

NETWORK SUPPORT AND CONTROL ANCILLARY SERVICE (NSCAS) DESCRIPTION AND QUANTITY PROCEDURE REVIEW

FINAL REPORT AND DETERMINATION

Published: **September 2020**





EXECUTIVE SUMMARY

The publication of this Final Report and Determination concludes the consultation process conducted by AEMO on the Network Support and Control Ancillary Service (NSCAS) description and NSCAS quantity procedure under the National Electricity Rules (NER).

In the Issues Paper released on 1 June 2020 for the first stage of the consultation, AEMO proposed changes to make the NSCAS description and quantity procedure more adaptive and flexible, to allow AEMO to respond to the changing needs of the power system. Key changes proposed were:

- Changing the definition of NSCAS types, from three types based on electrical phenomena, to two types based on the need they primarily address.
- Allowing assessments of system security to consider whether the system can be returned to a secure operating state within 30 minutes of a credible contingency or protected event.
- Allowing flexibility in how constraints inhibiting net economic benefit are chosen for investigation.
- Replacing prescriptive modelling and methodological assumptions with high level modelling principles.

AEMO commenced stage 2 of the consultation process on 4 August 2020, with the publication of the NSCAS description and quantity procedure amendments draft report and determination and the draft NSCAS description and quantity procedure. AEMO received one submission, from ERM Power, in response to stage 2 of the consultation. ERM Power raised the following key issues:

- Potential ambiguity about whether a single service could meet multiple NSCAS needs under the proposed new NSCAS types.
- Whether to consider the loss of double-circuit transmission lines as a potential contingency event when assessing security and reliability services.
- Inclusion of additional stakeholder engagement as part of the preparation of the annual NSCAS Report.
- Opportunities to enhance transparency of NSCAS assessments, including through publication of information and through explanation of the use of 'appropriate margins'.
- Potential for a clearer mechanism to include market participants' feedback.
- Consideration of non-network solution costs from market participants in addition to other references.
- Degree of detail specified for cost benefit assessments.
- Transparency of the market benefits ancillary services assessment.
- Whether to consider additional benefits in the cost benefit assessment.
- Further sharing of power system study options and results.

After considering the submission received, AEMO has made further updates to the NSCAS description and quantity procedure which is now published in its final form as an attachment to this Final Report and Determination. This report summarises the background for the consultation, and how the issues raised in the submission have been addressed.

The publication of this Final Report and Determination marks the completion of the consultation process. The amended NSCAS description and quantity procedure published alongside this document are in effect as at 1 October 2020.



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1. STAKEHOLDER CONSULTATION PROCESS

As required by clause 5.20.2 of the NER, AEMO is consulting on the NSCAS description and NSCAS quantity procedure in accordance with the Rules consultation process in rule 8.9.

AEMO’s timeline for this consultation is outlined below.

Deliverable	Indicative date
Notice of first stage consultation [and Issues Paper] published	1 June 2020
First stage submissions closed	7 July 2020
Draft Report & Notice of second stage consultation published	4 August 2020
Second stage submissions closed	18 August 2020
Final Report and Determination published	30 September 2020

The publication of this Final report and the NSCAS description and quantity procedure marks the conclusion of this consultation.

Note that there is a glossary of terms used in this Final Report and Determination in **Appendix A**.

2. BACKGROUND

2.1. NER requirements

AEMO is responsible for managing power system security and reliability of supply in the National Electricity Market (NEM). The NSCAS framework is one of the last-resort tools in place for AEMO to manage power system security and reliability of supply, and is part of the broader joint system planning process between AEMO and transmission network service providers (TNSPs) who are Jurisdictional Planning Bodies.

NSCAS are non-market ancillary services acquired to control active and reactive power flow into or out of an electricity transmission network to address an NSCAS need¹. An NSCAS need is NSCAS required to:

- Maintain power system security and reliability of supply of the transmission network in accordance with the power system security standards and the reliability standard²; and
- Maintain or increase power transfer capability of the transmission network to maximise the present value of net economic benefit to all those who produce, consume or transport electricity in the market³.

AEMO is required to develop and publish an NSCAS description⁴ providing a detailed description of each type of NSCAS, and an NSCAS quantity procedure⁵ explaining the determination of the location and quantity of each type of NSCAS required. AEMO may amend the NSCAS description and quantity procedure. When amending the NSCAS description and/or the NSCAS quantity procedure AEMO must comply with the NER consultation procedures⁶.

¹ NSCAS definition, Chapter 10 glossary, NER Version 150.

² NSCAS need definition, Chapter 10 glossary, NER Version 150. The NSCAS need definition specifically excludes an *inertia network service* to address an *inertia shortfall* and a *system strength service* to address a *fault level shortfall*

³ NSCAS need definition, Chapter 10 glossary, NER Version 150. The NSCAS need definition specifically excludes an *inertia network service* to address an *inertia shortfall* and a *system strength service* to address a *fault level shortfall*

⁴ NER 5.20.2(a)

⁵ NER 5.20.2(b)

⁶ Except for minor and administrative amendments (NER clause 5.20.2(d)).



Annually, AEMO must also publish an assessment of any NSCAS gaps in the coming five-year period, and a summary of any NSCAS it has procured in the previous year⁷. An NSCAS gap is defined as any NSCAS need that AEMO forecasts will arise within a planning horizon of at least five years.

When AEMO declares an NSCAS gap, it may ask the relevant TNSP when it will have arrangements in place to address the gap. In cases where AEMO does not consider that an NSCAS gap will be met, where AEMO considers it necessary to acquire NSCAS to meet the gap relates to prevent an adverse impact on power system security and reliability of supply of the transmission network, AEMO must use reasonable endeavours to acquire the necessary NSCAS itself via an ancillary services agreement.

2.2. Context for this consultation

Since the 2011 release of the current NSCAS description and NSCAS quantity procedure, the NEM has undergone a significant transformation. The power system is transitioning from being dominated by large thermal power stations to including a multitude of generation sources and technologies of various sizes. Customer demand profiles have also changed rapidly, primarily driven by the introduction of significant distributed energy resources, predominantly distributed solar photovoltaic (PV) systems.

The changing nature of the NEM power system is explored in detail in AEMO's recently published Renewable Integration Study (RIS) report⁸. The report demonstrated the potential for significant change in the NEM over the coming five years, highlighting the need for flexible market and regulatory frameworks that can adapt swiftly and effectively as the power system evolves.

Three known trends in the changing system have the potential to affect the type and way in which NSCAS will be required in the coming years:

- Fewer synchronous machines online and more inverter-based resources online.
- Increasing variability and uncertainty in the NEM.
- Increasing decentralised generation, particularly growth in distributed PV systems.

As the power system's transition continues, additional trends may become evident.

AEMO considers that the known trends, and the potential for additional trends in future, highlight that NSCAS procedures must be adaptive and flexible to allow AEMO to respond to the changing needs of the power system.

2.3. First stage consultation

AEMO issued a Notice of First Stage Consultation on 1 June 2020, and published an Issues Paper for the NSCAS Consultation. This information is available on AEMO's website⁹. The Issues Paper provided detail on AEMO's review of the NSCAS description and quantity procedure. The purpose of this review is to:

1. Develop the NSCAS description such that it fulfils the NER requirement to be a "detailed description of each type" of NSCAS, while still being flexible enough to allow NSCAS to be used to address emerging challenges.
2. Develop the NSCAS quantity procedure such that it meets the NER requirement to specify how the location and quantity of NSCAS required will be determined, while allowing investigation of a variety of relevant and localised challenges.

⁷ NER 5.20.3.

⁸ See AEMO's Renewable Integration Study Stage 1 Report, April 2020, at <https://www.aemo.com.au/energy-systems/Major-publications/Renewable-Integration-Study-RIS>.

