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Wednesday, 12 November 2025

Teresa Smit
General Manager Modelling and Engineering
Australian Energy Market Operator

Via Email: gpsrr@aemo.com.au

Dear Teresa,

AEMO's Draft 2026 General Power System Risk Review (GPSRR) Approach Paper

Transgrid welcomes the opportunity to provide feedback on the Australian Energy Market Operator's (**AEMO**) Draft 2026 GPSRR Approach Paper. The Draft 2026 GPSRR Approach paper is part of AEMO's annual consultation on network inputs for the GPSRR. The report identifies the approach to managing system risks which are critical to maintaining system security.

Transgrid considers that the energy transition and associated regulatory changes have the potential to introduce material new power system security risks. For example, the growing complexity of power system operations requires an uplift in control room capabilities, and the establishment of multiple new transmission network operators in NSW is creating new system and operational interfaces which must be carefully managed. Transgrid supports the evolution of the GPSRR to holistically assess a broader range of risks that could threaten the safe and reliable operation of the power system, including the adequacy of tools, systems and capabilities of relevant parties across the NEM. We look forward to working with AEMO to navigate these challenges.

We commend AEMO's continued commitment to evolving the GPSRR framework through a transparent and consultative process. In particular, we acknowledge:

- AEMO's thorough identification of critical system risks;
- The soundness of the proposed risk evaluation methodology;
- The value in extending consultation to the implementation methodology, including clauses 5.20A1(a1)(2), 5.20A1(c)(2)(i–iii), and 5.20A.4(a).
- The GPSRR process is increasingly challenging as the emerging risks become more complex and onerous to assess and manage

Transgrid welcomes ongoing collaboration with AEMO on power system risk management and the development of effective solutions. Our attached submission provides further commentary on the points above, along with responses to the specific questions raised in the Draft 2026 GPSRR Approach Paper.

Should you require any further information or clarification, please contact Sophie Dowling, Major Projects Planning Manager, at sophie.dowling@transgrid.com.au.

Yours faithfully

Doug Thomson
Head of Strategic Network Planning & Development

Transgrid's response to AEMO's questions

Transgrid welcomes the opportunity to provide feedback on the Draft *2026 General Power System Risk Review (GPSRR) Approach* paper. It sets out the identification and management strategies for priority risks that could impact the reliability and security of the National Electricity Market (NEM). To support the implementation of the GPSRR Transgrid offers the following for consideration in response to the questions raised in the consultation:

1. What are stakeholder views on the proposed priority risks and the associated approach and methodology for assessment in the 2026 GPSRR?

Transgrid believes that AEMO has identified the key priority risks to the network and supports a more rigorous assessment of the contributing events, probabilistic assessment, impacts and assessment of mitigating impacts.

Transgrid supports the evaluation of the *voltage control risks* and a more rigorous assessment of contributing factors using lessons learned from international system operators. Analysing this assessment will allow AEMO to understand if the risks apply to the NEM and associated steps required to manage the subsequent impact. In addition to these assessments, Transgrid has recently observed that some generators and Battery Energy Storage Systems (BESS) are not operating as originally designed, for example exporting reactive power (VARs), causing voltage oscillations on the network. These unexpected behaviours, if left unaddressed, may introduce unforeseen impacts on network stability and performance.

The current approach to managing voltage oscillations involves detecting oscillations with Phasor Measurement Unit (PMU) devices and tripping the offending generation source. However, this method introduces risk due to limited coordination between detection devices. Presently, detectors operate independently, without cross-referencing data from other sources, which can lead to premature or unnecessary tripping of multiple generators. Transgrid recommends AEMO consider this risk in the proposed qualitative assessment of *voltage control risk* on the network.

Transgrid understands AEMO is planning to quantitatively assess large generation contingencies, Renewable Energy Zone (REZ) disconnections and loss of major transmission lines at high flows. Transgrid agrees that risks associated with the loss of a double circuit on a single tower across the NEM transmission backbone from South to North should be a priority assessment. We recommend changing the risk description to include "loss of large power system element" to cover the loss of either generation unit, large single load or transmission network asset.

2. Are there any other current and emerging system operator risks that may lead to cascading failure or major supply disruptions that should be included for discussion in the 2026 GPSRR?

Transgrid considers that the establishment of multiple new transmission network operators in NSW may pose considerable challenges to effective coordination, system reliability, and clear accountability. The level of risk will vary depending on the configuration of connections between adjacent networks and will be higher if parallel backbone networks are established with separate operators, compared to having a single operator of the transmission backbone. This is due to the increased coordination required between operators and additional time to make critical real time operational decisions where three or more parties would need to be involved. Such arrangements do not currently have a precent in the NEM.

We note that coordination issues between network operators and the need to make critical decisions quickly has been a cause of major blackouts around the world. Minor events that would ordinarily be

managed have developed into major blackouts due to these coordination issues between operators and the resulting lack of situational awareness when operational control is split amongst parties. Given the potential seriousness of these consequences, Transgrid encourages AEMO to assess these kinds of coordination and interface risks in the GPSRR.

