

Draft 2027 General Power System Risk Review Approach Paper

October 2026

Consultation Draft

A report for the National Electricity Market





We acknowledge the Traditional Custodians of the land, seas and waters across Australia. We honour the wisdom of Aboriginal and Torres Strait Islander Elders past and present and embrace future generations.

We acknowledge that, wherever we work, we do so on Aboriginal and Torres Strait Islander lands. We pay respect to the world's oldest continuing culture and First Nations peoples' deep and continuing connection to Country; and hope that our work can benefit both people and Country.

AEMO is proud to have launched its Innovate [Reconciliation Action Plan](#) (RAP) in June 2026. Pictured left and featuring on the cover of the Innovate RAP is Wiradjuri artist Lani Balzan's 'Journey of unity: AEMO's Reconciliation Path', a visual representation of our ongoing journey towards reconciliation – a collaborative endeavour that honours First Nations cultures, fosters mutual understanding, and paves the way for a brighter, more inclusive future.

Important notice

Purpose

AEMO has prepared the 2027 General Power System Risk Review (2027 GPSRR) Approach Paper under clause 5.20A.2(c)(3) of the National Electricity Rules.

Disclaimer

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1 Executive summary

AEMO operates the power system to maintain a secure and reliable supply of electricity for homes and businesses across the National Electricity Market (NEM). The system continues to undergo a period of significant change as synchronous generators review their operating regimes and approach retirement, renewable generation and consumer energy resources (CER) continue to grow, and as technology evolves. Understanding and managing risks is essential to keep the power system secure and reliable, with new challenges continuing to emerge as the energy mix changes. Collaborative planning across the sector is key to ensuring the secure and reliable operation of the NEM into the future with consumers' interests at the centre.

Purpose of the GPSRR

Each year, AEMO collaborates with key industry stakeholders such as Network Service Providers (NSPs) to undertake a General Power System Risk Review (GPSRR) and publishes a GPSRR report for the NEM. The GPSRR is an annual requirement under rule 5.20A of the National Electricity Rules (NER), with the latest GPSRR report¹ having been published on 31 July 2026.

AEMO has commenced the 2027 GPSRR and plans to publish the 2027 GPSRR report by 31 July 2027.

The GPSRR provides greater transparency of current and emerging system risks that need to be managed, and helps AEMO, NSPs, governments and market participants better understand the nature of these risks and how they could potentially be addressed. It forms part of AEMO's broader approach to identifying, assessing and managing power system security risks across the NEM.

The GPSRR focuses on power system resilience, highlighting the capability of the system to withstand high impact but low probability events. The transition of the NEM is increasingly requiring greater utilisation of existing power system capability and its operation closer to technical limits. While operating at high levels of efficiency, this may also introduce new operational challenges or increase the likelihood or impact of existing risks. The GPSRR provides a proactive, forward-looking view of potential risks and recommends targeted measures that can restore or maintain resilience.

Alongside the GPSRR, AEMO publishes a range of planning and system security publications including the *Transition Plan for System Security* (TPSS), which includes information on system strength, inertia and network support and control ancillary services (NSCAS), and the Engineering Roadmap. Together these measures support planning and operational strategies to maintain system security.

Under the NER, AEMO is required to review:

- a prioritised set of risks comprising credible or non-credible contingency events and other events and conditions that could lead to cascading outages or major supply disruptions,
- the current arrangements for managing the identified priority risks and options for their future management,
- the arrangements for management of existing protected events and consideration of any changes or revocation, and

¹ See <https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/system-operations/general-power-system-risk-review>.

- the performance of existing emergency frequency control schemes (EFCS) and the need for any modifications.

In addition to the identified priority risks, the GPSRR will also summarise key activities related to other power system risks that AEMO is currently undertaking.

Proposed priority risks for the 2027 GPSRR

AEMO has proposed four priority risks for assessment in the 2027 GPSRR:

- **Non-credible contingency management.** Increasing utilisation of high-capacity transmission corridors may increase the consequences of non-credible contingency events, particularly when the power system is operating closer to its limits. As contingency sizes increase, remedial action schemes and emergency frequency control schemes have become more complex and interdependent, and large control actions may contribute to cascading failures or major supply disruptions. In the 2027 GPSRR, it is proposed to build on the assessments undertaken in the 2026 GPSRR² on *Large non-credible generation and network contingency events* by assessing the risks related to a non-credible contingency in South-West Victoria. This specific non-credible contingency event has been selected for study due to the large potential generation contingency size, and the expected unsuitability of expanding existing or implementing new remedial action schemes to mitigate this risk. This case study will demonstrate the potential use of a protected event or the indistinct events framework as other avenues for non-credible contingency risk management. If this approach is determined to be appropriate, it may then be applied to mitigate risks for other non-credible contingency events in the NEM.
- **Operational technology and digital systems risks.** Power system operation is increasingly reliant on operational technology, digital platforms, communications networks and third-party applications. Failures or inadequacies in these systems may affect dispatch, operational visibility and decision-making, while gaps or compromises across models, data, tools and procedures may weaken multiple operational controls at the same time. Impacts arising from the failure of operational technologies or digital systems may now result in significant consequences for the power system equivalent to multiple asset failures. Increasing interconnection between digital systems, reliance on third-party providers and emerging AI-enabled cyber threats may further increase the potential for common-mode failures and associated major power system consequences.
- **Voltage control and inverter-based load (IBL) risks.** Strong progress has been made in the integration of IBLs into the NEM through proposed or draft rule changes such as the *Improving the NEM access standards – Package 2*³ and the *Operational integration and visibility of large inverter-based loads*⁴. Progress is also being made through sub-working groups, further access standard reviews⁵, and updates to power system stability, modelling and system strength impact assessment guidelines. However, in a rapidly changing environment, it is important to further extend risk assessments to proactively understand the potential for residual risks related to high impact low probability events. AEMO proposes to consider potential risks related to IBL behaviour on voltage and frequency management. These include behaviour related to the temporary disconnection of large IBLs, which may cause rapid increases in voltage or frequency,

² See https://www.aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2026/draft-2026-gpsrr-report-consultation/final-2026-gpsrr-report.pdf

³ See <https://www.aemc.gov.au/rule-changes/improving-nem-access-standards-package-2>

⁴ See <https://www.aemc.gov.au/rule-changes/operational-integration-and-visibility-large-inverter-based-loads>

⁵ An access standards review is completed every five years in accordance with NER S5.2.6A(a) to assess the need for amendments to the technical requirements outlined in Schedules 5.2, 5.3 and 5.3a.



particularly in weak networks. Without risks being managed, the increasing concentration of IBLs may also increase exposure to non-credible load disconnections. Assessment of these potential risks will support the ongoing resilience of the power system and supplement the existing work already underway in integrating IBLs into the NEM.

- **Power system oscillation risks.** Changing network topology, synchronous generator retirements and increasing inverter-based generation and loads may alter the oscillatory characteristics of the NEM. These changes will influence traditional electromechanical modes (also called inter-area modes in the NEM) and increase exposure to converter-driven, forced or previously unobserved oscillations, particularly during periods of high power transfer, low system strength or reduced synchronous generation. Further uplifts in modelling, monitoring and source-location capabilities may be required to identify emerging issues related to oscillations in both transmission and distribution networks and mitigate risks before they become more material and contribute to plant disconnections, system separation or cascading failure. In the 2027 GPSRR, it is proposed to provide a holistic overview of oscillatory risks that could impact power system resilience in the NEM and identify key actions required. Measures to address oscillatory stability risks are being considered through AEMO's broader system security planning activities, including the Engineering Roadmap component of the 2026 TPSS, which is examining future transient and oscillatory stability challenges associated with the energy transition.

Scope of the approach paper and invitation for submissions

This approach paper is seeking stakeholder views on:

- the prioritised set of risks that AEMO plans to review in the 2027 GPSRR (see Section 2),
- AEMO's proposal to consult with relevant parties throughout the review (see Section 3),
- the approach, methodologies, information, and assumptions AEMO proposes to use in assessing the priority risks (see Sections 4, 5, and 6), and
- the appropriateness of the current GPSRR framework (Section 1).

As AEMO conducts the fifth annual review under the expanded GPSRR framework, AEMO is taking the opportunity to ask for feedback on the NER framework supporting the GPSRR. Additionally, the approach paper also includes a high-level description of the work planned to address the other core elements of the 2027 GPSRR.

How stakeholders have informed this approach paper

AEMO has engaged early with Network Service Providers (NSPs), the Reliability Panel⁶ and relevant industry stakeholders to inform development of this draft approach paper. In addition to consultation with external parties, AEMO also undertook a review of potential risks based on operational experience, recent power system events and anticipated power system changes.

Engagement commenced with an industry-wide briefing for transmission and distribution NSPs on the 2027 GPSRR risk assessment process, followed by provision of a structured risk assessment template to support the submission of potential risks. AEMO has also used regular discussions with individual NSPs to explore proposed priority risks, risk conditions, existing management arrangements and potential assessment approaches.

⁶ The panel established by the AEMC under section 38 of the National Electricity Law.



In developing this draft approach paper, AEMO shared an early version with NSPs and sought targeted input on the proposed priority risks and assessment methodology. The draft approach paper reflects these inputs alongside AEMO's operational experience, consideration of recent power system events and anticipated changes to the power system.

Invitation for submissions

Publication of this draft approach paper marks the next stage of engagement. AEMO is seeking broader stakeholder feedback on the proposed priority risks, assessment methodology, models, assumptions, risk-cost methodology and planned engagement approach. Feedback will inform the final approach paper and the scope and conduct of the assessments that will support the draft and final 2027 GPSRR reports.

Submissions are now invited on this draft approach paper from interested parties and may be made by email to gpsrr@aemo.com.au by **12 November 2026**.

Please note that relevant submissions will be published, except for material identified as confidential, and should be consistent with AEMO's consultation submission guidelines⁷. AEMO may additionally or alternatively elect to summarise the substance of relevant issues raised that are common across multiple submissions.

