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Reliability Panel
Draft Determination
Review of the System Restart Standard
Rainer Korte, Chair of the Panel

Dear Mr Korte

Submission to the Draft Determination on the System Restart Standard

Please find attached AEMO's submission in response to the Draft Determination.

We support the proposed revisions to the System Restart Standard, including the introduction of a dual-target framework, the 8-hour supply restoration procurement objective, and the increase in aggregate reliability to 95%. These changes reflect the evolving nature of the power system and provide AEMO with the flexibility to procure and plan for system restart in a more resilient and efficient manner.

Our submission also addresses some of the Panel's draft findings on investment, governance, compliance, and transparency in system restart planning and reporting. On a number of these matters we remain of the view that existing frameworks in the National Electricity Rules (NER) could be improved to better support effective system restart outcomes.

We appreciate the opportunity to contribute to this consultation and look forward to continued engagement with the Panel.

Yours sincerely,

Violette Mouchaileh

Executive General Manager - Policy & Corporate Affairs

Attachments: AEMO Submission to Reliability Panel Draft Determination on the Review of the System Restart Standard

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1 Draft revisions to the standard

AEMO supports the Panel's proposed changes to the structure of the System Restart Standard (SRS), including the introduction of a dual-target framework, the 8-hour supply restoration procurement objective, and the increase in aggregate reliability to 95%. These changes reflect the changing power system and provide AEMO with more flexibility to procure and plan for system restart in a more efficient manner.

Key context for this review is the System Restart Standard (SRS) is a procurement target calibrated to the assumptions in the planning and tender evaluation studies, which may differ from operating conditions. This means these planning studies do not – and cannot practically – account for all potential conditions, particularly where the system is not intact. Therefore, the framework cannot guarantee that a supply restoration target is met following any black system event.

The SRS targets represent the time by which a given level of supply (which in this context is understood to mean generation and transmission capacity) should be restored to keep losses within an acceptable economic trade-off between the potential cost of procurement and the cost of extended unserved energy. The SRS does not need to be set at levels AEMO is certain of achieving. Rather, it should be informed by a reasonable view (a likely planning scenario) of the capabilities of the system. It is also important to recognise that AEMO uses its reasonable endeavours to acquire system restart ancillary services (SRAS) commensurate with the SRS procurement targets. While the Reliability Panel considers projections of potential sources of SRAS and restart paths to inform its economic analysis when it sets the SRS, a subsequent procurement process may not always yield sufficient services to meet the SRS. AEMO's SRAS reporting will identify any such outcomes.

Restoring the system can be split into three stages: Stage 1 is creating a stable restoration island, and this has typically been a black starter energising the auxiliary loads (fans, pumps, mills, etc.) of a large power station. Stage 2 is expanding the restoration by energising further lines, substations, and auxiliary loads, with power stations increasing output to minimum stable load. As generation synchronises and ramps, it must be matched by increasing load (including consumer load) to stabilise the power system through this stage. Stage 3 is not covered by either the current or the proposed draft SRS and involves resupplying the remaining bulk consumer load.

The current SRS is a stage 1 target that arguably extends into stage 2 in some cases (because it is not prescriptive of the MW of the power station(s) that are to be energised by

the black start service). It is expressed as a MW quantity of restoration (generation and transmission) within a specified time.

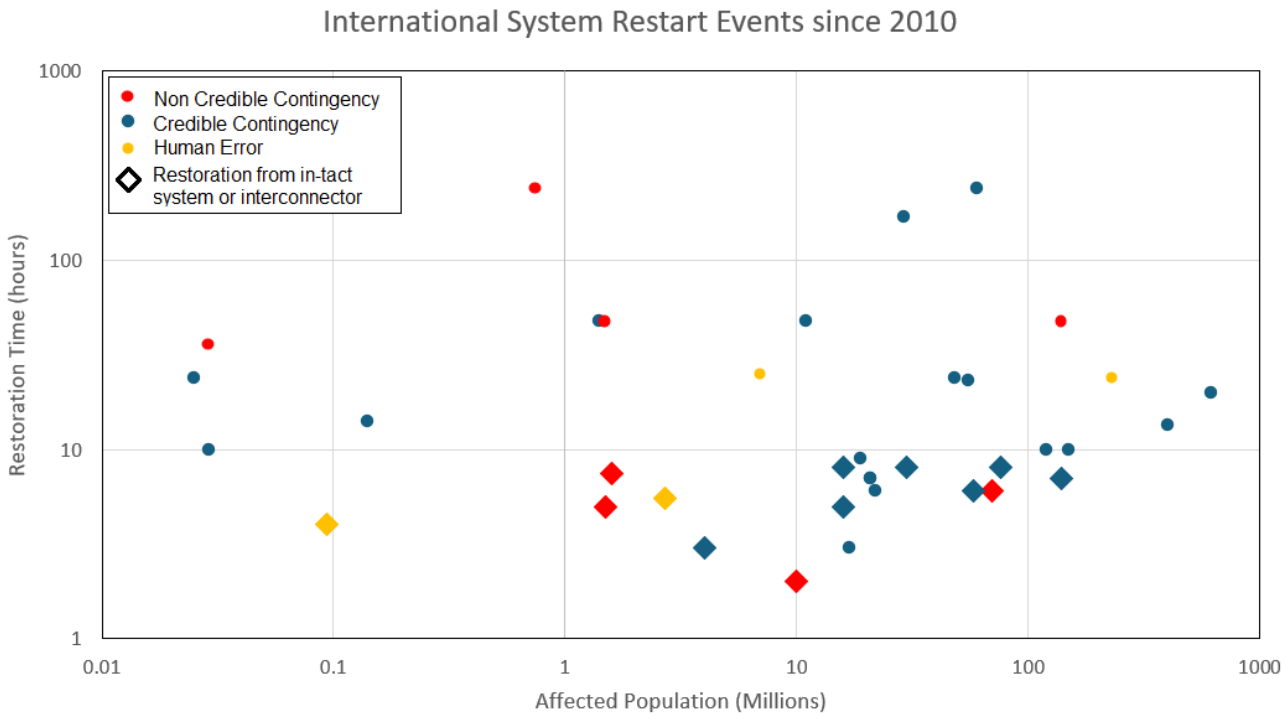
AEMO supports the Panel's proposal to change the structure of the SRS to a dual procurement target for capability sufficient to achieve: stage 1 – being stable restoration islands (with no associated MW quantity) within a specified time, and stage 2 – being a MW quantity within a specified time. Setting a stage 1 target without an associated MW quantity provides greater flexibility to procure and form stable restoration islands, while extending the MW target to stage 2 provides increased scope to procure SRAS for restoration support (like stabilising load, synthetic inertia, voltage stability service) to sustain further energisation of supply through to the end of stage 2.