⁹ See AEMO's current consultation on Network Support and Control Ancillary Services Description and Quantity Procedure Amendment, June 2020, at <https://aemo.com.au/consultations/current-and-closed-consultations/network-support-and-control-ancillary-services-description-and-quantity-procedure-amendments>.



In the Issues Paper, AEMO sought views on its proposals to amend the NSCAS description and the NSCAS quantity procedure. The current arrangements and proposed amendments are summarised in Table 1.

Table 1 Proposed changes to NSCAS description and quantity procedure from NSCAS Issues Paper

	Summary of existing restrictions and proposed amendments
NSCAS Types	<p><u>Current:</u> NSCAS types are classified according to electrical phenomena</p> <p><u>Proposal:</u> Classify NSCAS types according to which of the two NSCAS needs the service would primarily address:</p> <ul style="list-style-type: none"> • System Security and Reliability Ancillary Service - a non-market ancillary service primarily procured in order to assist AEMO to operate the NEM within the System Security and Reliability Standards. This service will exclude any services excluded by the rules that have existing frameworks. • Constraints Alleviation through Net Market Benefits Ancillary Service - a non-market ancillary service primarily acquired to increase the power transfer capability of the transmission network, to maximise the present value of net economic benefit to all those who produce, consume or transport electricity in the market. The identification of top binding current and/or projected top binding future constraints would be assessed to determine if there is an identified need to alleviate these constraints.
System security and reliability assessment assumptions	<p><u>Current:</u> Assess NSCAS needs under system normal plus a credible contingency for the next five years.</p> <p><u>Proposal:</u> Include in the assessment the ability to restore the network to a secure state within 30 minutes following a credible contingency.</p>
Increase power transfer capability methodology	<p><u>Current:</u> Assess the net economic benefit of alleviating the top 10 historically binding system normal constraints.</p> <p><u>Proposal:</u> Allow for flexibility in the methodology such that any appropriate analysis, historical or forward-looking, can be used to determine any constraints inhibiting net economic benefit.</p>
Modelling assumptions	<p>Remove the prescriptive modelling assumptions in the NSCAS Schedule 1 and replace them with high-level modelling principles. Any detailed assumptions can then be included in the annual NSCAS review.</p>

AEMO received **three** written submissions in the first stage of consultation. Copies of all written submissions have been published on AEMO’s website at: <https://aemo.com.au/en/consultations/current-and-closed-consultations/network-support-and-control-ancillary-services-description-and-quantity-procedure-amendments>.



2.4. Second stage consultation

AEMO issued a Notice of Second Stage Consultation on 1 August 2020 together with the draft report and determination and the draft NSCAS description and quantity procedure.

AEMO received **one** written submission in the second stage of consultation.

AEMO held a meeting with ERM Power on 27 August 2020 to gain a better understanding of the concerns highlighted in their submission.

Copies of all written submissions have been published on AEMO’s website at:

<https://aemo.com.au/en/consultations/current-and-closed-consultations/network-support-and-control-ancillary-services-description-and-quantity-procedure-amendments>

3. SUMMARY OF MATERIAL ISSUES

The key material issues arising from the proposal and raised by Consulted Persons in the second stage of this consultation are summarised in the following table:

No.	Issue	Raised by
1.	NSCAS types	ERM Power
2.	Assessing security and reliability services	ERM Power
3.	Stakeholder engagement	ERM Power
4.	Transparency in NSCAS assessments	ERM Power
5.	Mechanism to include market participants’ feedback	ERM Power
6.	Non-network solution costs	ERM Power
7.	Cost benefit assessment – forecasting methodology	ERM Power
8.	MBAS assessment – transparency	ERM Power
9.	Cost benefit assessment – considering additional benefits	ERM Power
10.	Power system study options and results	ERM Power

A detailed summary of issues raised by Consulted Persons in submissions to the second stage of this consultation, together with AEMO’s responses, is contained in **Appendix B**. In addition, a summary of issues raised in the previous stages of this consultation and AEMO’s response to each issue are recorded in Appendix E.

4. DISCUSSION OF MATERIAL ISSUES

This section discusses the material issues raised in the second stage of this consultation, along with AEMO’s considerations and conclusions. Appendix B and Appendix E summarises all issues raised.

4.1. NSCAS types

4.1.1. Issue summary and submissions

AEMO considered the existing NSCAS description as not flexible enough to encompass the variety of services that may be needed to deliver a secure and reliable power system in the context of declining minimum demand, changing generation operations, increasing penetration of inverter-based resources or



other as yet unforeseen changes in the rapidly transforming power system. AEMO proposed to amend the NSCAS types by classifying them according to the need addressed, namely: Reliability and Security Ancillary Services (RSAS) and Market Benefits Ancillary Services (MBAS).

ERM Power generally supported the shift to the new categories. ERM Power highlighted that under the proposed framework some services might fit into both categories. ERM Power noted that while this may not be an issue, it will be important to examine how a single provider could be contracted for the two separate services, or alternatively, how a provider seeking to provide services under both may only be awarded the contract for a single service, but might then be dispatched for either service.

ERM Power therefore considered that the NSCAS description should also include details of the process to be observed by AEMO for the transparent reporting of NSCAS procurement and dispatch. The NSCAS description, as per ERM Power's submission, could for example cross reference an AEMO process document for NSCAS tendering and procurement and for dispatch, and set out the methodology by which AEMO intends to inform the market that NSCAS has been dispatched and for which NSCAS service.

4.1.2. AEMO's assessment

AEMO agrees with ERM Power that some services may under certain circumstances fall under both categories of NSCAS, namely MBAS and RSAS. AEMO notes that even with the previous NSCAS categories, it was still, under certain circumstances, possible for a service to fall under more than one NSCAS category.

AEMO acknowledges that it is important to examine how a single provider could contract for two separate services, or alternatively how a provider seeking to provide services under both may only be awarded the contract for a single service.

The NER under chapter 5.20.1 defines the NSCAS description as '*a detailed description of each type of network support and control ancillary service*'. It also defines the NSCAS quantity procedure as '*a procedure that determines the location and quantity of each type of network support and control ancillary service required*'.

Therefore, AEMO considers that the NSCAS description and quantity procedure is not the appropriate platform to address this issue. AEMO considers the NSCAS contract between the relevant parties, for example AEMO or a TNSP and the NSCAS provider, is a more appropriate mechanism.

The generic proforma contract, published by AEMO in 2017, specifies that for each contracted NSCAS, there will be a schedule including the description of the NSCAS and any associated equipment for delivering the NSCAS¹⁰. It also stipulates payments to providers which may provide more than one service at a given time. AEMO does acknowledge that this proforma contract will need to be updated to include the changes resulting from this NSCAS description and quantity procedure amendments consultation.

4.1.3. AEMO's conclusion

AEMO concludes that the NSCAS description and quantity procedure will not be amended to include details of contracting arrangements as this would be better addressed within the NSCAS contract between the relevant parties.

4.2. Assessing security and reliability services

4.2.1. Issue summary and submissions

ERM Power's proposal asked that AEMO's annual NSCAS analysis for RSAS consider each double circuit transmission line in the NEM as a potential contingency event, not just double circuit transmission lines

¹⁰ https://www.aemo.com.au/-/media/files/electricity/nem/security_and_reliability/ancillary_services/nscas-agreement-proforma-2017-final.pdf?la=en



that are subject to routine reclassifications as a credible contingency under a range of prevailing weather conditions. ERM Power noted that while it is generally accepted as uneconomical to protect a power system against every potential sequence of non-credible contingencies, many of which would represent high impact low probability events, NSCAS contracts should target a secure operating state for the power system with a reasonable margin over 'system normal' conditions in order to be fit-for-purpose.

AEMO, in the amended NSCAS description and quantity procedure, includes in the NSCAS analysis the ability for the power system to return to a secure operating state, as defined by clause 4.2.4 of the NER within 30 minutes of a credible contingency event or protected event. ERM Power considered that the proposed shift to a 30-minute interval makes sense.