Please identify any parts of your submission that you wish to remain confidential and explain why. AEMO may still publish that information if it does not consider it to be confidential but will consult with you before doing so. Material identified as confidential may be given less weight in the decision-making process than material that is published.

Late submissions may be accepted at AEMO's discretion, and a late submission request should be submitted at least one week in advance of the consultation closing date, where possible. Submissions received after the closing date and time may not be given equal consideration compared to on-time submissions.

List of key consultation questions

Table 1 outlines key areas of this draft approach paper on which AEMO is seeking industry feedback. AEMO also welcomes feedback on any other aspect of the proposed approach described in this paper.

Table 1 Key consultation questions

Question	Section
1. Do the current approach, scope, risk assessment and consultation arrangements for the GPSRR provide an appropriate framework for assessing material power system risks? If not, please identify any deficiencies and describe additional arrangements that would improve the effectiveness of future GPSRRs.	Section 1
2. What are stakeholder views on the proposed priority risks and the associated approach and methodology for assessment in the 2027 GPSRR?	Section 2.1
3. Are there any other higher priority current and emerging system operator risks that should be included for discussion in the 2027 GPSRR?	Section 2.2
4. 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 2027 GPSRR?	Section 3
5. Are there any suggested improvements regarding the risk assessment methodology?	Section 4

⁷ See https://aemo.com.au/-/media/files/stakeholder_consultation/working_groups/industry_meeting_schedule/aemo-consultation-submission-guidelines---march-2023.pdf.

Question	Section
6. What are stakeholder views regarding the proposed modelling approach for the priority risks for assessment in the 2027 GPSRR?	Section 5
7. What are stakeholder views regarding the proposed risk cost assessment methodology to be applied in the 2027 GPSRR?	Section 6

Feedback requested on the GPSRR framework

The current framework for the GPSRR involves consultation on the identification of, approach to and reporting of priority risks considered in the GPSRR each year, in addition to regular communication with interested parties outside of the formal consultation processes. AEMO's approach is intended to support a transparent and consultative process to identify material power system risks and consider options for their management. However, as the nature of power system risks continues to evolve, AEMO is seeking stakeholder views on whether the approach, scope, risk assessment and consultation arrangements supporting the GPSRR remain appropriate and whether any improvements are recommended.

Consultation question 1

Do the current approach, scope, risk assessment and consultation arrangements for the GPSRR provide an appropriate framework for assessing material power system risks? If not, please identify any deficiencies and describe additional arrangements that would improve the effectiveness of future GPSRRs.

Next steps

AEMO thanks NSPs, industry participants and other stakeholders for their advice and input over the past four months as part of the 2027 GPSRR engagement process, which has helped inform this draft approach paper.

AEMO will continue to engage with stakeholders through to publication of the final 2027 GPSRR Approach Paper, and throughout the remainder of the 2027 GPSRR, including development of the draft report scheduled for publication in May 2027 and the final report in July 2027.

All stakeholders are invited to provide a written submission on the draft 2027 GPSRR approach paper. Submissions should be sent in PDF format⁸ to gpsrr@aemo.com.au by 5 PM (AEDT) on Thursday 12 November 2026.

⁸ Submissions may also be accepted via email, post or verbally at AEMO's discretion.

2 Priority risks to be assessed

2.1 Proposed priority risks to be assessed

AEMO has reviewed the risks identified under the 2027 GPSRR risk assessment process and has proposed the following priority risks for assessment, each of which could lead to cascading outages or major supply disruptions:

- **Non-credible contingency management.**
- **Operational technology and digital systems risks.**
- **Voltage control and inverter-based load risks.**
- **Power system oscillation risks.**

In identifying the risks listed above as priority risks, AEMO has had regard to:

- the likely power system impact and estimated probability of occurrence of the risks,
- details of any previous reviews or other work undertaken to understand or manage the risks,
- whether there are any current risk mitigation measures or processes in place to manage the event,
- any changes to power system conditions or other factors which may have materially changed the risk profile, and
- whether the risks have been reviewed previously as part of AEMO's risk review process (under a recent Power System Frequency Risk Review [PSFRR] or GPSRR).

The proposed priority risks are targeted for study against historical and future operating conditions, typically considering a timeframe up to five years in the future. For the 2027 GPSRR, this includes consideration up to 1 July 2031.

Further details on the proposed priority risks are provided in the sections below.

Priority Risk 1 – Non-credible contingency management

The integration and increasing utilisation of high-capacity transmission corridors is elevating the potential consequences of certain non-credible contingency events. To enable the energy transition, significant transmission developments and increased interconnection are being progressed to support secure and reliable operation in the NEM, while existing assets are expected to be operated closer to their limits more frequently. While the 2026 GPSRR observed that resilience to large non-credible contingency events is expected to improve over time under normal operating conditions, elevated risks associated with certain non-credible contingency events may still be present when operating closer to system limits or when non-credible events are more likely to occur. As new transmission corridors become more critical for the operation of the NEM, the non-credible loss of these high-capacity transmission assets may increasingly result in more severe system consequences. This reinforces the need for the continued assessment and management of non-credible contingency risks.

Existing emergency controls may face increasing challenges in managing future non-credible contingency risks. Remedial Action Schemes (RASs) and EFCS are currently relied upon to mitigate severe non-credible contingency risks. However, as contingency sizes increase with the growing utilisation of high-capacity transmission corridors, the scale, complexity, and interdependency of these schemes may need to increase to be capable of mitigating these risks. In some cases, RASs are

becoming cross-jurisdictional and non-credible contingency management may rely on the coordinated operation of multiple schemes across the NEM. These trends highlight practical limitations in the extent to which future risks can be managed through increasingly complex remedial actions alone and reinforce the need for complementary approaches to address residual non-credible contingency risks.

It is proposed that the 2027 GPSRR uses a case study to assess emerging challenges in the management of non-credible contingency risks and evaluate additional measures to complement existing emergency controls. Each new high-capacity transmission development introduced to the NEM will require consideration of how the associated non-credible contingency risks will be managed. Drawing on a non-credible contingency event originating in the South-West Victorian 500 kV network⁹ as a case study for this risk, targeted power system studies will assess the current risk to the power system and the effectiveness of a range of potential risk management approaches, including:

- Current system scenario: assessing the system response with existing controls and EFCs, without additional risk-management measures.
- RAS expansion studies: evaluating options to expand existing RAS(s) to reduce the wide-area impacts.
- Indistinct events framework¹⁰: applying operational constraints during adverse weather conditions to manage elevated non-credible contingency risk.
- Protected event¹¹ declaration: assessing permanent N-2 constraint measures to limit the size and consequences of a potential non-credible contingency event.
- Network augmentations or non-network alternatives to augmentation: The installation of additional infrastructure or other non-network solutions could be used to reduce risk.

AEMO plans to undertake a comparative cost-benefit assessment for each risk management option to evaluate the trade-offs between implementation complexity, operational and market impacts, and the level of risk reduction achieved. This assessment will compare the extent to which each approach mitigates the identified non-credible contingency risk, the operating conditions under which the risk remains exposed, and the associated costs¹² imposed on the power system. The assessment will also consider the ongoing operational and lifecycle requirements of each option, including how its effectiveness, complexity and suitability may change as the network, generation connections and operating conditions evolve, and the circumstances in which it may need to be modified or replaced. The case study will provide insight into the practical limitations of existing emergency control frameworks and support consideration of alternative approaches where traditional remedial actions alone may no longer provide an efficient or sustainable means of managing future non-credible contingency risks.

⁹ See 2026 General Power System Risk Review Report, Section 3.2.2, for an overview of South-West Victorian 500 kV non-credible contingency risks: https://www.aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2026/draft-2026-gpsrr-report-consultation/final-2026-gpsrr-report.pdf

¹⁰ For more information on the inclusion of *indistinct events* in the contingent events framework, see: <https://www.aemc.gov.au/sites/default/files/2022-03/Indistinct%20Events%20Information%20Sheet.pdf>

¹¹ Per clause 4.2.3(f) of the NER, a *protected event* means a non-credible contingency event that the Reliability Panel has declared to be a *protected event* under NER 8.8.4, where that declaration has come into effect and has not been revoked. This is a low likelihood, high consequence non-credible contingency event for which AEMO must maintain the power system security standards, including the frequency operating standards, following the occurrence of the event.

¹² See Section 4 of AEMO's Request for Protected Event Declaration, detailing the cost benefit assessment completed in 2018: <https://www.aemc.gov.au/sites/default/files/2019-04/AEMO%20Request%20for%20protected%20event%20declaration.pdf>

Table 2 Non-credible contingency management overview

Risk	Non-credible contingency management
Likelihood	Unlikely – annual probability >1% - 20%: • Several recent historical occurrences across the NEM, driven by changing weather conditions^{13,14,15,16}. • Addition of new generation to existing or new double circuit transmission lines. • Large new REZ connections to the NEM connected via double circuit lines. • Progressive withdrawal of synchronous generation, contributing to declining system strength and inertia. • Increasing RAS complexity, interdependency, and cross-jurisdictional designs contributing to increasing maloperation or non-operation risks.
Impact	Extreme – loss of supply to a region(s), for any duration: • Increasing contingency sizes may be too large or complex for remedial action schemes to mitigate, leading to cascading failure and system instability. • Increasing penetration of distributed photovoltaics (DPV), contributing to increased contingency sizes due to the associated DPV shake-off that can occur during other large contingency events, particularly for legacy DPV that are not required to comply with the latest inverter requirements standard. • Large IBLs may behave unexpectedly during large system disturbances resulting in further impacts to frequency or voltage. • Large changes in inter-regional flows may lead to instability and subsequent disconnection of multiple interconnectors. • Significant non-credible contingencies may result in cascading failures leading to frequency instability that cannot be arrested by under frequency load shedding (UFLS) or over frequency generator shedding (OFGS) schemes.
Risk conditions	Based on current and future scenarios, the following risk conditions will be considered: • Coincident high interconnector and intra-network transmission line flows. • Severe weather conditions. • Low system inertia, including the retirement of major coal-fired power stations. • Increasing DPV penetration. • High and low demand conditions.
Existing management strategies	NER S5.1.8 requirements, RAS, EFCS.
Potential solutions	Potential solution options include: • Application of the indistinct events framework. • Declaration of a protected event(s). • Procurement of increased or regional FCAS. • Review of UFLS and performance enhancements. • Network augmentations or non-network alternatives.
Assessment approach	Full-NEM phasor-domain transient stability studies in PSS®E and risk-cost assessment of alternative non-credible contingency management options.
Risk raised by	AEMO, AusNet, ElectraNet, Powerlink, Transgrid, VicGrid.