1.1 Restoration Timeframes

We support the revised draft restoration timeframes, particularly the requirement for AEMO to form a stable restoration island(s) within 2 hours.

The removal of a specific MW quantity allows AEMO to form restoration islands using a broader mix of technologies, rather than being constrained to large synchronous generators with high MW capacity. This is especially important as the system transitions toward one with more inverter-based resources (IBR), which may not individually meet traditional MW thresholds but may credibly contribute to a stable restoration island from which further capacity can be restored. By focusing on stability and operational viability of the restoration island, rather than an arbitrary MW quantity of supply in the initial stage of restoration, the revised draft SRS standard enables AEMO to plan for restoration islands that are best suited to the available resources in the evolving power system, whether by energising auxiliaries of large power stations with a high MW capacity or smaller assets.

We also support the inclusion of the 8-hour restoration target for restoring supply to 50% of forecast average annual underlying demand. Following historic black system events, large-scale power systems have been typically restored within approximately 10 hours, although in many instances with the assistance of a neighbouring interconnection. Beyond this time, backup power supplies and switching arrangements become increasingly complex and less reliable. The following chart provides a desktop summary of events since 2010, compiled from AEMO's review of publicly available sources, including classifications for the type of contingency event and when restoration was supported by an intact transmission system and interconnection.



Location	Date	Affected Population	Local Time	Restoration Time
Brazil and Paraguay	10 Nov 2009	60 M	2215hrs	10 days
Arizona	8 Sept 2011	7 M	1538hrs	25 hrs
India	30 Jul 2012	400 M	0235hrs	13.5 hrs
India	31 Jul 2012	620 M	1302hrs	20 hrs
South Vietnam	22 May 2013	<30 M	1414hrs	8 hrs
Darwin (Aust)	12 Mar 2014	140 k	0136hrs	14 hrs
Bangladesh	1 Nov 2014	150 M	2330hrs	10 hrs
Amsterdam	27 Mar 2015	2.7 M	0935hrs	5.5 hrs
Turkey	31 Mar 2015	76 M	1036hrs	8 hrs
Zambia	10 Dec 2015	16 M	2230hrs	8 hrs
Zambia	23 Dec 2015	16 M	1845hrs	5 hrs
Pakistan	24 Jan 2015	140 M	2330hrs	48 hrs
Alice Springs (Aust)	30 Jan 2016	25 k	0245hrs	24 hrs
Sri Lanka	13 Mar 2016	21 M	1230hrs	7 hrs
Puerto Rico	21 Sep 2016	1.5 M	Approx. 1500hrs	>48 hrs
South Australia (Aust)	28 Sep 2016	1.6 M	1550hrs	7.5 hrs
Brazil	21 Mar 2018	70 M	1548hrs	6 hrs
Venezuela	7 Mar 2019	29 M	1656hrs	>7 days
Venezuela	22 Jul 2019	22 M	1600hrs	-
Argentina	16 Jun 2019	48 M	0707hrs	>24 hrs
Manhattan	13 Jul 2019	1.5 M	1847hrs	5 hrs
Java	4 Aug 2019	120 M	1150hrs	10 hrs
Alice Springs (Aust)	13 Oct 2019	29 k	1418hrs	10 hrs
Sri Lanka	17 Aug 2020	21 M	1230hrs	7 hrs
Amapa, Brazil	3 Nov 2020	750 k	Late Evening	10 days (21 Amapa)
Darwin (Aust)	18 Nov 2020	93 k	1600hrs	4 hrs
Mexico	29 Dec 2020	10 M	1429hrs	2 hrs
Pakistan	9 Jan 2021	230 M	2341hrs	24 hrs
Bangladesh	4 Oct 2022	140 M	1400hrs	7 hrs

