



# Amendments to the NSCAS Description and Quantity Procedure

Final Report – Standard consultation  
for the National Electricity Market

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## Executive summary

The publication of this final report concludes the second stage of the standard consultation procedure conducted by AEMO to consider proposed amendments to the Network Support and Control Ancillary Service (**NSCAS**) Description and Quantity Procedure (the **Procedure**) under the National Electricity Rules (**NER**) (the **proposal**).

AEMO thanks all stakeholders for their feedback on the proposal during the consultation, which was undertaken as required by NER 5.20.2, following the procedure in NER 8.9.2.

The Australian Energy Market Commission (**AEMC**) published the *National Electricity Amendment (Improving security frameworks for the energy transition) Rule 2024 (Amending Rule)* in March 2024<sup>1</sup>. With effect from 1 December 2024, the Amending Rule will amend the NER definition of an 'NSCAS need' to include requirements for inertia network services and system strength services. This necessitates changes to the Procedure to describe and quantify those requirements.

In its consultation paper, AEMO identified proposed amendments in the following broad categories:

- **Meeting NER requirements** – amend NSCAS description to include inertia network and system strength services, and the process for quantifying the requirements for those services.
- **Procedure improvements** – use 'system typical' conditions for NSCAS studies, consider the impact of anticipated or actionable projects when screening for NSCAS gaps, and other minor amendments and updates.

After considering feedback received in the first round of consultation, AEMO's draft report and draft Procedure described amendments to:

- **Describe inertia network and system strength services** – AEMO will include these as types of Reliability and Security Ancillary Services (**RSAS**) in the Procedure, removing the current explicit exclusions, with descriptions of each service as outlined in the consultation paper proposal.
- **Set out how the quantity and location of inertia network and system strength services is determined** – AEMO will specify this process as outlined in the consultation paper proposal, using a three-sigma from the mean approach (when security cannot be maintained for at least 99.87% of the time).
- **Use 'system typical' conditions for NSCAS studies** – AEMO will include 'system typical' studies in the Procedure substantially as outlined in the consultation paper proposal, but with additional information on defining these configurations based on stakeholder feedback.
- **Anticipated and actionable projects** – AEMO will amend the Procedure to provide for anticipated and actionable projects to be considered in studies to identify and quantify

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<sup>1</sup> At <https://www.aemc.gov.au/sites/default/files/2024-03/ERC0290%20-%20ISF%20final%20determination.pdf>.

NSCAS gaps in appropriate cases, as outlined in the consultation paper proposal, with applied assumptions to be noted in NSCAS reports.

AEMO received two submissions on the draft report, in which the main issues raised were:

- Seeking further justification for a three-sigma from the mean probabilistic approach for system strength and inertia gap declarations, and whether this is an appropriate measure to use.
- A request for clarification on the types of system strength and inertia needs quantified as potential NSCAS needs and gaps.

This final report includes AEMO's responses to those issues and other comments made in submissions. After considering the submissions, AEMO has decided not to change the position set out in its draft report and draft Procedure. AEMO's final determination on the proposal is to amend the Procedure in the form published with this final report, with an effective date of 1 December 2024.

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## 1. Stakeholder consultation process

As required by National Electricity Rules (**NER**) 5.20.2, AEMO has consulted on proposed amendments to the Network Support and Control Ancillary Service (**NSCAS**) Description and Quantity Procedure (the **Procedure**) in accordance with the standard rules consultation procedure in NER 8.9.2 (the **proposal**).

Note that this document uses terms defined in the NER, which are intended to have the same meanings. There is a glossary of additional terms and abbreviations in Appendix A.

AEMO's process and timeline for this consultation are outlined below.

**Table 1 Consultation process and timeline**

Consultation steps	Dates
Consultation paper published	5 July 2024
Submissions closed on consultation paper	2 August 2024
Draft report published	18 September 2024
Submissions due on draft report	16 October 2024
Final report published	29 November 2024

AEMO's consultation webpage for the proposal<sup>2</sup> contains all previous published papers and reports, written submissions, and other consultation documents or reference material (other than material identified as confidential).

In response to its consultation paper on the proposal, AEMO received four written submissions. AEMO considered these submissions and other relevant information in developing the draft report and draft determination on the proposal.

In response to its draft report, AEMO received **two** written submissions, from ElectraNet and EUAA, and held one meeting with the Energy Users Association of Australia (EUAA) on 14 November 2024 to clarify some elements of their submission. These have been considered in this final report and AEMO's final determination on the proposal.