¹³ See https://www.aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/power_system_incident_reports/2024/final-report---loss-of-moorabool---sydenham-500-kv-lines-on-13-feb-2024.pdf

¹⁴ See https://www.aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/power_system_incident_reports/2022/trip-of-south-east-tailem-bend-275-kv-lines-november-2022.pdf

¹⁵ See https://www.aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/power_system_incident_reports/2022/trip-of-liapootah---palmerston---waddamana-no-1-and-no-2-220-kv-lines.pdf

¹⁶ See https://www.aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/power_system_incident_reports/2021/final-report-victoria-and-south-australia-separation-event.pdf

Priority Risk 2 – Operational technology and digital systems risks

Power system operation is becoming increasingly reliant on operational technology, digital platforms and third-party applications. Modern power system operation depends on a growing range of forecasting systems, market systems, supervisory control and data acquisition (SCADA) platforms, communications networks, operational tools and third-party applications. Failures, defects or inadequacies within these systems can impact dispatch outcomes, situational awareness and operational decision-making, leading to consequences comparable to traditional network, generation or demand contingency events. Several recent NEM events have demonstrated that failures originating within digital and operational technology systems can materially impact power system security and operational resilience, contributing to frequency disturbances and increasing the risk of operation near or beyond secure operating limits.

The power system may be changing faster than the operational capabilities needed to manage it can be developed. New operational capabilities, control systems and decision-support tools are required to maintain secure operation as the NEM transitions toward increasingly complex operating conditions. In a rapidly changing system, new operational requirements may emerge faster than capabilities to manage them can be developed. Accumulating gaps across power system models, data, visibility, decision support, controls, procedures and coordinated response may weaken the operational controls that prevent a high-impact contingency from escalating into cascading failure or major supply disruption. While AEMO is uplifting operational capabilities through initiatives such as the Transmission System Operational Capability Framework¹⁷ and the Operations Technology Roadmap¹⁸, the increasing speed and complexity of the transition may continue to create operational capability gaps.

Reliance on interconnected digital systems is increasing rapidly, resulting in additional operational complexity and uncertain risk exposure. The growing use of self-forecasting platforms, automated bidding systems, cloud-hosted applications and other third-party service providers creates new pathways through which common-mode failures, software defects and communications outages may affect multiple participants simultaneously. Increasing dependence on digital systems also introduces challenges associated with system recovery, operational visibility and management of power system security while critical systems remain unavailable. Distribution networks are also seeing higher reliance on digital systems with control pathways that interface with distributed energy resources such as Advanced Distribution Management Systems, Distributed Energy Resource Management Systems, emergency backstop and CSIP-AUS servers, as well as remote control of inverters by manufacturers or aggregators. Communications is also becoming increasingly important, particularly when supporting UFLS, RASs and distribution, transmission and AEMO control rooms.

Breakthrough and evolving AI capabilities may further influence this risk environment. Frontier AI systems are demonstrating increasingly capable autonomous behaviours, including software engineering, code generation, multi-step problem solving and vulnerability discovery. Security agencies have identified that these developments have the potential to increase the speed, scale and sophistication of cyber threats while simultaneously reducing barriers to entry for malicious actors, such that advances in AI may increase both the likelihood and potential consequences of cyber and operational technology incidents. Security agencies have also proposed changes to the Security of Critical Infrastructure (SOCi) Act that will broaden the definition of a cyber security incident to include internally approved AI systems autonomously and deliberately acting maliciously. As the NEM becomes increasingly reliant on digital infrastructure, operational technology

¹⁷ See <https://www.aemo.com.au/-/media/files/electricity/nem/system-operations/tsocf/draft-tso-capability-framework-overview.pdf>

¹⁸ See <https://www.aemo.com.au/initiatives/major-programs/operations-technology-program/operations-technology-roadmap>

networks, communications systems and third-party software platforms, any risks associated with the integration into the power system of this new technical capability, which represents a paradigm shift, must be explored.

It is proposed that the 2027 GPSRR will assess how the integration or failures of digital, operational technology and AI-enabled systems may affect secure power system operation and identify opportunities to improve operational resilience.

Drawing on recent NEM events and investigating potential future scenarios, the review will examine how these risks may contribute to significant power system consequences and identify potential improvements to operational processes, governance, tools, cyber security arrangements and system recovery capabilities.

The proposed scope for the 2027 GPSRR includes the consideration of:

- Risks associated with forecasting systems, SCADA platforms, telecommunications networks, operational and market systems, and third-party applications.
- Recent NEM events involving dispatch errors, self-forecasting failures, SCADA outages, control centre communication failures and other digital system disruptions.
- Emerging AI-enabled cyber security threats and integration risks relevant to electricity infrastructure.
- Hypothetical scenarios involving widespread digital, operational technology, AI or cyber-related failures.
- Potential impacts on operational technology environments and critical power system functions.
- Operational resilience gaps, future monitoring requirements and potential risk mitigation measures.

Note that the nature of this priority risk may result in the identification of sensitive or confidential information that will not be included in the public report. Where specific actions are required to be taken relating to this information, relevant parties will be contacted directly.

Table 3 Operational technology and digital systems risks overview

Risk	Operational technology and digital systems risks
Likelihood	Unlikely – annual probability >1% - 20%: - Several recent NEM events have demonstrated that operational technology and digital system failures can materially impact power system security and market operations^{19,20,21}. - Increasing reliance on operational technology, digital platforms and third-party systems is elevating digital system failure risk and introducing additional failure pathways. - The changing power system may outpace the development of operational tools, processes and control systems required to effectively operate the system, resulting in a growing gap between emerging operational requirements and the capabilities available to manage them. - Increasing system complexity and volumes of IT change elevate the risk of defects, configuration errors and unintended consequences. - The complexity, time and resources required to transition away from legacy technologies may increase exposure to operational risks. - Management of power system security following a critical digital system failure is becoming increasingly challenging as participant numbers, system complexity, and automation continue to grow. - Multiple capability gaps across models, data, visibility, decision-support tools, controls and procedures may coincide during abnormal conditions, weakening operational controls and increasing the likelihood or consequence of cascading failures.
Impact	Extreme – loss of supply to a region(s), for any duration. Market suspension of multiple markets for a prolonged period: - Third-party system failures, software defects or operational technology outages may result in significant dispatch errors, reduced situational awareness or degraded operational response, increasing the risk of operation beyond secure limits and leaving the power system vulnerable to cascading failure following a subsequent contingency event. - Complete or partial loss of SCADA, Electricity Market Management System (EMMS) or inter-control centre communications may impair AEMO's ability to securely operate the power system in accordance with the NER, potentially requiring market suspension, exercising the Instruments of Delegation for TNSPs²² and degraded operational arrangements. - Cyber-attack-triggered events may simultaneously impact power system operation, operational technology, market systems and critical digital infrastructure, reducing operational visibility, situational awareness and AEMO's ability to effectively coordinate and respond to emergency operating conditions. In some instances, it may be possible to create unsatisfactory outcomes that may impact power system reliability or the physical condition of power system assets.
Risk conditions	Alignment of high-risk power system and digital system operation will be considered, such as: - Power system operation close to the limits of the technical envelope. - High interconnector and intra-regional network flows. - High penetration of inverter-based resources (IBR) and semi-scheduled generation. - Limited operational headroom on BESS facilities to manage dispatch errors and frequency disturbances. - High DPV. - Conditions requiring timely operational intervention to maintain secure operating limits, including management of emergency conditions. - Abnormal or degraded operating conditions where delayed intervention may contribute to cascading failure or major supply disruption.
Existing management strategies	Control room procedures, cyber security monitoring, IT/digital change management, testing and operational readiness processes for critical operational technology and market system changes, Instruments of Delegation for TNSPs.

¹⁹ See https://www.aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/market_event_reports/2024/final-report---nem-market-suspension-5-september-2024.pdf

²⁰ See https://www.aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/power_system_incident_reports/2025/self-forecasting-errors-and-frequency-excursion-on-19-august-2025.pdf

²¹ See https://www.aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/market_event_reports/2026/preliminary-report-nsw-market-suspension-on-23-march-2026.pdf

²² See <https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/power-system-operation/schedules-for-delegations>

Risk	Operational technology and digital systems risks
Potential solutions	Potential solutions may include: • Integration of real-time monitoring, modelling, decision support and automated controls. • Uplift of control room tools and training. • Reduced manual dependencies, strengthened operator readiness and coordinated response arrangements across AEMO, NSPs and participants. • Integration of AI tools into cyber security operations. • Greater separation of operational technology and information technology systems. • Regulatory requirements on third-party systems that interface with market and power system operation.
Assessment approach	Review recent NEM events and assess future operational technology and digital system failure scenarios to identify potential power system consequences and opportunities.
Risk raised by	AEMO

Priority Risk 3 – Voltage control and inverter-based load risks

While significant progress is underway to support the integration of IBLs into the NEM, ongoing assessment remains important as power system conditions continue to evolve. Recent and proposed reforms²³, together with other supporting work from sub-working groups, further access standard reviews, and updates to guidelines, are expected to continue to strengthen the management of risks associated with large IBLs. However, there is a need to assess the potential for emerging challenges to arise as connection volumes increase, operating conditions continue to change, and an increased understanding of IBL behaviour is gained based on local and international experience. The proposed assessments in the 2027 GPSRR are intended to complement existing industry work by examining emerging high-impact, low-probability scenarios and identifying whether any additional risk mitigation measures may be required to support the ongoing resilience of the power system.

