

# Security Enablement Procedures

Consultation paper -  
Standard consultation for the  
National Electricity Market

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New South Wales | Queensland | South Australia | Victoria | Australian Capital Territory | Tasmania | Western Australia

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## Explanatory statement and consultation notice

This consultation paper commences the first stage of the standard rules consultation procedure conducted by AEMO to consider updates to the Security Enablement Procedures (**Procedures**) (**proposal**) under National Electricity Rules (**NER**) 4.4A.6(a). The standard rules consultation procedure is described in NER 8.9.2.

### Context

On 28 March 2024, the Australian Energy Market Commission (**AEMC**) made a final determination in relation to the *Improving security frameworks for the energy transition* rule change<sup>1</sup>. The determination introduced the National Electricity Amendment (Improving security frameworks for the energy transition) Rule 2024 (**ISF Rule**)<sup>2</sup> to improve market arrangements for system security services. The ISF Rule evolves existing frameworks with the aim of ensuring sufficient system security services are provided as the power system continues to transition to higher penetrations of inverter-based resources (**IBR**). It requires AEMO to assess and enable the necessary system security services in operational timeframes to ensure that the power system is secure day-to-day<sup>3</sup>.

The enablement of all system security services under the ISF Rule commenced on 2 December 2025 and must be conducted in accordance with the Procedures, the first version of which was published on 31 August 2025.

The proposed changes to the Procedures include updates to:

- how AEMO determines, and enables system strength services to support, the level of stable voltage waveform requirements,
- when an enablement instruction issued to a system security services provider will be considered, under normal circumstances, as firm,
- the treatment of dispatchable plant with multiple units that are determined to be in commercial operation,
- how AEMO will inform the market should the automated scheduler have an outage, and
- that AEMO may require transitional services to be enabled through a process other than that documented in the Procedures.

In developing the changes to these Procedures, AEMO's continued focus is a framework that allows enablement of system security services in a transparent way that evolves over time. This includes:

- the assessment of security service needs over the pre-dispatch timeframe and the impact of stable voltage waveform enablement on emissions and efficiency
- ongoing collaboration with transmission network service providers (**TNSPs**) on how the enablement of system security services for stable voltage waveform best aligns with their system strength planning obligations
- adaptation of the procedure to AEMO's increased understanding of the solution during the progressive implementation approach.

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

<sup>2</sup> See <https://www.aemc.gov.au/sites/default/files/2024-04/Final%20Rule%20-%20in%20mark%20up.pdf>.

<sup>3</sup> See <https://www.aemc.gov.au/sites/default/files/2024-03/ERC0290%20-%20ISF%20final%20determination.pdf>.

A track marked version of proposed changes to the Procedures has been provided as part of this consultation process.

## Proposal

AEMO proposes updates to the Procedures, with particular consideration of:

- TNSP obligations under the 'Efficient management of system strength on the power system' rule change<sup>4</sup> to support dispatch of IBR which elect to pay the system strength charge,
- TNSP advice on the stable voltage waveform requirements for IBR that are paying the system strength charge and the services that can meet those requirements, and
- AEMO's development timelines and an incremental approach to expanding automated enablement process capability from December 2025.

The procedures will continue to be aligned with:

- the NSCAS Descriptions and Quantities Procedure,
- the System Strength Requirements Methodology,
- the Inertia Requirements Methodology, and
- the Transition Plan for System Security<sup>5</sup>.

For detailed information on the proposal and AEMO's reasoning, please see subsequent sections of this paper.

## Consultation notice

AEMO is now consulting on this proposal and invites written submissions from interested persons on the issues identified in this paper to [NEMReform@aemo.com.au](mailto:NEMReform@aemo.com.au) by 5:00 pm (Melbourne time) on 10 April 2026.

Submissions may make alternative or additional proposals you consider may better meet the objectives of this consultation and the national electricity objective in section 7 of the National Electricity Law. Please include supporting reasons.

Before making a submission, please read and take note of AEMO's consultation submission guidelines, at <https://aemo.com.au/consultations>. Subject to those guidelines, submissions will be published on AEMO's website.

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

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. Interested persons can request a meeting with AEMO to discuss any particularly complex, sensitive or confidential matters relating to the proposal.

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<sup>4</sup> See <https://www.aemc.gov.au/rule-changes/efficient-management-system-strength-power-system>.

<sup>5</sup> See <https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/transition-planning>.

Please refer to NER 8.9.1(k). Meeting requests must be received by the end of the submission period and include reasons for the request. AEMO will try to accommodate reasonable meeting requests but, where appropriate, we may hold joint meetings with other stakeholders or convene a meeting with a broader industry group. Subject to confidentiality restrictions, AEMO will publish a summary of matters discussed at stakeholder meetings.

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# 1. Stakeholder consultation process

As required by the National Electricity Rules (**NER**) 4.4A.6, AEMO is consulting on changes to the Procedures (**proposal**) in accordance with the standard rules consultation procedure in NER 8.9.2. AEMO has also conducted a series of meetings and one-on-one engagements with TNSPs in 2026 to inform the preparation of this consultation paper and the updated Procedures.

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

AEMO’s indicative process and timeline for this consultation are outlined below. Future dates may be adjusted and additional steps may be included if necessary, as the consultation progresses.

Consultation steps	Dates
Briefing to Electricity Wholesale Consultative Forum*	4 March 2026
Draft updated procedure and consultation paper published	6 March 2026
Submissions due on draft updated procedure and consultation paper	10 April 2026
Draft report published	Expected 1 May 2026
Submissions due on draft report	Expected 22 June 2026
Final report and updated procedure published	Expected 31 July 2026

\* See <https://aemo.com.au/consultations/industry-forums-and-working-groups/list-of-industry-forums-and-working-groups/electricity-wholesale-consultative-forum>.

## Questions

1. What specific areas would you like more in-depth material or information from AEMO on?

## 2. Background

### 2.1. Context for this consultation

Under the National Electricity Amendment (Improving security frameworks for the energy transition) Rule 2024 (**ISF Rule**)<sup>6</sup>, AEMO has been given a new power to enable system security services provided or procured by TNSPs or procured by AEMO to meet minimum system security requirements and to meet stable voltage waveform requirements.

The intention of this framework is to enable the most cost-efficient system security services available to maintain system security in the transition to a low or zero-emissions power system, and system strength services to meet stable voltage waveform requirements when appropriate to do so.

System security services include:

- system strength services,
- inertia network services,
- network support and control ancillary services (**NSCAS**), and
- transitional services (introduced by the ISF Rule).

Figure 1 illustrates the interaction between frameworks that are the subject of the Procedures. Transitional services, introduced under the ISF Rule, are also the subject of these procedures but are not included in Figure 1 as they do not relate to system strength or inertia. The same applies to NSCAS not related to system strength or inertia, for example, voltage control.