4.2.2. AEMO's assessment

ERM Power's proposal asked that AEMO consider each double circuit transmission line in the NEM as a potential contingency event in its NSCAS analysis for RSAS. RSAS is NSCAS procured, consistent with the NER definition of an NSCAS need¹¹, to assist AEMO to:

*"maintain power system security of the transmission network in accordance with the power system security standards or maintain reliability of supply of the transmission network in accordance with the reliability standard."*¹²

Regarding system security, the NER stipulates¹³ that:

"the power system is defined to be in a secure operating state if, in AEMO's reasonable opinion, taking into consideration the appropriate power system security principles described in clause 4.2.6:

- (1) the power system is in a satisfactory operating state, and*
- (2) the power system will return to a satisfactory operating state following the occurrence of any credible contingency event or protected event in accordance with the power system security standard."*

As per AEMO's Power System Security Guidelines¹⁴, the following is applicable:

- Only credible contingency events are considered when assessing whether the system is in a secure operating state¹⁵.
- Generally, a credible contingency event can be regarded as the unplanned tripping of any single item of network or generation equipment.
- Under normal conditions the simultaneous trip of both circuits of a double circuit transmission line would be considered a non-credible contingency event¹⁶.
- Under certain conditions such as bushfires and lighting storms, AEMO may determine the occurrence of a non-credible contingency event is reasonably possible and AEMO may reclassify that event to be a credible contingency event.

¹¹ NSCAS need definition, Chapter 10 glossary, NER Version 144.

¹² AEMO. Draft network support and control ancillary service (NSCAS) description and quantity procedure, August 2020, section 2.2.1, at https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2020/ncas/stage-2/2020-draft-ncas-description-and-quantity-procedure-for-consultation.pdf?la=en

¹³ NER 4.2.4

¹⁴ AEMO. Power System Security Guidelines, at https://aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Power_System_Ops/Procedures/SO_OP_3715---Power-System-Security-Guidelines.pdf

¹⁵ AEMO. Power System Security Guidelines, Chapter 7, at https://aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Power_System_Ops/Procedures/SO_OP_3715---Power-System-Security-Guidelines.pdf

¹⁶ AEMO. Power System Security Guidelines, Chapter 8.4 at https://aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Power_System_Ops/Procedures/SO_OP_3715---Power-System-Security-Guidelines.pdf



Thus, non-credible contingencies (other than protected events) are not applicable for assessing ability to maintain the system in a secure operating state. For this reason, AEMO will generally not include the non-credible contingency loss of a double circuit transmission line under the RSAS assessment.

However, AEMO may study the trip of the first circuit, of a double circuit line, followed by studying the ability to return to a secure operating state within 30 minutes for trip of the parallel line. This is already covered under the revision of the procedure in stages 1 and 2 of the consultation. In addition, there may be some cases where AEMO decides to consider a double-circuit transmission line such as in some cases under the final point noted above from the Power System Security Guidelines.

4.2.3. AEMO's conclusion

AEMO concludes that the NSCAS description and quantity procedure will not be amended to include the non-credible trip of double circuit lines when assessing power system reliability and security.

4.3. Stakeholder engagement

4.3.1. Issue summary and submissions

ERM Power recommended that AEMO consider outlining a requirement under section 3.2.1 of the NSCAS description and quantity procedure, for transparent reporting to stakeholders and requesting feedback on all identified transmission system security and reliability issues, before proceeding to the power system simulation studies to determine the RSAS need as set out in section 3.2.3 of the procedure.

4.3.2. AEMO's assessment

AEMO agrees with ERM Power's proposal to include in the NSCAS description and quantity procedure a mechanism for AEMO to report to stakeholders on all identified transmission system security and reliability issues, but considers that committing to report to stakeholders before proceeding to the power system simulation studies to determine the RSAS needs would run the risk of delaying the delivery of the annual NSCAS Report.

4.3.3. AEMO's conclusion

AEMO has amended the NSCAS description and quantity procedure to incorporate feedback provided by ERM Power. In Appendix A of the NSCAS description and quantity procedure, AEMO has included the following to incorporate additional stakeholder engagement:

'To the extent it is practical to do so, AEMO will share and discuss preliminary results of identified RSAS and MBAS issues with market participants'.

Note that due to time constraints this year, sharing of preliminary results is likely to occur in parallel with AEMO conducting analysis of solutions. In future years AEMO will endeavour to share preliminary results earlier in order to incorporate feedback from market participants into subsequent analysis, while noting that it is likely that analysis will begin in parallel with consultation given annual time and resourcing constraints on the delivery of the NSCAS Report.

4.4. Transparency in NSCAS assessments

4.4.1. Issue summary and submissions

ERM Power requested that AEMO include clarification on the statement that 'appropriate margins' would be applied when assessing NSCAS quantities, under section 3.2.3 of the draft NSCAS description and quantity procedure. ERM Power suggested that this would improve the transparency of the NSCAS process, and recommended that AEMO publish, in a reasonable level of detail, its reasons for any



additional margins applied so that market participants would be able to conceive non-network projects of the highest value to consumers.

ERM Power further noted that AEMO is not proposing a complete disclosure of relevant assumptions and methodologies but will provide more on request. ERM Power recommended, for transparency purposes, that all information should be published in a timely fashion.

4.4.2. AEMO's assessment

On the matter of appropriate margins, AEMO acknowledges that 'appropriate margins' is an indeterminate statement. Engineers often apply appropriate margins acknowledging that some assumptions may be uncertain or some details not yet known. Depending on the problem at hand and assumptions used, AEMO may need to apply appropriate margins. AEMO agrees to publish information about how margins have been determined.

On the matter of the publication of assumptions and methodologies, Appendix A of the draft NSCAS description and quantity procedure already proposes to, where necessary, publish descriptions of any relevant assumptions and methodologies used in the NSCAS review at the time of publication of the NSCAS Report or as soon as practicable thereafter. However, a significant amount of information is used to prepare the annual NSCAS review and what AEMO may deem relevant or irrelevant for publication may not align with all stakeholders' requirements. In addition, some of this information may be confidential. For this reason, to ensure maximum transparency, AEMO has decided to continue with the existing proposed mechanism which allows for stakeholders to ask for any additional information should the information they need not already be part of the annual NSCAS Report.

4.4.3. AEMO's conclusion

AEMO has updated the NSCAS description and quantity procedure under sections 3.2.3 and 3.3.3 to include the following commitment that AEMO will describe how margins were determined, *'Descriptions of how margins were determined will be recorded in the NSCAS Report.'*

The provisions in Appendix A of the NSCAS description and quantity procedure are AEMO's commitment to transparency of the assumptions and methodologies used in the annual NSCAS review. No further amendments have been made.

4.5. Mechanism to include market participants' feedback

4.5.1. Issue summary and submissions

The draft determination included a mechanism for market participants to nominate constraints for assessment under MBAS. ERM Power noted that no firm timeframes or transparency provisions were detailed for this mechanism. ERM Power also requested that the mechanism enable market participants to propose non-network option solutions along with nominated constraints for assessment under MBAS.

ERM Power also interpreted AEMO's Draft Report and Determination as proposing to delay developing a mechanism for considering participants' input until delivery of the Energy Security Board's (ESB's) post-2025 NEM review. They considered this to be an unnecessary delay to a concept that AEMO acknowledges could lead to benefits.

ERM Power raised concerns that Appendix A of the draft quantity procedure only sets out an obligation for AEMO to consult on inputs and assumptions for the NSCAS assessment with TNSPs, rather than with market participants wishing to propose constraint for consideration as well as non-network options.



4.5.2. AEMO's assessment

AEMO agrees it would be valuable for market participants to be able to propose non-network option solutions to network issues and constraints, for consideration in the NSCAS review.

