

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

DRAFT REPORT AND DETERMINATION

Published: **November 2021**







NOTICE OF SECOND STAGE CONSULTATION – NETWORK SUPPORT AND CONTROL ANCILLARY SERVICES (NSCAS) DESCRIPTION AND QUANTITY PROCEDURE

National Electricity Rules – Rule 8.9

Date of Notice: 18 November 2021

This notice informs all Registered Participants and interested parties (Consulted Persons) that AEMO is commencing the second stage of its consultation on the NSCAS description and quantity procedure.

This consultation is being conducted under clause 5.20.2 of the National Electricity Rules (NER), in accordance with the Rules consultation requirements detailed in rule 8.9 of the NER.

Invitation to make Submissions

AEMO invites written submissions on this Draft Report and Determination (Draft Report). AEMO also welcomes submissions on the proposed updates to the NSCAS description and the NSCAS quantity procedure (Attachment 1) including any alternative or additional proposals you consider may improve the documents.

Please identify any parts of your submission that you wish to remain confidential, and explain why. AEMO may still publish that information if it does not consider it to be confidential, but will consult with you before doing so.

Consulted Persons should note that material identified as confidential may be given less weight in the decision-making process than material that is published.

Meetings

In your submission, you may request a meeting with AEMO to discuss the matter under consultation, stating why you consider a meeting is necessary or desirable.

If appropriate, meetings may be held jointly with other Consulted Persons. Subject to confidentiality restrictions, AEMO will generally make details of matters discussed at a meeting available to other Consulted Persons, and may publish them.

Closing Date and Time

Submissions in response to this Notice of Second Stage of Rules Consultation should be sent by email to planning@aemo.com.au, to reach AEMO by 5.00pm (AEDT) on 2 December 2021.

All submissions must be forwarded in electronic format (both pdf and Word). Please send any queries about this consultation to the same email address.

Submissions received after the closing date and time will not be valid, and AEMO is not obliged to consider them. Any late submissions should explain the reason for lateness and the detriment to you if AEMO does not consider your submission.

Publication

All submissions will be published on AEMO's website, other than confidential content.



EXECUTIVE SUMMARY

The publication of this Draft Report and Determination (Draft Report) commences the second stage of the Rules 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).

AEMO forecasts increasing occurrences of NEM mainland operational demand falling below the expected minimum threshold for operation¹ over the coming five-year period. In order to adjust power system planning assessments to respond to this unprecedented situation, in the Notice of First Stage of Consultation released on 4 October 2021 AEMO proposed to amend the current NSCAS description and quantity procedure to facilitate the broader use of a planning assumption for no pre-contingent line switching for voltage control.

While noting that switching a transmission line (or lines) can reduce voltages during low demand periods, AEMO considers that this can create other risks on the system.

AEMO received two submissions in response to the Notice of First Stage of Consultation. The submissions were generally supportive of the proposed amendment, with recommendations that AEMO supports, in relation to improved transparency and suggested alternative wording. Table 1 summarises AEMO’s response to the key issues raised in the submissions.

Table 1 AEMO response to key issues raised in submissions on the Notice of First Stage of Consultation

Pre-Contingent Line Switching for Voltage Management	
Issue and AEMO proposal	AEMO considers that pre-contingent line switching should no longer be assumed for voltage management in NSCAS planning studies, due to unprecedented minimum demand conditions, asset management risks and operational considerations. AEMO proposes amending the NSCAS description and quantity procedure to assume no pre-contingent line switching in NSCAS planning studies unless there is a regionally-specific justification.
Submissions	Two submissions were received. Both submissions supported AEMO’s proposed changes to the pre-contingent line switching assumption, with one proposing alternative wording to clarify AEMO’s intent. Both submissions raised an expectation of transparency when regionally-specific exceptions applies, as well as a number of additional matters.
Assessment and outcome	Amending the pre-contingent line switching assumption will allow AEMO to align its planning assumptions with the context of declining minimum demand and ensure that the system is designed to more efficiently maintain reliability and security with manageable operational risks. AEMO agrees with stakeholder feedback that the proposed amendment should be reworded to better reflect AEMO’s intent. The updated proposed wording is included in the draft NSCAS description and quantity procedure provided with this report. AEMO acknowledges the importance of transparency and will publish any rationale regarding the use of pre-contingent line switching in NSCAS studies. AEMO has also responded to each of the additional matters raised.

