SYSTEM RESTART ANCILLARY SERVICES GUIDELINE 2020

(INCORPORATING BOUNDARIES OF ELECTRICAL SUB-NETWORKS)

FINAL REPORT AND DETERMINATION

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EXECUTIVE SUMMARY

The publication of this Final Report and Determination (Final Report) concludes the consultation process conducted by AEMO on amendments to the System Restart Ancillary Services (SRAS) Guideline under the National Electricity Rules (NER). This report includes AEMO's responses to material issues raised in the second stage consultation and in further discussions with industry participants.

The SRAS Guideline relates to AEMO's procurement, assessment and testing of SRAS to meet the procurement objective specified in the NER. It also incorporates the boundaries of electrical sub-networks for SRAS procurement. The SRAS Guideline is being updated following the *National Electricity Amendment (System restart services, standards and test) Rule* made by the Australian Energy Market Commission (AEMC) in April 2020[1] (Amending Rule). AEMO was required to finalise amendments to the SRAS Guideline by 2 November 2020, when the substantive provisions of the Amending Rule take effect.

This Final Report discusses AEMO's assessment of the key areas of stakeholder feedback on the SRAS Guideline, and explains the final modifications made from the draft Guideline published with AEMO's draft report in August 2020.

SRAS procurement objective

The final SRAS Guideline includes guidance on how AEMO will achieve the revised 'SRAS procurement objective' in the Amending Rule, which is to meet the Reliability Panel's system restart standard (SRS) at the lowest long-term cost. No changes have been made from the draft Guideline.

AEMO considers that this guidance is appropriately principles-based, so as not to unintentionally restrict the options that may be available to achieve the lowest long-term cost of SRAS. This is particularly important given the broad range of possible current and future scenarios.

The SRAS procurement objective allows AEMO to balance potentially higher up-front costs with long-term efficiencies, and to enter into longer duration contracts or procure various SRAS combinations if AEMO reasonably expects this to result in the lowest long-term costs for consumers. The Guideline indicates the types of forecast changes in the power system that will be relevant to SRAS procurement decisions, and provides examples of factors that will be relevant for AEMO in considering how to meet the SRAS procurement objective. After considering stakeholder feedback on the question of contract duration, AEMO determined that the Guideline should not include specific guidance, criteria or limits for the duration of SRAS contracts.

SRAS capabilities

AEMO has amended the SRAS Guideline to address the expanded definition of SRAS in the Amending Rule. These changes account for the possibility that black start capability could be provided by facilities that are not limited to generation, and describe the capabilities that could be provided by a new category of SRAS, called restoration support services.

The inclusion of restoration support services was one of the most significant changes in the Amending Rule and is a major area for amendment of the SRAS Guideline. It is important to note that these services are not expected to be acquired in significant numbers in the short term. AEMO may not require any restoration support services in the next SRAS procurement (scheduled for 2021). They will only be needed if assessment indicates that restoration along a minimum restart path may not otherwise meet the SRS, given power system performance expectations. AEMO expects restoration support services will start to play a more important role as the generation mix and power system conditions continue their transition.

[1] AEMC 2020, available at: https://www.aemc.gov.au/rule-changes/system-restart-services-standards-and-testing

The final SRAS Guideline confirms that:

- SRAS can be provided by combinations of facilities, including under separate ownership, although network service providers (NSPs) cannot themselves be SRAS Providers.
- A restoration support service may (but need not) have self-starting capability, and must provide any one or more of the following attributes, with the detailed technical requirements specified in the Guideline:
  - Voltage or reactive power control capability.
  - Frequency control capability.
  - Provision of stabilising load.
  - Provision of fault current.
- A facility can only be considered as a restoration support service to meet an identified need for a restart path if the facility would not otherwise inherently deliver that capability in expected power system restoration conditions.

The content of the final SRAS Guideline in respect of SRAS capability includes some amendments from the draft Guideline to illustrate and clarify its application to restoration support services. The final Guideline includes two examples of scenarios where restoration support services may be required, and the types of facilities that could provide them. For reliability assessment purposes, the definitions and application of SRAS transmission components have also been expanded to include distribution where applicable, to reflect the potential for a broader range of service delivery needs. Some of these may involve greater use of distribution networks.

SRAS tests

The final SRAS Guideline includes revised guidance on:

- The identification of differences between test procedures and actual restart conditions, including the role of NSPs in test facilitation and reporting.
- The requirement for an SRAS test after plant maintenance or alteration with the potential to materially impact SRAS performance or delivery.
- Use of NSP measurement devices for recording test data where available.

The content of the final SRAS Guideline in respect of SRAS tests has not changed materially from the draft Guideline. It has been amended to recognise the possibility that SRAS agreements may specify different types of SRAS test for restoration support service attributes, noting it is difficult to anticipate what (if any) regular testing will be practical for most attributes.

