



Constraint Formulation Guidelines – ISF Rule Consultation

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 proposed amendments to the Constraint Formulation Guidelines (**proposal**) under National Electricity Rules (NER) 3.8.10(c). The standard rules consultation procedure is described in NER 8.9.2.

AEMO is consulting on two changes as required for the National Electricity Amendment (Improving security frameworks for the energy transition) Rule 2024 No. 9 (**ISF Rule**) commencing 2 December 2025 and the National Electricity Amendment (Integrating price-responsive resources into the NEM) Rule 2024 No. 24 (**IPRR Rule**) commencing 23 May 2027.

The proposed changes for the ISF Rule includes an added section for security service constraints.

The proposed changes for the IPRR Rule is adding the new term “voluntarily scheduled resources” and changing the minimum threshold for left-hand side factors to 0.15 from 0.07.

The detailed sections of this consultation paper include more information on the proposal and AEMO’s reasons for making it. A suggested draft of the Constraint Formulation Guidelines reflecting the proposal is published with this consultation paper to provide context.

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 by **5:00pm (Melbourne time) on 8 May 2025**.

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, which can be found 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. 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. We 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.

Contents

Explanatory statement and consultation notice	3
1. Stakeholder consultation process	5
2. Background	6
2.1. Context for this consultation	6
2.2. NER requirements	6
2.3. The national electricity objective	6
3. Proposal discussion	7
3.1. Description and effect of proposal	7
3.2. How the proposal meets the objectives	9
3.3. Proposed effective date	9
4. Drafting for proposed changes	10
Appendix A. Glossary	11

1. Stakeholder consultation process

As required by the National Electricity Rules (**NER**) clause 3.8.10(c), AEMO is consulting on changes to the Constraint Formulation Guidelines (**proposal**) in accordance with the standard rules consultation procedure in NER 8.9.2.

Note that this document uses terms defined in the NER, which are intended to have the same meanings. A glossary of additional terms and abbreviations in this paper are located 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	Indicative Dates
Meeting with TNSPs regarding proposed constraint formulations	20 February 2025 (completed)
Consultation paper published	7 April 2025 (completed with this publication)
Submissions due on consultation paper	8 May 2025
Draft report published	Expected 6 June 2025
Submissions due on draft report	Expected 8 July 2025
Final report published	Expected 4 August 2025

2. Background

2.1. Context for this consultation

This consultation is to propose amendments to the Constraint Formulation Guidelines to reflect the National Electricity Amendment (Improving security frameworks for the energy transition) Rule 2024 No. 9 commencing 2 December 2025 and the National Electricity Amendment (Integrating price-responsive resources into the NEM) Rule 2024 No. 24 commencing 23 May 2027.

2.2. NER requirements

Under NER 3.8.10(c), AEMO must, in accordance with the Rules consultation procedures, amend network constraint formulation guidelines, to address the principles set out in clause 3.8.10(c)(1) to (4).

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. Proposal discussion

3.1. Description and effect of proposal

3.1.1. Security service / inertia constraints

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 change¹. The determination introduced the National Electricity Amendment (Improving security frameworks for the energy transition) Rule 2024 (ISF Rule) to improve market arrangements for security services. The ISF Rule evolves existing frameworks with the aim of ensuring sufficient security services are provided as the power system continues to transition to higher penetrations of inverter-based resources (IBR).

The enablement of security services under the ISF Rule commences 2 December 2025 and must be conducted in accordance with the Security Enablement Procedures that are to be published by 31 August 2025.

On 20 February 2025, AEMO met with TNSPs to discuss the formulation for inertia and system strength constraints and how it will align with network limits advice. AEMO also discussed the progress on the contracts for system security services and if there were any outstanding requirements for network service providers.

AEMO has proposed updates to the Constraint Formulation Guidelines (CFG) in a new Section 6.4 for security service constraints. This section proposes the security service constraint equations that will be applied to the system security services scheduler to allow for scheduling of inertia or system strength combinations. These are not applied in NEMDE or PASA but applied through the security service scheduler. Similarly to other constraint equations, these proposed formulations allow for flexibility in the methodology. AEMO commits to providing worked examples prior to market trials. The system security services scheduler will be implemented in December 2025.

Proposed formulation

Inertia

$a \times \text{Generator / synchronous condenser } 1 \text{ (Plant Status)} + \dots +$

$b \times \text{Generator / synchronous condenser } n \text{ (Plant Status)} \geq \text{RHS}$

Where the Security Service is an on/off status for the generator or synchronous condenser (represented as a 1 or 0). “a” and “b” are the inertia value of generator or synchronous condenser in MW seconds.

Security Service

$a \times \text{Generator / synchronous condenser } 1 \text{ (Plant Status)} + \dots +$

$b \times \text{Generator / synchronous condenser } n \text{ (Plant Status)} \geq \text{RHS}$

Where the Security Service is an on/off status for the generator or synchronous condenser (represented as a 1 or 0). “a” and “b” are the factors on each variable.

¹ <https://www.aemc.gov.au/sites/default/files/2024-04/Final%20Rule%20-%20in%20mark%20up.pdf>

These do not work like existing constraint equations and the solver only needs to satisfy a group of constraints for each region and not all constraint equations in the solver.

In addition to the general form each Security Service constraint equation includes two attributes:

- Region Identifier: The NEM Region to which this requirement applies. This is a mandatory attribute.
- Grouping Identifier: An optional grouping attribute to identify a group of constraints that represent a valid of combination of in-service assets.