Timeframes for market participants to propose network issues, constraints and solutions are not explicitly defined in the draft NSCAS quantity procedure; it notes, however, that each NSCAS Report will include details of the timeframes and logistics for market participants to submit recommendations for consideration in the following year's NSCAS review. AEMO considers it appropriate that this information be recorded outside of the quantity procedure, so it can be defined as needed according to the work program in a given year.

To clarify, AEMO does not intend to delay development of this engagement mechanism until after the ESB's post-2025 NEM review. AEMO will include a request for market participant proposals in the 2020 NSCAS Report, such that they can be considered in the 2021 NSCAS review. The overlap of this 2020 NSCAS description and quantity procedure amendments consultation with the 2020 NSCAS review means it is not feasible to include a request for proposals in the 2020 review which must be completed by December 2020 as a NER requirement¹⁷.

AEMO agrees that market participants should be consulted regarding their proposals, noting that AEMO must retain discretion over which proposals are investigated, given the potentially open-ended number of proposals that may be submitted.

AEMO considers it appropriate to retain the requirement in Appendix A of the procedure to consult with TNSPs about inputs and assumptions, given that this requirement is relating generally to network setup and modelling and to matters that may come through to the TNSP to address as NSCAS shortfalls.

4.5.3. AEMO's conclusion

For clarity, footnotes 9 and 10 of the NSCAS description and quantity procedure have been updated to note that:

1. Each Annual NSCAS Report, starting from the 2020 NSCAS review, will include details of the timeframes and logistics for market participants to submit recommendations to be considered in the next years NSCAS review.
2. Recommendations can include solutions, in addition to network issues and constraints.

Section 3.3.3 has also been updated to note that MBAS studies may consider solutions proposed by TNSPs or market participants, who will be consulted accordingly.

4.6. Non-network solution costs

4.6.1. Issue summary and submissions

In Appendix A of the draft NSCAS description and quantity procedure, AEMO noted that generator technologies and economic drivers are evolving and NSCAS studies will use the inputs and assumptions applied in the Integrated System Plan and Electricity Statement of Opportunities (including the latest CSIRO GenCost Report¹⁸ or any replacements) to inform analysis on potential NSCAS needs. An example of might be coal-fired generation switching off during low price periods, or any other relevant conditions.

ERM Power raised concerns that the CSIRO GenCost Report represents a 'point in time' analysis rather than a more accurate assessment of what a participant can achieve in the market. ERM Power considered that

¹⁷ NER 5.20.3 version 150, Publication of the NSCAS Report.

¹⁸ AEMO and CSIRO. GenCost 2019-20: Preliminary results for stakeholder review, published December 2019, at https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/Inputs-Assumptions-Methodologies/2019/CSIRO-GenCost2019-20_DraftforReview.pdf



AEMO should be obliged to accurately represent potential market participants' non-network options rather than assuming costs.

4.6.2. AEMO's assessment

AEMO acknowledges that market participants have detailed insights into non-network solution costs for services they can provide. If additional information can be provided, this can improve the probability of AEMO identifying the best opportunities to mitigate constraints to maximise net economic benefits, and is expected to contribute to the achievement of the National Electricity Objective, specifically:

"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"

4.6.3. AEMO's conclusion

AEMO has adapted the NSCAS description and quantity procedure Appendix A, to consider any cost information provided by TNSPs and market participants for solutions, in addition to other sources.

4.7. Cost benefit assessment – forecasting methodology

4.7.1. Issue summary and submissions

ERM Power was disappointed that AEMO rejected its prior suggestion to ground NSCAS assessment in a specific forecasting methodology for cost benefit assessment. ERM Power recommended a specific and detailed methodology to improve transparency of AEMO's process, rather than the originally proposed set of higher-level modelling principles.

4.7.2. AEMO's assessment

In its initial submission, ERM Power asked AEMO to develop a methodology for assessing NSCAS requirements that may be justified to increase power transfer capability of the network, that is consistent with the *"Australian Energy Regulator (AER) Best Forecast Practice Guideline and Cost Benefits Analysis Guideline"*¹⁹.

AEMO accepts that there is value in recording how cost benefit assessments will be conducted, in so far as this is possible without being exhaustive and locking AEMO into applying a prescribed methodology to unsuitable circumstances. However, AEMO considers that to maintain flexibility, a high level methodology is preferable to a specific and detailed methodology.

Given the open-ended range of MBAS issues that could arise, pre-defining in specific detail how the cost benefit analysis will be approached for all circumstances is not feasible. A specific and detailed methodology would therefore require exceptions allowing AEMO to deviate from it where necessary.

Given ERM Power's stated aim is to increase transparency while maintaining assessment flexibility, AEMO considers that this can be more efficiently achieved by documenting relevant details of the cost benefit methodologies used in an NSCAS assessment and making them available via publication or on request. Section 4.4 of this report notes the provisions in place to achieve this.

Regarding the specific guidelines cited by ERM Power, these were written for purposes which do not necessarily align with the NSCAS requirements. The Cost Benefit Analysis (CBA) Guidelines²⁰ apply to the Integrated System Plan (ISP)²¹ and regulatory investment test for transmission (RIT-T) projects which are

¹⁹ ERM Power Stage 1 Submission, https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2020/ncas/stage-1-submissions/erm-power_ncas-quantity-procedure-and-description-amendments-issues-paper.pdf?la=en

²⁰ AER, Cost Benefit Analysis Guidelines, August 2020, <https://www.aer.gov.au/system/files/AER%20-%20Cost%20benefit%20analysis%20guidelines%20-%2025%20August%202020.pdf>

²¹ NER Chapter 5.22.5 (b)



actionable ISP projects²². The Forecasting Best Practice Guidelines (FBPG) relate to the ISP and Electricity Statement of Opportunities (ESOO)²³.

It is worth emphasising that AEMO has no powers to address an MBAS gap, only to declare the gap, which the TNSP can then choose to address. If AEMO declares an MBAS gap and the TNSP proceeds to address it, arrangements to meet the MBAS gap will be subject to rules requirements applying to TNSP expenditure. If the solutions exceed the RIT-T cost threshold (presently \$6 million)²⁴, it would be subject to a RIT-T and therefore subject to the regulatory investment test for transmission application guidelines²⁵. If solutions were below the RIT-T cost threshold, the TNSP could conduct a less rigorous cost-benefit assessment.

AEMO will similarly align the level of detail of the cost benefit assessment to the expected cost of the solution. Any MBAS solution with a capital cost above the RIT-T threshold would need to pass the RIT-T. Therefore, the level of analysis undertaken by AEMO needs to provide reasonable confidence to the TNSP that the project would pass the RIT-T. For solutions with a capital cost less than the RIT-T threshold, assessment to a level of detail akin to a network capability incentive parameter action plan (NCIPAP) assessment is more likely to be sufficient.

4.7.3. AEMO's conclusion

AEMO has included in the cost benefit assessment an alignment of the level of detail to the estimated capital cost of the solution:

'The level of detail of assessments will be commensurate to the estimated capital cost of the solutions. Solutions with an estimated capital cost less than the regulatory investment test – transmission (RIT-T) cost threshold²⁶ will be assessed to a level of detail akin to a network capability incentive parameter action plan (NCIPAP) assessment. Solutions with an estimated capital cost greater than the RIT-T threshold may be assessed in greater detail accordingly'.

4.8. MBAS assessment – transparency

4.8.1. Issue summary and submissions

ERM Power indicated the proposed amendments to the NSCAS description appear reasonable, but that the new framework requires visibility and accountability on:

- Which constraints are assessed and how?
- Which solutions are considered suitable?
- Which solutions were discarded and why?
- Non-network options, including a list of benefits and costs unaccounted for in its analysis
- The results of cost-benefit assessments.

²² NER Chapter 5.15A.1

²³ AER, Forecasting Best Practice Guidelines, August 2020, Figure 1, <https://www.aer.gov.au/system/files/AER%20-%20Forecasting%20best%20practice%20guidelines%20-%202025%20August%202020.pdf>

²⁴ \$6 million at the time of publication of this document. This value may be revised by the AER over time.