AEMO thanks all stakeholders for their feedback on the proposal throughout this consultation, which has been considered in preparing this final report.

<sup>2</sup> At <https://www.aemo.com.au/consultations/current-and-closed-consultations/amendments-to-the-nscas-description-and-quantity-procedure>.

## 2. Background

### 2.1. Context for this consultation

The Australian Energy Market Commission (**AEMC**) published the *National Electricity Amendment (Improving security frameworks for the energy transition) Rule 2024 (Amending Rule)* in March 2024. The Amending Rule will expand the system security procurement frameworks for the National Electricity Market (**NEM**), providing AEMO with new tools to manage power system security in the NEM through the current energy transition.

With effect from 1 December 2024, the Amending Rule will include inertia network services and system strength services in the NSCAS framework (removing the current explicit exclusion of those services). This will provide a regulated procurement mechanism for these security needs in specified circumstances.

Under the inertia and system strength frameworks in the NEM, Transmission Network Service Providers (**TNSPs**)<sup>3</sup> have three years to resolve any forecast shortfall of inertia or system strength from the time AEMO declares them. Where shortfalls emerge within the three-year compliance period, AEMO must seek to manage them in real time under its power system security functions.

To address these gaps more efficiently, the final rule will allow inertia and system strength gaps to be declared and procured through the NSCAS framework if AEMO forecasts that the relevant minimum requirement will exceed the level a TNSP is required to meet at any time in the next three years.

To implement the Amending Rule, the Procedure must be updated to address requirements for inertia network and system strength services within the NSCAS framework. AEMO also identified other aspects of the existing Procedure that would benefit from amendment to improve the accuracy and utility of AEMO's NSCAS Reports.

The Procedure does not cover the new transitional services also introduced by the Amending Rule. Those services are intended to provide a safety net to allow the system to transition through new operating points, while NSCAS addresses known and quantifiable security shortfalls within existing system standards or deliver network capability with net market benefits. Transitional services will be procured under a separate framework, and transitional services guidelines will be consulted on separately.

AEMO is also conducting a separate consultation process on proposed changes to the Inertia Requirements Methodology to implement other aspects of the Amending Rule.

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<sup>3</sup> In their capacity as inertia network service providers or system strength service providers respectively.

## 2.2. NER requirements

NER reference	Summary of relevant requirement
5.20.1, 5.20.2	<p>AEMO must develop and publish, and may amend, in accordance with the rules consultation procedures:</p> <ul style="list-style-type: none"> <li>• An NSCAS description, defined as a detailed description of each type of NSCAS.</li> <li>• An NSCAS quantity procedure, defined as a procedure that determines the location and quantity of each type of NSCAS required.</li> </ul>
10 - Definition of 'NSCAS' (Amending Rule)	<p>From 1 December 2024, NSCAS is defined as:</p> <p>A service (including an inertia network service or system strength service) with the capability to control the active power or reactive power flow into or out of a transmission network to address an NSCAS need.</p>
10 - Definition of 'NSCAS need' (Amending Rule)	<p>Definition of NSCAS need is expanded from 1 December 2024 from the existing definition (which becomes paragraph (a)), to include (b) and (c) for inertia and system strength respectively:</p> <ol style="list-style-type: none"> <li>NSCAS required to: <ol style="list-style-type: none"> <li>maintain power system security and reliability of supply of the transmission network in accordance with the power system security standards and the reliability standard; and</li> <li>maintain or increase the power transfer capability of that transmission network so as to maximise the present value of net economic benefit.</li> </ol> </li> <li>A requirement for an inertia network service necessary to meet the inertia requirements where AEMO has revised the inertia requirements in accordance with clause 5.20B.2(f) such that the revised inertia requirements exceed one or more of the binding inertia requirements (as applicable).</li> <li>A requirement for a system strength service necessary to meet the system strength requirements to maintain the minimum three phase fault level where AEMO has revised the minimum three phase fault level in accordance with clause 5.20C.1(e) such that the revised minimum three phase fault level exceeds the minimum three phase fault level specified in the system strength standard specification (as defined in clause S5.1.14).</li> </ol>
5.20.3(c1), 5.20.3(c2) (Amending Rule)	<p>If AEMO's annual NSCAS Report identifies an NSCAS gap required to address an NSCAS need for inertia network services or system strength services, the date for the NSCAS need to be addressed must be within three years from the date of the report.</p>

## 2.3. The national electricity objective

Within the specific requirements of the NER applicable to this proposal, AEMO has sought to make a determination that is consistent with the national electricity objective (NEO) and, where relevant, to select the option best aligned with the NEO.