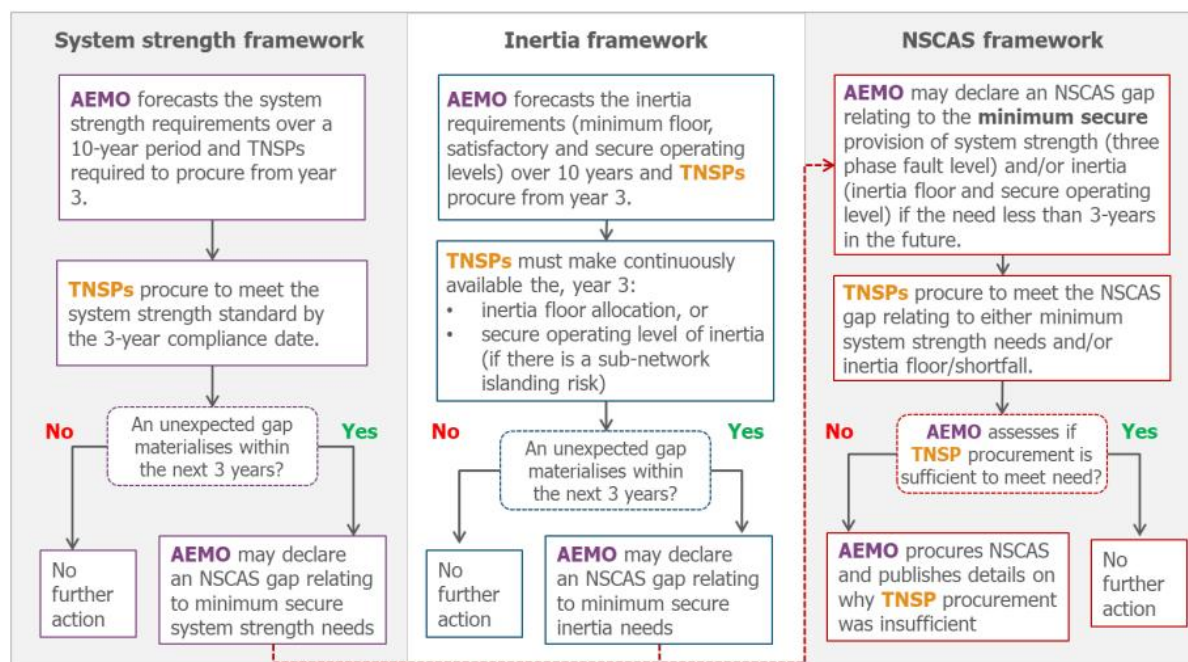
AEMO is taking an incremental approach to the implementation of the new system security services enablement framework under the ISF Rule. The intention is to adopt an approach in consultation with industry that provides an ongoing opportunity to develop the framework further as understanding of the available services, their enablement capabilities, the ongoing need and the impact of enablement on electricity market operation deepens.

The Procedures establish how AEMO will determine the minimum system security and stable voltage waveform requirements and the methodology by which system security services will be enabled to meet these requirements.

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<sup>6</sup> See <https://www.aemc.gov.au/rule-changes/improving-security-frameworks-energy-transition>.

Figure 1 Interaction between system strength, inertia and NSCAS frameworks



Note: From Australian Energy Market Commission (AEMC) Final Determination, page 37 Figure 3.8. While this figure shows the relationship between these three frameworks, the scope of NSCAS gap declarations is broader than only system strength and inertia. NSCAS can include any characteristic necessary to maintain the security and supply reliability of the transmission network in accordance with the power system security standards and the reliability standard.

## 2.2. NER requirements

NER 4.4A.6 specifies the following requirements for changes to the Procedures that are the subject of this consultation paper:

- (a) AEMO must develop and publish procedures for the enablement of system security services (Security Enablement Procedures), which must include: .....
  - (2) a methodology for the enablement of system security services in accordance with the enablement principles in clause 4.4A.4; .....
  - (4) a description of how AEMO determines the level of stable voltage waveform requirements under clause 4.4A.1(b) and how it will enable system strength services under a system strength services agreement to support this level.
- (b) AEMO must comply with the Rules consultation procedures when making or amending the Security Enablement Procedures.

### 2.2.1. Enablement of system security services

NER 4.4A.1 establishes the objective of system security service enablement that informs changes to the Procedures:

AEMO may, at any time, enable:

- (a) any system security services to achieve and maintain the minimum system security requirements; and
- (b) system strength services to achieve and maintain stable voltage waveforms for the level and type of inverter based resources and market network service facilities that AEMO forecasts would be

*dispatched in the relevant trading interval if this were not limited by system strength services (stable voltage waveform requirements),*

*in accordance with this rule 4.4A and the Security Enablement Procedures.*

## 2.2.2. System security service enablement principles

NER 4.4A.6(a)(2) references enablement principles. These are defined in NER 4.4A.4 and AEMO is required to use reasonable endeavours to give effect to these principles when enabling services under 4.4A.1:

- (a) the system security services that are enabled should be the lowest total cost combination required to achieve and maintain the minimum system security requirements and the stable voltage waveform requirements;*
- (b) a system security service should be enabled as close as practicable to the relevant trading interval, and in any case, enabled no more than 12 hours ahead of the trading interval;*
- (c) a system security service should only be enabled where, in AEMO's reasonable opinion, the minimum system security requirements or the stable voltage waveform requirements would not be met but for such enablement;*
- (d) when enabling a system security service to achieve the stable voltage waveform requirements, where such services are required in addition to those required to achieve the minimum system security requirements, AEMO should:*
  - (1) only enable a quantity of system strength services that is reasonably necessary to achieve stable voltage waveforms for the level and type of inverter based resources and market network service facilities that AEMO projects could be dispatched in the relevant trading interval; and*
  - (2) not enable a system strength production unit if enabling that unit would result in significant adverse effects on power system efficiency or power system emissions.*

## 2.3. The national electricity objective

Within the specific requirements of the NER applicable to this proposal, AEMO will seek to make a determination that is consistent with the national electricity objective (**NEO**) and, where considering options, to select the one best aligned with the NEO.

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

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

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

## 3. Security Enablement Procedures

At a high level, the main proposed changes to the Procedures are:

1. Clarification that ‘always on’ security services are enabled whenever they are contributing to achieving and maintaining the minimum system security requirements or the stable voltage waveform requirements after commencement of the relevant contract. ‘Always on’ services will be subject to a single enablement decision by AEMO.
2. An approach to enablement for stable voltage waveform that meets the principles, aligns with the system strength obligations of TNSPs, and is appropriate for the scale and frequency of which AEMO expects to be enabling to meet the stable voltage waveform requirement.
3. Removal of the cost threshold at which an enablement instruction will be replaced with a lower cost and treatment of an enablement instruction that is issued at or after the initial enablement instruction (IEI) time or minimum activation time as firm.
4. A new set of assumptions for plant with multiple units when determining if the plant is in commercial operation as the current Procedures do not allow for a multi-unit scenario.
5. Amendment to the approach for market notification should the automated scheduler have an outage
6. Clarification that transitional services may be enabled through a process other than NER 4.4A.1

These areas are discussed in the following sections.