Testing of system restart paths

The final SRAS Guideline addresses a number of matters relating to the introduction of system restart testing provisions in the Amending Rule. A system restart test will verify what happens after an SRAS energises a transmission network delivery point, to confirm continued stable energisation further into the network, or identify unexpected interactions which can then be addressed.

The content of the final SRAS Guideline in system restart testing is substantially unchanged from the draft Guideline, providing for:

- The factors influencing AEMO's decision to conduct a system restart test.
- Consultation with any registered participants whose facilities are not participating in a test, but may be directly impacted by it (this has been clarified from the draft Guideline).
- The measurements and data to be reported to AEMO on the operation facilities during a test.

Boundaries of electrical sub-networks

AEMO's final determination is to change the boundaries of electrical sub-networks for SRAS procurement purposes by combining the existing north and south Queensland electrical sub-networks into a single sub-network, aligning with the NEM regional boundary for Queensland.

Combining the sub-networks will reduce the inefficiency created by the need to allocate SRAS exclusively to a single sub-network. It will allow increased restoration path flexibility and better access to stabilising loads. This greater flexibility will be of benefit both under conditions where system restoration is required in any given part of the Queensland power system, or if necessary to restart the entire system.

As any change to the boundaries requires the Reliability Panel to amend the SRS, AEMO's decision will not take effect until the Panel determines a revised standard for a single Queensland electrical sub-network, supported by economic analysis. As foreshadowed in the Draft Report, AEMO is recommending that the standard for Queensland include a requirement that at least one SRAS must be procured in the area north of Bundaberg.

System restart standard amendments and consequential Guideline updates

AEMO is required by the NER to determine and publish revised SRAS Guideline by 2 November 2020.

In parallel, the Reliability Panel has been considering and consulting on a set of qualitative amendments to the SRS (to ensure the standard is consistent with the Amending Rule, in particular the introduction of restoration support services), as well as quantitative amendments to reflect AEMO's determination of a single Queensland sub-network.

The Reliability Panel is scheduled to publish an interim standard reflecting the qualitative amendments in late October 2020. As AEMO will not have time to complete its approval processes between the Panel's final determination of these matters and AEMO's NER publication deadline, it may be necessary to further amend the SRAS Guideline if there are any inconsistencies with the revised SRS.

The Reliability Panel's final determination on the quantitative standard for Queensland is expected by the end of January 2021. AEMO proposes to update the SRAS Guideline as required to reflect both sets of amendments after that determination. AEMO currently anticipates that only minor or administrative amendments would be needed, not requiring further extensive consultation, but the position will be reviewed following the Panel's determinations.

Effective date

The amended SRAS Guideline will take effect on 2 November 2020, with the exception of the change to the Queensland sub-network boundaries. That change will take effect on the effective date of the Reliability Panel's determination of a revised SRS for Queensland.

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1. STAKEHOLDER CONSULTATION PROCESS

As required by clauses 11.123.2, 3.11.7(f) and 3.11.8 of the National Electricity Rules (NER, or Rules), AEMO has consulted on amendments to the system restart ancillary services (SRAS) Guideline (Guideline), incorporating boundaries of electrical sub-networks, in accordance with the Rules consultation process in rule 8.9.

Consultation documents have been published and are available on AEMO's website.[2]

AEMO's timeline for this consultation is shown below.

Deliverable	Date
Notice of first stage consultation and Issues Paper published	13 May 2020
First stage submissions closed	3 July 2020
Draft Report & Notice of second stage consultation published	3 August 2020
Submissions due on Draft Report	4 September 2020
Final Report published	15 October 2020

The publication of this Final Report marks the conclusion of the consultation process.

Note that there is a glossary of terms used in this Draft Report at **Appendix A**.

2. BACKGROUND

2.1. Context for this consultation

On 2 April 2020, the Australian Energy Market Commission (AEMC) made the *National Electricity Amendment (System restart services, standards and testing) Rule 2020 No. 6*[3] (Amending Rule). The Amending Rule included substantive amendments in Schedule 1 and transitional provisions in Schedule 2.

Schedule 1 will commence on 2 November 2020; Schedule 2 commenced on 2 April 2020.

As required by the transitional provisions in NER clause 11.123.2(a), AEMO has amended the SRAS Guideline to reflect the Amending Rule by 2 November 2020.

2.2. Relevant NER requirements

As part of its power system security responsibilities under the NER, AEMO uses reasonable endeavours to acquire adequate SRAS to coordinate restoration of the power system following a major supply disruption, including a black system.