Location	Date	Affected Population	Local Time	Restoration Time
Brazil	15 Aug 2023	58 M	0830hrs	6 hrs
Kalgoorlie (Aust)	17 Jan 2024	29 k	1746hrs	36 hrs
Ecuador	20 Jun 2024	17 M	1500hrs	3 hrs
Balkans blackout	21 Jun 2024	4 M	1209hrs	3 hrs
Cuba	18 Oct 2024	11 M	1200hrs	>48 hrs
Broken Hill (Aust)	21 Oct 2024	20 k	1638hrs	24 hrs
Sri Lanka	09 Feb 2025	22 M	1045hrs	6 hrs
Chile	25 Feb 2025	19 M	1516hrs	9 hrs
Cuba	14 Mar 2025	11 M	2015hrs	>48 hrs
Puerto Rico	16 Apr 2025	1.4 M	1240hrs	>48 hrs
Spain	28 Apr 2025	55 M	1238hrs	23 hrs

Source: AEMO summary of publicly available sources

1.2 Restoration target

AEMO considers the use of 50% of average underlying demand as the supply restoration target is also appropriate under current circumstances. While this figure is lower than might be extrapolated from earlier modelling[1] used to set the current SRS, it reflects the reduced availability of large synchronous generators, many of which may be colder or slower to restart. It also accounts for the uncertainty surrounding the restart capabilities of emerging technologies, such as inverter-based resources (IBR) and battery energy storage systems (BESS).

The technical analysis used to produce the restoration curves provided in the AEMO Technical Advice was based on the information available to us at the time. The focus was on those IBRs that could feasibly contribute to the restart process due to their location along each of the modelled restart paths and the technical capability as known to AEMO. This included only existing and new-entrant BESS, (which were assumed to contribute little stored energy, but may be more useful to manage frequency, voltage and provide stabilising load during restoration rather than contributing to the supply quantity). Variable renewable IBR were excluded due to their inherent variability and need for stability.

For AEMO to procure SRAS under the revised standard, we will require detailed analysis and information sourced from network service providers (NSPs) and market participants to assess tender submissions. AEMO will need to undertake new detailed procurement assessments that extend to a stage 2 target (8 hours) in a similar way it assessed SRAS providers against the existing SRS at far shorter timeframes. While this aspect of the target is intended to increase AEMO's ability to procure services that support a sustained restoration, it remains unclear whether sufficient SRAS sources will submit viable tender offers and data provided in participants' Local Black System Procedures (LBSPs) will provide enough supply in enough time to meet this new standard.

[1] Deloitte Access Economics - Economic assessment of System Restart Ancillary Services in the NEM for Australian Energy Market Commission published 30 November 2016.

Importantly, a lower implied supply restoration quantity (50% of average underlying demand) should not be equated with a reduction in the number of SRAS that may be procured. Changes in the actual reliability of SRAS sources, together with the SRS provisions for increased aggregate reliability (95%), the additional requirements for the north of both QLD and NSW, and a requirement for diversity, must all be assessed in making procurement decisions considering the lowest **long-term** cost.

In summary, AEMO considers the revised standard balances realism with ambition and provides more flexibility to adapt to a changing generation mix.

1.3 Aggregate Reliability

We support the proposed increase in the aggregate required reliability of SRAS to 95% across all mainland electrical sub-networks[2], raising it to the current level for Tasmania, and the draft decision to apply the reliability requirement to stage 1 only. The Panel's economic analysis demonstrates that procuring SRAS at this level is both prudent and efficient, which is the foundational rationale for the system restart framework.

The aggregate reliability represents the expected probability that the SRAS procured for an electrical sub-network will perform as intended to form the necessary restoration island(s). It is important to clarify that this reliability is a probability assessment exercise that applies to the SRAS themselves based on reasonable performance assumptions, and not to the restoration islands. A sub-network may have multiple SRAS services but only one stable restoration island—or conversely, a single SRAS service may be sufficient to form a stable restoration island.

AEMO is unsure whether the increase in aggregate reliability will be a primary driver of additional SRAS procurement towards three services. Subject to available supply restoration capability in LBSPs, the restoration target in stage 2 may require at least one; in the case of NSW and QLD, the special exceptions requiring a service in the north of each sub-network may require a second; and if the aggregate reliability value is not already met, the 95% requirement may just replace the SRAS service that would otherwise have been procured to satisfy the diversity requirements. Notwithstanding this, the increase to 95% aggregate reliability may influence the number of SRAS procured if there is a decline in available SRAS sources, with fewer providers participating in tenders, or the individual services themselves become less reliable. This may occur if the availability, or number of units on-line at a power station is expected to reduce. If meeting the 95% reliability target requires additional SRAS procurement of black start sources, it may prove challenging for AEMO to secure these services immediately.

[2] Understanding that separately QLD and NSW north requirements have their own levels of reliability specified by the Panel.

Nonetheless, AEMO notes the Panel hopes that the setting of this higher reliability standard will act as a market signal, encouraging more parties to tender and invest in SRAS capability. This change is a necessary step to maintain system resilience and ensure restoration outcomes remain robust, especially as the generation mix continues to evolve and existing traditional black start-capable assets retire.