In assessing whether the Security Service is sufficient in a region the logic with constraint equations and these attributes is:

The Security Service requirement in a Region is met if both conditions are met:

1. All of the constraints in that Region without a grouping identifier are satisfied AND
2. At least one of the identified groups within that Region is satisfied, where a group is defined as satisfied if all constraint equations within that group are satisfied.

3.1.2. Changes to the LHS threshold

AEMO is currently consulting on the Congestion Information Resource (CIR), with the final CIR due to be published in July 2025². The CIR provides information, in a cost effective manner, to NEM participants that enables an understanding of network congestion patterns and projections of market outcomes in the presence of network congestion. During feedback from stakeholders during the initial stage of this consultation, AEMO was provided with submissions from stakeholders discussing the original change in 2010 to the minimum threshold for left-hand side factors to 0.07. AEMO undertook to review this threshold and whether it was still appropriate in 2025.

AEMO conducted analysis with 2025 system normal constraint equations to determine the impact of changing the threshold particularly on power system security, operating margins and negative residues. Using AEMO's dispatch training simulator 3 scenarios were tested - (1) current (do nothing approach), (2) medium size threshold (0.15) and (3) high threshold (0.4). The results from the analysis indicated that the medium factor threshold of 0.15 will reduce the large impact on interconnectors and generators with small factors as well as reduce negative residues (as key constraints such as N>>NIL_33_34, N^NIL_X5_xxx, Q>>NIL_BCCPxxx). There was little to no impact observed on operating margins or on for managing power system security.

AEMO's initial review of the high threshold change is that the Murraylink runback scheme logic in the constraint equations would not work, and the PEC Stage 1³ impact would not be included in a number of constraint equations. This would make it difficult for AEMO to manage security in and around Buronga/Red Cliffs area. It is also possible that the operating margins used in the constraints would need to be increased to manage these issues⁴. During the simulation AEMO also observed very

² <https://www.aemo.com.au/consultations/current-and-closed-consultations/2024-congestion-information-resource-guidelines>

³ <https://www.projectenergyconnect.com.au/index.html>

⁴ Note - operating margins can increase if the units that are removed from the LHS still have an impact on line(s) flow the constraint thus which needs to be accounted for in the operating margin – likely increasing them. For more information see: https://www.aemo.com.au/-/media/files/electricity/nem/security_and_reliability/congestion-information/2016/confidence_levels_offsets_and_operating_margins.pdf

different dispatch and pricing in Victoria and South Australia, as well as security issues in South Australia that did not occur in the other simulations.

AEMO is therefore proposing to change the minimum threshold for left-hand side factors to 0.15 from 0.07.

3.1.3. Addition of voluntarily scheduled resources

On 19 December 2024, the AEMC made a final determination in the National Electricity Amendment (Integrating price-responsive resources into the NEM) rule change⁵, which will allow aggregated CER, distributed energy resources and price-responsive loads to be scheduled and dispatchable in the NEM⁶.

AEMO have also proposed updates to include the new term *voluntarily scheduled resources* as per the IPRR Rule terminology.

Questions

- **Are there any comments, feedback or unidentified consequences from the proposed security service constraints?**
- **Is there any further feedback or concerns on how AEMO's selected LHS coefficient threshold are applied to constraint equations?**

3.2. How the proposal meets the objectives

AEMO considers that this Proposal meets the NEO with respect to reliability and security of supply of electricity and the reliability, safety and security of the national electricity system. AEMO anticipates that the proposal will not involve material costs for market participants, with the substantial change relating to the security service constraint equations applied to the system security scheduler to allow for scheduling of inertia or system strength combinations.

3.3. Proposed effective date

The proposed effective date of the determination is 2 December 2025. This date coincides with the commencement of the relevant provisions of the ISF rule change.

AEMO will be publishing a transition plan for the LHS factor thresholds to allow the constraints to be available for 2 December 2025 (for the ISF rule commencement date). This plan will be available with the final consultation paper.

Components of this proposal related to the IPRR rule will be effective from 1 June 2026.

⁵ <https://www.aemc.gov.au/rule-changes/integrating-price-responsive-resources-nem>

⁶ Currently, unscheduled price-responsive resources are not able to participate in dispatch, meaning they are not effectively integrated into the NEM's planning and operation functions and are not visible to AEMO or the electricity market. Inability to participate in dispatch and energy markets, therefore, restricts these currently unscheduled price-responsive resources from contributing to the real-time matching of supply and demand and from potential value streams accessible in the market that could enhance benefits to consumers who own CER, such as regulation frequency control ancillary services (FCAS).

4. Drafting for proposed changes

To help interested parties respond to this consultation paper, AEMO has published a change marked version of Constraints Formulation Guideline incorporating the drafting AEMO is proposing in this consultation.

For proposed changes to the CFG to include the security service constraints, AEMO has included drafting in a new Section 6.4.

Marked changes to the minimum threshold for left-hand side factor, from 0.07 to 0.15, and inclusions for IPRR Rule terminology are also included in the draft CFG.

The change-marked version is available with this publication.

Appendix A. Glossary

Term or acronym	Meaning
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
CER	Consumer energy resources
CFG	Constraint Formulation Guidelines
CIR	Congestion Information Resource
IBR	Inverter based resource
IPRR	Integrated Price Responsive Resources
ISF	Improved Security Frameworks
LHS	Left Hand Side
MW	Megawatt
NEM	National Electricity Market
NEMDE	NEM dispatch engine
NEO	National Electricity Objective
NER	National Electricity Rules
PASA	Projected assessment of system adequacy
PEC	Project Energy Connect
RHS	Right Hand Side
System security services scheduler	The system security services scheduler is to allow for scheduling of inertia network service or system strength service combinations
TNSP	Transmission network service provider