Clause 3.11.7(a1) of the NER, as amended by the Amending Rule, describes the SRAS procurement objective – to acquire SRAS to meet the system restart standard (SRS) at the lowest long-term cost. AEMO publishes the SRAS Guideline to describe AEMO's procurement process and other matters prescribed in the NER, consistent with achieving the SRAS procurement objective. When the Amending Rule takes effect, clause 3.11.7(d) will require AEMO to include in the SRAS Guideline:

(1) a description of the technical and availability requirements of system restart ancillary services;

(2) a process for meeting the aggregate required reliability of system restart ancillary services for each electrical sub-network under clause 8.8.3(aa)(3);

[2] SRAS Guideline consultation documents including the Issues Paper, forum presentation and stakeholder submissions are available at: https://aemo.com.au/consultations/current-and-closed-consultations/sras-guideline-2020

[3] AEMC, System restart services, standards and testing, Rule determination, 2 April 2020

(3) a process for the modelling, assessment and physical testing of system restart ancillary services proposed to be provided by an SRAS Provider, including any assumptions to be made by AEMO regarding the state of transmission elements during a major supply disruption;

*(3A) guidance to Registered Participants on the factors influencing a decision of AEMO to conduct a system restart test, including (but not limited to) the types of conditions or changes in the power system which could necessitate a system restart test;

*(3B) guidance to Registered Participants required to participate in a system restart test under clause 4.3.6 on the measurements and data to be reported to AEMO about the operation of their facilities during the system restart test;

(4) a process for determining the number and location of system restart ancillary services required to be procured for each electrical subnetwork consistent with the system restart standard;

*(4A) requirements designed to identify any inconsistencies between the arrangements used in the testing of system restart ancillary services and those planned to be used in the deployment of system restart ancillary services following a major supply disruption and how the impact of any inconsistencies will be assessed;

(5) guidance to Registered Participants on the factors that AEMO must take into account when making a decision to follow a particular type of procurement process to acquire system restart ancillary services to meet the SRAS procurement objective;

*(5A) guidance to Registered Participants on how AEMO will achieve the SRAS procurement objective;

(6) a process for AEMO to follow for contacting a potential SRAS Provider to negotiate the provision of system restart ancillary services without a competitive tender process; and

(7) a process for a potential SRAS provider to contact AEMO to offer the provision of system restart ancillary services without a competitive tender process, which offer AEMO is in no way obliged to accept.

*The requirements in paragraphs (3A), (3B), (4A) and (5A) were added by the Amending Rule.

In addition, the SRAS Guideline includes the boundaries of electrical sub-networks for SRAS procurement purposes. These are determined by AEMO under NER clause 3.11.8.

2.3. First stage consultation

On 13 May 2020, AEMO started consultation on proposed updates to the SRAS Guideline to account for the Amending Rule. The first stage consultation included an Issues Paper to facilitate informed feedback and an initial draft amended SRAS Guideline. The main changes proposed related to:

- Specification of the requirements for SRAS, including the new category of restoration support services.
- New testing requirements, both for SRAS procurement or contract testing and for wider testing of system restoration paths.
- Additional guidance on AEMO's procurement approach in light of the NER change to the SRAS procurement objective.

The Issues Paper also asked stakeholders for feedback on a proposal to combine the two electrical sub-networks in Queensland into a single sub-network.

AEMO received eight written submissions in the first stage of consultation, from AGL, CS Energy, ERM Power, Hydro Tasmania, MEA Group, Origin Energy, Stanwell and Tesla. AEMO also held a virtual industry forum on 24 June 2020.

2.4. Second stage consultation

On 3 August 2020, AEMO published a draft report and determination (Draft Report) addressing the feedback received from the industry as part of the first stage consultation, together with an updated draft of the SRAS Guideline.

In response to the Draft Report, AEMO received five written submissions, from AGL, Energy Users Association of Australia (EUAA), MEA Group, Powerlink Queensland as the Jurisdictional System Security Coordinator (JSSC), and the Public Interest Advocacy Centre (PIAC).

Copies of all written submissions from both the first and second stage consultations (excluding any confidential information) have been published on AEMO's website at: https://aemo.com.au/consultations/current-and-closed-consultations/sras-guideline-2020.

In addition to written submissions:

- AEMO received an informal request from Stanwell for clarification of some ambiguity in relation to a restoration support service.
- Feedback from the reconvened System Restart Working Group prompted further consideration of the potential application of restoration support services.

3. SUMMARY OF MATERIAL ISSUES

Issues from the first stage of consultation are described and addressed in detail in the Draft Report, and have not been repeated in this Final Report. The key material issues arising from written submissions and AEMO's discussions with stakeholders in the second stage of consultation are summarised in the table below.