3. Are there any suggested improvements regarding the risk assessment methodology?

Transgrid is seeking to better understand the application of the risk assessment methodology.

In particular, the interpretation of the *likelihood* assigned to large non-credible contingency events in *Table 4: Risk 3 Overview*. Based on the descriptions in *Table 1: Likelihood* and *Table 2: Consequence*, it appears the annual probability is between 5–20%. Does this translate to a one in 5–20 year probability of an extreme event occurring? Further Transgrid would like to understand if this likelihood is assessed with or without mitigation measures in place and the level of risk where further action is deemed necessary. We also support close collaboration with the AER on these assessments such that there is alignment on the need for rectification, and where required, regulatory approval pathways enabling timely completion of mitigation projects.

Transgrid seeks clarity regarding the intended definition of some of the language used in the risk assessment methodology section and the impact on the risk assessment:

1. "*Likelihood of Event Occurring*" – a single event can result in multiple consequences of varying magnitude, and the same event may lead to different magnitudes of consequence each time it occurs. In risk assessment practice, it is common to evaluate the likelihood of an event resulting in a specific magnitude of consequence (which is different from just the likelihood of the event). Therefore, when assessing risk, the likelihood should reflect both the likelihood of the event occurring and the event leading to consequences of a particular magnitude (e.g., Moderate, Major, Extreme).
2. "*Inherent Risk*" – this term is subject to differing interpretations among risk practitioners. While it is not formally defined in ISO 31000 (2018), multiple industry Enterprise Risk Management Framework's[1] define it as: "The level of risk in the absence of any response or control actions." While the term "Inherent Risk" is not explicitly defined in the GPSRR Approach Paper the "Inherent Risk Assessment" appears to be after considering "existing control or risk management strategies" (refer to Section 3.3, NSP Consultation, page 17). This approach may not align with widely accepted definitions, such as that provided by Australian Government. Given that only one level of risk is calculated, it may be clearer to remove the term "Inherent" and instead refer to it as "risk rating" or "current risk rating."
3. *Likelihood Descriptions (Table 7)* – To enhance clarity and support consistent interpretation, Transgrid recommends adding a column that describes the expected frequency of occurrence (or similar). This would help illustrate how the framework accounts for low-frequency events over a longer time period.

[1] Stanford, COSO, Australian Government

Likelihood	Likelihood Rating	Annual Probability	Qualitative Description	Frequency of Occurrence
Almost Certain	5	>90%	Xxx	Expected to occur every year
Likely	4	50%-90%	Xxx	Expected to occur every two years
Possible	3	20%-50%	Xxx	Expected to occur every 2-5 years
Unlikely	2	5%-20%	Xxx	Expected to occur every 5-20 years
Rare	1	<5%	xxx	Expected to occur less than every 20 years OR every 20 to 100 years

Table 1 – Suggested update to Table 7 in the GPSRR Approach paper 'Likelihood descriptions'

4. What are stakeholder views regarding the proposed modelling approach for the priority risks for assessment in the 2026 GPSRR?

The GPSRR 2026 Approach demonstrates a mature and holistic power system analysis methodology by incorporating a wide range of models, including network, Primary Frequency Response governor, FCAS, SPS, EFCS, DER/DPV, and load models. This breadth reflects alignment with best practice in power system planning and risk assessment. Notably, the use of PSCAD™ for high-fidelity dynamic simulations is sound and commendable, particularly for assessing risks associated with inverter-based resources (IBR).

Transgrid seeks clarification on the following points:

- **Forecast Demand Modelling:** While forecasting assumptions are outlined, the paper does not detail how forecast demand will be modelled. Will AEMO apply a uniform scaling approach across the NEM, or will demand be modelled in detail for each Bulk Supply Point (BSP). Additionally, which load model will be used to represent forecast demand?
- **Non-Credible Contingency Studies:** Will non-credible contingencies be assessed under peak load conditions, or will their study be guided by probabilistic analysis (e.g. only during high-risk periods such as storms or lightning events).
- **Primary Frequency Response (PFR) Settings:** While generator models typically include PFR capability, settings may be disabled, particularly for existing generators. Will AEMO update these settings to reflect actual on-site configurations?

Transgrid supports AEMO in developing a methodology to assess a more holistic approach to incorporate not only technical network analysis but also broader systemic vulnerabilities, including delivery risks to synchronous condenser installations, premature or unreliable coal unit operation, human error, and limitations in operational tools and capabilities, all of which have the potential to trigger catastrophic system consequences.

5. What are stakeholder views regarding the proposed risk cost assessment methodology to be applied in the 2026 GPSRR?

We support AEMO's proposed risk cost assessment methodology with the following modifications:

Transgrid requests further information on how the risk cost is applied. For example in assessing if a risk should be treated does the risk cost calculation methodology account for probabilities of consequence pre and post treatment of the risk? Applying consistent Risk Management across TNSPs will ensure that the best value economical and technically feasible option is implemented.