After considering the submissions received, AEMO’s draft determination is to amend the NSCAS description and the NSCAS quantity procedure in the form published with this Draft Report and Determination.

¹ AEMO, 2021 Electricity Statement of Opportunities, August 2021, https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2021/2021-nem-esoo.pdf



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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 indicative timeline for this consultation is outlined below. Future dates may be adjusted depending on the number and complexity of issues raised in submissions.

Deliverable	Indicative date
Notice of first stage consultation published	4 October 2021
First stage submissions closed	8 November 2021
Draft Report & Notice of second stage consultation published	18 November 2021
Submissions due on Draft Report	2 December 2021
Final Report published	Between 7 and 17 December 2021

The publication of this Draft Report marks the commencement of the second stage of consultation. Note that there is a glossary of terms used in this Draft Report at Appendix A.

2. BACKGROUND

2.1. NER requirements

AEMO is responsible for managing power system security and reliability of supply in the 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 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 need². 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 standard³; 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 market⁴.

AEMO is required to develop and publish an NSCAS description providing a detailed description of each type of NSCAS, and an NSCAS quantity procedure explaining the determination of the location and quantity of each type of NSCAS required⁵. 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.

² The NSCAS definition is in the Chapter 10 Glossary of the NER Version 144.

³ NSCAS need definition, Chapter 10 glossary, NER Version 144. 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 NSCAS need definition, Chapter 10 glossary, NER Version 144. 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*

⁵ AEMO. Network Support and Control Ancillary Service (NSCAS) Description and Quantity Procedure, published September 2020, accessible via https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2020/ncas/2020-ncas-description-and-quantity-procedure.pdf

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 at any time 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, via connection agreements or network support agreements. In cases where AEMO does not consider that an NSCAS gap will be met, where the gap relates to preventing an adverse impact on power system security and reliability of supply of the transmission network, AEMO may use reasonable endeavours to acquire the necessary NSCAS itself via an ancillary services agreement.

2.2. Context for this consultation

Australia is experiencing what is acknowledged to be the world's fastest energy transition⁸. AEMO has forecast that the occurrence of operational demand falling below 6 GW in the NEM mainland (excluding Tasmania) is increasing over the coming 5-year period, most notably in the middle of the day due to distributed PV generation uptake. AEMO's 2021 Electricity Statement of Opportunities notes that minimum operational demand of 4 to 6 GW may be required in the mainland NEM to ensure delivery of essential system security services with the present operational toolkit⁹. AEMO considers that power system planning and operational practices must be urgently reviewed and adjusted to respond to this unprecedented situation.

In September 2020, AEMO published its updated NSCAS description and NSCAS quantity procedure in order to allow NSCAS reviews to appropriately respond to challenges introduced by the energy transition. After applying the updated description and quantity procedure for delivery of the 2020 NSCAS review¹⁰, AEMO found that some traditional network planning assumptions may no longer be fit for purpose.

AEMO has previously assumed in planning assessments that one transmission line per region can be switched out of service before a credible contingency event ('pre-contingent') to manage voltage levels at times of minimum demand. This assumption is aligned with historical operational practices and historical power system design. Switching a transmission line (or lines) out of service can reduce voltages during low demand periods. However, switching transmission lines out of service creates other risks because:

- Maintaining system security under unprecedented minimum demand conditions is now differing from many historically planned-for system security challenges.
- Asset management risks must be considered when assuming more frequent switching practices.
- Increased forecast occurrence of minimum demand as well as the shift to daytime minima ahead of evening ramping events introduces an increased likelihood that power system operators would need to switch lines in the middle of the day and return to service in time for evening peak demand events. AEMO considers that it may not be practically feasible for power system operators to implement this safely for multiple lines across multiple regions on a recurring basis.