The NEO is expressed in section 7 of the National Electricity Law as:

to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:

- price, quality, safety, reliability and security of supply of electricity; and
- the reliability, safety and security of the national electricity system; and
- the achievement of targets set by a participating jurisdiction—
  - for reducing Australia's greenhouse gas emissions; or
  - that are likely to contribute to reducing Australia's greenhouse gas emissions.



### 3. Material issues in submissions

In the two submissions made to the draft report, the most significant issue raised related to analysis of the likely impact of AEMO's proposed use of a three sigma from the mean (or three standard deviations) approach to quantifying NSCAS needs for inertia network and system strength services. In particular:

- EUAA asked for more evidence and comparative information to justify the change from the current approach to quantifying the requirements for inertia network and system strength services.
- ElectraNet noted that the change could mean higher levels of security and higher costs.

This issue is discussed in detail in Section 4.

A detailed table of issues raised by stakeholders in written submissions to the draft report, together with AEMO's responses, is in Appendix B. Please refer to the draft report for AEMO's consideration of issues arising at earlier stages of consultation.

## 4. Discussion of material issues

### 4.1. Impact of a three-sigma from the mean approach

#### 4.1.1. Issue summary and submissions

Consistent with NER 5.20.1, the Procedure must record the process to determine the location and quantity of each type of NSCAS needed, now including inertia Reliability and Security Ancillary Services (**RSAS**) and system strength RSAS. In the consultation paper, AEMO proposed using a statistically appropriate measure to represent operational uncertainty in the planning timeframe. In particular, AEMO proposed to apply a threshold of three standard deviations from the mean when considering the quantity of services that can reliably be considered 'available' when comparing against the minimum secure requirements for inertia network and system strength services.

In the draft report, AEMO provided extra analysis and justification for this approach in response to feedback from Powerlink and the EUAA. AEMO received a further submission from the EUAA on the draft report, seeking evidence to justify the change in modelling approach. ElectraNet also commented in their feedback that this change could result in a higher level of security and higher costs.

#### 4.1.2. AEMO's assessment

The EUAA asked AEMO for more information about the impact of the new approach when compared against the existing approach used to assess shortfalls – specifically in each case:

- The magnitude of the predicted shortfalls.
- The likelihood and magnitude of intervention required.
- The likely cost of intervention versus the supply of resources to be utilised for the predicted shortfall periods.

These points are discussed below, with respect to inertia and system strength separately.

It is important to emphasise that the choice of percentile in this part of the methodology does not change the minimum security requirements which must still be met at all times – instead it changes the percentage of time in any typical year where shortfalls would be resolved through planning processes rather than operational processes. That is, if the system is operating at the minimum requirement, this percentile sets the **percent of time** where operational intervention is **expected**, which is different from setting the **probability** of an intervention occurring in a given year.

For example, selecting the 50<sup>th</sup> percentile here would represent planning to allow intervention in the worst 50% of a typical year (that is, planning to use operational intervention 4,500 hours each year on average); this threshold is not the same as planning to a 50% probability of intervention (that is, one intervention per two years). In other words, this parameter sets the likelihood that a given hour (not year) will require intervention.

AEMO's proposal is to move to a 3-sigma (99.87<sup>th</sup> percentile) parameter, based on its regular usage in statistics and simulation for identifying statistical significance, limiting noise in modelled outcomes, and providing a balance between rigour and usability.

In the NSCAS context, this threshold would allow last-resort planning to a level that permitted approximately 10 hours per year where directions may still be necessary for a given issue. Of note, regardless of which percentile value is chosen, the need for action (and associated costs) remains in effect for the same proportion of each year – the change is in which timeframe is responsible for procuring a solution (Operational or Planning), so this percentile can be thought of as reflecting the tolerance that last-resort planning processes have with respect to operational intervention.