In the context of assessing non-credible contingencies for new infrastructure, it appears that Network Service Providers (NSPs) may be required to implement Emergency Control Schemes when the potential consequences of such events are severe, regardless of their likelihood. Could AEMO please clarify the threshold or criteria it applies when determining the need for such remedial action schemes? Additionally, confirmation on whether this approach is consistently applied across both planning and operational frameworks would be appreciated.

Transgrid recognises the *funding pathways for options* identified through the General Power System Risk Review (GPSRR) are not clear. While the existing investment processes under the National Electricity Rules provide a robust framework for large-scale infrastructure decisions, they may not be sufficiently flexible or timely for addressing emerging or rapidly evolving power system risks. A more adaptive funding approach, potentially incorporating targeted funding streams, innovation allowances, or expedited regulatory pathways, would support proactive risk management and enhance the resilience of the power system. Transgrid recommends a collaborative effort between the NSPs, AEMO and AER in developing clear funding and approval pathways. It is essential that where the GPSRR identifies serious risks to power system security, appropriate mitigation projects become 'actionable' and can be completed in an efficient and timely way.

6. Does the proposed consultation approach meet stakeholder expectations and do stakeholders have any suggestions on how AEMO could best engage with industry on the development of the 2026 GPSRR?

Transgrid commends AEMO's proposed engagement with industry and will continue to collaborate with AEMO in planning and developing a secure and reliable network.

General Transgrid Comments

Transgrid considers the GPSRR to be a critical component in managing risks to the network. In light of its importance, we recommend AEMO consider consulting on the entire process, rather than limiting consultation to only those items mandated under the National Electricity Rules.

- *Rules 5.20A.1(a)(4,5) options for future management of the events*

With regards to generation of options to address system risk, Transgrid recommends AEMO provide clarity on how the options are generated and whether they would be open to considering alternative options in consultation with market participants.

Further Transgrid seeks guidance on implementing Remedial Action Schemes (RAS) and the acceptable parameters for the maximum size of the Scheme including the permissible levels of load or generation shedding. For example is the amount of generation to be shed less than the largest generating unit. Clarification on this matter would support Transgrid in aligning its implementation of RAS with practices adopted by other Network Service Providers (NSPs), thereby promoting consistency and system-wide reliability.

- *Rule 5.20A1.(a1).(2) and (b1)(2)(i). How options are determined to be technically and economically feasible and calculating the benefits of options.*

Transgrid seeks to understand AEMO's approach to evaluating treatment options, particularly in the context of implementing Remedial Action Schemes (RAS). We are interested in whether AEMO considers the change in risk probability to the network, both before and after treatment, as part of its assessment process. For example, while a RAS may mitigate certain risks, it may introduce risks such as the potential for maloperation. In this context, we would appreciate any insights AEMO can provide regarding how such risks are valued during the evaluation process.

Transgrid seeks to better understand how AEMO's application of risk probability in the GPSRR Approach Paper is consistent with the requirements of NER clause S.5.1.8, which addresses the need to limit the probability of cascading failure in the power system. We would appreciate AEMO's insights on whether the methodology should also be adopted by TNSPs when assessing risk in their own planning and operational frameworks. For example, if a severe event – such as a specific double circuit tower failure – is expected to occur less than once in twenty years, it is unclear whether this would necessitate the implementation of emergency controls to reduce the probability of cascading failure, or whether alternative approaches may be appropriate where mitigation is not practically achievable.

- Rule 5.20A1.(a1).(2) (ii) and (iii) *assess the expected costs and time for implementation of each option and any other factors that AEMO considers should be taken into account in selecting a recommended option AND identify the recommended option or range of options*

We recommend AEMO provide greater transparency and detail regarding its implementation of clause 5.20A1(a1)(2)(ii), which requires AEMO to assess the expected costs and time for implementation of each option considered in the development of a recommended option for power system planning. Specifically, we seek clarity on the methodologies and assumptions used in estimating implementation costs and timelines, including how stakeholder input, market impacts, and technical feasibility are factored into these assessments. Furthermore, we ask AEMO to outline any additional factors it considers relevant in selecting a preferred option, and how these are weighted and applied in the decision-making process. Sharing the method used in this process helps NSPs include it in their planning, to manage risks concurrently with delivering project benefits.

- Rule 5.20A.4(a) *AEMO must develop and submit to the Reliability Panel a request for declaration of a non-credible contingency event as a protected event in accordance with the recommendations of a general power system risk review*

Transgrid would like to understand the criteria / threshold for AEMO to determine whether a 'non-credible contingency event' is suitable for declaring a 'protected event'. This will lead to efficiencies in power system studies and system development costs as it will allow option feasibility screening at an earlier stage in the planning process.

- *Rule 5.20A.1(a)(3)current arrangements for management of the priority risks described in subparagraphs (1) and (2);*

Given the increasing complexity of the power system, driven by rapid technological change, evolving market dynamics, and the integration of variable renewable energy sources, it is essential that the GPSRR process be afforded adequate time to ensure its findings are comprehensive, consultative, and actionable. Transgrid remains committed to supporting AEMO in managing power system risks to the fullest extent possible.