### 3.1. Enablement of ‘always on’ contracts

Under NER 4.4A.1, only AEMO may enable a system security service. In developing a contract approval process with TNSPs for TNSP procured system security services, AEMO has identified a need to clarify how an ‘always on’ service is enabled.

NER Chapter 10 defines ‘enable’ as:

*A system security service is enabled when AEMO has selected the relevant service, and the service is contributing to achieving and maintaining the minimum system security requirements or the stable voltage waveform requirements.*

Given this definition, and the nature of ‘always on’ contracts, AEMO considers it appropriate to implement a single enablement decision at the point the relevant service has begun to be provided following commencement of the contract. It is proposed that the enablement is effective at the date of the service commencement and for the duration of the contracted service. AEMO considers that no further enablement instruction is required, and that the terms of each contract regarding, for example, availability and outage management can operate under that single enablement decision.

AEMO has added clarification of this approach in the Procedures.

### 3.2. New approach to enabling for stable voltage waveform

#### 3.2.1. Stable voltage waveform rule requirements

The stable voltage waveform requirements as defined in NER 4.4A.1(b) are intended to support IBR

that would be dispatched if not constrained for system strength reasons. These requirements are sometimes known as the efficient level of stable voltage waveform. AEMO may enable system strength services to achieve and maintain the stable voltage waveform requirements.

NER 4.4A.6 specifies

- (a) *AEMO must develop and publish procedures for the enablement of system security services (Security Enablement Procedures), which must include:*

.....

- (4) *a description of how AEMO determines the level of stable voltage waveform requirements under clause 4.4A.1(b) and how it will enable system strength services under a system strength services agreement to support this level.*

The ISF Rule provides AEMO with the ability to enable system security services to achieve and maintain the stable voltage waveform requirements. In doing so, AEMO must use reasonable endeavours to give effect to certain principles set out in NER 4.4A.4(d), namely:

- (1) *only enable a quantity of system strength services that is reasonably necessary to achieve stable voltage waveforms for the level and type of inverter-based resources and market network service facilities that AEMO projects could be dispatched in the relevant trading interval; and*
- (2) *not enable a system strength production unit if enabling that unit would result in significant adverse effects on power system efficiency or power system emissions.*

Achieving and maintaining the stable voltage waveform requirements using system strength services is a new operational process with no existing National Electricity Market (**NEM**) mechanisms that can be leveraged to meet this obligation and limited theoretical development to draw upon.

Current instances of system strength impacts limiting IBR are infrequent and/or isolated. System strength limits advice provided by TNSPs<sup>7</sup> does not generally put limitations on IBR dispatch based on unit combinations in system normal conditions<sup>8</sup>. AEMO's recent analysis has identified that system strength currently represents less than 4% of all IBR curtailment.

It is important to note that AEMO does not consider that time and cost spent on a complex system to automate operational enablement of stable voltage waveform services is an efficient outcome at this time, given the current infrequent need for stable voltage waveform services and AEMO's expectation that a proportion of contracts to meet this need will be 'always on' (and therefore not requiring enablement by AEMO in the operational timeframe).

AEMO believes a simple and transparent approach that is commensurate with the anticipated frequency of enablement is most appropriate. Reassessment of this approach can occur when a greater number of services are required to be enabled in the operational timeframe and a clear benefit in automation of these processes presents itself.

<sup>7</sup> See <https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/congestion-information-resource/limits-advice>.

<sup>8</sup> There is a scenario in Queensland that is an exception to this statement.

### 3.2.2. AEMO's initial approach to stable voltage waveform requirement

In Section 5.1 of the current Procedures, high level guidance has been established on how AEMO will manage enablement for the stable voltage waveform requirement. This includes:

- requiring limits advice from TNSPs that identifies system strength services that should be enabled to support IBR unit dispatch,
- consideration of bespoke or manual processes that would facilitate AEMO's ability to manage enablement in accordance with limits advice,
- prioritisation of continuous ('always on') system strength services, and
- delegation to TNSPs where appropriate, efficient and separable from scheduling for minimum requirements.

AEMO's consultation paper for the current version of the Procedures identified that an automated enablement process for stable voltage waveform will consider the requirement to enable services that have been procured by TNSPs and paid for by IBR connecting parties to centrally remediate IBR that would be otherwise dispatch-limited as a result of system strength impacts.

AEMO's understanding of the minimum system security services scheduler solution has increased during implementation, and AEMO has clarified that automation for stable voltage waveform is not feasible in the near term for reasons of complexity and cost:

- The scheduler relies on energy targets in pre-dispatch. It has no understanding of system strength related constraints on IBR.
- The scheduler cannot differentiate between minimum security requirements constraints and stable voltage waveform constraints. In the scheduler, failure to meet a stable voltage waveform constraint will be treated in the same way as failure to meet minimum security constraints and AEMO's automated monitoring tools and alarms will identify if the power system is not in a secure operating state.

### 3.2.3. Updated approach to stable voltage waveform requirement

In the consultation on these Procedures in 2025, AEMO identified that it would consult on subsequent amendments prior to AEMO commencing enablement to meet the stable voltage waveform requirement. The timing of this need is now anticipated to be late 2026.

AEMO has considered the requirement under NER 4.4A.4(d) not to enable a production unit to provide system strength services to meet the stable voltage waveform requirement if enabling that unit would result in significant adverse effects on power system efficiency or power system emissions. As highlighted in the previous consultation, the key focus area for specifying this methodology is identifying a practicable solution that is reasonably achievable within the timeframe.

AEMO's updated approach:

- expands on the guidance in the current Procedures with a series of guardrails that:
  - maintains the stable voltage waveform relationship with the Efficient management of system strength on the power system rule change<sup>9</sup>, and
  - allows for a simple and transparent approach to meeting AEMO's obligations under NER 4.4A.4(d), and

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<sup>9</sup> See <https://www.aemc.gov.au/rule-changes/efficient-management-system-strength-power-system>.

- clarifies that, notwithstanding the above, AEMO will consider for enablement any contract for stable voltage waveform that is either approved by the Australian Energy Regulator (**AER**), the service is a part of a regulatory investment test for transmission (**RIT-T**), or are the subject of a published federal or state mandate.

AEMO's expectation of a low number of stable voltage waveform services requiring considerable operational enablement leads AEMO to consider that the likelihood of significant adverse effects on power system efficiency resulting from enablement of these services is low. However, AEMO considers it is appropriate to set high-level guardrails to reflect its obligations under NER 4.4A.4(d)(2) to consider power system efficiency, power system emissions and enablement only when reasonably necessary to support IBR dispatch.

AEMO recognises that TNSPs will look to contract for services based on planning forecasts and may require AEMO to approve these contracts prior to limits advice being developed. AEMO will facilitate this outcome but for the avoidance of doubt, AEMO will consider the commencement of service and therefore enablement once limits advice has been received by AEMO and its due diligence process completed.