AEMO's proposed change is to move a higher proportion of this necessary intervention into the planning timeframe rather than the operational one. In doing this, two outcomes can reasonably be expected:

- A broader range of options may be available to deliver solutions for these shortfalls that are known in advance of them occurring, potentially with greater overall efficiency, to mitigate the risk of widespread operational impact if an option cannot be found in real-time operation.
- Longer-term efficiencies of options can be explored in the planning timeframe with appropriate economic testing and consultation through the regulatory process.

The cost of a real-time market intervention can vary considerably depending on the power system and market circumstances at the time, including equipment availability, competing system needs, and any subsequent compensation claim processes. There are also flow on economic consequences associated with Directions that are much more difficult to quantify – including market distortion, inadequate maintenance planning, increased dispatch uncertainties faced by other participants, and insufficient or reactionary investment signals.

By shifting these decisions into the planning horizon, the same set of solution providers may still be available, but with the added prospect of other (potentially more efficient) long-term solutions and providers. Where a solution is going to be required in either case, AEMO generally considers that it would be more economically efficient to negotiate for its provision ahead of time (except for specific market power considerations). It is important to note that commercial contracting with generation participants (who might otherwise be the Directed party) remain a valid option in the planning horizon – and if such options are able to provide more efficient solutions, then TNSPs must still choose those solutions as part of their associated RIT-T or NSCAS investments. In the future, as generating units may not be available to direct or contract with, planning for the potential shortfalls of these services in advance gives operational certainty that the majority of possible market dispatch outcomes can be managed.

In addition, the Amending Rule also introduces a new system security scheduling obligation on AEMO to develop a look-ahead contract enablement engine. This engine would run in the pre-dispatch timescale, aggregating any NSCAS security contracts provided by the TNSPs, and dispatching only those which are needed operationally. This bridges benefits between the two horizons, by allowing contract terms to be negotiated and known in advance, while ensuring

these contracts are only called upon when necessary (i.e. when the alternative would have been operational intervention).

## Inertia

AEMO has conducted a comparative analysis of outcomes for 2025-26 using the 2023 Inertia Report, with 50 iterations<sup>4</sup>, and applying the newly proposed three-sigma threshold. The results are shown in Table 2, and indicate that the new threshold has the effect of lowering expected levels of inertia by between 400 and 1,400 megawatt seconds (MWs) (that is, allowing these lower expected levels to be planned for, rather than left to operational intervention).

Of note is that while a move to the 3-sigma approach does make the inertia assessment more onerous by approximately 3,000 MWs out of a base of 55,000 MWs (~5%), the impact on declared shortfalls would have only affected Tasmania, and only an increase of 278 MWs above previously declared shortfalls. Other regions may approach their thresholds over time as installed regional levels of inertia fall towards their minimum values, although this will also be offset by any market response provided through the 1-second Frequency Control Ancillary Services (FCAS) market in those regions.

**Table 2 Comparison of shortfalls for 2025-26 inertia results**

Inertia subregion	Secure inertia requirement	Inertia (MWs) – new proposal	Inertia (MWs) – existing procedure	Difference in assessed level of inertia (MWs)	Difference in Shortfall (MWs) <sup>A</sup>
QLD	14,400	18,153	19,572	<b>1,419</b>	0
TAS	3,800	1,300	1,577	<b>278</b>	278
NSW+QLD	14,400	50,667	51,417	<b>750</b>	0
VIC+SA	17,500	22,040	22,440	<b>400</b>	0

A. An inertia shortfall against the secure operating level requirement is when an inertia subregion is likely to island, and the projected level of inertia is below the secure level of inertia. AEMO has excluded regions previously deemed unlikely to island in 2025-26 (New South Wales, South Australia and Victoria) on this basis.

## System strength

AEMO has conducted a comparative analysis of outcomes for 2025-26 using the 2023 System Strength Report, with 50 iterations<sup>5</sup>, and applying the newly proposed three-sigma threshold. Results are shown in Table 3 and highlight differences of between 2 and 1,237 megavolt amperes (MVA) across fault level nodes.

While the three-sigma fault current threshold is lower than the existing approach, most nodes remain sufficiently above their minimum requirement in both cases, and no additional shortfalls would have been declared. In cases where shortfalls already existed, the magnitude of these would be increased by up to 450 MVA. For comparison, a single large synchronous generating unit provides approximately 3,700 MVA of fault current, so the changed methodology may require such a unit (or several smaller ones in the right locations) to be running for an additional 80 hours of the year.

<sup>4</sup> Representing different outage patterns of generators. Larger number of iterations required to ensure confidence in results.