The rapid growth of large IBLs, increasing IBR penetration, declining synchronous generation and evolving network operating conditions will require the investigation of potential dynamic voltage control challenges across the NEM. The interaction between large IBLs, both in transmission and distribution networks, and changing system strength characteristics may increase the risk of adverse voltage outcomes during both credible and non-credible contingency events. These risks may be exacerbated under low demand conditions, where reduced system strength, elevated voltages and increasing reactive power control requirements create increasingly complex operating conditions.

The temporary disconnection of large IBLs during severe voltage disturbances may introduce new voltage control risks as the scale of connected load increases. While the 2026 GPSRR highlighted risks that are now being addressed with the introduction of dedicated IBL access standards in the NEM, technical and operational challenges may persist as IBLs become more prevalent and power system operating conditions continue to evolve. Due to technical limitations, large IBLs may temporarily disconnect from the power system for deep voltage disturbances, with reconnection delayed by 500 milliseconds up to 1 second. Proactive assessment is required to determine whether the temporary loss of large quantities of load may result in significant increases in system voltage, particularly in weak networks or operating conditions where limited dynamic reactive power absorption is available. As more IBLs connect to the NEM, the magnitude of these voltage excursions could increase, creating conditions where post-fault voltages exceed the operating range within which loads are

²³ See <https://www.aemc.gov.au/rule-changes/improving-nem-access-standards-package-2>, and <https://www.aemc.gov.au/rule-changes/operational-integration-and-visibility-large-inverter-based-loads>

required to remain connected following their fault ride-through. In these circumstances, an initial temporary load cessation could transition into a permanent loss of load, further increasing voltages.

The temporary disconnection of large IBLs could also result in significant impacts to frequency and rate of change of frequency during major disturbances. The temporary disconnection of IBLs effectively behaves as a short-term large load contingency event, causing rapid power imbalances and high rates of change of frequency. As the concentration and aggregate size of large IBL developments increase, maintaining compliance with the frequency operating standard may become increasingly challenging during these transient conditions. In some circumstances, it may be possible that the resulting over-frequency response could result in unexpected responses from generation and protection systems. This would create additional operational challenges when large volumes of IBL subsequently reconnect, potentially resulting in further frequency disturbances, interconnector power swings or other undesirable system outcomes.

Assessments will be required for non-credible contingency events that may result in significant IBL disconnection. As IBL developments continue to expand, consideration is required regarding whether common assets, shared network infrastructure or other low-probability events could result in the simultaneous disconnection of significant quantities of load. NSPs must plan the network with consideration of non-credible contingency events to reduce the probability of cascading failure through the implementation of emergency controls. Where this cannot be achieved, AEMO can propose to further review these risks through the GPSRR. It is intended that the 2027 GPSRR will review representative non-credible contingency scenarios involving the loss of IBLs or common network assets, assessing whether emerging risks exist and whether additional measures may be required to maintain acceptable levels of power system resilience.

It is proposed that the 2027 GPSRR will assess emerging voltage control and other associated risks with IBLs to identify any additional mitigation measures required. Targeted studies will be undertaken to demonstrate potential adverse power system outcomes and identify the extent of management measures that may be required. The proposed assessments for the 2027 GPSRR are intended to complement broader AEMO work on large IBLs, including work being completed through the TPSS and the Engineering Roadmap. Together, these activities will support a coordinated understanding of emerging power system risks and mitigation options.

The proposed scope for the 2027 GPSRR includes consideration of:

- Studies assessing overvoltage risks related to the non-credible loss of reactive power support.
- Temporary disconnection of IBLs and the impacts on system voltages and frequency.
- Assessment of non-credible contingency events resulting in the loss of multiple IBL connections.
- Maximum demand studies assessing voltage performance during faults.
- Evaluation of mitigation measures including dynamic reactive support and other potential technical requirements.

Table 4 Voltage control and inverter-based load risks overview

Risk	Voltage control and inverter-based load risks
Likelihood	Unlikely – annual probability >1% - 20%: • Significant volumes of large IBLs are projected to connect to the NEM over the next five years and beyond. • Individual large load connections may equal or exceed the current largest credible load contingency size in the NEM.

Risk	Voltage control and inverter-based load risks
	- Recent international incidents have involved the disconnection of large quantities of IBLs^{24,25,26}. - Multiple large IBLs may connect within common network areas, increasing the potential for a single disturbance to simultaneously affect multiple facilities. - Existing and future large IBLs may be subject to different technical and performance requirements, resulting in a diverse range of disturbance responses. - Declining system strength may increase voltage sensitivity and the likelihood of post-disturbance overvoltages that inhibit IBL reconnection. - Lower minimum system load conditions may elevate system voltages and reduce the available headroom for dynamic reactive plant and generating systems to manage voltage following disturbances. - Large IBLs may exhibit active and reactive power characteristics that increase loading during stressed network or low-voltage conditions.
Impact	Extreme – loss of supply to a region(s) for any duration: - Significant voltage disturbances have the potential to affect multiple IBLs simultaneously, causing shake-off or temporary cessation of their demand, and significant quantities of residential/distributed load. This could drive high RoCoF conditions leading to unexpected responses from generation and protection systems. - Voltage control of the network will be more difficult, particularly when large IBLs disconnect or reconnect suddenly. Uncontrolled voltages could lead to lack of post-disturbance IBL reconnection. - The dynamic response of a large aggregation of IBLs could develop unstable power swings on AC interconnectors, with potential for cascading failures. - System voltages approaching high limits could prime the power system for an event leading to uncontrolled cascading overvoltages and underfrequency, with emergency control schemes driving positive feedback for voltage or frequency control.
Risk conditions	Based on current and future scenarios, the following risk conditions will be considered: - Increasing projected large load connections, particularly high concentration of connections in New South Wales, Victoria, and South Australia. - High interconnector flows. - Low PFR availability from other plant. - Minimum system load conditions. - Low system strength and inertia.
Existing management strategies	Existing load connection processes. Future IBLs will be subject to new performance requirements under the <i>Improving the NEM Access Standards – Package 2</i> rule change, specifying large load disturbance ride-through capability.
Potential solutions	Revisions to the NER schedule 5.3 requirements on large loads to improve overvoltage withstand capability and frequency and RoCoF management. Requirements for dynamic reactive and active power support, such as STATCOMs, synchronous condensers, SVCs or BESS, to be installed to support voltages and frequency.
Assessment approach	Full-NEM phasor-domain transient stability studies in PSS®E.
Risk raised by	AEMO, AusNet, ElectraNet, Transgrid.

Priority Risk 4 – Power system oscillation risks

Multiple aspects of the energy transition are changing the oscillatory characteristics of the power system and may increase both the likelihood and consequence of oscillatory events. Major transmission augmentations, changing interconnector flows, REZ development and evolving network topology are influencing oscillatory stability in the NEM and may introduce new oscillatory modes that have not historically been present. At the same time, the progressive retirement of synchronous generation is reducing the availability of synchronous plant and their power system stabilisers (PSSs) which

²⁴ See <https://www.pjm.com/-/media/DotCom/committees-groups/committees/oc/2026/20260806/20260806-item-05---dominion-july-loss-of-load-event---presentation.pdf>

²⁵ See https://www.nerc.com/globalassets/who-we-are/legal--regulatory/filings--orders/nerc-filings-to-ferc/2025/comments-re-large-loads-el25-49_signed.pdf

²⁶ See https://www.nerc.com/globalassets/programs/rapa/pa/nerc_sor_2026_overview.pdf

provide damping in the system, while the impacts of IBR and new synchronous condensers may further affect damping characteristics. Distribution networks are also changing rapidly, with a growing number of connections of generation and IBLs impacting network monitoring and control methods at the distribution level. These factors, combined with an expanding range of operating conditions including lower minimum demand, higher interconnector transfers, changing system strength characteristics and increasingly dynamic patterns of generation and demand, may result in reduced power system resilience in relation to inter-area oscillatory stability. If not managed appropriately, undamped or poorly damped oscillations have the potential to result in significant consequences for the power system.

Oscillatory behaviour observed in the NEM and international power systems demonstrates the importance of maintaining adequate visibility, modelling accuracy and operational preparedness for oscillation risks. Recent experiences related to oscillatory instability have highlighted that poorly understood or inadequately managed oscillations can contribute to broader power system security issues and potentially result in cascading failures or major supply disruptions, as was observed in the Iberian Peninsula in 2025²⁷. In the NEM there have also been documented examples of oscillations in South Australia²⁸ and the West Murray Zone²⁹. Examples from both the NEM and overseas have demonstrated the challenges associated with identifying oscillation sources, assessing the severity of oscillatory behaviour, and determining the most appropriate operational response. These events have reinforced the importance of maintaining fit-for-purpose modelling and analysis capabilities, monitoring tools, and operational procedures that support effective intervention when oscillations emerge.

Managing oscillatory risks is likely to require a combination of operational and longer-term planning measures as the power system continues to evolve. The effective operational management of oscillatory behaviour can be supported through improved visibility of oscillatory behaviour, enhanced monitoring and source-location tools, development of operational oscillation limits, and clear response procedures. Over longer planning horizons, measures such as power system stabiliser retuning, enhanced model validation and benchmarking practices, development of planning oscillation limits, deployment of grid-forming technologies and power oscillation damping controllers may contribute to maintaining adequate damping and system resilience. The 2027 GPSRR will review these approaches and identify areas where further industry action may be required to support the resilient operation of the NEM.

It is intended that the 2027 GPSRR will provide a practical review of oscillatory risks across the NEM and identify the actions required to manage them. Building on work undertaken through the Transition Plan for System Security, the review will aim to provide a holistic overview of oscillation mechanisms, assess how risks may evolve throughout the energy transition and discuss the measures required to maintain adequate damping and system resilience. A key outcome of this review will be to support a shared industry understanding of how oscillatory risks may evolve through the energy transition, identify risks that are most likely to result in cascading failures or major supply disruptions, and help inform future priorities for oscillation management.

The proposed scope for the 2027 GPSRR includes consideration of:

- Assessment of electromechanical, converter-driven and forced oscillation risks.

²⁷ See <https://www.entsoe.eu/publications/blackout/28-april-2025-iberian-blackout/>.