### Prior approval of stable voltage waveform services

AEMO does not consider it appropriate to reject a stable voltage waveform contract that a TNSP can demonstrate has been approved by the AER, the service is part of a RIT-T process or is required to meet a government mandate. Where a TNSP attests to the fact, AEMO will consider for approval stable voltage waveform contracts that have been approved by any of the following processes:

- the service is part of a RIT-T,
- the contract has undergone the AER non mandatory approval process documented under NER 6A.6.6A(a), or
- the contract is subject of a published state or federal government mandate.

This includes the circumstance where not all guardrails are satisfied. However, AEMO's enablement pre-requisites required for approval will still need to be satisfied.

### Efficient management of system strength on the power system rule change

NER 5.3.4B allows a connection applicant to determine the method for connecting IBR to remediate their system strength impact, including through:

1. central remediation that requires the connecting IBR to pay the TNSP for centrally procured system strength services to support their dispatch, or
2. a system strength remediation scheme behind the IBR connection point, or
3. a system strength remediation scheme on the network funded by the IBR connecting party (system strength connection works).

AEMO considers that ensuring that TNSP contracts are relieving system strength constraints on IBR resources which are paying for that service, through the central remediation mechanism, allows AEMO to be satisfied that the service is not being cross subsidised by parties that do not benefit from it, representing an efficient outcome for the power system in alignment with NER 4.4A.4(d).

### Simple and transparent approach

In developing the guardrails, AEMO has considered alternative processes such as determining counterfactuals for either carbon intensity or market price outcomes, that is, run "what-if" scenarios based on AEMO's pre-dispatch. This type of arrangement was assessed as computationally complex and expensive, which would

not be commensurate with the scale and frequency that AEMO expects to be operationally enabling these services<sup>10</sup>.

AEMO considers that the proposed guardrails are the most efficient way of addressing stable voltage waveform obligations and meets the AEMC's intent that the initial stages of implementation should avoid unnecessary complexity.

AEMO considers these guardrails allow AEMO's application of the enablement stable voltage waveform principles to be clearly understood and implemented in an efficient and timely manner.

### 3.2.4. Proposed stable voltage waveform guardrails

The following guardrails have been developed in consultation with TNSPs to allow for a simple and transparent approach to meeting AEMO's obligations under NER 4.4A.4(d) and support the TNSPs central remediation obligations under the Efficient management of system services under S5.1.14(b). AEMO proposes to apply these guardrails when assessing initial enablement of stable voltage waveform services.

#### **Guardrail 1: Power system efficiency: No minimum dispatch (MW) enablement**

AEMO considers that minimising impacts of system strength service enablement on dispatch will contribute to avoiding a significant adverse effect on power system efficiency. To this end, AEMO proposes to only consider services which do not have a minimum dispatch value for enablement to meet the stable voltage waveform requirement.

This guardrail will ensure that enablement of system strength services to reduce or remove constraints on dispatch of IBR will only impact dispatch outcomes via the increased dispatch of IBR, and not via displacement of other generation due to minimum dispatch of the system strength service.

AEMO does not see a need to develop what if scenario analysis or perform multiple runs of pre-dispatch to understand the potential consequence of an enablement on the portfolio of dispatched entities and market price to avoid a significant adverse impact on efficiency.

#### **Guardrail 2: Power system efficiency: Consider operationally enabling services procured for the purpose of central remediation**

AEMO understands that TNSPs, when procuring services to meet the efficient levels of system strength under NER S5.1.14(b), generally have the objective of procuring sufficient services to support dispatch of IBR that, at the time of connection, have elected to pay for the central system strength remediation charge.

AEMO considers that this TNSP objective aligns with AEMO's obligation to avoid a significant adverse impact on power system efficiency, under NER 4.4A.4(d)(2) when enabling these services.

AEMO acknowledges that enablement of system strength services to meet the efficient level may, in some scenarios, increase dispatch of other IBR due to the physical nature of the power system and other TNSP considerations. AEMO's expectation is that the procurement of the service should have the general intention of supporting dispatch of IBR paying the central remediation charge.

This guardrail seeks to align enablement of system strength services to reduce or remove system strength constraints on dispatch of IBR paying for central system strength remediation.

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<sup>10</sup> Operationally enabled refers to contracts that are not 'always on' contracts.

In the operational timeframe, AEMO is not proposing to consider the cost of enabling services to meet the stable voltage waveform requirement (outside of any least-cost prioritisation of multiple services that can meet the same need), as this is considered by TNSPs at the time of procuring these services. This aligns with the process of enablement to meet the minimum system strength requirement.

AEMO expects to receive limits advice from the TNSP that identifies under what conditions IBR is to be curtailed due to the absence of stable voltage waveform services and confirmation that these services have been procured to meet their obligations for system strength services under NER S5.1.14(b).

To avoid a significant adverse impact on efficiency, AEMO does not see a need to develop what-if scenario analysis or perform multiple runs of pre-dispatch to understand the potential market benefit of reducing constraints on IBR and perform a cost benefit analysis of enablement.

### **Guardrail 3: Power system emissions: Only enabling low emission system security services**

AEMO considers that only enabling a system security service that is not directly powered by a fuel with a carbon dioxide intensity index that is greater than the NEM's maximum Carbon Dioxide Equivalent Intensity Index (CDEII)<sup>11</sup> value in the previous 12 months is a simple way to meet the requirement to avoid a significant adverse effect on power system emissions.

To avoid a significant adverse impact on emissions, AEMO does not see a need for what-if scenario analysis or multiple runs of pre-dispatch (to understand the likely impact on emissions intensity) in the operational timeframe. This guardrail looks to ensure significant adverse impacts on emissions are avoided.

### **Guardrail 4: Prioritise power system security: enable stable voltage waveform daily for pre-established periods of time**

AEMO considers it necessary to minimise the number of manual operational activities in the control room to ensure that there is no risk to the focus on secure power system operation. Enablement for stable voltage waveform requirements will be performed on a reasonable endeavours basis.

To achieve this outcome, AEMO is proposing to assess the stable voltage waveform gap (if any) and enable services (at least) once a day. This gap assessment will consider services currently enabled for the minimum system security requirements regarding system strength. Any stable voltage waveform gap will be analysed against the least cost stable voltage waveform services available and enablement instructions for required services will be entered into AEMO's Security Services Management (**SSM**) tool and sent out to participants. These instructions will appear as firm to providers at the IEI (initially 4 hours).

To optimise the coverage of stable voltage waveform gaps under a single daily enablement protocol, AEMO is proposing to initially establish a four (4) hour minimum enablement duration for system strength services that meet the stable voltage waveform requirement. The minimum enablement duration will be reviewed at least annually and published on AEMO's website.