<sup>5</sup> Representing different outage patterns of generators. Larger number of iterations required to ensure confidence in results.

While the impact of this change is limited to a select few nodes at present, the introduction of this higher threshold is intended to future-proof the methodology as levels of fault current in the system fall towards their minimum values.

**Table 3 Comparison of statistical measures for 2025-26 system strength results**

Node	Minimum requirement (MVA)	Fault level Projection (MVA) - $3\sigma$	Fault level Projection (MVA)-99th	Difference in projected fault level (MVA)	Difference in shortfall (MVA)
Armidale 330 kV	2,800	3,073	3,137	64	0
Darlington Point 330 kV	600	719	721	2	0
Newcastle 330 kV	7,100	5,326	5,676	350	350
Wellington 330 kV	1,800	1,807	1,869	62	0
Sydney West 330 kV	8,050	6,437	6,882	445	445
Buronga 220 kV	905	2,190	2,205	15	0
Dederang 220 kV	3,300	3,850	3,970	120	0
Hazelwood 500 kV	7,150	7,104	8,341	1,237	46
Moorabool 220 kV	4,050	4,110	4,321	211	0
Red Cliffs 220 kV	1,036	1,945	1,955	10	0
Thomastown 220 kV	4,500	4,923	5,216	293	0
Greenbank 275 kV	3,750	4,419	4,669	250	0
Gin Gin 275 kV	2,250	2,172	2,201	29	29
Lilyvale 132 kV	1,150	1,168	1,184	16	0
Western Downs 275 kV	2,550	2,741	2,864	123	0
Ross 275 kV	1,175	1,245	1,337	92	0
Davenport 275 kV	1,800	2,021	2,028	7	0
Robertstown 275 kV	2,000	2,776	2,792	16	0
Para 275 kV	2,000	2,253	2,268	15	0
Burnie 110 kV	850	446	495	49	49
George Town 220 KV	1,450	664	776	112	112
Risdon 110 KV	1,330	855	976	121	121
Waddamana 220 KV	1,400	865	1,023	158	158

### Impact on TNSP planning processes

EUA also indicated that AEMO is proposing a different measure for system strength compared with the TNSP's planning for system strength services, saying: *"This suggests that AEMO is not confident with its own system for overseeing TNSP led services, and will instead establish competition for TNSP supplied services, reducing the economic efficiency of the TNSP services"*.

AEMO acknowledged in the draft report that different TNSPs may use different approaches when determining their investment obligations under the system strength framework to meet the system strength requirements<sup>6</sup>, and not all are using a 99<sup>th</sup> percentile approach.

AEMO's NSCAS process is not intending to replace proactive planning by TNSPs. In their roles as inertia or system strength service providers, TNSPs are required to plan to avoid even more onerous conditions – including all system strength constraints and market interventions under system normal, credible contingencies, and protected events. The NSCAS threshold for these services represents a safety net and the proposed measures are in fact less onerous as they allow for system strength constraints and for some periods of intervention in the operational timeframe. AEMO is proposing to reduce the allowance for interventions, but not to remove it. AEMO therefore considers that the proposed quantification approach for the NSCAS declaration framework remains suitable as a last-resort safety net in the 0-to-3-year horizon.

AEMO remains concerned that without sufficient forward planning and contracting arrangements, short-term options for last resort contracts and interventions may not be available – for example, once units have retired they become unavailable to be directed; likewise, without certainty in the planning timeframe, necessary units may not be maintained or operable to the levels needed for security in operational timeframes.

#### 4.1.3. AEMO's conclusion

Consistent with the draft proposal, AEMO will amend the Procedure to use a three-sigma from the mean statistical measure when determining NSCAS needs for inertia RSAS and system strength RSAS.

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<sup>6</sup> While it is unknown at the time of publishing, AEMO expects that this statement is also likely to apply for inertia contracts that a TNSP will develop in its role of Inertia Service Provider under the Amending Rule.

## 5. Other matters

AEMO also received feedback in submissions to the draft report on other matters, including:

- ElectraNet sought to clarify which components of system strength and inertia would be quantifiable within the NSCAS framework (i.e. minimum fault currents, stable voltage waveforms, synchronous and synthetic inertia requirements, etc).
- EUAA requested further information on a potential feedback loop for NSCAS gaps.

AEMO's responses to these and other comments are included in Appendix B. No further changes to the Procedure are proposed.