²⁸ See https://www.aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/power_system_incident_reports/2022/south-australia-power-system-oscillations.pdf

²⁹ See https://www.aemo.com.au/-/media/files/electricity/nem/network_connections/west-murray/high-level-summary-of-wmz-subsynchronous-oscillations.pdf

- Review of recent NEM and international oscillation events.
- Evaluation of how oscillatory risks may change through new interconnection, coal retirement, REZ development and increasing IBR.
- Assessment of requirements including an uplift in modelling, monitoring, visibility, procedures and definition of oscillation limits.
- Discussion of longer-term mitigation options including PSS tuning, grid-forming technologies and power oscillation damping controllers.

Table 5 Power system oscillation risks overview

Risk	Power system oscillation risks
Likelihood	Unlikely – annual probability >1% - 20%: • Significant changes to the generation, transmission and load mix are expected to alter the modal characteristics of small signal power system oscillations over the next five years and beyond. • Non-credible contingency events may significantly alter system damping characteristics, resulting in poorly damped or unstable power system oscillations. • Retirement of synchronous generation is expected to reduce system inertia, system strength, and the damping of electromechanical oscillatory modes. • New inter- and intraregional transmission developments, including REZ integration, may alter power transfer patterns, create new inter-area oscillatory modes, and modify the frequency and damping characteristics of existing electromechanical modes. • New synchronous condensers may provide lower damping characteristics than the synchronous generating plant they replace. • Increasing penetration of grid-following IBR may reduce damping of small-signal oscillatory modes and continue to elevate the risk of sub-synchronous control interactions (SSCI). • Broadening operating conditions, including lower minimum demand conditions and more frequent periods of high interconnector transfers, may increase exposure to poorly damped oscillatory behaviour. • Modelling and assessment of oscillatory phenomena remains challenging, increasing uncertainty in the determination of operational limits and mitigation measures. • Increasing numbers of IBR, high-voltage direct current (HVDC) interconnectors, BESS, IBLs and other large controllable loads may increase the likelihood of forced oscillations and adverse control interactions. • Limited operational visibility, tools and procedures may reduce AEMO's ability to identify, assess and effectively manage emerging oscillatory instability risks.
Impact	Major – loss of supply to a large portion of a region, for any duration: • Poorly damped oscillations, forced oscillations or adverse control interactions may result in widespread disconnection of generation, loads or network elements, with potential to lead to system separation and cascading failures. • Oscillatory instability may result in sustained operation beyond secure operating limits, compromising power system security and increasing the likelihood of high-impact contingency events. • SSCI, forced oscillations or adverse control interactions may result in widespread maloperation of plant controls and protection systems, causing unexpected disconnection of utility- and distributed-scale resources. • Uncertainty in oscillatory behaviour and damping performance may impair the identification of secure operating limits and effective mitigation measures, reducing AEMO's ability to maintain power system security under abnormal operating conditions.
Risk conditions	Based on future scenarios, the following risk conditions will be considered: • High inter-regional and intra-regional power transfers. • Low system strength, low inertia and reduced synchronous generation. • High penetration of IBR, including periods of high utility- and distributed-scale renewable generation. • Operating conditions with reduced natural load damping, such as MSL periods. • Major transmission outages.

Risk	Power system oscillation risks
Existing management strategies	PSSs, static VAR compensator (SVC) power oscillation dampers (PODs), online and offline oscillation monitoring, imposing inverter limits to prevent SSCI under low system strength conditions, oscillation limits, internetwork testing procedures.
Potential solutions	Potential solutions, both operational and longer term, include: • PSS retuning and implementation of synchronous condenser PODs. • Enhanced oscillation monitoring and source-location visibility. • Operational limits, procedures and frameworks for the management of electromechanical, forced and sub-synchronous oscillations. • Enhanced operational tools and decision-support systems for oscillation management. • Benchmarking and validation of online and offline oscillation assessment tools. • Fit-for-purpose tuning of grid-forming inverter-based resources to improve damping performance, supported by appropriate governance, validation and oversight arrangements involving AEMO. • Small-signal modelling uplift, including the development, validation and integration of IBR models into oscillation assessment tools.
Assessment approach	Review of recent NEM and international oscillation events, and high-level quantitative assessment of oscillatory stability risks under transitioning NEM operating conditions. Review of existing tools, modelling capability, processes and management options to identify capability gaps and opportunities.
Risk raised by	AEMO, ElectraNet, Transgrid.

Consultation question 2

What are stakeholder views on the proposed priority risks and the associated approach and methodology for assessment in the 2027 GPSRR?

2.2 Current and emerging system operator risks

In addition to the priority risks, AEMO also considers other current and emerging risks that were identified throughout the GPSRR risk assessment process. Updates on these risks are proposed to be provided in the 2027 GPSRR, covering:

- an overview of each current or emerging system operator risk, outlining the consequence and likelihood factors contributing to the risk,
- details on any actions or mitigation measures that are planned or underway, and
- where necessary, recommendations including the consideration of particular risks for the following year's GPSRR.

AEMO intends to discuss these current and emerging system operator risks in the report but does not plan to carry out additional studies. AEMO may also include additional commentary regarding whether systems and tools are fit for purpose to manage these risks.

Examples of the risks that may be included are provided in the list below:

- Synchronous generator retirement or unavailability
- Dispatch error risks, including semi-scheduled generation and non-scheduled loads
- Distributed energy resources risks, including impacts on transmission and distribution networks.
- Extreme weather conditions

- Gas adequacy and impacts on power system resilience
- Generator non-compliances
- Multiple network operator risks
- Power system modelling risks
- System restart and restoration adequacy

Where risks were not selected for study, AEMO may consider them in future reviews or refer to relevant work underway by NSPs or AEMO to assess the risk.

Consultation question 3

Are there any other higher priority current and emerging system operator risks that should be included for discussion in the 2027 GPSRR?

2.3 Other review tasks

The following activities are also within the scope of the 2027 GPSRR where relevant:

- Summary of key emergency under frequency management initiatives underway in each NEM region.
- Consideration of potential requests for declaration of new protected events, including cost-benefit analysis.
- A status update for the recommendations from the 2026 GPSRR³⁰ and previous risk reviews.

³⁰ See https://www.aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2026/draft-2026-gpsrr-report-consultation/final-2026-gpsrr-report.pdf.

3 Engagement approach and delivery timelines

3.1 Our engagement approach

The GPSRR is developed through an iterative process that draws on AEMO's operational experience and technical analysis, risk inputs from NSPs, insights from recent power system events, previous risk reviews and feedback from governments, market bodies, industry participants and other interested stakeholders.

AEMO's engagement approach for the 2027 GPSRR is intended to:

- seek early input on potential power system risks before the assessment scope is finalised
- test whether the proposed priority risks and assessment approaches reflect current and emerging industry concerns
- obtain technical information, models and practical experience required to undertake robust risk assessments
- provide opportunities for broader industry input at key decision points
- share emerging findings with parties that have relevant technical expertise or may be affected by potential risk-management options, and
- explain how stakeholder feedback has been considered in finalising the approach and report.

Engagement will be targeted to the nature of the issue and the stage of development. This will include formal written consultation, industry briefings, targeted technical discussions and regular engagement with NSPs. Where an issue may involve confidential, security-sensitive or operationally sensitive information, AEMO may engage directly with relevant parties and report publicly at an appropriate level of depth and detail.

3.2 Engagement undertaken to develop this draft

AEMO commenced engagement on the 2027 GPSRR before publication of this draft approach paper to support early identification and assessment of potential risks.

In May 2026, AEMO briefed transmission and distribution NSPs on the 2027 GPSRR risk assessment process and the information sought to support the nomination and assessment of potential risks. AEMO subsequently provided a structured risk assessment template to NSPs to facilitate consistent input on potential events or conditions, their likelihood and consequences, existing management arrangements and potential mitigation measures.

AEMO continued to engage with NSPs through targeted and regular discussions. These discussions covered the risk assessment process, non-credible contingency management, proposed priority risks and the developing draft approach paper. AEMO also briefed the Reliability Panel on the risks proposed for consideration in the 2027 GPSRR.

In September 2026, AEMO shared an early version of this draft approach paper with NSPs for comment before broader public consultation. This early engagement provided an opportunity to test the proposed priority risks, clarify the intended assessment scope and identify matters requiring further development.

Inputs received through this process were considered alongside:

- recent power system events
- AEMO's operational experience
- anticipated changes to generation, transmission, demand and power system operating conditions
- findings and recommendations from previous GPSRRs and other relevant reviews, and
- the scope of work that can reasonably be completed before publication of the final 2027 GPSRR.

Table 8 shows how this early engagement fits within the broader consultation and delivery process for the 2027 GPSRR.

Table 6 Inputs used to develop the draft approach paper

Stakeholder input	How it informed the draft
Structured risk inputs from NSPs	Informed AEMO's consideration and prioritisation of potential events and conditions for assessment.
Regular discussions with TNSPs and relevant jurisdictional bodies	Helped clarify proposed risks, existing management arrangements and possible assessment approaches.
Reliability Panel briefing	Provided an opportunity to brief the Reliability Panel on the transition from the 2026 GPSRR to the proposed 2027 risk scope.
Early review of the draft approach paper by NSPs	Allowed AEMO to test and refine the proposed risk scope and assessment approach before wider public consultation.
AEMO operational experience and review of recent events	Supplemented external inputs and supported identification of current and emerging risks.

2027 GPSRR Engagement to date

Early engagement in the development of the 2027 GPSRR has focused on identifying potential priority risks, gathering structured risk inputs and testing the proposed assessment scope with NSPs and relevant technical bodies. Public consultation on this draft approach paper broadens the conversation to all interested stakeholders before the assessment program is finalised.

3.3 How stakeholders can contribute to the 2027 GPSRR

Stakeholders will have opportunities to contribute at several stages of the 2027 GPSRR. The matters open for input will evolve as the review moves from scope definition to technical assessment, draft findings and finalisation.