No.	Issue	Raised by
	General matters	
1	General support for the changes in the draft SRAS Guideline	MEA Group
2	General support for most changes in the draft SRAS Guideline	AGL
	Procurement objective	
3	Disagreement with previous stakeholder submissions to limit contract length	PIAC
4	Residual concerns about unexpressed downsides of long-term contracts	AGL
	Restoration support services	
5	Clarification on terminology used in clause 3.4.2(d)(ii)	Stanwell
6	Provide examples of the need for and application of restoration support services	System Restart Working Group
	System restart tests	
7	Continued concern on how AEMO will consult with test and non-test participants for system restart path testing	AGL
	Queensland sub-networks	
8	Concern that a single subregion could result in all SRAS being located in one geographical area, impacting restoration of sensitive load*	Powerlink as JSSC
9	Supported submission of Powerlink (JSSC)	EUAA

* Other confidential matters were discussed directly between AEMO and the JSSC

A detailed summary of issues raised by Consulted Persons in written submissions, together with AEMO's responses, is contained in **Appendix B**.

4. DISCUSSION OF MATERIAL ISSUES

This section 4 provides AEMO's assessment of the material issues identified in the second stage of consultation on the draft Guidelines. For detailed submissions and responses please refer to **Appendix B**.

4.1. SRAS procurement objective

4.1.1. Issue summary and submissions

The definition of the SRAS procurement objective was changed in the Amending Rule to require AEMO to procure SRAS to meet the system restart standard at the lowest **long-term** cost, on a reasonable endeavours basis. The Amending Rule also added a requirement for the Guideline to provide 'guidance on how AEMO will achieve the SRAS procurement objective' (new clause 3.11.7(d)(5A) of the NER).

AEMO proposed new sections 6(c) and 6(d) of the draft SRAS Guideline to explain how AEMO interprets the new 'long-term costs' aspect of the SRAS procurement objective. The guidance recognised the AEMC's statement in its final determination on the Amending Rule that: 'Practically speaking, this change will make it clear that AEMO can enter into long-term SRAS contracts, or procure specific combinations of services, if it considers that this will result in the lowest long-term costs for consumers'.

The Issues Paper noted that AEMO is expected to balance long-term and short-term costs to minimise expenditure. Longer-term considerations require AEMO to focus less on a deterministic assessment of the SRS, and instead take more of a risk-based approach, where the benefits of new entry, technological advances and longer-term coordinated resource planning must be offset against the risk that AEMO might, in theory, be acquiring more services than are strictly required for the power system as configured at the time of procurement. The Issues Paper also noted the procurement risk arising from the possibility that some system services, like restoration support services, might in future be remunerated with future market designs.

In its Draft Report, AEMO decided to add guidance about the type of developing power system conditions that AEMO would consider in determining the range and type of SRAS required to meet emerging needs. AEMO did not make any changes to address requests by stakeholders for specific guidance on the maximum duration of SRAS contracts, noting the need for the Guideline to remain principles-based with regard to the SRAS procurement objective.

In the second round of consultation, AEMO received two submissions which provided opposing perspectives on how the SRAS Guideline should address contract duration:

- AGL reiterated a preference for the Guideline to express the potential negative effects of long-term contracting, but appreciated the clarifications AEMO made on this matter in this Draft Report.
- The Public Interest Advocacy Centre disagreed with previous participant submissions which had called for limits on contract duration, stating that longer-term agreements can introduce innovations into the system, and allow AEMO to explore more efficient options.

4.1.2. AEMO's assessment

As stated in the Draft Report, SRAS procurement involves an important balance between the advantages of longer-term contracts in incentivising investment in new capability or preserving low-cost capability with ongoing viability, and the potential drawbacks of shutting out or deferring the development of new sources or technology improvements. AEMO considers that section 6 of the draft Guideline appropriately captures this balance on a broad level, which encompasses consideration of a range of potential costs and benefits of procuring any given service or contract structure. Given that AEMO cannot speculate on either the prospect or the cost of potential new SRAS-capable developments, it does not propose to prescribe any specific requirements, limits or considerations on the benefits or drawbacks of any particular contract

duration. It is also worth noting that the Guideline provides for any prospective SRAS provider to approach AEMO at any time to express its interest in providing SRAS.

4.1.3. AEMO's conclusion

The provisions of section 6 of the final SRAS Guideline relating to AEMO's application of the SRAS procurement objective are unchanged from the draft published with the Draft Report.

4.2. Restoration support services

4.2.1. Issue summary and submissions

To meet the requirements of the Amending Rule, a new section 3.4 will be added to the SRAS Guideline, outlining the technical capabilities for restoration support services providing various attributes. These may be required in future to sustain the stable energisation of generation and transmission sufficient to facilitate restoration and maintenance of power system security during restart following a major supply disruption. AEMO does not expect that many (if any) restoration support services will be required in the short term.