## 6. Final determination on proposal

Having considered the matters raised in submissions to the draft report, AEMO's final determination is to amend the Procedure in the form published with this final report, in accordance with NER 5.20.2 (as amended by the Amending Rule).

The final amendments to the Procedure do not differ from the draft determination.

### **Effective date**

The amended Procedure will take effect on 1 December 2024 and be used for the purposes of the 2024 NSCAS Report.



## Appendix A. Glossary

This document uses several terms defined in the NER, with the same meanings. Acronyms for NER terms and some additional terms used in this document are defined in the table below.

Term or acronym	Meaning
Actionable projects	Includes both actionable ISP projects and projects that are actionable under a jurisdictional scheme.
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
Amending Rule	National Electricity Amendment (Improving security frameworks for the energy transition) Rule 2024
GFM	Grid-forming machines
ISP	Integrated System Plan
NEM	National Electricity Market
NEO	National Electricity Objective as expressed in section 7 of the National Electricity Law
NER	National Electricity Rules
NSCAS	Network Support and Control Ancillary Service
Procedure	AEMO's NSCAS Description and Quantity Procedure
RSAS	Reliability and security ancillary service, as defined in the Procedure
TNSP	Transmission Network Service Provider

## Appendix B. List of submissions and AEMO responses

No.	Stakeholder	Submission comment	AEMO response
1	ElectraNet	System Strength and Inertia are different to entities usually included in the NSCAS. The stable voltage waveform is supported by controls within GFM plants, Physics of Synchronous machines and Fault Level at the node. Inertia is supported by Physics of Synchronous machines and fine controls of GFM plants but not by the Fault Level. Which of these components are quantifiable within the NSCAS?	<p>RSAS includes maintaining the system in a secure operating state during normal operation, consistent with the power system security standards. System strength and inertia are required for stable operation of the power system as core element of system security, despite being different to previously studied items under NSCAS.</p> <p>The stable voltage waveform requirements are related to the efficient level of system strength, which is not covered under the revised NSCAS framework in the Amending Rule. Only the minimum three phase fault level is included for the minimum level of system strength, per NER definitions.</p> <p>Inertia requirements are informed by the specific physics of the network, and fast frequency response from batteries is considered.</p> <p>AEMO is obliged to consider power system needs for system strength services and inertia network services as part of its NSCAS assessment in accordance with the Amending Rule, and does not propose any further changes to the Procedure in this respect.</p>
2	ElectraNet	The quantity defined by new method is 99.87% compared to previous 99% requirement for System Strength. This could mean higher level of security and higher costs too	This issue is discussed in Section 4.1.
3	ElectraNet	Synchronous Condenser outage may exceed 1% [referring to the draft report statement that AEMO remains of the view that the existing 1% tolerance band for system strength will no longer represent an acceptable level of projected operational intervention in circumstances where basic units-online directions are expected to become less viable]. Therefore, assuming a 99.87% reliability (ie. 9~11 hours of loss per year) may not be realistic. In order to achieve 99.87% availability the cost increase may be significant too.	<p>Where appropriate, outages of major network equipment will be treated on a consistent basis to major generators with statistical outage rates applied across each market modelling iteration. With regard to possible cost increases, please see Section 4.1.</p> <p>AEMO's planning criteria for system strength and inertia services, does not include planning for N-1 (an outage of a plant which provides system strength or inertia network services), in contrast to a TNSP's planning obligations.</p>
4	ElectraNet	Special large loads such as Hydrogen Electrolysers need accurate modelling when it comes to NSCAS assessment studies.	AEMO will discuss any specific assumptions for large loads with the TNSP at preliminary inputs and assumptions meetings.
5	ElectraNet	The Amendments implies considering only the fault current as a NSCAS measure for system strength; however, actual need of the TNSP may be the stable voltage waveform (SVW). In such a situation can the NSCAS measure be applicable to system strength at efficient level (SVW)?	As above, the requirement for stable voltage waveform for the efficient level of system strength is not included in the NSCAS framework.