Consequently, AEMO believes there is a need to consult on the existing line switching assumption for NSCAS studies. AEMO proposes that pre-contingent line switching should no longer be assumed in system normal planning studies for the management of high voltages unless there is a regionally-specific justification.

⁷ NER 5.20.3.

⁸ AEMO, 2020 Integrated System Plan, July 2020, accessible via <https://aemo.com.au/-/media/files/major-publications/isp/2020/final-2020-integrated-system-plan.pdf>

⁹ AEMO, 2021 Electricity Statement of Opportunities, Chapter 5 'Factors and implications of an accelerated transition', August 2021, accessible via https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2021/2021-nem-esoo.pdf

¹⁰ AEMO, 2020 Network Support and Control Ancillary Services Report, December 2020, accessible via <https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/planning-for-operability>



2.3. First stage consultation

AEMO issued a Notice of First Stage Consultation on 4 October 2021. This information is available on AEMO’s website¹¹. The topic of this consultation is the proposed amendment to the NSCAS description and quantity procedure to assume no pre-contingent line switching for voltage management unless there is a regionally-specific justification.

In the first stage consultation, AEMO sought views on its proposal to amend the NSCAS description and the NSCAS quantity procedure. The current arrangements and proposed amendments are summarised in Table 2.

Table 2 Proposed changes to NSCAS description and quantity procedure from the Notice of First Stage Consultation

	Summary of existing and proposed line-switching assumptions
Current	“AEMO will conduct the NSCAS review by applying the planning assumption that one transmission line per region may be switched out of service in order to meet system security and reliability obligations such as addressing high voltage levels. Exceptions to this approach will include plausible network conditions which permit the assumption that more than one line may be switched in a region (or sub-region), or conversely plausible network conditions for which assuming pre-contingent switching of any transmission lines is not feasible. These exceptions would be subject to an appropriate assessment by AEMO of the risk associated with such an assumption, informed by the experience of the relevant AEMO and TNSP system operators.”
Proposed	“AEMO will conduct the NSCAS review by applying the planning assumption that no transmission line per region may be switched out of service in order to meet system security and reliability obligations such as addressing high voltage levels. Exceptions to this approach may include plausible network conditions which permit the assumption that one or more lines may be switched in a region (or sub-region), informed by the experience of the relevant AEMO and TNSP system operators.”

AEMO received two 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/consultations/current-and-closed-consultations/network-support-and-control-ancillary-services-description-and-quantity-procedure-consultation>.

3. SUMMARY OF MATERIAL ISSUES

The key material issues arising from the proposal and raised by Consulted Persons are summarised in the following table:

No.	Issue	Raised by
1.	Need to clarify that the assumption is for pre-contingent line switching.	Shell Energy
2.	Need for transparency about regionally-specific application of line switching assumption.	CS Energy, Shell Energy

¹¹ See AEMO’s current consultation on Network Support and Control Ancillary Services description and quantity procedure Consultation, October 2021, accessible via <https://aemo.com.au/consultations/current-and-closed-consultations/network-support-and-control-ancillary-services-description-and-quantity-procedure-consultation>



AEMO received two written submissions from stakeholders. The written submissions were from:

- CS Energy
- Shell Energy.

AEMO would like to thank all stakeholders who provided feedback throughout this process. A detailed summary of issues raised by Consulted Persons in submissions, together with AEMO's responses, is contained in **Appendix B**.

4. DISCUSSION OF MATERIAL ISSUES

This section discusses the material issues raised, along with AEMO's considerations and conclusions. Appendix B summarises all issues raised.

4.1. Need to Clarify that Assumption is for Pre-Contingent Line Switching

Submissions were provided by CS Energy and Shell Energy. Both proposals were generally supportive of AEMO's proposal and the submissions re-affirm the risks associated with line switching. Two material issues were raised, as addressed in the sections below.

4.1.1. Issue summary and submissions

Shell Energy proposed adjusted wording for the NSCAS description and quantity procedure, to clarify that while pre-contingent line switching should not be assumed for planning studies, post-contingent line switching should be considered allowable to manage the next contingency event from a planning perspective.