General requirements for all restoration support services were set out in section 3.4.1 of the draft SRAS Guideline, with requirements for specific capabilities in section 3.4.2, including any one of self-starting, voltage or reactive power control, frequency control, provision of stabilising load, and fault current contribution, noting that self-starting alone is an insufficient attribute for further consideration.

No written submissions on the description of restoration support services were received in the second stage consultation. However:

- AEMO received an informal enquiry (from Stanwell Corporation) requesting clarification of the meaning of "those conditions" in section 3.4.2(d)(ii).
- At a meeting of the System Restart Working Group convened by AEMO, CS Energy (on behalf of the Australian Energy Council) suggested including more guidance or examples of the type of facilities that could be considered as candidates for restoration support services.

4.2.2. AEMO's assessment

AEMO agrees that:

- The term "those conditions" in section 3.4.2(d)(ii) is ambiguous. It is intended to describe the conditions that are expected to prevail during a system restoration.
- Further clarification and practical examples would assist potential SRAS providers to understand when a restoration support service might be needed, and how candidate facilities could provide this type of service.

In considering restoration support service examples in relation to the attribute of 'Stabilising Load', AEMO also identified the need to broaden the SRAS Guideline description to capture a wider range of potential providers that could achieve the required objective of increasing the load available for pick-up on a restart path. This should not be limited to directly increasing active power consumption, but could include (for example) increasing the availability of load by reducing the output of distributed photovoltaic (PV), in distribution feeders with high concentration of distributed PV and loads.

The potential breadth of facilities that could be used for delivery of restoration support services, including services that could be delivered wholly within distribution networks, also suggested a need to expand the current definition of 'SRAS Transmission Components' to include distribution assets. These are the network components that will be assessed as part of the individual reliability of an SRAS, as required by the SRS. The SRAS Guideline previously contemplated that an SRAS (black start service) could be located at

distribution level, but the intervening network between the source's connection point and the delivery point on the transmission level would be considered part of the 'SRAS Equipment'.

The assessment of individual reliability currently applied to black start services may also need to assess different factors and equipment for some restoration support services, depending on the relevant attribute and the way it is delivered. Under the SRS, individual reliability is currently assessed to the first transmission substation on the restart path, but AEMO recognises that may not be a suitable location for the assessment of all types of SRAS. The Guideline will therefore be adjusted to recognise potential differences and allow flexibility in assessing the reliability of future SRAS.

AEMO notes that the Reliability Panel will be amending the reliability provisions of the SRS to accommodate restoration support services. Should the updated SRS be inconsistent with the final SRAS Guideline, AEMO will make further amendments to ensure alignment.

4.2.3. AEMO's conclusion

The final SRAS Guideline has been amended from the draft to:

- Clarify the potential ambiguity in section 3.4.2(d)(ii). AEMO will make a minor clarification to this portion of the Guideline to avoid any ambiguity.
- Expand the definition of stabilising load in section 3.4.2(d) to allow for a broader range of facilities to potentially offer this type of service, including aggregators or virtual power plants, either by consuming energy or increasing the available load.
- Provide two illustrative examples of when a Restoration Support Service may be required, and of facilities that could possibly offer this service (new Appendix D). These include an inverter-based resource with control capability to provide voltage control at zero active power output, and an aggregator controlling sufficient distributed PV to increase the amount of stabilising load on distribution feeders that may otherwise provide little or negative load when energised.
- Change the definitions of 'SRAS Transmission Components' and 'Transmission Component Reliability' to 'SRAS Network Components' and 'Network Component Reliability' respectively. This will incorporate distribution network components where applicable, and for individual reliability assessment purposes will extend to a suitable point on a network consistent with the SRS. There is a consequential change to the definition of SRAS Third Party Assets, which will no longer include distribution network downstream of the final connection point of the SRAS provider's facilities.
- Confirm that the assessment of individual reliability may require adjustment for some restoration support services, if the factors in the Guideline are not applicable (new section 3.6.1(b)).

4.3. System restart tests

4.3.1. Issue summary and submissions

The introduction of new provisions allowing AEMO and transmission network service providers (TNSPs) to test the viability of system restart paths was a major feature of the Amending Rule. A system restart test will verify what happens after an SRAS energises a transmission network delivery point, to confirm continued stable energisation further into the network, or identify unexpected interactions which can then be addressed.

New sections 4.5 and Appendix B in the SRAS Guideline will provide the guidance required by the Amending Rule in relation to:

- Factors that would lead AEMO to decide a system restart test is required (section 4.5.1).
- How restart test participants should develop system restart test procedures (section 4.5.2).

- Test data and evidence to be measured, recorded and produced (section 4.5.3 and Appendix B).

Only one submission was received in relation to system restart tests in the second stage of consultation.

