



---

# Response to AEMC Consultation Paper

---

**October 2019**

System Restart Ancillary Services Rule Changes

---

# Executive summary

AEMO welcomes the opportunity to comment on the AEMC's Consultation Paper on rule changes proposed by AEMO and the AER on SRAS standards, services and testing (**Consultation Paper**).

As the proponent of one of the rule change requests, AEMO's submission responds to some of the issues canvassed in the Consultation Paper and clarifies the intent of AEMO's proposed changes where necessary. AEMO's submission also comments on some aspects of the AER's rule change request.

AEMO's proposed changes to the system restart ancillary services (**SRAS**) framework in the National Electricity Rules (**NER**) are intended to achieve the following outcomes, as explained in AEMO's rule change request:

- The range of services AEMO can procure to assist in restoring supply after a major supply disruption must be expanded beyond its current scope, because we are increasingly unable to rely on abundant synchronous generation being available to provide the physical properties needed to support stable restoration in low voltage and low fault level conditions. These are services that AEMO believes can readily be sourced from new inverter-connected generation, if the capability is considered as part of the design.
- New sources of black start capability are needed to supplement or replace traditional sources, some of which are becoming less reliable or are withdrawing or reducing participation in the market for economic or technical reasons. We must ensure that the SRAS procurement framework does not inadvertently create barriers to the development and procurement of those new sources.
- The power system transformation means that occasional physical testing of system restart paths in each region is now a necessity. Without it, we cannot have confidence that the restoration can be sustained beyond initial restart, sufficient to allow progressive reconnection of a critical mass of generation and load in a timeframe that is acceptable from a safety, social and economic perspective. This testing cannot be achieved without obligations on network service providers (**NSPs**) to facilitate and participate in it, and where necessary also non-SRAS generators. Testing must be well-planned and coordinated to minimise impacts on registered participants, and would not involve the involuntary disconnection of customer loads.

AEMO is open to alternative means of achieving these outcomes, if they can be implemented and maintained efficiently in the long term interests of electricity consumers.

# Contents

<b>Executive summary</b>	<b>2</b>
<b>1. Redefining SRAS</b>	<b>4</b>
1.1 Restoration support services	4
1.2 SRAS from NSPs	4
<b>2. Capability for restoration support services</b>	<b>5</b>
<b>3. Replacing the SRAS procurement objective</b>	<b>6</b>
<b>4. System restart testing</b>	<b>6</b>
<b>5. The AER's proposal</b>	<b>6</b>
<b>6. Role of LBSPs</b>	<b>8</b>

# 1. Redefining SRAS

## 1.1 Restoration support services

The objective of AEMO's proposal to expand SRAS to include restoration support services is to secure and enhance the ability to restore MW more reliably and with significantly more coverage. This will improve the prospects of successfully continuing restoration from initial restart to a critical mass, and re-energising remote parts of the network in timeframes that can be considered objectively acceptable.

The Consultation Paper seems to suggest that the inclusion of restoration support services in the SRAS framework was intended to increase competition for the supply of SRAS. In fact, the potential for increased competition discussed in AEMO's rule change request relates to black start services,<sup>1</sup> but competition of itself was not the driver for AEMO's proposed changes.

AEMO proposes that the NER describe the outcome that restoration support services are to be capable of achieving or contributing to, with the detailed technical attributes of those services to be included in an AEMO consulted guideline or procedure (the SRAS Guideline or equivalent). The Consultation Paper raises questions about the level of flexibility that AEMO should have to define the detail of the services it procures. The paper indicates that frequency control ancillary services (FCAS) and network support and control ancillary services (NSCAS) provide precedents for the NER defining this type of service.

The exact requirements for restoration support will not remain static as the power system continues to transform. As such, it is both necessary and appropriate for AEMO as independent system operator to determine what technical capability is needed in the range of conditions across the NEM, and to review those requirements at regular intervals during periods of rapid change. AEMO submits that a comparison with FCAS or NSCAS does not reveal major differences in approach. Both allow :

- The need for FCAS is constant and must deliver a physical response, which can be defined in the NER, as is the concept that the response will be needed over different timeframes and for small and large deviations. However, the technical attributes of different FCAS are defined by AEMO in the market ancillary services specification.
- NSCAS is also only defined at a high level in the NER, by reference to the generic outcomes that a service must be capable of achieving. To meet those broad objectives, NSPs can define the capabilities they consider are required in any part of their networks. Where AEMO acquires NSCAS, detailed descriptions of each type of service are to be set out in a consulted 'NSCAS description' document.

## 1.2 SRAS from NSPs

AEMO observed in the rule change request that international experience indicates high voltage direct-current (HVDC) links can successfully provide black start capability, as well as other combinations of equipment. The NER should allow for sources other than generation to provide this capability in future.

As noted in the Consultation Paper, AEMO has no current intention to acquire SRAS directly from regulated NSPs. However, AEMO recognises that they have an increasingly important role in maintaining and investing in the network capability necessary to make system restart and supply restoration work in practice.