4.1.2. AEMO's assessment

AEMO agrees that the intent of the proposed amendment is for the application of a pre-contingent line switching assumption, not for post-contingent line-switching assumptions. AEMO agrees with Shell Energy that the wording of the assumption should explicitly reflect this intent, and proposes the following alternative wording to provide clarity:

"AEMO will conduct the NSCAS review by applying the planning assumption that no transmission line per region may be switched out of service *before a credible contingency event* in order to meet system security and reliability obligations..."

4.1.3. AEMO's conclusion

AEMO's draft determination is to amend the line switching assumption in the NSCAS description and quantity procedure. AEMO has incorporated Shell Energy's feedback to be explicit in stating that the amended assumption relates to pre-contingent line switching from a planning perspective, with the following proposed wording:

"AEMO will conduct the NSCAS review by applying the planning assumption that no transmission line per region may be switched out of service *before a credible contingency event* in order to meet system security and reliability obligations such as addressing high voltage levels. Exceptions to this approach may include plausible network conditions which permit the assumption that one or more lines may be switched in a region (or sub-region), informed by the experience of the relevant AEMO and TNSP system operators."

Please refer to the draft NSCAS description and quantity procedure in Attachment 1 for more details.



4.2. Need for Transparency about Regionally-Specific Application of Line Switching Assumption.

4.2.1. Issue summary and submissions

Submissions from CS Energy and Shell Energy both raised an expectation of transparency where there is an exception to assuming no pre-contingent line switching for the purposes of the NSCAS description and quantity procedure.

4.2.2. AEMO's assessment

AEMO acknowledges the importance of transparency and agrees to publish information about any regionally-specific exceptions made to the pre-contingent line switching assumption.

4.2.3. AEMO's conclusion

AEMO notes CS Energy's preference for transparency about situations where line switching will be assumed in planning studies. AEMO will publish any rationale (including advice from the relevant TNSP, if any) in the relevant documents, for example in the annual Network Support and Control Ancillary Services reports.

5. OTHER MATTERS

AEMO has also made some minor changes to formatting to ensure consistency with the Rules definitions for the terms credible contingency event, protected event and TNSP.

6. DRAFT DETERMINATION

Having considered the matters raised in submissions, AEMO's draft determination is to **amend** the **NSCAS description and quantity procedure** shown in the form of Attachment 1, in accordance with clause 5.20.2 of the NER.



APPENDIX A. GLOSSARY

Term or acronym	Meaning
AEMO	Australian Energy Market Operator
NEM	National Electricity Market
NEMOC	National Energy Market Operations Committee
NSCAS	Network Support and Control Ancillary Service
TNSP	Transmission Network Service Provider



APPENDIX B. SUMMARY OF SUBMISSIONS AND AEMO RESPONSES

No.	Consulted person	Point raised in submission	AEMO response
1.	CS Energy	“CS Energy is strongly supportive of AEMO’s proposal to change the existing assumption regarding line switching for voltage management in the current NSCAS description and quantity procedure and considers it a step in the right direction.”	AEMO notes CS Energy’s support for this change.
2.	CS Energy	“CS Energy has continued to express concern about the observed routine and patterned line switching for voltage management in the operational domain. This has been raised to AEMO both in written correspondence and at a variety of forums hosted by AEMO that included discussions on system security challenges”	AEMO notes CS Energy’s concern around line switching for voltage management.
3.	CS Energy	“Since 2018, CS Energy with interest from the AEMC has encouraged AEMO to form a NEM voltage control working group that could reside under existing operational working groups or as a standalone group.”	AEMO notes CS Energy’s interest in the establishment of a voltage control working group. However, at this stage, AEMO intends to continue with its existing industry consultation practices for matters such as these, for example through membership of the National Electricity Market Operations Committee ¹² .
4.	CS Energy	<p>CS Energy note their support for AEMO’s proposal through the proposed amendment, however raised its expectations on transparency and the consideration of non-network solutions.</p> <p>“[...] CS Energy would expect any agreement between the local Transmission Network Provider (TNSP) and AEMO to be transparent and available to Participants. The information would provide transparency and potential opportunities for viable non-network solutions, that could include VRE synchronous condensers required for connection to the network to be utilised in the management of voltages in the NEM.”</p>	<p>AEMO agrees with CS Energy that network and non-network options should be considered when addressing NSCAS gaps, consistent with the existing regulatory framework.</p> <p>AEMO notes CS Energy’s preference for transparency about situations where line switching will be assumed in planning studies. AEMO will publish any rationale (including advice from the relevant TNSP, if any) in the relevant documents, for example in the annual Network Support and Control Ancillary Services reports.</p>