No.	Stakeholder	Submission comment	AEMO response
6	ElectraNet	This is [a] good approach [referring to the proposal to explicitly allow consideration of expected but uncommitted network and generation changes, where relevant and appropriate to adequately identify or quantify an emerging NSCAS gap.]	Noted
7	ElectraNet	Good addition [referring to the proposed expansion of the introductory scope and purpose to include a brief description of how the Procedure connects to NSCAS acquisition.]	Noted
8	EUAA	<p>We wrote about a concern from AEMO taking the opportunity to shift its modelling from the 84th percentile to the 99.87th percentile (or three sigma - <math>3\sigma</math>) for NSCAS, System Security - Reliability and Security Ancillary Services (RSAS) and inertia RSAS without any evidence. We also noted that this approach was likely to lead to over-supply of these services. We note that Powerlink has a similar concern.</p> <ul style="list-style-type: none"> <li>• AEMO responded that its predicted ~87 hours a year of operational intervention for NSCAS is now inappropriate and AEMO considers the <math>3\sigma</math> tolerance band is more appropriate as it provides for only 9 hours of forecast operational intervention (noting elsewhere AEMO uses 72 days and 15 days respectively for system strength), and implies that without the <math>3\sigma</math> modelling, during shortfalls in system strength and inertia, there may be a lack of suitable plant for direction and therefore larger impacts such as curtailment of generation or load.</li> <li>• What AEMO did not provide is the economic, statistical or technical evidence required to justify its position. That is, during the predicted shortfalls: <ul style="list-style-type: none"> <li>– What is the magnitude of the shortfalls?</li> <li>– What is the likelihood and magnitude of intervention required that is above the available services provided under the 84th percentile? and</li> <li>– what is the likely cost of intervention versus the supply of resources (for both the 84th and 99.7th percentiles) that will only be utilised for 87 hours a year for NSCAS or parts of 57 days for system strength?</li> </ul> </li> <li>• Further, we understand that the NER requires TNSPs to provide NSCAS and system strength that meets requirements 99% of the time (i.e. a 1% shortfall), to be billed back to generators, who collect their liabilities from consumers through the competitive market.</li> <li>• This is an economically efficient process that drives efficient outcomes. We note that where AEMO projects a shortfall in these services above the 1% level, it may direct the TNSP to supply more of each service.</li> <li>• The proposed <math>3\sigma</math> modelling of NSCAS provides a 0.17% shortfall,</li> <li>• This suggests that AEMO is not confident with its own system for overlooking TNSP led services, and will instead establish competition for TNSP supplied services, reducing the economic efficiency of the TNSP services.</li> </ul>	This issue is discussed in Section 4.1.



No.	Stakeholder	Submission comment	AEMO response
9	EUAA	<p>We wrote about the lack of a feedback loop to assure consumers that AEMO's conservative approach to NSCAS shortfalls is both efficient and in the long-term interest of consumers.</p> <ul style="list-style-type: none"> <li>• AEMO's response is that they prepare an NSCAS report on contracts and size of NSCAS gap and report on the effectiveness of NSCAS dispatch.</li> <li>• This does not provide assurance of a feedback loop that influences how AEMO prepare future NSCAS forecasts with continuous improvement in mind.</li> </ul>	<p>AEMO reports on the effectiveness of the dispatch of NSCAS at least yearly<sup>7</sup>.</p> <p>In each NSCAS Report, AEMO reviews any open NSCAS gaps previously declared, and whether a gap remains with updated assumptions. AEMO works collaboratively with TNSPs and reviews operational outcomes when determining appropriate inputs and assumptions for each year's NSCAS studies.</p> <p>As noted previously, AEMO has not used its last resort planning powers in over five years, as the existing TNSP joint-planning processes have ensured system standards are met outside of last-resort timeframes.</p> <p>Importantly, declared gaps under the NSCAS framework are generally subject to a consultative regulatory investment test and/or Australian Energy Regulator (<b>AER</b>) approvals to establish that the identified option(s) are those that best meet the NEO.</p> <p>AEMO also notes that operational interventions in real-time have been increasing, which indicates a need to consider either a broader scope of NSCAS studies (to catch new security issues), or tighter near-term thresholds (to ensure efficient planning solutions can be explored before issues must be addressed in real-time operations).</p>

<sup>7</sup> In accordance with AEMO's SO\_OP-3708 Non-Market Ancillary Services standard operating procedure, at [https://aemo.com.au/-/media/files/electricity/nem/security\\_and\\_reliability/power\\_system\\_ops/procedures/so\\_op\\_3708-non-market-ancillary-services.pdf?1a=en](https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/power_system_ops/procedures/so_op_3708-non-market-ancillary-services.pdf?1a=en).