement them, they are likely to reflect the minimum or 'base level' that can be supported under the current framework. Our response to question 4 above provides more information about this constraint, which is likely to require policy reform or additional commercial incentives to address.

Question 6.2: What commercial arrangements would provide incentives to invest in SRAS capability?

We agree with AEMO's observation in its 'General Power System Risk Review' that there is a shrinking pool of SRAS providers and 'limited incentives for the development/construction of new restart capable plants'.[5] Ausgrid would encourage the AEMC to explore options for providing new commercial arrangements that provide these missing incentives.

The AEMC made a rule change in 2020 that expanded the definition of SRAS so that it includes both black start capabilities and system restoration support services. Any new incentives that are established should incorporate this broadening of SRAS, particularly regarding the system restoration support that distribution networks can offer in an electricity system becoming increasingly dominated by inverted based generation.

Question 6.3: What is the lead time for investment in SRAS capability if a locational gap was identified?

[5] AEMO, General Power System Risk Review, 2024, p. 124.

There are long planning and approval lead times that must be completed under Chapter 5A of the NER before network operators can invest in synchronous condensers and other plant that provide system restoration capabilities. These lead times, which can run for up to 3 years, could prevent an investment from closing a gap in SRAS capability before it emerges. We encourage the AEMC to explore streamline planning and approval processes that address this risk.

Question 6.4: Are further commercial incentives needed for plant maintenance and uplift? If any, please elaborate.

Commercial incentives should provide investors with a reasonable opportunity of recovering the cost of their investment. This is likely to mean that plant and other maintenance costs should be included in the incentives offered to SRAS providers.

Question 6.5: What is the experience of potential providers of new technology-based SRAS, including BESS and grid forming inverters?

Ausgrid is currently working with proponents for Battery Energy Storage System (**BESS**) projects, including the Steel River East BESS in Mayfield West that would be capable of storing up to 400MWh of energy.[6] These projects do not have plans to add grid forming inverters capable of providing SRAS to any of our planned BESS projects, as this would require additional investment with no clear regulatory or commercial mechanism to recover the associated costs. The introduction of a pathway to recover these costs would lead to Ausgrid revisiting our current position and potentially adding grid forming inverters to these projects, ideally at the time of construction.

Question 7 Understanding how the Standard could evolve to support a transitioning system

Question 7.1: Do the current requirements set out in the NER for setting the Standard remain appropriate when considering the issues for system restart? If not, please elaborate. Note the current NER requirements for setting the Standard are outlined in section 3.2.

We note that the current Standard sets out the speed of restoration, how much supply is to be restored and the level of reliability of SRAS. It may be appropriate to consider the role of electricity distribution networks as a requirement going forward. We would be open to collaborating with the AEMC on what this would require.

Question 7.2: How does the Standard inhibit the ability to secure sufficient SRAS capability in the future as the NEM continues to transition?

The Issues Paper notes that the current Standard may be too prescriptive in the way it sets requirements for SRAS and this may inhibit the ability of AEMO to adapt to changes in system restart capability that is expected over the coming decade as the NEM evolves. This warrants further consideration and potentially allowing AEMO more flexibility under the Standard to consider alternative ways to support a timely, effective system restoration.

Question 7.3: What are some considerations for providing SRAS across interconnectors?

We recognise that when restarting the system following a major supply disruption the most optimal pathway may involve commencing generation restoration from neighbouring regions via interconnectors.

[6] https://yoursay.ausgrid.com.au/steelrivereastbess