Refer to <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/cost-thresholds-review-for-the-regulatory-investment-tests-2018>

²⁵ AER, Application guidelines regulatory investment test for transmission, December 2018, https://www.aer.gov.au/system/files/AER%20-%20Final%20RIT-T%20application%20guidelines%20-%202014%20December%202018_0.pdf

²⁶ The threshold is \$6 million at the time of publication of this document. This value may be revised by the AER over time. See <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/cost-thresholds-review-for-the-regulatory-investment-tests-2018>



ERM Power further requested the framework contain mandated timeframes and obligations for AEMO to publish information about how cost benefit assessments are calculated and why any TNSP-led network solution is preferred on both technical and economic grounds.

4.8.2. AEMO's assessment

AEMO agrees that the five items listed by ERM Power are all relevant to understanding how AEMO reaches conclusions regarding MBAS gaps in the NSCAS assessment. AEMO considers that the visibility objective can be achieved by AEMO documenting relevant details of the processes followed in an NSCAS assessment and making them available via publication or on request. Section 4.4 of this report notes the provisions in place to achieve this.

For reasons already covered under Section 4.7.2, AEMO does not believe assessment processes can be usefully pre-defined in the NSCAS description and quantity procedure. However, illustrative examples of information that may be considered are listed where relevant. For example, the NSCAS quantity procedure records examples of inputs that will guide AEMO to identify constraints to potentially be assessed under MBAS.

Regarding ERM Power's request for mandated timeframes and obligations for AEMO to publish information about how cost benefit assessments are calculated, Section 4.4 of this report covers the provisions in place regarding publication of NSCAS assessment information. AEMO considers these provisions to be adequate.

AEMO agrees that, when conducting cost benefit assessments, it should consider both network and non-network solutions if alternative options are available. AEMO will therefore update the NSCAS description and quantity procedure to be explicit that both network and non-network options can be considered.

Regarding publication of information on these assessments, AEMO considers the provisions discussed in Section 4.4 of this report to be adequate. Cost benefit analysis in particular may involve confidential information, therefore pre-defined commitments regarding what will be published are not practical and will need to be considered on a case-by-case basis, with market participants having the ability to request further information if needed.

4.8.3. AEMO's conclusion

AEMO has updated the NSCAS description and quantity procedure for MBAS assessment to be explicit that both network and non-network solutions can be considered.

4.9. Cost benefit assessment – considering additional benefits

4.9.1. Issue summary and submissions

ERM Power recognised that AEMO explicitly states in the draft determination that certain benefits such as capital deferral and reductions in ancillary service costs will not be considered. ERM Power considers that including these benefits on a qualitative basis could provide important context for consideration of non-network options.

4.9.2. AEMO's assessment

In the draft NSCAS description and quantity procedure, AEMO stated that the cost benefit assessment approach identifies the market benefits of enabling efficient generation dispatch. The approach would not consider any other benefit. However, AEMO also stated that these benefits could be considered if they are deemed to be important to the market benefit test decision, and if it is practical to do so. AEMO agrees that under certain circumstances including additional benefits categories on a qualitative basis can provide important context for consideration of non-network options. The inclusion of these under certain



circumstances is expected to contribute to the achievement of the National Electricity Objective, specifically:

"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"

4.9.3. AEMO's conclusion

In the cost benefit assessments, under section 3.3.4 of the NSCAS description and quantity procedure, AEMO has included the consideration and reporting of:

'additional market benefit classes if they are deemed to be important to the market benefit test decision, and if it is practical to do so'.

The additional market benefits classes could include those stipulated in the application guidelines RIT-T²⁷.

4.10. Power system study options and results

4.10.1. Issue summary and submissions

ERM Power noted AEMO's preference for 'principles of assessment' over an assessment methodology. They considered that this will be suitable provided there is a high degree of transparency on inputs to AEMO's process, including explicit and accurate modelling of proposed non-network options and clarity on the technical impacts of the various options on the power system. This would mean publishing the results of the RSAS power system studies described in Section 3.2.3 and MBAS studies described in section 3.3.3 of the NSCAS description and quantity procedure.

4.10.2. AEMO's assessment

AEMO agrees that transparency of inputs to the NSCAS assessment is desirable. AEMO considers the provisions discussed in Section 4.4 of this report to be adequate to achieve this end.

Regarding explicit modelling of non-network options, with respect to RSAS studies, AEMO will identify the quantity of NSCAS required to resolve any system security and reliability issues on a technology neutral basis in so far as this is possible. This may mean that it is not necessary to explicitly model a specific solution.

An example could include addressing unacceptably high voltage at a substation. AEMO could determine that 30 MVAR of reactive absorption at the substation would alleviate the issue and therefore declare a gap of 30 MVAR reactive absorption at the substation. The reactive absorption would be modelled generically. There is no need for AEMO to explicitly model any particular reactive absorption technology whether it be a network option or a non-network option.

It is also possible that the high voltages could be alleviated by absorbing 50 MVAR at a neighbouring substation. There could be infinite such variations. A market participant that could provide such absorption would be free to demonstrate to the TNSP that their solution resolves the issue and offer it as a means of meeting the RSAS gap.

However, there may be circumstances where modelling a generic solution is not appropriate, and explicit modelling of a specific solution proposed by a market participant or TNSP is necessary.

With respect to MBAS studies, because it is necessary to demonstrate net economic benefits to declare an MBAS gap, both the cost of a solution and its benefits (derived from its physical impact) must be

²⁷ Application guidelines regulatory investment test, December 2018, at https://www.aer.gov.au/system/files/AER%20-%20Final%20RIT-T%20application%20guidelines%20-%202014%20December%202018_0.pdf



determined. Therefore, AEMO agrees that explicit modelling of a proposed non-network option may be necessary in some circumstances.

AEMO will publish relevant results of RSAS and MBAS studies in the NSCAS Report in order to meet NER requirements that the NSCAS Report include *'an assessment that identifies any NSCAS gap'*²⁸. Market participants will be able to request additional information if needed as per the provisions discussed in section 4.4 of this report.

4.10.3. AEMO's conclusion

AEMO has amended the NSCAS description and quantity procedure to include the following changes:

1. *"Studies may also consider solutions to issues proposed by TNSPs or market participants, who will be consulted accordingly"* has been added to RSAS assessment section 3.2.3, and MBAS assessment section 3.3.3.
2. *"In so far as is practical, AEMO will describe any solution in a manner that is neutral as to whether it can be delivered by a network option or a non-network option"* has been added to RSAS assessment section 3.2.3 and MBAS assessment section 3.3.3.
3. A statement has been included in cost benefit analysis section 3.3.4 that *"In so far as is practical, AEMO will consider both network options and non-network options"*.

5. FINAL DETERMINATION

Having considered the matters raised in submissions, AEMO has determined to **amend** the **NSCAS description and quantity procedure** in the form of Attachment 1, in accordance with clause 5.20.2 of the NER.

The amended version will take effect from 1 October 2020.

For clarity, a tracked-changes copy of the NSCAS description and quantity procedure is also published, highlighting the changes between the draft and final documents. This copy is provided for stakeholder information only and cannot be used for official purposes.