1.4 Restoration Island Guidelines

We support the inclusion of new guidelines for the characteristics of restoration islands in the draft SRS, to facilitate system restart planning and SRAS procurement consistent with the operational realities of a transitioning power system.

The proposed attributes (such as self-sufficiency, voltage and frequency stability, system security capability, synchronisation with other islands, and adequate communication systems) are appropriate and align with AEMO's technical advice. These characteristics will help define what constitutes a stable restoration island, for initiating and sustaining system restoration.

It is important to note that the guidelines apply to the operational characteristics of the restoration island, not to the SRAS themselves. A restoration island may be formed by multiple SRAS services, or conversely, a single SRAS service may be sufficient to form a restoration island. The flexibility to accommodate either scenario is important, especially as the system evolves to include a wider range of technologies and configurations.

By focusing on the functional capability of the restoration island rather than prescriptive configurations, the draft SRS allows AEMO to adapt its planning and procurement to the available resources and emerging technologies. This is particularly relevant as traditional black start-capable generators retire and potential new forms of SRAS, such as inverter-based resources and battery energy storage systems, become more prominent.

The guidelines also support the broader objective of ensuring that restoration islands can operate in a satisfactory operating state throughout the restoration process, even if they are not immediately in a secure state. This distinction is important and aligns with the staged nature of system restoration.

1.5 Consideration of Sensitive Loads

We support the inclusion of additional guidance requiring AEMO to consult with Jurisdictional System Security Coordinators (JSSCs) regarding the strategic location of SRAS and the existence of sensitive loads. While this is an improvement on the current arrangements, the proposed drafting remains somewhat ambiguous.

The JSSC already has functions and obligations under both the National Electricity Law and NER to advise AEMO of any designated sensitive loads, and NSPs, generators and integrated resource providers must disclose energy support arrangements in their LBSPs. The purpose of AEMO consulting with the JSSC on their existence is therefore unclear, although it may be helpful for JSSCs to provide AEMO with more specific advice about related limitations and capabilities.

Further clarification is also required on the extent to which AEMO is required or expected to implement a JSSC's advice on strategic location. For example, if a JSSC advises AEMO to procure SRAS above what the SRS requires to facilitate faster restoration of a sensitive load, does the Panel expect that AEMO should do so, noting that any additional costs would be allocated to that jurisdiction? Alternatively, if dedicated resources are needed for a sensitive load, should energy support arrangements more appropriately be put in place (or continued) outside the SRAS framework?

These distinctions are important, as they affect both procurement strategy and restoration planning. Clarifying the JSSC's role in influencing SRAS procurement decisions would strengthen the effectiveness of this provision.

Given the significant economic risks associated with delayed restoration of sensitive loads, (for example, aluminium smelters may suffer irreversible damage if not restored within certain timeframes), AEMO recommends that, in addition to the guidance in the draft standard, the Panel consult directly with JSSCs to determine the necessity to procure more SRAS for this purpose. This would provide greater clarity and ensure that restoration planning reflects the real-world consequences of supply disruptions for sensitive loads.

2 Recommendations to Improve System Restart Preparedness

2.1 Procurement and Investment

In this section we comment on the Panel's recommendations for AEMO to:

- Proactively engage with the market to identify future SRAS needs by leveraging flexibility in the existing framework to procure SRAS and meet any identified SRAS gaps in a timely manner.
- Explore co-investment in new SRAS capability through the Electricity Services Entry Mechanism (ESEM).

The Panel's recommendation to Use Type 2 transitional service contracts for trialling new SRAS technologies to understand their potential role in system restoration is discussed in Section 2.2 of this submission.

We also note the importance of investment to maintain and enhance network capabilities to sustain restoration, for which the procurement of an increasing number of SRAS ultimately cannot compensate. We suggest the possibility of closing gaps in the NER framework to give this investment due priority.

Role of the SRAS framework in a transitioning power system

It is important to note that the System Restart Ancillary Services (SRAS) framework is a procurement framework for the provision of services that are, explicitly, *ancillary* to the primary function of the facility providing those services.

Historically, large power stations have included supporting plant that enables black start or appropriate switching arrangements to re-energise those stations rapidly. Many of these capabilities were designed into the plant when built by government authorities. More recent generators have not always added additional balance-of-plant to support system restart, and it became the role of the SRAS framework to procure this balance-of-plant to ensure enough is available to restart the system, or to encourage investors to at least consider it.

However, there is a technology boundary with the increasing use of inverter-based resources (IBR), variable renewables and the closure of large synchronous power stations with plentiful energy supplies. New power stations are increasingly being built without restart capability and are not integrated into system restoration procedures. AEMO encourages the Panel to consider how Rules should evolve to support targeted, co-optimised investment of SRAS.

More broadly, the rules should reflect the reality that system restoration is a network-wide challenge, requiring planning, design, investment, maintenance and testing from a range of participants. This becomes more relevant with the 8-hour restoration target and the emergence of new TNSPs whose REZ connections need to be incorporated into restart

preparedness. Restoration capability must be designed into the network, not added after SRAS procurement.