¹² See AEMO’s website for further details on NEMOC, accessible via <https://aemo.com.au/en/consultations/industry-forums-and-working-groups/list-of-industry-forums-and-working-groups/national-electricity-market-operations-committee-nemoc>



No.	Consulted person	Point raised in submission	AEMO response
5.	Shell Energy	<p>“Shell Energy supports AEMO’s intent to amend the NSCAS description and quantity procedure [... and agrees] that switching out lines during the middle of the day will increasingly expose the system to additional risk”</p> <p>“Taking lines out of service for any reason reduces system security and increases system losses, which is reflected in indirect costs to all stakeholders.”</p>	AEMO notes Shell Energy’s support for this change.
6.	Shell Energy	<p>Shell Energy proposes the following change to the proposed amendment, to clarify AEMO’s intent that post-contingent line switching is allowable to manage the next contingency event from a planning perspective:</p> <p>“AEMO will conduct the NSCAS review by applying the planning assumption that no transmission line per region may be switched out of service before a credible contingency event in order to meet system security and reliability obligations post contingency such as addressing high voltage levels. Exceptions to this approach may include plausible network conditions which permit the assumption that one or more lines may be switched in a region (or sub-region), informed by the experience of the relevant AEMO and TNSP system operators.”</p>	<p>AEMO notes Shell Energy has proposed alternative wording. AEMO agrees that the amendment should be explicit in stating that the assumption is that line switching should not be considered before a contingency event from a planning perspective. As such, AEMO now proposes the following alternative wording:</p> <p>“AEMO will conduct the NSCAS review by applying the planning assumption that no transmission line per region may be switched out of service before a credible contingency event in order to meet system security and reliability obligations such as addressing high voltage levels. Exceptions to this approach may include plausible network conditions which permit the assumption that one or more lines may be switched in a region (or sub-region), informed by the experience of the relevant AEMO and TNSP system operators.”</p>
7.	Shell Energy	<p>Shell Energy recommend that the process for exceptions to the default “no line switching” assumption is formal and transparent.</p> <p>“In our view, it is insufficient for there to be a non-publicised agreement between the local TNSP and AEMO. We recommend that, if there is an exception, AEMO should publish the rationale. This could be either as a short standalone report, or as part of an existing process (e.g., the General Power System Risk Review).”</p>	AEMO notes Shell Energy’s preference for transparency about situations where line switching will be assumed in planning studies. AEMO will publish any rationale (including advice from the relevant TNSP, if any) in the relevant documents, for example in the annual Network Support and Control Ancillary Services reports. AEMO does not currently consider this assumption to be strongly relevant for the General Power System Risk Review.
8.	Shell Energy	Shell Energy note the need for additional reactive power support to manage voltage levels without pre-contingent line switching, and raise the likely involvement of inverter-connected technologies in achieving the most efficient outcome.	AEMO agrees that a range of solutions are possible to meet reactive power requirements in the power system. AEMO agrees with Shell Energy that network and non-network options should be considered when addressing NSCAS gaps, consistent with the existing regulatory framework



No.	Consulted person	Point raised in submission	AEMO response
9.	Shell Energy	"[Shell Energy] ask AEMO to consider if a NSCAS contract(s) could be used to reduce or remove the need for ongoing directions in South Australia"	AEMO notes Shell Energy's suggestion about ongoing directions in South Australia. AEMO will continue to publish information about system security in South Australia, and will continue to consider system security issues through the NSCAS process and other AEMO processes.



APPENDIX C. ATTACHMENT 1 – DRAFT NSCAS DESCRIPTION AND QUANTITY PROCEDURE

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