AGL expressed continued concern about how AEMO will consult and coordinate with both test and non-test participants affected by a system restart test. AGL considered it important for AEMO to clarify who will be consulted under section 4.5.1(d), which was added to the draft Guideline at the Draft Report stage.

4.3.2. AEMO's assessment

In the Draft Report, AEMO acknowledged the possibility that a system restart test could impact in-service facilities that are not participating in the test (for example by temporarily removing a fuel source shared with a test participant facility). AEMO added a requirement – section 4.5.1(d) – to consult with other registered participants whose facilities might be directly impacted in this way, to minimise potential disruption to specific facilities.

AEMO also noted that new clause 4.3.6 of the NER, added by the Amending Rule, addresses the scheduling, coordination and development of test programs for system restart tests in detail. Like any other test that requires network elements to be removed from service, network constraints will be applied. Constraints have the potential to limit some market participants' use of the network, and to change market outcomes that might otherwise have eventuated. Clause 4.3.6 obliges AEMO to seek to minimise these impacts, which it will do by setting the timing and scope of the test in consultation with the relevant NSPs and considering expected dispatch patterns and system security and reliability concerns. It would not be reasonable or practical for AEMO to consult with every participant who would be impacted by a constraint.

The intent of section 4.5.1(d) is that AEMO will consult with non-test participants if a system restart test could directly impact the ability to physically operate a specific facility, rather than an impact resulting from inclusion in a network constraint. As AEMO cannot foresee all the scenarios in which direct operational impact might occur, AEMO will not seek to prescribe them in the Guideline.

4.3.3. AEMO's conclusion

AEMO has made minor modifications to section 4.5.1(d) to clarify that AEMO will consult with non-test participants where AEMO has identified that the ability to physically operate their facilities may be directly and materially adversely affected by a proposed System Restart Test. A note has also been added confirming that consultation is not required with participants who are generally included in a network constraint.

4.4. Queensland boundaries of electrical sub-networks

4.4.1. Issue summary and submissions

The SRAS Guideline incorporates AEMO's determination of the boundaries of electrical sub-networks for which SRAS is procured (under NER clause 3.11.8). Other than Queensland, all sub-networks are currently aligned with the NEM regional boundaries. As part of this consultation, AEMO considered whether to consolidate the existing two Queensland electrical sub-networks that apply under the NER and SRS, for SRAS procurement purposes.

The Queensland region is currently divided into two electrical sub-networks, with the north-south boundary located just north of South Pine and Tarong. As a natural 'breakpoint' in the Queensland power system, this has historically been considered an appropriate boundary for SRAS procurement purposes. AEMO's Draft Report explained that AEMO has re-examined this assumption and identified that consolidating the sub-networks could enhance the overall restoration capability by allowing more options and available support for generation, network and load restoration. This would provide more confidence

that a restoration plan will work in an actual black system event, regardless of the extent of the network requiring restoration.

AEMO received two written submissions on this matter in the second stage of consultation:

- Powerlink, in its capacity as the Queensland jurisdictional system security coordinator (JSSC), raised concerns that the combination of regions may lead to all SRAS being procured in what is currently the southern sub-network, and that electrical limitations would make the restoration of the central and northern Queensland regions challenging, if not impossible. The JSSC submitted that this would have follow-on impacts for the ability to restore sensitive load in Queensland.
- The Energy Users Association of Australia referred to Powerlink's submission and supported it.

Confidential matters were discussed directly with the JSSC.

4.4.2. AEMO's assessment

Following subsequent discussions with the JSSC, AEMO understands that the issues raised in the submission relate to the implementation of the SRS, rather than the SRAS Guideline.

As stated in the Draft Report, AEMO fully agrees with the JSSC's position that efficient and effective power system restoration in Queensland requires SRAS to be procured from sources located in each of the areas that currently form the north and south electrical sub-networks.

The Draft Report explained that the diversity and locational factors of the SRS, together with AEMO's consideration of energy support arrangements and sensitive loads, would drive this outcome in any event. However, AEMO recognised the desire for certainty. As foreshadowed in the Draft Report, AEMO will advise the Reliability Panel that at least one procured SRAS must be located north of Bundaberg to enable a timely and efficient restoration of the Queensland network following a major supply disruption.[4]

AEMO is also providing advice to the Reliability Panel to inform its consideration of the combined restoration quantity and timeframes, with the aim of effectively maintaining the standard overall for a single Queensland sub-network. The Reliability Panel's draft SRS determination is expected to be published in late October 2020, with a final determination by the end of January 2021.

4.4.3. AEMO's conclusion

AEMO's final determination is to consolidate the north and south Queensland electrical sub-networks into a single sub-network, aligning with the NEM regional boundary for Queensland. While the SRS for a combined Queensland sub-network is for the Reliability Panel to determine, AEMO will recommend to the Panel that the SRS include a requirement for SRAS to be procured north of Bundaberg to account for the inherent requirements of the Queensland network during supply restoration.