The replacement of power stations that have either been SRAS sources or are early and important to the restart path provides opportunity to design restoration capability into the power system, instead of considering restoration as an ancillary service that can be procured after investments have been made.

AEMO will have to explore how it can use the existing framework to encourage new SRAS investment, and some guidance from the Panel as to what proportion of a new SRAS source (e.g. a Gas Turbine) would be reasonable to pay as part of a 10-year contract could prove useful - for example if the developer is struggling to reach financial close due to a lack of sufficient offtake agreements for energy and other services, is it reasonable for AEMO to secure the project through an SRAS contract?

A question for the restart framework is the extent to which a possible SRAS contract can underpin new investment in facilities specifically designed with capability for black start, forming a stable restoration island and supporting system restoration. An SRAS agreement has not been issued to a new-build generator or battery for over 15 years because the framework has been effective at procuring services from existing plant, some of which newly built, sometimes subject to minor modification.

It may be helpful if the Panel clearly states whether the SRAS framework can underpin investment in a new power station with restart capability in a transitioning power system. If the answer is no, and the intent of the framework is only to support investment in balance-of-plant that could make a proposed new generator SRAS capable, then the problem is whether it is necessary to establish a mechanism to coordinate SRAS agreements and project development, or simply rely on a possible SRAS agreement to entice expenditure on SRAS balance-of-plant.

The Panel's recommendation in Section 4.1.4 to explore co-investment in new SRAS capability through the Electricity Services Entry Mechanism (ESEM) supports something that can support targeted investment in restoration-capable infrastructure instead of only relying on the market incentive (of a future SRAS agreement) to encourage developers to invest in merchant capability.

The Panel's recommendations for AEMO to report opportunities for SRAS suggests a view that market signals should encourage more investment in SRAS capability, and the Panel's comments[3] on SRAS expenditure indicate that SRAS agreements could fund capital costs for replacing black start capability. If there is a central contracting mechanism for new-build plant, whether it is the ESEM or something else, AEMO considers it is necessary to

[3] Draft Determination – p32 – "the Panel recognises that some increase in SRAS expenditure is expected in the future as a result of: the procurement of additional new restoration support services to meet the draft Standard; and capital costs for trialling and building new black start SRAS capability to replace the retirement of existing capability."

encourage coordinated investment in new security services across potential opportunities provided by the disparate incentive frameworks. This is because otherwise black start and restoration capability may be ignored by investors if they only target the tender requirements of the central contracting mechanism and not broader power system requirements.

Network investment in system restoration paths

Ideally, NSPs – generally TNSPs – should invest in restoration-supporting assets if the investment is prudent and consistent with good electricity industry practice. AEMO would welcome the Panel considering whether chapters 4, 5, and 6A of the NER are sufficient to encourage this necessary investment.

> **Chapter 4** – AEMO's power system security responsibilities in clause 4.3.1 include coordinating restoration following a major supply disruption. Clause 4.3.4(a) is a general requirement for NSPs to co-operate with and assist AEMO in the proper discharge of those responsibilities. Clause 4.3.4(a1) requires each NSP to facilitate testing of SRAS and system restart tests and conduct those tests as required, comply with the SRAS Guideline, and take all reasonable steps to facilitate the effective deployment of SRAS.
>
> **Chapter 5** – Network planning standards: Schedule 5.1 describes the planning, design and operating criteria to be applied by NSPs to their networks. Schedule 5.1 does not include any criteria that reference support for system restoration after a major supply disruption.
>
> **Chapter 6A** – Economic Regulation of Transmission Services: Clauses 6A.6.6 and 6A.6.7 allow TNSPs to propose capital and operating expenditure required to meet or manage the expected demand for *prescribed transmission services*, and comply with *regulatory obligations or requirements* associated with the provision of those services.

The definition of *prescribed transmission services* includes the services a TNSP must provide under the NER relating to shared transmission services, including those "necessary to ensure the integrity of a transmission network, including through the maintenance of power system security and assisting in the planning of the power system". While these generic references can arguably encompass investment in effective system restoration support, we suggest that more explicit requirements to plan and maintain transmission networks in a manner that supports restoration (including the design of restoration pathways and switching arrangements) would promote better restoration outcomes.

On a related point of clarification, the Draft Determination[4] appears to suggest that AEMO could procure restoration support SRAS from NSPs. This framing is problematic because restoration is a network function, not ancillary to it. TNSPs should not be treated as SRAS providers for network functionality that should be considered part of their regulated obligations. Doing this ensures accountability, avoids duplication, and aligns better with the existing regulatory framework. We note that the AEMC, in its final determination on the *SRAS Rule 2020*, confirmed that NSPs should not be SRAS providers (section A.6.3, page 47). It would be helpful for the Panel to confirm this position, not least because there are new TNSPs whose REZ connections need to be incorporated into restart preparedness.

2.2 Transparency and Reporting

In this section we comment on the following recommendations:

- From 2026, AEMO to report future system restart needs in the transition Plan for system security (TPSS), based on future focused restoration modelling accounting for the contribution of IBR and the expected closure of coal-fired generation over the three TPSS planning horizons.
- Engagement with the Panel on system restart needs and restoration modelling.
- From 2026, report on identified SRAS investment opportunities in the electricity statement of opportunities (ESOO) or similar publication.