Table 7 Engagement activities and scope

Stage	Indicative engagement	What stakeholders can contribute
Development of the draft approach paper	Early risk input from NSPs, targeted technical discussions and early review of the draft approach paper	Potential priority risks; relevant events and operating conditions; existing risk controls; possible assessment approaches; data, models and assumptions.
Consultation on the draft approach paper	Written submissions and industry briefing/Q&A	Whether the proposed priority risks are appropriate; whether material risks have been omitted; assessment methodology;

Stage	Indicative engagement	What stakeholders can contribute
		models, inputs and assumptions; risk-cost methodology; engagement approach.
Finalising the approach paper	Targeted follow-up where clarification or additional technical evidence is required	Clarification of submissions; additional evidence; feasibility of proposed changes to scope or methodology.
Risk assessment and study phase	Regular engagement with relevant NSPs and targeted technical stakeholders	Technical data and models; study scenarios; risk conditions; existing and potential management options; practical implementation considerations.
Development of the draft GPSRR report	Early sharing of relevant findings with NSPs and targeted discussions with affected or expert stakeholders	Factual accuracy; interpretation of study results; feasibility and implications of possible risk-management actions.
Public consultation on the draft GPSRR report	Written submissions and stakeholder briefing	Draft findings; proposed recommendations and actions; implementation considerations; areas requiring clarification or further assessment.
Final GPSRR report	Publication of the final report and consultation summary	How material feedback was considered and the reasons for significant changes.

3.4 How AEMO will consider and respond to feedback

AEMO will consider stakeholder feedback according to its relevance to the purpose and requirements of the GPSRR, the supporting evidence provided, technical feasibility, and potential power system security implications.

Following consultation on this draft approach paper, AEMO will review submissions and determine whether changes are required to the priority risks, assessment scope, methodologies, models, assumptions or engagement approach. Where useful, AEMO may contact stakeholders to clarify information or seek additional technical evidence.

AEMO will publish a consultation summary with the final approach paper explaining the material issues raised, how those issues were considered and any resulting changes. Where AEMO does not adopt a material suggestion, the consultation summary will explain the basis for the position taken, subject to confidentiality and security considerations.

A similar process will be followed for consultation on the draft 2027 GPSRR report. This will support transparency and enable stakeholders to trace how feedback has informed the final report.

3.5 Delivery and engagement timeline

Table 8 below provides an overview of the key delivery stages for the 2027 GPSRR and the engagement activities planned at each stage. Engagement will continue throughout the review, from early identification and assessment of potential risks through to consultation on the draft report and publication of the final 2027 GPSRR.

Table 8 2027 GPSRR engagement timeline

Timing	Key stage	Engagement activity
May – September 2026	Development of draft approach and identification of proposed priority risks	NSP risk-input process; structured risk assessment inputs; regular targeted NSP discussions; Reliability Panel briefing; early NSP review of draft approach paper
October – November 2026	Public consultation on draft approach paper	Publication of draft approach paper; industry briefing and Q&A; written submissions; targeted follow-up where required
December 2026	Final approach paper	Publication of final approach paper and consultation summary

Timing	Key stage	Engagement activity
January – April 2027	Technical assessments and development of draft report	Regular NSP and targeted technical engagement; sharing and testing relevant findings; collection and validation of technical information
May 2027	Draft GPSRR report	Public consultation, industry briefing and written submissions
June – July 2027	Finalisation of GPSRR	Consideration of submissions; targeted clarification; publication of final report and consultation summary by 31 July 2027

Consultation question 4

Does the consultation approach meet stakeholder expectations, and do stakeholders have any suggestions on how AEMO could best engage with industry on the development of the 2027 GPSRR?

4 Risk assessment methodology

4.1 Priority risk identification

The GPSRR takes in a range of inputs to determine priority risks for assessment. Each year, the GPSRR highlights a number of priority risks that will be assessed in detail through the annual GPSRR report. The identification of risks for the GPSRR is an iterative process that draws on a broad range of inputs across the power industry.

Risk inputs are sourced from:

- TNSPs and DNSPs,
- internal AEMO teams,
- the Reliability Panel,
- wider industry through formal consultation periods and engagements, and
- insights and recommendations from previous GPSRRs.

Formal requests for risk inputs commence prior to the publication of the previous year's GPSRR and continue through to the finalisation of the 2027 GPSRR Approach Paper.

Once risk inputs are received, individual risks are reviewed and grouped into common themes. This analysis assists in identifying overarching risks that may affect the power system more widely. For each theme, existing mitigation measures are reviewed and assessed for their effectiveness.

Risks are then evaluated and ranked to determine the priority risks. Risks are ranked in priority order based on their assessed likelihood and consequence ratings, taking into account the effectiveness of any mitigation measures already in place. The top-ranked risks are designated as priority risks and will be assessed in detail. Risks that are not selected as priority risks will be considered for inclusion as current and emerging system operator risks, or for assessment as priority risks in a future GPSRR.

4.2 Priority risk identification factors

Multiple factors are considered when determining the priority risks for the GPSRR. When identifying contingency events or other events or conditions for assessment as priority risks in the 2027 GPSRR, AEMO had regard to the following key factors and sources of information³¹:

- The severity of the likely power system security outcomes if the events or conditions occur.
- The likelihood of occurrence.
- Whether technically and (on preliminary assessment) economically feasible management options are likely to be available.

³¹ As required by NER 5.20A.1(a1).

- Any regulatory requirements or obligations that may make management options difficult to implement.
- Any information provided by NSPs and Jurisdictional System Security Coordinators (JSSCs).
- If applicable, any findings or analysis from previous event investigation or reporting.
- Whether there are any current risk mitigation measures or processes in place to manage the event.
- The scope of work that is achievable within the publication timeframe of the final 2027 GPSRR report (by 31 July 2027).

Other relevant factors and how they contribute to the categorisation of risks are outlined in the following sections.

4.3 NSP consultation

NSPs were consulted on potential events or conditions that may lead to cascading outages or major supply disruptions.

To identify potential risks for priority assessment, AEMO asked each TNSP and DNSP to share with AEMO any:

- priority credible or non-credible contingency events that may result in uncontrolled changes in frequency leading to cascading outages, or major supply disruptions, and
- other events or conditions that would likely lead to cascading outages or supply disruptions.

Information was provided to AEMO through detailed risk assessment documents. To aid the collection and assessment of this information, AEMO requested NSPs to complete a risk assessment document providing the following information in relation to the nominated event or condition as applicable:

- A high-level description of the risk or non-credible contingency event that could lead to cascading outages or major supply disruptions.
- A primary risk category (see Table 9).
- A description of which protection or control schemes would be likely to operate if the event occurred.
- Details of any existing control or risk management strategies.
- Details of any planned augmentations that may affect the event or risk.
- The likelihood of the event occurring. Table 10 below outlines how likelihood was categorised for this risk assessment. A likelihood rating from 1 to 5 was assigned based on the likelihood category specified, where 1 was the lowest likelihood and 5 was the highest likelihood.
- Consequence. Table 11 below outlines how consequence was categorised for this risk assessment. A consequence rating from 1 to 5 was assigned based on the consequence category specified, where 1 was the lowest consequence, and 5 was the highest consequence.

A risk rating was then calculated based on the likelihood and consequence of the event, taking into account the impact of existing controls on the risk rating. Where required, additional information is requested through further consultation with NSPs.

In addition to consultation with NSPs, AEMO undertook a review to identify potential priority risks based on its operational experience, recent power system events and anticipated power system changes (such as major transmission augmentations). The NSP risk-input process forms one part of the broader engagement approach described in Section 3.

AEMO will continue to engage with NSPs during the assessment phase to clarify risk inputs, obtain relevant technical information and models, test assessment scenarios and discuss emerging findings.

Broader public consultation on this approach paper and the draft report will provide other interested stakeholders with opportunities to comment on the proposed scope, methodology, findings and potential risk-management considerations.

Table 9 Risk categories

Risk category	Description
Frequency risk	Any incident caused by unacceptable frequency conditions on the power system.
Voltage risk	Any incident caused by unacceptable voltage conditions on the power system.
Inertia risk	Any incident caused by a lack of system inertia; this lack of inertia could lead to a rate of change of frequency (RoCoF) event.
System strength services risk	Any incident caused by a lack of system strength services. This lack of availability could lead to system instability and/or protection maloperations.
Distributed energy risks	Any incident which is caused by distributed energy resources (DER). This could be DER disconnecting during a fault and leading to an excessive frequency change, or it could be an incident directly caused by the DER in an area.
RAS risks	Any incident which is caused by unexpected interactions or maloperation or non-operation of RAS systems.
Oscillatory risks	Any condition that may result in undamped oscillations (local or wide area) on the power system.
Cyber security risks	Any incident which is caused by a malicious cyber attack.
IT risks	Any incident which is caused by an information technology (IT) failure (not a cyber attack).
Weather-related risks	Any incident caused by weather impacts such as flooding, lightning and storms.
Inverter-based load risks	Any incident related to the behaviour or operation of IBLs.
Other	Any incident not categorised above.

Table 10 Likelihood descriptions

Likelihood	Likelihood rating	Annual probability	Qualitative description	Expected frequency of occurrence
Almost certain	5	>90%	Will occur in most circumstances; statistical record of several occurrences.	Expected to occur every year.
Likely	4	>50% - 90%	Can be expected to occur in most circumstances; statistical record of at least two or more occurrences.	Expected to occur every two years.
Possible	3	>20% - 50%	May occur, but not expected in most circumstances; statistical record of at least one occurrence.	Expected to occur every two to five years.
Unlikely	2	>1% - 20%	Conceivable but unlikely to occur in any given year; may or may not have statistical history of occurrence.	Expected to occur every 5 to 100 years.
Rare	1	≤1%	Will only occur in exceptional circumstances; no history of occurrence.	Expected to occur less than once every 100 years.

Table 11 Consequence descriptions

Consequence	Consequence rating	Market and system impact
Extreme	5	Loss of supply to a region(s) for any duration. Market suspension of multiple markets for a prolonged period.
Major	4	Loss of supply to a large portion of a region, for any duration. Market suspension in one jurisdiction or market for a short period.