If a TNSP believes that the enablement period creates an unacceptable cost for their service and is unwarranted then AEMO will discuss this matter with the TNSP to agree to an alternative enablement time based on analysis by the TNSP that supports this, that is, demonstrates that any IBR constraint due to stable voltage waveform requirements will be of shorter duration. AEMO will also consider a process where manual enablement is

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<sup>11</sup> See <https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/market-operations/settlements-and-payments/settlements/carbon-dioxide-equivalent-intensity-index>.

performed following a TNSP request to manage control room manual processing time and shorter enablement durations.

AEMO assumes TNSPs will consider the approach summarised above when contracting for stable voltage waveform services.

In circumstances where enablement of system strength services is required to support IBR dispatch, AEMO expects that TNSPs will provide limits advice. This advice will include the relationship of system strength services procured to support dispatch of specific IBR units. Where a process does not involve a TNSP requesting enablement of these services, AEMO intends to use this advice to create control room tools that will guide the manual enablement in accordance with the enablement principles, power system conditions and guardrails proposed.

### Questions

2. Do you agree that Guardrails 1 and 2 are an efficient way of avoiding a significant adverse effect on power system efficiency. If not, what alternative guardrails would you propose? Is the proposed drafting in the Procedure 5.1.1 appropriate or too restrictive? Please explain your viewpoint.
3. Regarding Guardrail 2, do you align with AEMO's understanding of the general intention for enablement of system strength services to meet the stable voltage waveform requirement? If not, please provide your perspective on the suitability of Guardrail 2 and supportive reasoning.
4. Do you agree that Guardrail 3 is an efficient way of avoiding a significant adverse effect on power system emissions? Do you think the maximum NEM Carbon Dioxide Equivalent Intensity Index (CDEII) value in the previous 12 months is the appropriate emissions ceiling? If not, what alternative guardrails would you propose?
5. Do you agree that Guardrail 4 is a pragmatic and cost-efficient means for AEMO to make enablement decisions to meet the stable voltage waveform requirement, whilst prioritising its obligations to maintain a secure power system? Do you think 4 hours minimum is adequate? And if not, what would be a reasonable approach?

### 3.2.5. Enablement process for stable voltage waveform

A manual enablement approach for stable voltage waveform follows the following steps:

- AEMO provides a daily forward view for possible enablement of stable voltage waveform.
- The control room receives advice that IBR is being constrained by stable voltage waveform requirements and enables a service accordingly.

AEMO will typically only assess for a stable voltage waveform gap and enable services to meet that gap once a day. This means that ongoing automated scheduling for the minimum system strength requirement will assume stable voltage waveform enablement instructions are firm (regardless of whether the IEI has been reached or not). If the enabled stable voltage waveform service also contributes to meeting the minimum system strength requirement this will decrease any minimum security requirements gap that would otherwise have occurred.

AEMO is aware that, due to the size and variation in services offered and different mechanisms by which they are enabled (stable voltage waveform manually and once a day, minimum requirement automated half hourly

solution), it is possible that the most cost effective or efficient enablement outcome is generally, but not always, achieved. For example, a minimum requirements gap may be fulfilled by a service that would also fulfill the stable voltage waveform gap had the gaps been assessed and enabled for at the same time. AEMO considers these circumstances will occur infrequently. AEMO will monitor for these types of outcomes and work to minimise their impact should they become a frequent and material occurrence.

AEMO views ‘always on’ service agreements as the most practicable and straightforward means to meet the stable voltage waveform requirements. Broad adoption of this style of service would have the benefit of reducing complex interactions between scheduling to meet the minimum system security requirements, and to meet stable voltage waveform requirements. Additionally, ‘always on’ style arrangements would appear more conceptually aligned with the purpose of these services, as services used to support connection and dispatch; and broadly aligned with the technical nature of service provision from technologies being considered to provide such services.

### Questions

6. Do you agree that ‘always on’ service provision is an effective way of meeting stable voltage waveform requirements? If not, what concerns do you have with this approach?

## 3.3. Removal of cost threshold

### 3.3.1. Current cost threshold approach

In the current Procedures, AEMO introduced a cost threshold, above which issued enablement instructions will be cancelled and replaced to achieve a lower cost schedule. This cost threshold was included based on the following.

#### Lowest system security service cost

The enablement principle under NER 4.4A.4(a) requires AEMO to use reasonable endeavours to enable the lowest total cost combination of system security services.

The two factors that contribute to the cost of enablement of system security services are the volume of service required to meet a gap and the cost of services.

Under the automated process planned for release 1.1, a security service scheduler containing an intertemporal linear programming solver will be implemented to resolve minimum system security requirement gaps of system strength and inertia at least cost. It will take into account the amount of services required and provided, activation lead time (dynamic), minimum dispatch (dynamic), and availability (dynamic).

AEMO may mitigate the cost of multiple activations for an asset by extending an enablement instruction so that services are provided for longer periods of time but overall achieve the lowest cost outcome for when they are required.

Latest available pre-dispatch pricing will be used to estimate the energy revenue associated with enablement of each service, as the energy price cannot be known prior to enablement.

### Closest system security service enablement time

The enablement principle under NER 4.4A.4(b) requires AEMO to use reasonable endeavours to enable system security services as close as practicable to the relevant trading interval and not more than 12 hours in advance.

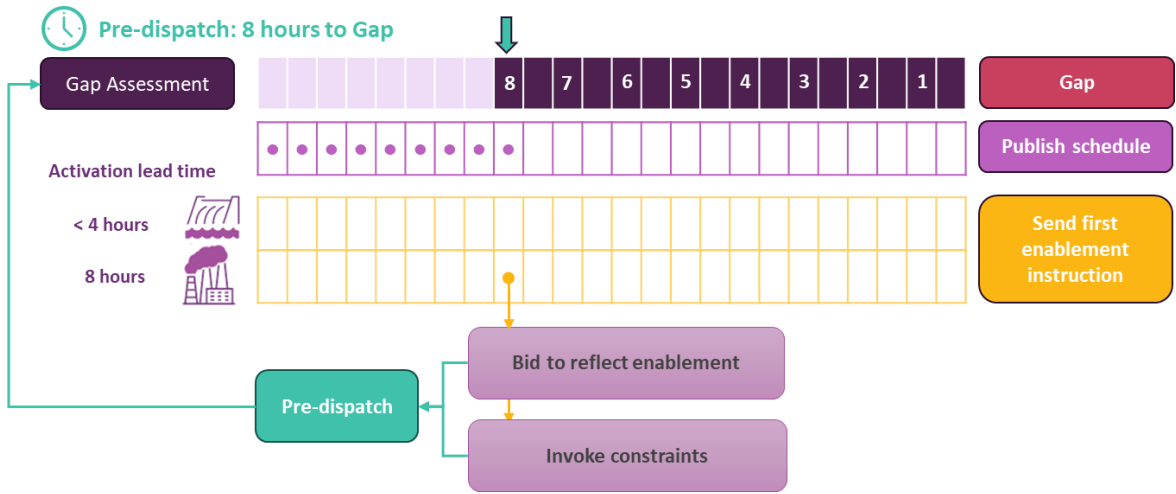
For automated security service enablement processes AEMO proposed to:

- commence issuing enablement instructions:
  - the IEI, that is, four hours before the start of a system security gap, or
  - to meet the activation lead time if greater than IEI, or
  - immediately, if a gap is identified to occur in less than four hours, and
- issue new or amended instructions if system conditions change:
  - as soon as practicable before the start of the new or amended instruction which can include:
    - an update to the start time and end time of an enablement, or
    - a cancellation of an enablement (which may involve the payment of any activation payment for which the activation lead time has passed), and
  - in the case of a lower cost solution being identified, only if the threshold cost saving for the forecast cost saving is met.