AEMO's determination of revised boundaries will not take effect unless and until the Reliability Panel determines a revised SRS for the sub-network. As such, the final SRAS Guideline includes both the current boundaries and those that will take effect when the SRS is amended.

5. OTHER MATTERS

In further reviewing the draft SRAS Guideline, in addition to the changes discussed in section 4 of this Draft Report, AEMO has made the following additional minor drafting changes and clarifications:

[4] This could result in a standard similar to the current arrangement for New South Wales, which includes a procurement standard for SRAS north of Sydney. See https://www.aemc.gov.au/sites/default/files/content/a1041e28-7d15-4e62-8d7d-1180221b6d44/REL0057-Review-of-the-System-Restart-Standard-Final-Standard.pdf

- Clarified the note in section 1 to confirm that the SRAS Guideline will be updated to reflect the SRS once amended. Absent any unforeseen changes to the SRS, this update is not expected to require consultation.
- Removed the generation and load figures for each sub-network from the table in section 9, as those numbers will become outdated fairly quickly.
- Amended section 4.1 to recognise the possibility that SRAS agreements may need to specify different types of SRAS test for restoration support attributes other than self-start capability, noting it is currently difficult to anticipate what (if any) regular testing will be practical. The nature of the service and the facilities providing it will determine whether there is a need for regular testing of any SRAS equipment, and the practical requirements for any necessary tests.

6. FINAL DETERMINATION

Following consideration of all matters raised in the second round of consultation, AEMO's final determination under rule 8.9(g) of the NER is to:

- Amend the SRAS Guideline in the form published on AEMO's website with this Final Report with effect from 2 November 2020.
- Revise the boundaries of electrical sub-networks (to be included in the SRAS Guideline) by combining the two existing sub-networks in Queensland to make one sub-network equivalent to the Queensland region. This determination takes effect subject to, and from the effective date of, the Reliability Panel's determination of a system restart standard for a single Queensland sub-network.

A marked-up version of the final SRAS Guideline showing changes from the Draft Report version has also been published with this Final Report.

Appendix A. GLOSSARY

Term or acronym	Meaning
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator Limited
Amending Rule	The National Electricity Amendment (System restart) Rule 2020 No. 6.
Black start service	An SRAS procured for its 'black start capability', as defined in the Amending Rule
JSSC	Jurisdictional System Security Coordinator
NEM	National Electricity Market
NER	National Electricity Rules
NSP	Network service provider
Restoration support service	A service with the capability to sustain the stable energisation of generation and transmission in a system restoration.
SRAS	System restart ancillary service
SRAS Guideline (or Guideline)	The guideline made by AEMO in accordance with clause 3.11.7 of the NER.
SRAS procurement objective	The objective to be met by acquiring SRAS. Under the Amending Rule, this is to meet the system restart standard at the lowest long-term cost.
SRS	The system restart standard made by the AEMC Reliability Panel
TNSP	Transmission network service provider

Appendix B. SUMMARY OF SUBMISSIONS AND AEMO RESPONSES

B.1 Summary of submissions on general matters

No.	Consulted party	Issue / Recommendation	AEMO response
1	MEA Group	MEA Group is generally supportive of the Paper and AEMO's amendments to the System Restart Ancillary Services (SRAS) Guideline. As part of the first stage of consultation, MEA Group made a submission to the SRAS Guideline 2020 Issues Paper. MEA Group's submission made reference to several points in the Issues Paper which we sought to clarify further. We are pleased to see general adoption and amendments were made in respect of that submission. Ensuring the SRAS Guideline remains fit for purpose is integral to ensuring system security and reduced costs for consumers into the future. The amendments to the SRAS Guideline will enable greater participation from current and emerging technology types, such as synchronous generators and subsequently facilitate the transition of the National Electricity Market (NEM) to a lower-emissions system.	Noted.
2	AGL	We [therefore] support the changes you have made to the guideline and consider they are appropriate. We appreciate the consultation team's constructive approach to the issues we had raised and the solutions you have proposed appear to strike the right balance of technical guidance required under the guideline.	Noted.

B.2 Summary of submissions on the SRAS procurement objective

No.	Consulted party	Issue / Recommendation	AEMO response
3	Public Interest Advocacy Centre	PIAC supports AEMO keeping the SRAS Guideline principles-based rather than prescriptive as we consider allowing AEMO to use its discretion in procurement will better support achieving the procurement objective. Therefore, we disagree with the suggestions from some stakeholders to limit the maximum SRAS contract duration to minimise the risk of locking in poor performance or creating barriers to new services. Some new providers may require longer-term agreements to help bring innovation into system restart and support services. Placing a limit on contract duration in the Guideline may unduly prevent AEMO from entering into otherwise efficient, low-cost agreements and prevent achieving the procurement objective.	Noted. AEMO acknowledges PIAC's viewpoint and notes that other stakeholders' views lie on both sides of this matter. AEMO believes that the appropriate balance has been achieved in the SRAS Guideline.