Consequence	Consequence rating	Market and system impact
Moderate	3	Localised/minimal loss of supply in a region. Market(s) in administered state or material scheduling error.
Minor	2	Intervention required to maintain supply. Immaterial scheduling error (below dispute threshold).
Immaterial	1	No restriction of supply. No disruption to markets.

To determine the rating of risks considered in the GPSRR, the risk rating was calculated as the product of the likelihood rating (1 to 5) and the consequence rating (1 to 5). The outcomes of this calculation are shown in Table 12.

Table 12 Risk rating matrix

	Almost certain	Likely	Possible	Unlikely	Rare
Extreme	25	20	15	10	5
Major	20	16	12	8	4
Moderate	15	12	9	6	3
Minor	10	8	6	4	2
Immaterial	5	4	3	2	1

Consultation question 5

Are there any suggested improvements regarding the risk assessment methodology proposed for the 2027 GPSRR?

4.4 Review of relevant system events since the 2026 GPSRR

In addition to the risks mentioned previously, AEMO will also consider significant system incidents. AEMO will identify all relevant system events that occurred during FY 2025-26 in the 2027 GPSRR report. The findings and recommendations from these incidents will be considered in the 2027 GPSRR.

5 Models, input data and assumptions

Power system network models and input data requirements which will be used in assessing priority risks for the 2027 GPSRR are discussed in this section of the approach paper. Where the assessment of credible or non-credible risks requires power system studies as part of the GPSRR, it is important that updated models of relevant systems are included and appropriate assumptions are made where information is unavailable.

5.1 Monitored parameters

In addition to the specific focus areas of the study, a subset of key system parameters will be monitored in assessing the results of the GPSRR studies. It is proposed that, where studies are undertaken for the 2027 GPSRR, the following system parameters will be considered when assessing the response of the power system for each priority risk:

- Violation of voltage and frequency operating standards.
- Performance of generators, FRT of the IBR units and DPV disconnections.
- Response of EFCS and RASs relevant to the contingency.
- Voltage, frequency, and transmission line flow instabilities.
- Indications in the results towards insufficiencies in system strength or inertia.
- High RoCoF conditions.

5.2 Network models

PSS@E full NEM network model

The full NEM network model will be used based on AEMO Modelling Platform (AMP) cases. This model is planned to be modified to include the new interconnectors, generation and BESS, major loads, network augmentations, and control schemes that are planned for completion by the time of the study.

Where required, future dispatch conditions will be based on the 2026 *Integrated System Plan (ISP) Step Change* data. As detailed in Section 5.12, future dispatch conditions are proposed to be based on the five-year 2026 *ISP Step Change* projection data. The key system forecast parameters planned to be considered in setting up the study cases are included in Table 2 to Table 5 (in Section 2.1). All studies are proposed to assume a system normal network configuration except where relevant to the study scenario³².

³² System normal snapshots restore the nominal configuration of the network. Network outages (planned or unplanned) are restored to the nominal configuration while generation and load are retained as they were in the snapshot timestamp. In the future studies it is planned that the load and generation will be redispatched, and network projects will be added to match the forecast network conditions.

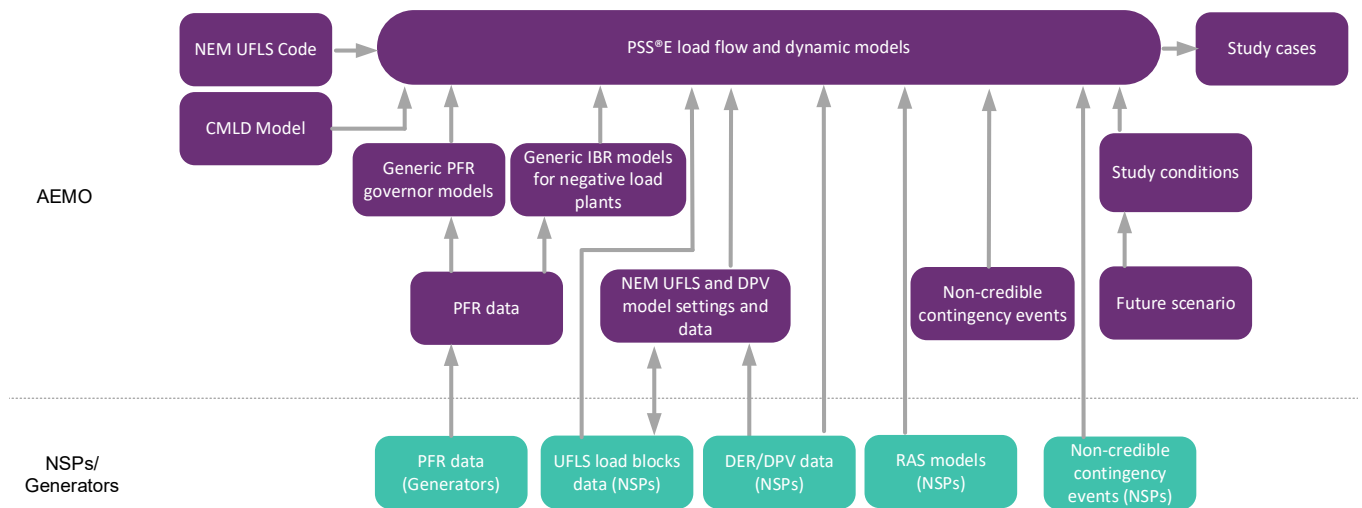
NEM mainland PSCAD™ model

The four-state NEM PSCAD™ model will be used to assess contingencies relating to system strength issues or IBR FRT. Consistent with the *System Strength Requirements Methodology*³³, to assess contingencies relating to system strength issues or FRT behaviours of IBR, AEMO will conduct electromagnetic transient (EMT) analysis as necessary using the four-state NEM PSCAD™ version 5 model. The key system parameters that will be considered in setting up the study cases are included in Table 2 to Table 5 (in Section 2.1). All studies will assume a system normal network configuration.

5.3 2027 GPSRR model sources

2027 GPSRR model sources are shown in **Figure 1**.

Figure 1 2027 GPSRR model sources



PFR: primary frequency response.

5.4 Frequency response

Frequency response from generators will be represented as per modelled primary frequency response (PFR) settings **where available**. Frequency Control Ancillary Services (FCAS) response from generators will not be considered beyond typical frequency response according to PFR settings. For resource-limited IBR plant, such as solar or wind generation facilities, only lower PFR capability will be considered. Further details on the proposed approach regarding PFR are provided below.

³³ See https://www.aemo.com.au/-/media/files/electricity/nem/security_and_reliability/system-strength-requirements/system-strength-requirements-methodology.pdf.

5.4.1 Applied PFR settings

PFR settings will be used where available to best represent generator performance during frequency events. The PFR settings data applied to the generators are required to model generator frequency performance accurately. Where these settings have been made available to AEMO, they are proposed to be incorporated into the system model.

5.4.2 Units without updated governor models in AMP

Generic governor models will be used for generating units where governor models are not available. Many generating units have implemented new PFR settings, however updated governor models were not made available to AEMO in some instances. To address this issue, AEMO has developed three generic governor models corresponding to steam, hydro and gas turbines that represent governor response in line with new PFR settings during frequency events. These generic governor models are proposed to be used for the 2027 GPSRR studies.

5.4.3 Units with updated governor models in AMP

Site-specific governor models will be used where available. Generators have an ongoing obligation to provide NSPs and AEMO with up-to-date modelling information which encompasses all control systems that respond to voltage or frequency disturbances on the power system. AEMO has sent reminders to all large mainland NEM generators of their obligations to provide updated frequency control models, and the need for this information to support the GPSRR. Where this information is available, it will be used in the GPSRR studies.

5.5 BESS models

Site-specific BESS models will be used where available and generic BESS models will be used for plant with no site-specific model. For future committed projects, site-specific models are planned to be used where they are available. If specific models of BESS are not available, suitable generic BESS models are proposed to be used with assumed PFR settings as advised by proponents.

5.6 IBR models for large-scale wind and solar generation

Large-scale wind and solar generation will be represented using site-specific models where available, with generic models used where site-specific models are unavailable. The following approach is proposed for modelling wind and solar generation in GPSRR studies:

- For those IBR units that have completed PFR commissioning, where appropriate, the generator model in AMP will be used.
- Generators have an ongoing obligation to ensure that the NSP and AEMO have accurate models that reflect the voltage and frequency performance of their plant, and it will be assumed that the provided models are representative of their actual performance.

- For future studies where representation of this plant is material to the study objectives, site-specific models will be used where available. Where a site-specific model is unavailable, committed wind and solar generation will be represented using generic models with minimum PFR settings.

5.7 RAS models

RAS models will be included in the GPSRR where relevant to system studies. Given the criticality of such models in the assessment of power system security in response to non-credible contingency events, it is proposed that key RAS models will be considered. Only remedial action schemes that are relevant to key study contingencies are planned to be modelled.

For the 2027 GPSRR studies, if any updated RAS model/relay models are not available, the latest RAS models available at the time of study or appropriate study assumptions are planned to be used.

5.8 Emergency frequency control scheme (EFCS) models

The operation of EFCS, including UFLS and OFGS, will be considered for contingencies where these schemes may be expected to operate. Study outcomes will be assessed against relevant system parameters, including frequency RoCoF, to determine whether conditions remain within the ranges associated with the expected operation of the EFCS. Where relevant, the potential contribution of EFCS to the system response following a contingency will be considered as part of the assessment of study outcomes.