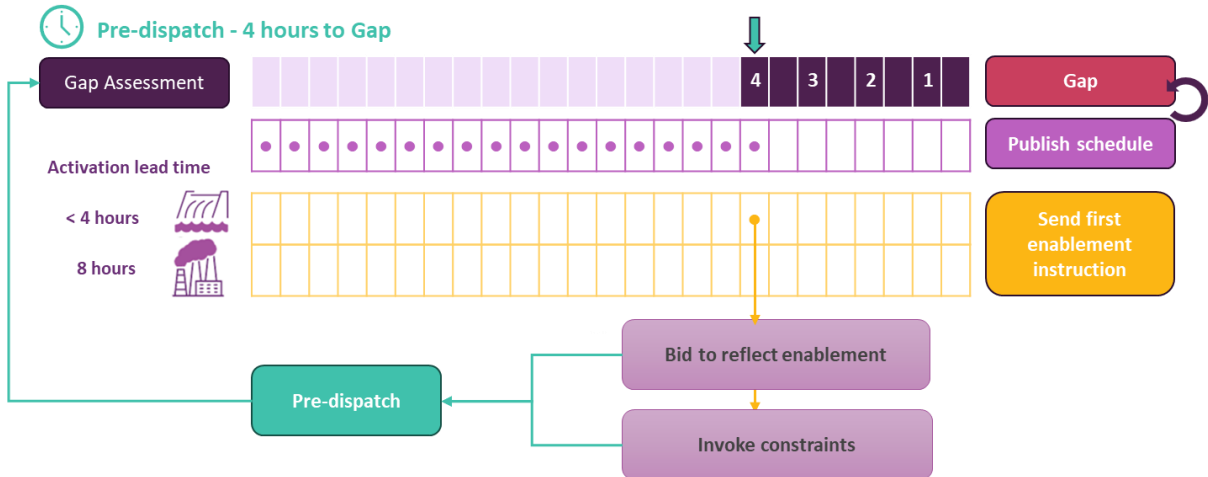
AEMO's approach was designed to prioritise power system security, increase transparency for stakeholders, minimise cost and avoid frequent short-term changes to enablement instructions.

Pre-dispatch will incorporate Provider energy bids and associated constraints (reflecting their minimum dispatch where applicable) ahead of the enablement timeframe (the greater of the initial enablement instruction window, or the activation lead time). If the system security gap is identified less than four hours in advance then the enablement timeframe will be the time between identification and forecast eventuation of the gap. The proposed timing is illustrated in Figure 2.

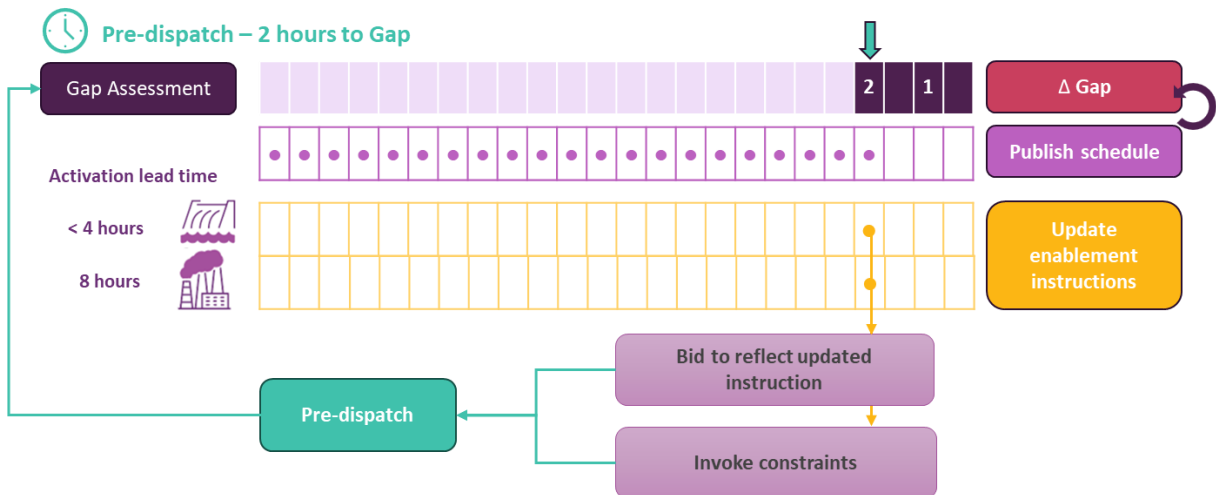
Figure 2 Illustration of schedule, enablement and enablement update timings.



Note: a gap in eight hours' time requires the services of a thermal plant with an eight-hour lead time. The thermal plant is enabled eight hours prior to the gap and bids into the NEM Dispatch Engine (NEMDE) accordingly.



Note: the gap, now in four hours time, requires the services of plant with lead times less than four hours. All remaining enablement instructions are issued and enabled plant bid into NEMDE accordingly.



The gap, now in two hours time, has changed in size requiring an update to enablement instructions. All enablement instruction updates are issued and enabled plant bid into NEMDE accordingly

### 3.3.2. Proposed approach

In developing detailed requirements for the solution described above, and the manner in which a cost threshold might be evaluated, AEMO has determined that it is not possible to assess the cost of an alternative schedule to meet a system security services gap and determine if a cost threshold has been met without unreasonable complexity and cost. This is due to the following:

- The issuance of an enablement instruction results in constraints and updated bids from providers being consumed in pre-dispatch. This fundamentally changes the pre-dispatch solution.
- The forecast gap and schedule next assessed by the scheduler is based on outcomes from pre-dispatch which have been fundamentally changed.
- There is no easy way to remove the impact of the enablement instructions that have been sent from pre-dispatch to understand what pre-dispatch outcomes would otherwise be.

To determine if a gap exists and if a lower cost schedule is available to meet it the following would be required:

- a second version of pre-dispatch without the enablement instruction related constraints and bids,
- a second run of the scheduler to determine if a gap exists in the second version of pre-dispatch and to establish a new schedule to compare the previous schedule against, and
- a comparison of the two schedules for the purpose of identifying the materiality of any lower cost solution.

Given the above, AEMO is proposing an approach that removes the cost threshold and considers a sent enablement instruction as firm. As illustrated in Figure 2, enablement instructions are sent at the activation lead time, the initial enablement instruction time (four hours), or immediately. At this time, they will not be changed except under the following circumstance:

- the instruction needs to be changed (not cancelled) to cater for a new or extended gap, or
- power system security requires a change or cancellation.