²⁸ NER 5.20.3(2)



APPENDIX A. GLOSSARY

Term or acronym	Meaning
AEMO	Australian Energy Market Operator
CBA	Cost Benefits Analysis
ESB	Energy Security Board
MBAS	Market Benefit Ancillary Service
NEM	National Electricity Market
NER	National Electricity Rules
NSCAS	Network Support and Control Ancillary Service
PV	Photovoltaic
RIS	Renewable Integration Study
RSAS	Reliability and Security Ancillary Service
RIT-T	Regulatory Investment Test – Transmission
TNSP	Transmission Network Service Provider



APPENDIX B. SUMMARY OF SUBMISSIONS AND AEMO RESPONSES

No.	Consulted person	Points raised in submission	AEMO response
1.	ERM Power	ERM Power noted that the changes and AEMOs responses in submissions to the Consultation are complex in nature. They are concerned that AEMO allowed only the minimum period of 10 business days as required by the rules consultation procedure for stakeholders to review and develop replies to the draft determination and report. ERM Power recommend that where matters under consultation involve more complex issues that AEMO allow more than the bare minimum requirements for stakeholders to develop replies.	AEMO acknowledges that the changes and submissions in the consultation are complex. With the annual NSCAS review to be published in December, AEMO needs to finalise the procedure such that it can be applied for the 2020 NSCAS review. AEMO System Planning, in future, will endeavour to provide more time where possible through the consultation process.
2.	ERM Power	ERM power supports the shift to new categories of NSCAS namely Market Benefits Ancillary services (MBAS) and Reliability and Security Ancillary Services (RSAS). They note that under these categories, some services may fit into both categories. ERM Power recognizes that whilst this may not be an issue, it is important to examine how a single provider may be able to be contracted for the two separate services, or alternatively, how a provider seeking to provide services under both may only be awarded a contract for a single service, but is then dispatched for either. ERM Power suggested that AEMO consider that the NSCAS description should also include details of the process to be observed by AEMO for the transparent reporting of NSCAS procurement and dispatch. The NSCAS description for example could cross reference an AEMO process document for NSCAS tendering and procurement and for dispatch.	AEMO agrees with ERM Power that some NSCAS services may under certain circumstances fall under both categories of NSCAS, namely MBAS and RSAS. AEMO consider that it would be best that the terms of services be captured in the NSCAS contract between the relevant parties. See Section 4.1 for further details.
3.	ERM Power	ERM Power believes that AEMO's annual NSCAS analysis for RSAS should consider each double circuit transmission line in the NEM as a potential contingency event, not just double circuit transmission lines that are subject to routine reclassification as a credible contingency under a range of prevailing weather conditions.	AEMO concludes that the NSCAS description and quantity procedure will not be amended to include the non-credible trip of double circuit lines when assessing power system reliability and security. Details and reasoning behind this response can be found in Section 4.2.



No.	Consulted person	Points raised in submission	AEMO response
4.	ERM Power	ERM Power recommends that AEMO transparently report to stakeholders and request feedback of all identified transmission system security and reliability issues under section 3.2.1 of the draft NSCAS description and quantity procedure before proceeding to the power system simulations studies to determine the RSAS needs as set out in section 3.2.3.	AEMO supports this proposal and has amended the NSCAS description and quantity procedure to incorporate feedback provided by ERM Power. The amendments include a commitment to share, to the extent practical to do so, preliminary results of identified RSAS and MBAS issues. See Section 4.3 for further detail.
5.	ERM Power	ERM Power considers the ‘Appropriate Margins to be added when assessing the NSCAS quantities’ as per section 3.2.3 of the draft NSCAS description and quantity procedure as too vague, and has requested additional clarification when applied in order to improve transparency. They recommend that AEMO publish in a reasonable level of detail its reasons to justify which additional margins are applied so that the market participants are able to conceive non-network projects that are of the highest value to the consumer.	AEMO supports this proposal and has updated the NSCAS description and quantity procedure under sections 3.2.3 and 3.3.3 to include the AEMO’s commitment to describing how margin were determined, to be published in the annual NSCAS report. See Section 4.4 for further detail.
6.	ERM Power	ERM Power considers the shift to a 30-minute interval makes sense given how the Rules and the Operating Procedure for System Security is written. Failing to specify this would likely mean that any NSCAS solution modelled may not adequately cater for resilience in the technical response of the contracted service.	AEMO acknowledges ERM Power’s support to shift to consider the ability to return the network to a secure operating state following the loss of a credible contingency.
7.	ERM Power	ERM Power acknowledges that the draft determination recognizes the important role that market participants can play in identifying NSCAS gaps. ERM Power is concerned that AEMO has not provided firm timeframes for market participant contributions, and ERM Power considers that AEMO has proposed to delay such a mechanism to be part of the Energy Security Board’s (ESB) post-2025 NEM review.	AEMO will create a mechanism to allow market participants a role to provide input on constraints to be assessed, together with proposed solutions, from the publication of the 2020 NSCAS review for inclusion in the 2021 NSCAS review. AEMO has not proposed delaying incorporation of market participant input until the delivery of the post-2025 NEM review. AEMO has amended the NSCAS description and quantity procedure to clarify the commencement of this process. See Section 4.5 for further details.



No.	Consulted person	Points raised in submission	AEMO response
8.	ERM Power	<p>The framework should contain mandated timeframes and obligations for AEMO to publish – the draft determination only requires AEMO to 'consider' estimates of costs and benefits – information about how a market participant’s proposed constraint/ and solution is assessed, how its cost benefit is calculated and why any Transmission Network Service Provider (TNSP) led network solution is preferable on both technical and economic grounds. ERM Power considers that AEMO should be obliged to accurately represent the market participant’s non-network option instead of assuming costs. The procedure suggests that AEMO will use the technology cost curves from the Integrated System Plan and the CSIRO GenCost reports which only represent a ‘point in time’ analysis rather than a more accurate assessment of what a participant is able to achieve in the market.</p>	<p>Appendix A of the draft determination NSCAS description and quantity procedure included commitments to publish relevant information regarding assumptions and methodologies at the time of publication of the NSCAS Report or as soon as practicable thereafter. It also included a mechanism for stakeholders to request additional information should the information they need not be contained in the published.</p> <p>AEMO considers these obligations to be sufficient to ensure transparency of cost benefit assessments. See Section 4.4 for further details.</p> <p>AEMO agrees that it should be able to justify why a particular solution (such as a TNSP network option) is preferred over an alternative. AEMO will therefore update the NSCAS description and quantity procedure to be explicit that both network and non-network options can be considered. See Section 4.8 for further details.</p> <p>AEMO will consider costs provided by market participants when conducting the MBAS analysis. AEMO has amended the NSCAS description and quantity procedure to include market participants’ input on non-network costs. See Section 4.6 for further details.</p>
9.	ERM Power	<p>When providing feedback on non-network options, ERM Power considers that AEMO should include a list of benefits and costs not accounted for in its analysis. ERM Power recognises that AEMO explicitly states in the draft determination that certain benefits such as capital deferral and reductions in ancillary service costs will not be considered but considers that including them on a qualitative basis could give important context to consideration of non-network options.</p>	<p>AEMO has amended the NSCAS description and quantity procedure to consider additional market benefit classes if they are deemed to be important to the market benefit test decision, and if it is practical to do so. See Section 4.9 for further details.</p>



No.	Consulted person	Points raised in submission	AEMO response
10.	ERM Power	ERM Power is disappointed that AEMO has rejected its prior suggestion to ground NSCAS assessment in a specific forecasting methodology for cost benefit assessment. ERM Power recommended a specific and detailed methodology to improve transparency of AEMO’s process, rather than the originally proposed “set of higher-level modelling principles”. ERM Power noted that their submission did not indicate any proposal to reduce AEMO’s flexibility as indicated by AEMO in the Draft Determination and Report.	<p>AEMO MBAS assessments can include a wide variety of potential constraints/solutions for assessment. Depending on the estimated capital cost of the solution, different levels of cost benefit assessments will be used. See Section 4.7 for further details.</p> <p>AEMO accepts ERM Power did not intend to reduce AEMO’s flexibility in conducting assessments. However, AEMO considers that to maintain flexibility, a high level methodology is preferable to a specific and detailed methodology. See Section 4.7 for further details.</p>
11.	ERM Power	The methodology set out in Appendix A of the draft determination only sets out an obligation for AEMO to consult with TNSPs, and not consult with market participants that have proposed constraints and non-network options.	AEMO agrees that market participants should be consulted regarding their proposals. AEMO has therefore updated Section 3.3.3. of the NSCAS description and quantity procedure to include that the MBAS analysis may consider solutions proposed by TNSPs or market participants, who will be consulted accordingly. See Section 4.5 for further details.
12.	ERM Power	ERM Power consider that AEMO is not proposing a complete disclosure of relevant assumptions and methodologies but will provide more on request. ERM Power considers that for transparency purposes, all of this information should be published in a timely fashion.	In Appendix A of the draft NSCAS description and quantity procedure, AEMO proposes to, where necessary, publish descriptions of any relevant assumptions and methodologies used in the NSCAS review at the time of publication of the NSCAS Report or as soon as practicable thereafter. AEMO acknowledges that there is a significant amount of information that will be used in the assumptions and methodologies of the annual NSCAS review and what AEMO may deem relevant or irrelevant may not align with all stakeholders’ requirements. Additionally, some of this information may be confidential. For this reason, to ensure maximum transparency, AEMO also included a mechanism for stakeholders to request additional information should the information they need not be contained in the report. See Section 4.4 for details.