We note the Panel's draft recommendations to enhance forward-looking modelling, transparency, and reporting—particularly through the TPSS. We consider the TPSS can examine the extent to which SRAS and the SRS itself remain fit-for-purpose. We also consider there is potential for "Type 2" Transitional Services to demonstrate the usefulness of some technologies for SRAS, which could subsequently be procured via SRAS agreements.

Although these enhancements may help guide SRAS procurement in a way that is technically credible, they are no substitutes for procuring SRAS to meet the Procurement Objective. Further, depending on the Panel's view regarding the extent to which the SRAS framework could fund capital costs for new restoration capability (discussed in section 2.1), it is possible greater transparency of SRAS investment opportunities would not remedy a deficiency in the system restart framework to incentivise timely investment in restart capable plant and supporting network equipment.

[4] Panel – Draft Determination, page 33 – "[the SRAS] definition provides AEMO with the flexibility to adapt to the needs of the transitioning system restart by amending the services it considers as restoration support services to include services such as those provided by **network assets**, Battery Energy Storage System (BESS) and IBR that could support the restoration process."

In summary, information enhancements can help identify system needs but also require improvements to investment and procurement (as previously discussed) to support future SRAS capabilities required to meet the Procurement Objective.

TPSS reporting and restoration modelling

It is appropriate for AEMO to outline future system restart requirements, including those related to the anticipated closure of coal power stations. AEMO may provide an initial view of these requirements in the 2025 TPSS.

However, AEMO does not consider the Panel should prescribe methods for undertaking this work. 'Future-focused restoration modelling' may not be feasible—particularly constructing and modelling restart paths in the way this is done for current SRAS tender assessments. This type of modelling requires detailed analysis based on specific, and often unknown, network characteristics for future periods. While simplified analyses may be achievable, they should not replace comprehensive power system studies. The Panel's recommendations should remain practical and actionable for AEMO, noting we recognise the need to develop different approaches to project future SRAS requirements and potential restart strategies.

AEMO also cautions against any presumptions about which technologies will be viable for SRAS. For example, the proposal to model the contributions of inverter-based resources (IBR) should be approached with care. As indicated in the Technical Advice, integrating IBR is important, and AEMO encourages innovation in this area—including an upcoming Type 2 trial for IBR black start applications – but expectations about their role and limitations for SRAS must remain realistic. For restoration support more broadly, battery energy storage systems (BESS) are expected to contribute, though accurately modelling their involvement remains a complex task.

Reporting on identified SRAS investment opportunities

As noted above, AEMO is already considering some level of reporting on this subject in the 2025 TPSS, and this process will inform how, and through which publications, AEMO can best report going forward. AEMO is therefore comfortable with a reporting recommendation on potential SRAS investment, without suggesting any specific publication.

Any enhanced expectations for additional modelling and reporting will need to be accompanied by an acknowledgement of the associated resourcing costs for AEMO and other parties such as TNSPs.

Consistent with our comments in section 2.5 of this submission in respect of governance, we support the Panel's draft recommendations to enhance forward-looking reporting as more effective means of driving accountability and investment in SRAS capability. These

measures will help ensure that AEMO's planning and procurement decisions are visible to stakeholders and aligned with the long-term interests of consumers.

2.3 Local Black System Procedures (LBSP)

In this section we comment on the following recommendations, in the context of the Panel's view that the NER framework itself is sufficiently strong and flexible to support AEMO in obtaining the information it requires in LBSPs:

- AEMO review the LBSP guidelines and related processes and investigate opportunities to support timely provision of accurate information on the capabilities of power system equipment to support system restoration.
- AEMO identify and audit a set of critical LBSPs before the next procurement round, with a more fulsome audit before the revised SRS becomes enforceable on 1 July 2027.

Deficiencies in the current framework

The current NER requirements for generators, integrated resource providers (IRPs) or NSPs to develop LBSPs and submit them to AEMO are procedural only. Unlike the system restart communication protocols (NER 4.8.12(j) to (m)), the NER do not specify that a facility must conform with its LBSP in a black system event. Nor do the NER include an explicit obligation to assure the accuracy of LBSP information.

LBSPs are critical inputs to the development of system restart plans and SRAS procurement, because AEMO uses the information to develop restoration plans which include detailed line energisation and switching protocols. Accurate and up to date LBSP information promotes improved coordination, effective use of plant, advance identification of issues and workarounds to minimise restoration setbacks, and identification of gaps and SRAS opportunities. The prospects of quicker and more successful restoration are likely to improve with LBSP information that accurately reflects current capabilities.

AEMO's LBSP guidelines[5], consistent with NER 4.8.12(f), set out the information AEMO requires to understand and plan for:

- likely plant condition and capabilities after a major supply disruption;
- the actions participants must undertake after a black system event, prior to energisation or synchronisation; and

[5] AEMO, Guidelines for Preparing Local Black System Procedures, 12 December 2019: https://www.aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2019/lbsp-amendments/final-stage/guidelinesforpreparinglocalblacksystemprocedures.pdf?rev=bab0e8af532b47b6aae890b8bfac32ab&sc_lang=en

- any relevant energy support arrangements.