This approach is also congruent with stakeholder feedback trying to minimise unnecessary cancellations.

#### Questions

7. Do you agree that removal of the cost threshold and firming of the security enablement instructions is an appropriate approach given the complexity of catering for a cost threshold?
8. Do you consider that four hours is a suitable IEI? If not, what timing would you propose and why?

## 3.4. Treatment of dispatchable plant with multiple units in commercial operation

### 3.4.1. Current approach to commercial operation

In its final determination on the Procedures consultation in June 2025 AEMO stated:

*The enablement principles under NER 4.4A.4 require AEMO to use reasonable endeavours to ensure lowest cost enablement solutions and to only enable when services are required.*

*In meeting these principles, AEMO does not believe it appropriate to pay enablement for a service from an asset that makes a commercial decision (potentially facilitated by an activation payment) to increase its dispatch above the minimum level required to meet an enablement instruction and provides that service as a byproduct of commercial operation. Where an action must be taken to provide a service from an asset, regardless of online status or dispatch level, AEMO considers it reasonable to enable and pay for that service. In these scenarios commercial operation is identified by dispatch above the minimum dispatch level.*

The current Procedures (Table 4 Key assumptions in determining a system security services gap, Section 3.4.3) includes the following assumption listed in Table 1.

**Table 1 Key commercial operation assumptions**

Issue	Assumption
<p><b>Spot market operation and enablement</b></p> <p>An enabled asset that is a market scheduled production unit that decides to bid above a minimum dispatch target is moving into “commercial operation” in favour of security service enablement and will cease to be paid under their security service contract for the period which they are operating commercially</p>	<ul style="list-style-type: none"> <li>• An asset that moves from system service enablement to commercial operation using the same capacity/energy will cease to be paid but will continue to be enabled and must provide the service until the end of the enablement period.</li> <li>• This assumption does not apply to assets, such as a battery, which can provide a service without dispatching or consuming energy as a byproduct of enablement, that is, do not have a minimum dispatch target and are not compensated for minimum dispatch through energy revenue payments.</li> </ul>

AEMO has not changed its position on commercial operation and when it is and is not appropriate to pay for a service. However, in discussion with TNSPs, it has become clear that the assumption included in the Procedures creates an unintended consequence, described below, if the asset has multiple generating units. This consequence needs to be addressed for the effective operation of the Procedures.

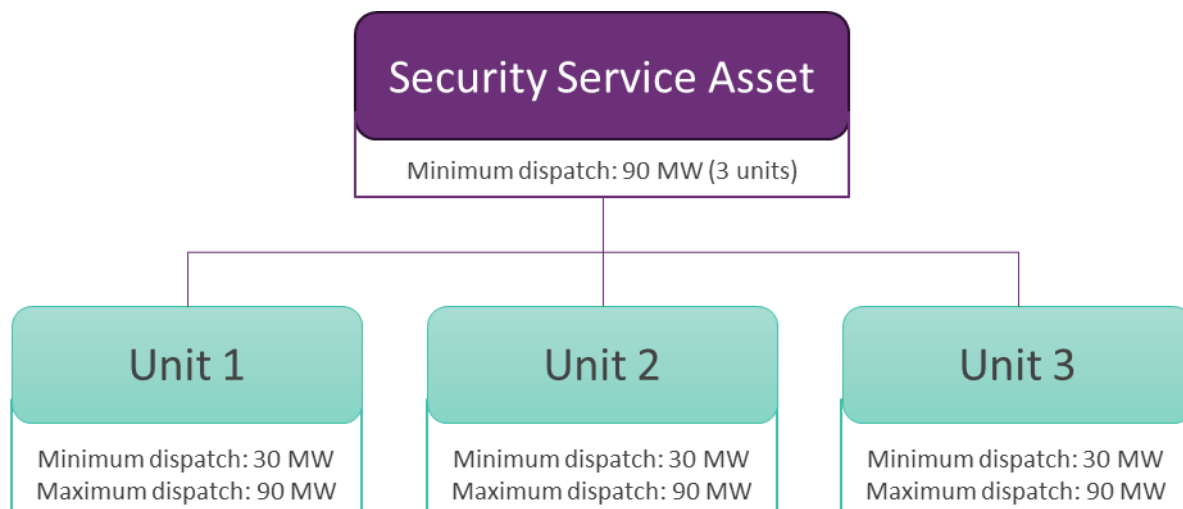
**Single unit security service assets**

A security service asset with a single unit will provide the full amount of system strength or inertia by operating at its minimum dispatch level. AEMO can identify when a security service asset with a single unit enters commercial operation through its bid availability, that is, if the availability is greater than the minimum dispatch level, at which time AEMO will consider the asset unavailable for security service enablement. If the asset is already enabled when it enters commercial operation then the obligation to meet the enablement by returning to the minimum dispatch level is maintained should the asset choose to cease commercial operation.

**Multiple unit security service assets**

Where a security service asset has multiple units then it is the number of units that are online that impacts the level of system strength or inertia being provided to the grid. When these types of assets move into commercial operation it is often not possible for AEMO to identify how many units will be used to meet bid availability. This means that additional services could be provided through enablement, regardless of the commercial operation of the asset. This issue is illustrated in Figure 3.

Figure 3 Units available for enablement in an asset with multiple units



Bid availability	Units to meet availability	Available for enablement	Assumed in operation	Assumed for enablement
0 MW	0	3	0	3
60 MW	1 or 2	2 or 1	1	2
90 MW	1, 2 or 3	2 or 1 or 0	1	2
120 MW	2 or 3	1 or 0	2	1
210 MW	3	0	3	0

### 3.4.2. Proposed approach to commercial operation for multi-unit assets

Given the scenarios presented in Figure 3, it is not appropriate for AEMO to assign commercial operation restrictions to assets with multiple units based solely on the minimum dispatch of the asset or the minimum dispatch of the individual units. The scenarios require AEMO to make an assumption regarding the number of units that will be operating commercially to meet the bid availability level. As such, AEMO will assume the minimum number of units required to meet the availability are in commercial operation and that other units are available for enablement unless indicated by the Provider as unavailable through the market portal. This approach will ensure that AEMO does not limit the ability of additional services to be enabled by overestimating the system security services available to the market through commercial operation.

It is worth noting that these assumptions are for the purpose of AEMO’s automated scheduler only. The scheduler will make assumptions on the pre-enablement levels of inertia and system strength (and hence any gap) from those units that are operating commercially and dispatched online based on the bid availability and dispatch targets in pre-dispatch. In practice, a TNSP may negotiate a system security services contract that only compensates for additional units being brought online to meet the enablement instruction. For example, in the scenario in Figure 3 where the bid availability is 90 megawatts (MW) and AEMO enables a further two units, if

the Provider has all three units on commercially then the TNSPs contract may not require payment, as no action has been required.