5.9 Distributed energy resources (DER)/distributed PV (DPV) models

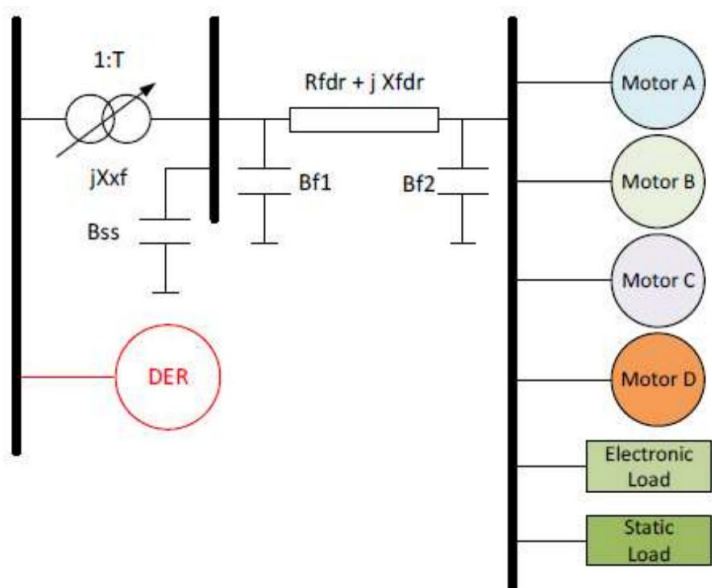
DER/DPV models are proposed to be considered as per the process outlined in *PSS®E models for load and distributed PV in the NEM*³⁴. DPV bus mapping data for all mainland NEM regions is available at the time of writing this report and is planned to be used to model the DER/DPV in PSS®E at relevant buses. For future scenarios, assumptions are planned to be based on 2026 ISP forecasts to project future DPV generation in each region.

5.10 Load models

The composite load model (CMLD) is proposed to be used to model typical distributed load response in the full NEM PSS®E studies, where appropriate. It consists of six load components at the end of a feeder equivalent circuit, which is represented by a series impedance and shunt compensation. It is intended to emulate various load components' aggregate behaviour. It includes three three-phase (3P) induction motor models (motor A, B and C), a single-phase (1P) capacitor-start motor performance model (motor D), static load components (constant current and constant impedance), and a power electronic load model (constant active and reactive power)³⁵. The composite load model structure is shown in Figure 2.

³⁴ Further details on AEMO PSS®E models for load and distributed PV in the NEM are at <https://www.aemo.com.au/initiatives/major-programs/nem-distributed-energy-resources-der-program/managing-distributed-energy-resources-in-operations/power-system-model-development>.

³⁵ See <https://aemo.com.au/-/media/files/initiatives/der/2022/psse-models-for-load-and-distributed-pv-in-the-nem.pdf?la=en>.

Figure 2 The CMLD model structure and the implementation of the DERAEMO1 model

The CMLD model captures load shake-off in response to large disturbances, which is a significant improvement compared with the previous impedance (Z), current (I) and power (P) (ZIP) model, which does not represent load shake-off. Since the CMLD model comprises explicit representations of different motor types, the load dynamics due to the response of motors are better captured³⁴. Load shake-off and load-driven transient recovery voltage is important to consider for the GPSRR studies so that the stability of the system is adequately modelled.

However, under some circumstances the CMLD model may provide an optimistic outcome where the loss of large quantities of generation are offset by the shake-off of load under the CMLD model response. In these circumstances, sensitivity studies may be required without the CMLD model to understand the performance of the system in the event that this load shake-off does not occur.

5.10.1 Modelling of large IBLs

The modelling of large IBLs is a rapidly developing area, and AEMO's modelling in the 2027 GPSRR is intended to align with best practice. Where site specific models are available, AEMO intends to include these in studies to represent the expected behaviour of committed facilities. In other cases where no site specific models are available, AEMO intends to use the Power Electronic Reconnecting and Ceasing (PERC) model to represent the behaviour of large IBLs in PSS®E. The current version of the PERC model was endorsed by the North American Electric Reliability Corporation's (NERC) Load Modelling Working Group in December 2025³⁶. However, further development is still underway in this area and updates to modelling best practice will be considered if available at an appropriate time prior to AEMO conducting studies related to large IBLs.

³⁶ See <https://www.nerc.com/globalassets/initiatives/large-loads-action-plan/ltf-quarterly-update-q4-2025.pdf>.

5.11 Modelling of network protection systems

Network protection system modelling is proposed to represent interconnector tripping under loss-of-synchronism conditions. Accurately representing the cascading consequences of interconnector instability requires explicit modelling of protection system operation. Protection relay models will be included to represent the expected disconnection of interconnectors under out-of-step conditions. Where available, protection settings provided by NSPs will be incorporated into generic distance relay models from the PSS®E model library to capture expected protection system performance.

5.12 Forecasting assumptions

The 2026 ISP forecasting methodology is planned to be applied to forecast future network conditions for future studies. The 2026 ISP forecasting methodology, set out in the *ISP Methodology* published in June 2025³⁷, is planned to be applied to forecast future network dispatch conditions. Where relevant, the future dispatch conditions will be used as a basis for developing sensitivities that may include further network changes to investigate the risk in question.

The following parameters are proposed to be applied for future projections. Minor adjustments to this approach may be considered to cater for specific risk conditions.

- Future dispatch years up to FY 2030-31.
- High and low demand traces (10% probability of exceedance [POE] and 90% POE).
- Fifteen reference years³⁸.
- Two solution iterations, to capture different model probabilistic outcomes, such as generation outages.
- The generation build and retirements in the 2026 ISP *Step Change* scenario.
- Full network constraints representing the network augmentations assumed in the 2026 ISP *Step Change* scenario.

Consultation question 6

What are stakeholder views regarding the proposed modelling approach for the priority risks for assessment in the 2027 GPSRR?

³⁷ At https://www.aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2024/2026-isp-methodology/isp-methodology-june-2025.pdf.

³⁸ AEMO optimises expansion decisions across multiple historical weather years known as “reference years” to account for short- and medium-term weather diversity.

6 Risk cost assessment methodology

This section describes the methodology that is proposed to be used in the 2027 GPSRR to estimate the risk cost for relevant risks. This risk cost methodology can be used to quantify key risks in monetary terms. A simplified quantitative approach can be used considering each risk consequence and likelihood as shown below:

$$\text{Risk} = \text{consequence} \times \text{likelihood of occurrence (or probability)}$$

The risk cost can be determined by calculating the cost of the risk consequence. The cost of a severe risk will be calculated as the total interruption of loads (measured in megawatts [MW]) multiplied by the value of customer reliability (VCR)³⁹ and the estimated time to restore interrupted load following the event (T). The residential VCR for the NEM was published at \$43.06/kilowatt hour (kWh) by the Australian Energy Regulator (AER) for year 2025⁴⁰ and it is required to be adjusted to the relevant year where the risk cost is being calculated based on the Consumer Price Index (CPI). The impact on business customers will be considered separately as per the AER's 2025 VCR Annual Adjustment. For assessment of the risk cost for outages expected to be greater than 12 hours, the work completed by the AER on the value of network resilience (VNR)⁴¹ will be referenced. This approach applies multiples of the standard VCR depending on the duration of the outage.

The likelihood of a severe risk event has two components:

- probability of the risk event (Pc), which can be determined using the historical data, and
- the probability of network conditions, which, in combination with the risk event, cause the consequence to occur (Pe). Detailed power system studies combined with dispatch forecasts are required to determine Pe.

Therefore, the above formula can be expanded to:

$$\text{Risk cost} = L \times T \times \text{VCR} \times P_c \times P_e$$

where:

- L is the megawatts (MW) loss (interrupted) due to a non-credible contingency
- T is the time to restore the interrupted loads following the event
- VCR is the applicable value of customer reliability (converted to \$/MWh)
- Pc is the probability of a risk event
- Pe is the probability that the relevant network conditions result in the assessed consequence following the non-credible contingency event.

Consultation question 7

What are stakeholder views regarding the proposed risk cost assessment methodology to be applied in 2027 GPSRR?

³⁹ AER 2024, Values of Customer Reliability - Final report on VCR values, Table 1, at https://www.aer.gov.au/system/files/2024-12/2024-12-18%20AER%20-%20Final%20report%20-%202024%20VCR%20review_0.pdf

⁴⁰ See <https://www.aer.gov.au/industry/registers/resources/reviews/values-customer-reliability-2024/2025-vcr-annual-adjustment>

⁴¹ AER 2024, Final Decision – Value of Network Resilience 2024, Section 4.2.1, at <https://www.aer.gov.au/industry/registers/resources/reviews/value-network-resilience-2024>

Abbreviations

Abbreviation	Term	Abbreviation	Term
1P	single-phase	MWh	megawatt-hour/s
3P	three-phase	NEM	National Electricity Market
AC	alternating current	NER	National Electricity Rules
AER	Australian Energy Regulator	NERC	North American Electric Reliability Corporation
AEDT	Australian Eastern Daylight Time	NSCAS	network support and control ancillary services
AI	artificial intelligence	NSP	network service provider
AMP	AEMO Modelling Platform	OFGS	over frequency generation shedding
BESS	battery energy storage system/s	PERC	power electronic reconnecting and ceasing
CER	consumer energy resources	PFR	primary frequency response
CMLD	composite load model	POD	power oscillation damper
CPI	consumer price index	POE	probability of exceedance
DER	distributed energy resources	PSCAD™	Power System Computer Aided Design
DNSP	distribution network service provider	PSFRR	Power System Frequency Risk Review
DPV	distributed photovoltaics	PSS	power system stabiliser
EFCS	emergency frequency control scheme	PSS®E	Power System Simulation for Engineering
EMMS	electricity market management system	RAP	Reconciliation Action Plan
EMT	electromagnetic transient	RAS	remedial action scheme
FCAS	frequency control ancillary services	REZ	renewable energy zone
FRT	fault ride-through	RoCoF	rate of change of frequency
FY	financial year	SCADA	supervisory control and data acquisition
GPSRR	General Power System Risk Review	SSCI	sub-synchronous control interaction/s
HVDC	high voltage direct current	STATCOM	static synchronous compensator
IBR	inverter-based resources	SVC	static VAr compensator
IBL	inverter-based load	TNSP	transmission network service provider
ISP	<i>Integrated System Plan</i>	TPSS	<i>Transition Plan for System Security</i>
IT	information technology	UFLS	under frequency load shedding
JSSC	Jurisdictional System Security Coordinator	VCR	value of customer reliability
kWh	kilowatt-hour/s	VNR	value of network resilience
MSL	minimum system load	ZIP	impedance (Z), current (I) and power (P)
MW	megawatt/s		