No.	Consulted party	Issue / Recommendation	AEMO response
4	AGL	[AGL's] concerns remain regarding long term contracting and the importance of considering the downside risks as well as the upsides. I appreciate AEMO has now stated this is appropriately reflected in the factors under the guideline. Whilst we would prefer an express delineation of the downside risks, we appreciate AEMO's clarification on how you interpret these factors.	Noted. AEMO acknowledges AGL's viewpoint and notes that other stakeholders' views lie on both sides of this matter. AEMO believes that the appropriate balance has been achieved in the SRAS Guideline, including the illustrative examples of relevant considerations in section 6(d).

B.3 Summary of submissions on restoration support services

No.	Consulted party	Issue / Recommendation	AEMO response
5	Stanwell (phone call)	Suggest clarification what is meant by "those conditions" in clause 3.4.2(d)(ii). Further guidance sought on what constitutes a restoration support service in terms of load.	Agreed. AEMO has replaced "in those conditions" with "when permitted to do so during a system restoration process".
6	System Restart Working Group	Given the novelty of the Restoration Support Services category, some examples may assist in clarifying what could be considered as such a service, particularly for the Stabilising Load category.	Agreed. AEMO has provided a non-exhaustive set of examples to aid understanding of this service.

B.4 Summary of submissions on system restart tests

No.	Consulted party	Issue / Recommendation	AEMO response
7	AGL	[AGL] notes our continued concern internally about how AEMO will consult with test-participants and non-test participants affected by a restart path test. This concern is in part driven by the uncertainty in how AEMO will approach these types of required tests. We therefore support the express AEMO requirement under 4.5.1(d) and consider it is important to clarify who AEMO will consult with in the event of an restart path test.	It is not feasible to document all the circumstances where we would consult with non-test participants, as these are not foreseeable. The test circumstances, participating facilities, corresponding outages and individual physical interdependencies between facilities will determine which non-test participants AEMO will consult with. Section 4.5.1(d) is intended to reflect the principle that AEMO will consult with market participants where there is (or could be) a direct adverse impact on the physical operation of their facility as a result of the conditions required for the test. This must be more than market impacts that would arise from a network constraint – which AEMO is already obliged

No.	Consulted party	Issue / Recommendation	AEMO response
			to minimise under clause 4.3.6 of the NER. AEMO has included further clarifications and a note to qualify the consultation requirement.

B.5 Summary of submissions on Queensland electrical sub-networks

No.	Consulted party	Issue / Recommendation	AEMO response
8	Powerlink Queensland (as JSSC)	As part of the proposed change, … SRAS generators would be contracted overall for Queensland, rather than … in each Southern and Central Queensland. The concern is that the location of the contracted Generators is not specified, and could therefore potentially all be located in the southern part of Queensland at the time of the event. If there was no SRAS Generator available in Central Queensland, Powerlink does not believe it will be possible to use … Central to Southern Queensland (CQ-SQ) paths in the early stages of a restart to Queensland's sensitive load … In order to provide a suitable return for Queensland's sensitive load, it is preferred that … contracted SRAS generators would need to be … in Central Queensland (CQ) – an outcome not assured under the proposal. This allows for one generator being unavailable (maintenance or damage in network black) and the need to… A preferred outcome arising from concerns listed above would be to secure … contracted generators in the central area and a suitable southern combination, increasing the opportunity for successful system restoration of Queensland's sensitive load and Queensland as a whole.	AEMO agrees that restoring the Queensland network in a timely and secure manner requires SRAS to be located in both southern Queensland and Central Queensland, regardless of the number of subnetworks. Consistent with the comments made in its Draft Determination, AEMO has made a recommendation to the AEMC and the Reliability Panel that when considering the updates to the SRS to account for a single Queensland subregion, at least one SRAS must be procured north of Bundaberg. The JSSC raised some issues about the procured SRAS sources, restoration paths and sensitive load that are confidential. AEMO has discussed those matters directly with the JSSC.
9	Energy Users Association of Australia	We note the concerns expressed by Powerlink on this topic and would support the Powerlink position as outlined in its submission.	The EUAA does not state specific concerns but refers to the Powerlink submission, which AEMO received on the same day. Please see AEMO's response to the Powerlink JSSC submission.

ATTACHMENT 1 – FINAL SRAS GUIDELINE

The final SRAS Guideline is published with this Final Report as a separate document