### Questions

9. Given AEMO's established position on system security service asset in commercial operation, do you consider the approach to assets with multiple units reasonable?

## 3.5. New approach to notifying market in the event of an IT systems outage

Section 3.3 of the current Procedures describes the fallback mechanism that AEMO will follow when reverting to manual enablement of system security services. This involves the issuance of a market notice.

AEMO has reviewed the processes by which the market is informed of IT system outages and considers that if there is an impact where participants must change their process for real time power system operation as part of the fallback mechanism, AEMO will issue a market notice.

In cases where there is an impact to participants due to a failure of IT systems, an IT Incident Notification will be issued.

### Questions

10. Do you see any reason why AEMO should change its standard process for notifying the market of an outage to an IT system outage?

## 3.6. Clarification of services enabled by NER 4.4A.1 and enablement process

Section 3.1 and 3.2 in the Procedures describes system security services that are either enabled automatically or manually, while Section 5.1.2 of the Procedures sets out the specific process for efficient system services.

Section 3.6 of the Procedures identifies system security services that may require enablement through a process other than 4.4A.1 and therefore not covered by the Procedures.

Table 2 clarifies if the system security services are covered by NER 4.4A.1 and whether they are enabled manually or automatically. The automation settings reflect capabilities available in ISF release 1.1, with AEMO planning further automation in future releases.

**Table 2 Clarification of system security services**

Service	Enabled under NER 4.4A.1	Covered by Security Enablement Procedure	Enablement process
<b>NSCAS</b>	Enabled under NER 4.4A.1	Covered by the Security Enablement Procedure	Manual enablement process described in Section 3.2 of the Procedures
<b>TNSP Procured Minimum System Security Services</b>	Enabled under NER 4.4A.1	Covered by the Security Enablement Procedure	Automated process described in Section 3.1 of the Procedures, unless it cannot be scheduled within the automated solution, which will then follow the manual enablement process described in Section 3.2 of the Procedures
<b>TNSP Procured Efficient System Security Services</b>	Enabled under NER 4.4A.1	Covered by the Security Enablement Procedure	Manual enablement process, described in Section 5.1.2 of the Procedures
<b>Transitional Services</b>	Under NER 3.11.11(1)(2) AEMO may require a transitional service to be enabled through a process other than under NER 4.4A.1	Where the enablement process for a transitional service is not enabled under NER 4.4A.1, the enablement process will be described in the relevant system security services agreement.	If applicable, enablement will follow the manual enablement process described in Section 3.2 of the Procedures

### 3.7. Amendments to enhance the clarity of the Procedures

AEMO proposes to make a number of minor and administrative amendments to the Procedures to improve clarity and usability. These changes are intended to enhance the readability of the document, remove ambiguity, and ensure the Procedures align with the NER and AEMO’s operational processes. The updates do not alter the intent or operation of the Procedures but instead provide clearer guidance to stakeholders and support consistent application across the industry.

## 4. Proposed effective date

The proposed effective date of the updated Security Enablement Procedures is 4 November 2026.

## 5. Summary of issues for consultation

At a high level, AEMO is proposing the following changes to the Procedures:

- an updated approach to enablement for stable voltage waveform,
- removing the cost threshold at which an enablement instruction will be replaced with a lower cost option,
- a new set of assumptions for plant with multiple units when determining if the plant is in commercial operation, and
- amendment to the approach for market notification if the automated enablement system has an outage

Submissions may be made on any matter relating to the proposal discussion in this consultation paper. AEMO would welcome comment and feedback on the following matters listed in Table 3.

**Table 3 Summary of issues for consultation**

Section	Questions
1. Stakeholder consultation process	1. What specific areas would you like more in-depth material or information from AEMO on?
3.2. New approach to enabling for Stable Voltage Waveform	<p>2. Do you agree that Guardrails 1 and 2 are an efficient way of avoiding a significant adverse effect on power system efficiency. If not, what alternative guardrails would you propose? Is the proposed drafting in the Procedure 5.1.1 appropriate or too restrictive? Please explain your viewpoint.</p> <p>3. Regarding Guardrail 2, do you align with AEMO's understanding of the general intention for enablement of system strength services to meet the stable voltage waveform requirement? If not, please provide your perspective on the suitability of Guardrail 2 and supportive reasoning.</p> <p>4. Do you agree that Guardrail 3 is an efficient way of avoiding a significant adverse effect on power system emissions? Do you think the maximum NEM Carbon Dioxide Equivalent Intensity Index (CDEII) value in the previous 12 months is the appropriate emissions ceiling? If not, what alternative guardrails would you propose?</p> <p>5. Do you agree that Guardrail 4 is a pragmatic and cost-efficient means for AEMO to make enablement decisions to meet the stable voltage waveform requirement, whilst prioritising its obligations to maintain a secure power system? Do you think 4 hours minimum is adequate? And if not, what would be a reasonable approach?</p> <p>6. Do you agree that 'always on' contracts would be an effective and simple way of meeting stable voltage waveform requirements in the short term? If not, what concerns do you have with this approach?</p>
3.3. Removal of cost threshold	<p>7. Do you agree that removal of the cost threshold and firming of the security enablement instructions is an appropriate approach given the complexity of catering for a cost threshold?</p> <p>8. Do you consider that four hours is a suitable IEI? If not, what timing would you propose and why?</p>
3.4 Treatment of dispatchable plant with multiple units in commercial operation	9. Given AEMO's established position on system security service asset in commercial operation, do you consider the approach to assets with multiple units reasonable?
3.5 New approach to notifying the market of an enablement system outage	10. Do you see any reason why AEMO should change its standard process for notifying the market of an outage to an IT system outage?

## Appendix A. Glossary

Term or acronym	Meaning
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
IBR	Inverter-based resource/s
Inertia Requirements Methodology	<a href="https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/system_security_planning/inertia-requirements-methodology-v2-0.pdf">https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/system_security_planning/inertia-requirements-methodology-v2-0.pdf</a>
Initial Enablement Instruction (IEI)	The standard number of hours prior to a security service gap that an asset which does not have an activation lead time greater than the IEI is sent an enablement instruction
ISF Rule	National Electricity Amendment (Improving security frameworks for the energy transition) Rule 2024
NEMDE	NEM Dispatch Engine
NEO	National electricity objective
NER	National Electricity Rules
NSCAS Description and Quantity Procedure	<a href="https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/system_security_planning/nscas-description-and-quantity-procedure-v3-0.pdf">https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/system_security_planning/nscas-description-and-quantity-procedure-v3-0.pdf</a>
Procedures	Security Enablement Procedures
Proposal	This consultation paper and the draft Procedures that accompany it
Provider	Provider of system security services (a TNSP or a third party service provider procured by TNSP or AEMO)
System strength requirements methodology	<a href="https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/system-strength-requirements/system-strength-requirements-methodology.pdf">https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/system-strength-requirements/system-strength-requirements-methodology.pdf</a>
TNSP	Transmission network service provider