No.	Consulted person	Points raised in submission	AEMO response
13.	ERM Power	<p>ERM Power considers that the proposed amendments to the NSCAS descriptions appear reasonable, but the new framework must provide some visibility and accountability on:</p> <ul style="list-style-type: none"> • Which constraints are assessed and how? • Which solutions are considered suitable? • Which solutions were discarded and why? • Non-network options; and, <p>The results of the cost-benefit assessment.</p>	<p>AEMO considers obligations in Appendix A of the draft NSCAS description and quantity procedure, as sufficient to ensure visibility and accountability on the issues listed by ERM Power. See Section 4.8 for details.</p> <p>For clarity, AEMO has updated the NSCAS description and quantity procedure for MBAS assessment to be explicit that both network and non-network solutions can be considered. See Section 4.8 for details.</p>
14.	ERM Power	<p>ERM Power notes AEMO's preference for 'principles of assessment' over an assessment methodology. ERM Power considers that this will be suitable provided that there is a high degree of transparency on inputs to AEMO's process, including explicit and accurate modelling of proposed non-network options and clarity on what the technical impacts of the various options are on the power system. This would mean publishing the results of power system studies described in Section 3.2.3 and 3.3.3 of the procedures.</p>	<p>AEMO agrees that transparency of inputs to the NSCAS assessment is desirable. AEMO considers the obligations regarding provision of information recorded in Appendix A of the draft NSCAS description and quantity procedure are sufficient to achieve this goal. See section 4.10.</p> <p>AEMO considers that explicit modelling of particular non-network options is necessary in some contexts, but not in others. AEMO has updated the NSCAS description and quantity procedure accordingly to state "Studies may also consider solutions to issues proposed by TNSPs or market participants, who will be consulted accordingly"</p> <p>See section 4.10 for further details.</p> <p>AEMO will publish relevant results of studies in the NSCAS Report in order to meet NER requirements that the NSCAS Report include 'an assessment that identifies any NSCAS gap'. See Section 4.10 for further details.</p>



APPENDIX C. ATTACHMENT 1 – NSCAS DESCRIPTION AND QUANTITY PROCEDURE

Please see Attachment 1 provided on AEMO’s website: <https://aemo.com.au/en/consultations/current-and-closed-consultations/network-support-and-control-ancillary-services-description-and-quantity-procedure-amendments>.

This attachment provides the final amended NSCAS description and quantity procedure (version 2.0), in effect from 1 October 2020.



APPENDIX D. ATTACHMENT 2 – TRACKED CHANGES BETWEEN DRAFT AND FINAL NSCAS DESCRIPTION AND QUANTITY PROCEDURE

Please see Attachment 2 provided on AEMO’s website: <https://aemo.com.au/en/consultations/current-and-closed-consultations/network-support-and-control-ancillary-services-description-and-quantity-procedure-amendments>.

This attachment provides the changes between the draft and final NSCAS description and quantity procedures, for stakeholder information. This attachment is for information only and cannot be used for official purposes.



APPENDIX E. SUMMARY OF SUBMISSIONS AND AEMO RESPONSES IN PREVIOUS STAGES OF THIS CONSULTATION

The tables below summarise issues and their treatment from first stage of this consultation are replicated from the NSCAS Draft Report and Determination²⁹. All references to section numbers in the tables refer to that report.

NSCAS description limitations	
Issue and AEMO proposal	The existing NSCAS types are not flexible enough to address emerging novel system security and reliability issues in the rapidly transforming power system. AEMO proposes to amend the NSCAS types, classifying each type according to the NSCAS need addressed.
Submissions	Two of three submissions supported AEMO’s proposed changes to the NSCAS types, with one recommending AEMO support, where considered appropriate by market participants, the development of market-based solutions for the required services. One submission opposed changing the definition of the NSCAS types before the Energy Security Board (ESB) and Australian Energy Market Commission (AEMC) system services workstreams have been completed and their findings considered.
Assessment and outcome	To address NSCAS gaps promptly, whilst addressing emerging issues, changes to the NSCAS types need to be implemented before the 2020 NSCAS review. Consideration of market-based solutions is expected to be considered as part of the Energy Security Board (ESB) Post 2025 Market Design review, to which AEMO is contributing, rather than in the NSCAS description and NSCAS quantity procedure. AEMO will reassess, where necessary, the NSCAS description and NSCAS quantity procedure in light of the findings from that review. AEMO proposes to amend the NSCAS types according to the need addressed.
Catering for system security	
Issue and AEMO proposal	The current NSCAS quantity procedure considers only single credible contingencies when assessing system security. AEMO proposes to include the ability to restore the network to a secure state within 30 minutes following a credible contingency in the assessment.
Submissions	No submissions opposed AEMO’s proposal.
Assessment and Outcome	Including the ability to restore the system to a secure operating state within 30 minutes of a single credible contingency will assist AEMO to meet its power system security obligations under NER 4.2.6. AEMO will amend the NSCAS quantity procedure to consider the ability to restore the network to a secure state within 30 minutes following a credible contingency or protected event.
Limitations in the assessment of binding constraints	
Issue and AEMO proposal	The current NSCAS quantity procedure restricts AEMO’s assessment to the top 10 historically binding system normal constraints. AEMO proposes to allow for flexibility in the methodology such that any appropriate analysis, historical or forward-looking, can be used to identify any constraints inhibiting economic benefit.
Submissions	No submissions opposed AEMO’s proposal. One submission’s support was conditional on AEMO determining a methodology aligning with the Australian Energy Regulators (AER) Best Forecast Practice Guideline and Cost Benefit Analysis Guideline, to be included in the appendix of the procedures. One submission suggested that AEMO also seek market participant input with regards to their views of potential NSCAS gaps.
Assessment and outcome	A prescriptive methodology risks leaving some constraints outside defined assessment processes. AEMO will amend the NSCAS quantity procedure to allow for flexibility in the methodology to allow AEMO to use any appropriate analysis, historical or forward-looking. Market participants may have insights into potential NSCAS gaps unknown to AEMO that should be considered. AEMO will create a mechanism whereby market participants can recommend network issues or constraints for AEMO to consider in an annual NSCAS review.
Detailed modelling assumptions	

²⁹ NSCAS Draft Report and Determination, at https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2020/ncas/stage-2/2020-ncas-description-and-quantity-procedure-amendments-draft-report.pdf?la=en



Issue and AEMO proposal	The prescriptive modelling methodology and assumption descriptions recorded in the current NSCAS quantity procedure limit the flexibility of investigations. AEMO propose to remove the prescriptive modelling methodology and assumption descriptions and replace them with high-level modelling principles. Detailed assumptions and methodology used can then be included in the NSCAS Report.
Submissions	Two of three submissions supported AEMO's proposal, but with further recommendations: <ol style="list-style-type: none">1. One submission recommended AEMO discuss and agree assumptions with the local TNSP.2. One submission's support was conditional on AEMO providing details of the modelling assumptions coupled with an opportunity for Participants to challenge or seek further information on the modelling assumptions. One of the submissions opposed the proposal and recommended a specific and detailed methodology document be developed for the NSCAS requirements.
Assessment and outcome	AEMO accepts that transparency of how assessments will be conducted is valuable. However, this needs to be weighed against maintaining flexibility such that a wide range of varying and difficult to predict scenarios can be analysed without falling outside prescriptive methodological descriptions. TNSPs have valuable network knowledge that should inform AEMO's assumptions. AEMO will continue to consult with the TSNPs during the NSCAS review and will include study assumptions for discussion. AEMO will provide a mechanism for the participants to seek further information on the inputs and assumptions.