AEMO undertook a significant update to the guidelines in 2019, in consultation with participants, where the information requirements were comprehensively reviewed and new LBSP templates issued. Between 2020 and 2022, AEMO proactively followed up with NSPs and generators to communicate the revised requirements and request submission of updated (or new) LBSPs. These concerted efforts eventually resulted in AEMO receiving updated LBSPs from all NSPs and synchronous generators over 30 MW. However, a significant number of generating system LBSPs remain outstanding for small systems, and some larger asynchronous systems. For LBSPs that have been submitted, AEMO has no practical means of verifying their accuracy or confirming whether they are regularly reviewed by the equipment operators. We note, however, that AEMO has previously received LBSPs that omitted or understated helpful restoration capabilities. This was only evident to AEMO because the LBSPs had been varied in the absence of any relevant plant alterations.

The LBSP guidelines explicitly permit the use of assumptions and appropriate disclaimers in LBSPs to encourage full disclosure of capabilities. The guidelines also recommend that LBSPs are reviewed on the occurrence of specified changes, and at least once every two years in any event. However, AEMO's experience suggests that better information would be facilitated by appropriate NER obligations requiring relevant participants to ensure LBSPs are kept up to date and reflect the best information and estimates reasonably available to the participant. In addition, we recommend the Panel consider a proposal to extend the LBSP provisions in the NER to major customer loads, if AEMO requests LBSP information to develop a system restart plan.[6]

Limitations of audit capability

NER 4.8.12(h) allows AEMO to request amendments to LBSPs as AEMO reasonably considers necessary to ensure the integrity of the system restart plan. AEMO is required to give reasons for any such request. This means the circumstances in which AEMO can make an amendment request are limited, for example where:

- AEMO has actual knowledge of a capability or limitation that may not be accurately reflected in the LBSP (for example from an ancillary services contract or previous power system incident); or
- AEMO is able to identify arrangements in the LBSP that could reasonably be varied if necessary for a viable system restart plan.

[6] The LBSP guidelines currently include an LBSP template for major loads, to be provided on request by AEMO, but note that there is no NER obligation to do so.

AEMO believes the NER do not appear to permit the type of broad LBSP audit that the Panel recommends, and in any event such a process would be unrealistic, even for a 'critical' subset of transmission and generation plant. In practice, AEMO must assume the information provided in an LBSP is accurate unless there is reasonable evidence to the contrary, and in most cases AEMO will not be able to identify potential gaps or inaccuracies. The LBSP framework is a process by which AEMO gathers information directly from registered participants about aspects of their own plant that AEMO may not otherwise know and relies on that information to develop or revise system restart plans.

Accordingly, AEMO does not consider the Panel's recommendation (on LBSP audits) can be implemented.

Role of LBSP information and relationship to restoration support services

We would like to clarify the Panel's observations in the box 13 on pages 47-48 of the Draft Determination about the relationship between 'gaps' on a restart path identified through revised LBSP information (including the decommissioning of generation or other plant), and AEMO's ability to procure restoration support services. The commentary in box 13 is from the AEMC's determination for the *SRAS Rule 2020*, indicating that AEMO should procure restoration support services "if the equivalent service is no longer provided for pursuant to a plant's capability in its LBSP. This may be because the plant is no longer operating as it used to or has been decommissioned."

As discussed earlier in this submission, restoration support services (currently defined in the SRAS Guidelines as providing voltage or reactive power control, frequency control, stabilising load or fault current contribution) are likely to be procured to achieve the 8-hour target. However, AEMO is keen to clarify that restoration support services cannot compensate for diminished capacity or delayed restoration capability based on revised LBSPs. Removal or delay in the return to service time of an existing synchronous generator on the restart path reduces not just the security contribution, but also the power generation capacity available to meet the SRS targets. That lost or delayed capacity cannot be replaced by restoration support services. The restoration plan is underpinned by these LBSP submissions and is therefore vulnerable to plant varying their LBSPs and LBSP inaccuracies.

AEMO requests the Panel carefully consider whether the SRAS framework may disincentivise participants to maintain existing capabilities that would assist restoration, further eroding declared LBSP capabilities, *unless* AEMO procures them as restoration support services.

2.4 Testing Arrangements

In this section we comment on the Panel's initial view that:

— the current SRAS testing arrangements under the NER provide sufficient flexibility for AEMO to undertake SRAS testing and compensate involved parties accordingly.

We consider this finding inconsistent with AEMO's Technical Advice, which recommended expanding obligations for system restart network testing to include potential new restart paths with appropriate mechanisms for cost recovery.

The closure of some power stations means that some traditional restart paths will become less effective, and new or additional or extended paths will need to be planned and tested, to make effective use of potential SRAS (both black start and restoration support) from a range of new sources. This requires two things: investment in network capabilities to support the development of new or enhanced system restart paths (which we discuss in section 2.1 above); and the ability to test the viability of both existing and potential new paths to meet the SRS, discussed in this section.