- NSPs may need to make investments to increase the resilience of the system in restart and restoration conditions, such as replacing control and protection functions, installing new reactive plant, or making changes in the distribution system to avoid rooftop PV pick-up immediately following restoration. It is critical that the regulatory framework provides clear obligations to make those investments, in turn

---

<sup>1</sup> As a result of removing or modifying the SRAS procurement objective and allowing for the possibility that black start capability may be provided from non-generation sources in future.

allowing for the efficient costs to be recovered. AEMO's rule change request identified that the proposal did not seek to specifically address this issue specifically, but noted it as an area requiring further work.

- Some equipment installed within NSP networks, such as synchronous condensers, could be used as part of a black start service for energy storage systems and other inverter-connected generation. Those arrangements could be accommodated within the current framework, but currently require the SRAS provider and the NSP to reach agreement.

### 1.3 Transitional considerations – system restart standard

AEMO had not considered that the system restart standard would necessarily require amendment as a result of the proposed rule change. However, there are aspects of the standard that are only capable of application to black start services, including some of the reliability criteria. It may be necessary for a transitional rule to provide for the interpretation of the system restart standard until it is next amended to recognise restoration support services.

## 2. Capability for restoration support services

AEMO's rule change request proposed the introduction of a new generator performance standard (**GPS**). This was intended to ensure that the design of new generating plant accommodates the capability to provide one or more restoration support services (but not necessarily black start capability). The purpose of this proposal was to ensure the new generation fleet is designed with the latent capability to support system restoration, but it would only be required to deliver that capability under an SRAS contract with AEMO.

The AEMC cautions that additional GPS requirements may increase the cost of connection to the extent of potentially creating barriers to new investment. AEMO acknowledges that the AEMC is seeking information about those costs, but makes the following observations:

- Several generators are already proposing to connect at weak locations in the network, with a low available fault level or short circuit ratio (SCR). These conditions are similar to what could be observed during system restoration, where minimal synchronous machines are online. If new generators do successfully connect to the grid at those low SCR locations, they will have had to demonstrate compliance with requirements for continuous uninterrupted operation, as well as voltage and frequency control capabilities in the conditions that are present at the connection point. This would allow the same generating system to offer one or more restoration support services with no or minimal control system changes.
- The South Australian generator licence conditions require all generating systems to be capable of operating in low system strength conditions (including down to a minimum SCR of 1.5).
- If new generation technologies are already incorporating these capabilities in their design, it is likely they could be tuned to provide restoration support services. However, retrofitting that capability will be significantly more expensive.
- The capability to provide a service need not be active at all times. It is envisaged that the necessary tuning would be performed only as required by an SRAS contract.

AEMO understands there are concerns about the potential for investment uncertainty if the technical capability required under the GPS is described in the SRAS Guideline, rather than in the NER themselves. However, should the relevant service requirements in the Guideline be amended after agreement of a generator's GPS, there is no intention that the GPS would be extended to any new or amended technical requirements in the revised Guideline. This can be made clear in the NER drafting.

AEMO is open to alternative approaches that would have the effect of delivering the necessary latent capability. It is noted that any technical requirements specified in the NER may need to distinguish between

synchronous and inverter-based generation, given their different characteristics. The capabilities required for restoration support are inherently provided by synchronous generators.

### **3. Replacing the SRAS procurement objective**

The rationale for AEMO's proposal to remove SRAS procurement objective is not to increase competition as an objective in itself, but to facilitate the acquisition of a range of black start capable sources that will deliver greater confidence that the system restart standard will continue to be met beyond the short term, in a cost-effective way.

The Consultation Paper discusses the roles and objectives of the Reliability Panel and AEMO respectively in determining the system restart standard and procuring SRAS to meet that standard. It notes that the Reliability Panel determines the standard after considering all relevant economic factors, including the benefits of SRAS and the cost of sourcing those services. AEMO observes that, under the current contract procurement regime, this can only be a theoretical exercise. It is not possible to account for SRAS pricing factors when those prices are not required to be cost-reflective. The volatility and variability of SRAS pricing has been starkly illustrated over the past four procurement cycles, particularly where SRAS sources are known or perceived to be scarce, or generators are seeking to meet different commercial objectives.

As a result of the 2015 NER amendments, AEMO already has flexibility to procure SRAS without requiring a competitive tender if it can justify doing so, and can actively seek SRAS offers from prospective providers. However, in a situation where AEMO has already contracted sufficient SRAS to meet the system restart standard in a region, the current procurement objective would prevent AEMO from acquiring additional amounts during the contract term. If AEMO were to negotiate for future capability to be provided once existing contracts expire, at the point of contracting it will often be difficult to establish whether the procurement objective is met. If AEMO cannot commit to a contract that will underwrite the cost of investing in black start capability then, in the absence of alternative funding, it is less likely to be developed. The Consultation Paper canvasses the possibility that this restriction may arise from AEMO's particular interpretation of the NER. Even if that were the case, it would be desirable for the NER to clearly establish that no such restriction exists.