No.	Consulted person	Point raised in submission	AEMO response
1.	CS Energy	CS Energy is supportive of the AEMO proposal to include in the assessment the ability to restore the network to a secure state within 30 minutes following a credible contingency.	AEMO notes support of proposed changes. See section 4.2 for further detail.
2.	CS Energy	CS Energy supports the proposal to allow for flexibility in the methodology to ensure the delivery of relevant analysis that enables the identification of any constraints inhibiting net economic benefits.	AEMO notes support of proposed changes. See section 4.3 for further detail.
3.	CS Energy	CS Energy supports AEMO's proposal to adopt high-level modelling principles on the proviso AEMO provide details of the modelling assumptions coupled with an opportunity for Participants to challenge or seek further information on the modelling assumptions.	Due to time constraints on preparing an annual NSCAS review, AEMO considers that it would not be possible to consult market participants on all inputs for the NSCAS review AEMO will include high level modelling principles in the NSCAS Quantity procedure. AEMO where necessary, will publish descriptions of any relevant assumptions and methodologies used in the NSCAS review. AEMO will publish this information at the time of publication of the <i>NSCAS report</i> (for example as an appendix) or as soon as practicable thereafter. The <i>NSCAS report</i> will include contact information whereby market participants may request more detailed information regarding study assumptions and methodologies, beyond what is published in the <i>NSCAS report</i> See section 4.4 for further detail.
4.	CS Energy	CS Energy recognises the changing context for the NSCAS framework but remains unconvinced that the changes justify a change to the NSCAS description at this stage. The proposal does not acknowledge the Energy Security Board (ESB) and Australian Energy Market Commission (AEMC) workstreams on system services. CS Energy suggests that AEMO consider a change to the NSCAS description following the completion of the ESB and AEMC system services workstreams. Furthermore, there is possibility of conflicting outcomes arising on the appropriate pricing mechanisms for the provision of the system services through real time markets.	To address NSCAS gaps promptly, whilst addressing emerging issues, changes to the NSCAS types need to be implemented before the 2020 NSCAS review. Upon completion of the work currently underway by the ESB and AEMC, AEMO will reassess, where necessary, the NSCAS description and NSCAS quantity procedure in light of their findings. In the meantime, AEMO will amend the NSCAS types in the NSCAS description, classifying each type according to the need addressed, rather than according to electrical phenomena. See section 4.1 for further detail.
5.	ERM Power	ERM Power recommend that AEMO also seek market participant input with regards to their views of potential NSCAS gaps.	AEMO will create a mechanism whereby market participants can recommend network issues or constraints for AEMO to consider in an annual NSCAS review.



No.	Consulted person	Point raised in submission	AEMO response
		ERM recommend that the NSCAS procedures be amended to include the capability for market participants to propose potential NSCAS solutions to AEMO.	See section 4.3 for further detail.
6.	ERM Power	ERM Power is generally supportive of the proposed changes to the NSCAS descriptions from the provision of defined physical services to the needs of the power system that different physical services would address.	AEMO notes support of proposed changes. See section 4.1 for further detail.
7.	ERM Power	ERM Power are concerned that many of the services included as examples in the Paper could equally be supplied by real time or close to real time markets or via traditional longer duration NSCAS contracts. Whilst for some services we would support the development of interim NSCAS contracts to meet emerging power system needs on a short term basis, we are concerned that establishing interim arrangements should not lead to a delay in the development of potentially superior arrangements, such as real time markets for the provision of these services. We recommend that the NSCAS description and quantity procedures set out details with regards to this, in particular that AEMO will support, where considered appropriate by market participants, the development of market-based solutions for the required services.	Consideration of market based solutions will be addressed in the ESB Post 2025 Market Design review, to which AEMO is contributing, rather than in the NSCAS description or NSCAS quantity procedure. In the meantime, AEMO will not refer to market based solutions in the NSCAS description or NSCAS quantity procedure. See section 4.1 for further detail.
8.	ERM Power	AEMO has proposed that in considering the procurement quantities of NSCAS that AEMO be allowed to include the requirement to restore the system to a secure state within 30 minutes of the first credible contingency, which includes consideration of the potential impact to the power system of a second credible contingency during this restoration period. ERM Power is supportive of the proposed change to procure NSCAS to meet this need.	AEMO notes support of proposed changes. See section 4.2 for further details.
9.	ERM Power	ERM Power are supportive of AEMO’s proposed change to; “allow a comprehensive assessment of NSCAS requirements that may be justified to increase power transfer capability of the network.” We are also supportive of AEMO’s proposal that “this assessment should also consider changes to the power system expected within the NSCAS planning horizon of at least five years (including, but not limited to, new infrastructure such as planned transmission network augmentations, committed and anticipated development of VRE, and reactive plant, and control schemes).”	A prescriptive methodology risks leaving some constraints outside defined assessment processes. It also risks having constraint alleviation benefit analysis that consumes a material portion of the potential economic benefits of alleviating a constraint. AEMO will amend the NSCAS description and NSCAS quantity procedure to include a description of factors AEMO may consider in assessing constraints and conducting a benefit analysis of constraint alleviation. It will be as comprehensive as possible without forming a prescriptive



No.	Consulted person	Point raised in submission	AEMO response
		However, this support is conditional on AEMO detailing the methodology for such assessment and that the relevant methodology for such assessment be included as an appendix to the NSCAS description and quantity procedures. Support is also conditional on the development of this methodology in accordance with the Australian Energy Regulator's (AER) Best Forecast Practice Guideline and Cost Benefit Analysis Guideline.	methodology that limits AEMO's flexibility to tailor studies as needed on a case by case basis. See section 4.3 for further details.
10.	ERM Power	ERM Power do not support AEMO's proposal to only include "a set of higher-level modelling principles which will guide industry on the nature of the analysis." We recommend a specific and detailed methodology document be developed for NSCAS requirements.	AEMO accepts that transparency of how assessments will be conducted is valuable. However, this needs to be weighed against maintaining flexibility such that a wide range of varying and difficult to predict scenarios can be analysed without falling outside prescriptive methodological descriptions. AEMO will include high level modelling principles in the NSCAS Quantity procedure. AEMO where necessary, will publish descriptions of any relevant assumptions and methodologies used in the NSCAS review. AEMO will publish this information at the time of publication of the <i>NSCAS report</i> (for example as an appendix) or as soon as practicable thereafter. The <i>NSCAS report</i> will include contact information whereby market participants may request more detailed information regarding study assumptions and methodologies, beyond what is published in the <i>NSCAS report</i> See section 4.4 for further details.
11.	Powerlink	The reclassification of the NSCAS service into broader categories is a logical simplification and inclusive of all types of service that may be required.	AEMO notes support of proposed changes. See section 4.1 for further details.
12.	Powerlink	Powerlink supports the detailed assumptions be removed from the NSCAS quantity procedure but recommends that all assumptions should be discussed and agreed with the TNSPs during the NSCAS review process.	AEMO will consult with TNSPs during the NSCAS review, including discussing detailed study assumptions and methodologies to ensure that the most appropriate inputs are used.