NER 4.3.6 gives AEMO the authority to conduct system restart tests and requires affected Registered Participants to cooperate in their planning and execution. It also includes provisions for compensating participants (other than NSPs[7]) for direct costs incurred during testing. However, the clause explicitly describes the purpose of testing as "to verify whether the system restart plan as it relates to [an] electrical sub-network is likely to be consistent with the achievement of the system restart standard" (4.3.6(b)). This limitation – assuming a system restart plan is in place first before testing it – may become increasingly misaligned with efficient restart planning and SRAS procurement given evolving power system conditions and the associated changes proposed to the SRS.

The proposed 8-hour restoration target in the revised standard requires confidence in the entire restoration pathway, including transmission switching arrangements, transmission support devices, and coordination across multiple network segments. The development of REZs will increase the importance of system restart planning, design and testing ahead of SRAS procurement and finalisation of system restart plans – the REZ LBSPs may need to be tested. System restart tests are already extremely difficult to achieve, given the very narrow windows for sufficiently benign conditions to minimise market disruption. If a single piece of critical equipment has not been maintained or is not operating to standard, a programmed test could easily be delayed for a full year. This underscores the criticality of timely and adequate investment in (particularly) network equipment, which requires a very clear regulatory path to cost recovery as discussed in section 2.1.

To align clause 4.3.6 with the revised standard and AEMO's technical advice, we recommend the Panel considers of amendments to:

[7] On the basis that regulated NSPs have the ability to recover the efficient costs of meeting their regulatory obligations through their revenue determinations.

- 4.3.6(b) to allow the conduct of system restart tests to confirm the feasibility of potential system restart paths to inform the development of a system restart plan; and
- 4.3.6(l) to clarify that the provision also does not prevent recovery of NSP testing costs through determinations made under chapter 6 or 6A.

The importance of testing is supported by the International System Restoration Review[8] completed by ISON, specifically recommendation 3.2.7, which states "Prioritise live energisation trials beyond the point of connection, ideally up to the next planned restart unit, in particular involving one or more IBR. Establish mechanisms for technical and commercial remediation of issues found during testing".

2.5 Governance and role of the standard

In this section we comment on the following recommendations:

- Maintain current roles for the Panel and AEMO.
- Seek stakeholder feedback on whether governance arrangements remain fit for purpose.

We affirm that the current governance structure for the SRS remains appropriate and effective. The division of responsibilities—where the Reliability Panel determines the standard and AEMO implements it through procurement and planning—continues to provide a sound basis for delivering system restart capability. The standard acts as a procurement target, not an operational benchmark, which ensures that SRAS procurement is grounded in engineering modelling and economic efficiency rather than being subject to unrealistic expectations during actual black system events. This arrangement provides AEMO with the necessary flexibility to adapt to the evolving power system while maintaining accountability through annual self-reporting and transparency measures. We do not see a compelling rationale for major changes to the governance framework.

The current focus on generation and transmission restoration (stages 1 and 2) is appropriate. However, we acknowledge stakeholder interest in extending the standard to include load restoration (stage 3). While we do not support a formal load restoration standard at this time, we support improved transparency around expected restoration outcomes through enhanced modelling and reporting. The Panel has previously recommended that load restoration be better understood and modelled, however AEMO has not identified the methodology and tools to undertake such a task reliably.

A load restoration-focused standard is appealing because it targets the main outcome of system restoration—restoring load and minimising unserved energy. However, the practicalities of both developing and seeking to meet such a standard are extremely challenging. The connection of load requires extensive low-voltage distribution switching and is subject to numerous local factors that AEMO is unable to model or evaluate with

[8] ISON – International System Restoration Review, published 13th August 2025.

sufficient accuracy. The unknown factors associated with load restoration increase substantially as the restoration process moves further from the originating black start sources, the original stable restoration islands, and along the established restart paths. For these reasons, it is more sensible for the central restart plan to be conducted by AEMO, supported by network companies, market participants, and SRAS providers. The focus should remain on a two-part standard: (1) the time required to form a stable restoration island, and (2) a target for the energisation of generation and transmission, which can subsequently be used to restore load. This approach balances ambition with operational realism and ensures that restoration planning remains technically credible and achievable.

We support the Panel's conclusion that the SRS should remain a procurement target, not an operational compliance obligation. This distinction is critical to ensure that SRAS procurement remains grounded in engineering modelling and economic efficiency, rather than being subject to unrealistic expectations during actual black system events.

The current compliance arrangements—where AEMO is required to use reasonable endeavours to meet the standard and report annually on its ability to do so—are appropriate. AEMO is best placed to assess compliance, given its access to detailed modelling, technical data, and operational insights. We agree with the Panel that no other body possesses the necessary capability to independently verify compliance with the standard.

We do not support the introduction of civil penalties or enforcement mechanisms for non-compliance with the standard. The risks associated with black system events are inherently probabilistic and complex, and the restoration process is subject to a wide range of operational variables. Imposing penalties for outcomes that may be beyond AEMO's control would be counterproductive and could discourage innovation or prudent risk-taking in SRAS procurement.

We also support the continued use of the SRAS Procurement Objective, which requires AEMO to meet the standard at the lowest long-term cost. This provides a clear and balanced framework for procurement decisions, ensuring that restoration capability is delivered efficiently while allowing for flexibility in contract design and investment support.