The national electricity objective guides the exercise of all of AEMO's functions; it should not be regarded as a lower objective but a higher one. In many respects it is easier for AEMO to meet a single metric 'lowest cost' objective, but this will not necessarily deliver the best value to consumers by facilitating investment in sustainable system restart sources that can be expected to deliver lower costs in the long term.

### **4. System restart testing**

With regard to the potential need for non-SRAS generators to participate in SRAS testing, the Consultation Paper indicates that participation could 'significantly impact' their operations. AEMO emphasises that its proposed rule will require any departures from expected dispatch and operation to be minimised, as currently required for tests under clause 5.7.6. Extended network testing will require substantial planning, in consultation with the relevant NSP, to minimise disruption, cost and threats to power system security.

These tests are necessary for verification purposes, where material changes in the power system mean that it is no longer prudent to rely on existing modelling studies. As such, it is unlikely that any region will see frequent testing.

### **5. The AER's proposal**

The AER's proposed amendments arise from its investigation of the 2016 black system event in South Australia and associated findings. AEMO makes no comment on those findings [except as necessary to illustrate the points made in this submission.]

## 5.1 Expanding AEMO's power system security responsibilities

AEMO considers it important that additions to the extensive list of AEMO's power system security responsibilities in clause 4.3.1 are carefully described in general, umbrella terms. This will minimise the potential for conflict between the general responsibility and the detailed rules that both expand upon and delineate the boundaries of that responsibility. It is also important that the general responsibility does not call out examples that could be taken to elevate the significance of one element over others.

AEMO agrees that the matters described in the AER's proposed clause 4.3.1(paa) are all things that fall within AEMO's power system security responsibilities. However, with the objective described above in mind, AEMO suggests that it is expressed more generally, allowing the relevant rules in chapters 3 and 4 to provide the detail. An example of alternative drafting might combine the intent of paragraph (paa) with the existing paragraph 4.3.1(p), as follows:

- (p) to manage and co-ordinate activities reasonably required to prepare for and implement an effective procure adequate system restart ancillary services in accordance with clause 3.11.9 to enable AEMO to co-ordinate a response to a major supply disruption, including the acquisition of adequate system restart ancillary services and the preparation of a system restart plan;

## 5.2 SRAS testing

AEMO considers that the AER's proposed new clause 3.11.7(d)(4a), for the SRAS Guideline to include a process for comparing the arrangements used in the testing of SRAS with those to be used in the deployment of SRAS, is too specific for inclusion in the NER.

As the AER's rule change request recognises, this requirement is already in the Guideline, together with many other details that are not explicitly provided for in the NER. The objective of SRAS testing (as well as wider network testing) is much broader than a comparison of test and actual conditions. The primary purpose of testing, and the accompanying information exchange, is to identify deficiencies and dependencies that may otherwise be unknown or variable, and may reduce the prospect of a successful system restart.

Clause 3.11.7(d)(3) already includes a requirement for the SRAS Guideline to include a process for testing. AEMO submits that the NER do not need to prescribe any further requirements in this regard. If the AEMC concludes that any further rule requirements are necessary, however, AEMO's preference is for them to specify a more general objective that SRAS testing requirements should be designed to achieve.

## 5.3 Communication protocol

AEMO has no objection in principle to the inclusion of more formal requirements in the NER to identify and promote the exchange of information to prepare for and implement system restart. However, the information covered by the protocols proposed by the AER overlaps to a significant degree with the local black system procedures (LBSPs). AEMO notes the AEMC intends to clarify the role of LBSPs, and suggests this is considered in parallel with suitable NER amendments for the proposed protocols.

AEMO makes the following additional observations on the proposed drafting for 4.8.12(j) and new paragraphs (k) to (m):

- Paragraph (j) should explicitly state that the protocols are to cover the preparation and implementation of the system restart plan.
- The matters to be covered by the protocols extend further than what would generally be considered by the industry as 'communication'. AEMO therefore suggests that the word 'communication' is omitted from the description.

- Logically the protocol for information exchange would sit in the system restart plan itself (as non-confidential content), and be subject to review with each iteration of the plan. The communication requirements that apply during a system restart process are currently part of the overview section of AEMO's system restart plan.
- If the protocol includes requirements for registered participants other than NSPs to exchange information, the protocol should be also binding on those participants.

## 6. Role of LBSPs

The Consultation Paper raises questions about the role and function of generator and NSP local black system procedures (**LBSP**), which the AEMC intends to address in its consultation on the SRAS rule change requests.

AEMO reiterates its view, based on the historic role of LBSPs, that their purpose is to inform, and in turn be informed by, the regional system restart plans. AEMO needs to know what a generating plant's capabilities are likely to be in black system conditions, what contribution the plant may be able to make to sustaining the restoration process as the network is energised. For plant that is contracted for SRAS, the LBSP must be consistent with the minimum technical requirements SRAS requirements provided for in the SRAS contract.

In principle, AEMO would support NER changes that remove any perceived ambiguity about the nature and purpose of LBSPs and their relationship with SRAS and the system restart plan. It is important for each of the processes and documents that supports system restart to have a clearly articulated purpose and content, with minimal overlap.